

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL PRINCIPAL  
BENCH, NEW DELHI**

**ORIGINAL APPLICATION NO. 1063 of 2024**

**IN THE MATTER OF:**

Tribunal on its own motion SUO MOTU based on the news item published in The Times of India dated 04.08.2024 titled, "Pollution control board reels in ghost nets "

**Index**

<b>Sr. No.</b>	<b>Particulars</b>	<b>Page No.</b>
<b>1.</b>	<b>Reply</b> on behalf of Central Pollution Control Board, (CPCB) i.e. Respondent no. 1 in compliance to Hon'ble NGT order dated 14.08.2024 in O.A No. 1063/2024.	1-8
<b>2.</b>	<b>Annexure- I</b> A copy of Guidelines issued by CPCB on September, 2024.	9-30
<b>3.</b>	<b>Annexure- II</b> A copy of report filed by CPCB on 10.02.2023 in O.A No. 251/2022	31-110
<b>4.</b>	<b>Annexure- III</b> A copy of action plan related to micro plastics.	111-117
<b>5.</b>	<b>Annexure- IV</b> A copy of Hon'ble NGT order dated 14.08.2024 in O.A No. 1063/2024.	118-121

  
(Filed by Adv. Vikrant Niles Goyal)  
On behalf of Central Pollution Control Board

**Place: Delhi**

**Dated: 30.10.2024**

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

**ORIGINAL APPLICATION NO. 1063 of 2024**

**IN THE MATTER OF:**

Tribunal on its own motion SUO MOTU based on the news item published in The Times of India dated 04.08.2024 titled, "Pollution control board reels in ghost nets "

**REPLY ON BEHALF OF THE RESPONDENT NO. 1, THE CENTRAL  
POLLUTION CONTROL BOARD (CPCB)**

1. That, Hon'ble NGT (PB) vide order dated 14.08.2024 in the instant matter has sought the reply from answering Respondent herein i.e. CPCB over the instant matter. Thereby, the reply is made in succeeding paragraphs.
2. That, CPCB is a statutory Board constituted under Section 3 of The Water (Prevention and Control of Pollution) Act, 1974. It performs the functions under The Water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) Act, 1981 and The Environment (Protection) Act, 1986.
3. The issue has been raised in the Newspaper article published in the Times of India dated 04.08.2024 with respect to plastic pollution caused due to ghost net in the marine environment and its impact of water bodies. The following issues have been raised in the article:

- A. As per the article, ghost nets are the torn and discarded fishnets that drift underwater, and strangle and kill fish, coral reefs, turtles and



other organisms and then they become marine debris. It further states that the HDPE (high-density polyethylene) or nylon fishnets wear out every six months to a year. These nets also lead to algal growth if they strangle coral reefs.

- B. Health Risks:** Accumulated, torn fishnets create sanitation issues, particularly during the monsoon season, posing health risks to nearby communities.

#### 4. CPCB's response

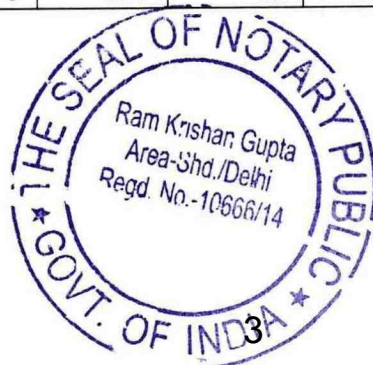
**Issue A:** As per the article, ghost nets are the torn and discarded fishnets that drift underwater, and strangle and kill fish, coral reefs, turtles and other organisms and then they become marine debris. It further states that the HDPE (high-density polyethylene) or nylon fishnets wear out every six months to a year. These nets also lead to algal growth if they strangle coral reefs.

- (i) **Plastic waste management in 13 Coastal States/ UTs:** As per information provided by SPCB/PCC in the Annual Report for plastic waste Management, 2022–23 by thirteen State Pollution Control Boards / Pollution Control Committees (SPCBs/PCCs) located in coastal areas, a total of 23.7 lac tonnes of plastic waste was generated in the States/ Union Territories (UTs). The details of the same are given in Table 1. Further, as per information available on Centralized EPR Portal for Plastic Packaging, details of plastic waste processed is has also been provided in **Table 1**.



Table 1: Overview of Plastic waste management in 13 Coastal States/ UTs:

Sr. No	State	PW generated (TPA) in 22-23	No. of registered PW recycling units	No. of Other processing units (other than Recycling Units)	Total No. of PW processing Units	PW recycled (T)	PW processed other than recycled (T)	Total Qty of Plastic Waste processed
1.	Andaman & Nicobar	744	0	0	0	0	0	0
2.	Andhra Pradesh	64339	42	5	47	4867	168212	173079
3.	DDDNH	14227	27	0	27	54366	0	54366
4.	Goa	29441	6	0	6	263	0	263
5.	Gujarat	271575	426	10	436	458690	0	458690
6.	Karnataka	360781	94	5	99	377717	14	377731
7.	Kerala	71000	16	0	16	66535	0	66535
8.	Lakshadweep	1358	0	0	0	0	0	0
9.	Maharashtra	395759	218	14	232	601714	26668	628382
10.	Odisha	53795	1	1	2	0	64151	64151
11.	Puducherry	31087	15	0	15	3654	0	3654
12.	Tamil Nadu	782560	37	10	47	26837	119067	145904
13.	West Bengal	294789	17	0	17	38793	0	38793
Total		2371455	899	45	944	1633436	378112	2011548



- (ii) **Fishing Net Waste:** Based on the information received from respective SPCBs/PCCs, details of fishing net waste generated in five States /UTs is provided in Table 2.

**Table 2: Details of Fishing Net waste generation**

State	Quantity of Fishing Net Waste (tonnes per annum)
Puducherry	0.075
Goa	1.5
Odisha	17.51
Gujarat	800 - 1,000
Karnataka	7,342
Total	~8400

- (iii) **Guidelines for One-Time Financial Support for Establishing Recycling Plants & Machinery for Abandoned, Lost & Discarded Fishing Gears (ALDFG) and High littering Plastic Wastes in Coastal Areas**

In light of the estimated increase in ALDFGs and marine plastic litter in the coming years, there is need for additional waste management actions apart from ongoing measures:-

- Enabling reduced plastic waste and ALDFGs littering in the twelve Blue Flag certified beaches in the country, by facilitating establishment of plastic recycling facilities and thus, encouraging channelization of plastic waste from collection to recycling.
- Reducing usage of virgin plastics, encouraging and promoting a circular economy



Guidelines were issued in September 2024 and are issued are enclosed at **Annexure-I**

**Issue B: Health Risks: Accumulated, torn fishnets create sanitation issues, particularly during the monsoon season, posing health risks.**

CPCB response: It is submitted that in compliance of Hon'ble NGT's order in O.A. No 251 of 2022, CPCB has filed report dated 13.02.2023. The report highlights widespread Micro plastics contamination across environments and organisms including biota. Micro plastics enters water primarily through sewage, wastewater, and surface runoff, persisting due to inadequate filtration in treatment systems and contributions from plastic infrastructure. Micro plastic is also prevalent in bottled water. Airborne Micro plastic poses inhalation risks in urban settings, while soil contamination occurs via plastic films and waste. Micro plastic has been found in human and biota samples, suggesting potential health impacts from ingestion and inhalation routes. However, presently there are no studies on the impacts of ingested micro plastics on human health. Submitted report is enclosed at **Annexure-II**. In compliance of NGT Directions rendered vide order dated 01.03.2023 in OA 251/2022, MoEF&CC has prepared an action plan, specifying activities related to micro plastics to be taken up by CPCB. The same has been taken on record by the Hon'ble Tribunal and the copy of action plan is at **Annexure-III**.

Micro plastic which is ultimately coming from various kind of plastics (may include ghost net also) has been found in human and biota samples, as mentioned in the above report However, presently there are no studies on the impacts of ingested micro plastics on human health.



5. That the answering respondent CPCB craves the leave of this Hon'ble Tribunal to file additional reply, in future, if required.
6. That, in the light of the above submissions, it is respectfully submitted that the answering respondent CPCB shall abide by any order(s) and/or direction(s) passed by the Hon'ble Tribunal in the instant case.



(Divya Sinha)  
Scientist 'F'

Central Pollution Control Board



BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI

ORIGINAL APPLICATION NO. 1063 of 2024

IN THE MATTER OF:

Tribunal on its own motion SUO MOTU based on the news item published in The Times of India dated 04.08.2024 titled, "Pollution control board reels in ghost nets "

AFFIDAVIT

I, **Divya Sinha** working as Scientist 'F' in Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi, the Respondent No. 1 in the above matter, do hereby solemnly affirm, declare on oath and state as under:-

1. That I, the deponent herein is authorized representative to represent the Respondent CPCB in the present case, and as such, I am well conversant with the facts and circumstances of the present case on the basis of the information derived from the official records, and hence, I am competent and authorized to verify, sign and swear this affidavit on behalf of the Respondent CPCB.
2. That the accompanying reply may be read part and parcel of the present affidavit.
3. That the accompanying reply has been drafted and filed under my instructions and authority the contents thereof are true and correct on the basis of the record maintained during ordinary course of business of CPCB and available records and documents and the contents of the same are read over and explained to me and are not repeated herein for the sake of brevity.



DEPONENT



दिव्या सिन्हा / Divya Sinha  
वैज्ञानिक 'एफ' / Scientist 'F'  
केंद्रीय प्रदूषण नियंत्रण बोर्ड  
Central Pollution Control Board  
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार)  
(Mo Environment, Forest & Climate Change, Govt. of India)  
परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली-110032  
Parivesh Bhawan, East Arjun Nagar, Delhi-110032

## VERIFICATION

Verified at New Delhi on this day of 29 OCT 2024 2024 that the contents of the above reply are correct and true on the basis of the records of the case as mentioned in the day-to-day affairs of the CPCB. Nothing has been concealed therefrom or mis-stated.

## DEPONENT

दिव्या सिन्हा / Divya Sinha  
 वैज्ञानिक 'एफ' / Scientist 'F'  
 केंद्रीय प्रदूषण नियंत्रण बोर्ड  
 Central Pollution Control Board  
 (पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार)  
 (Mo Environment, Forest & Climate Change, Govt. of India)  
 परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली-110032  
 Parivesh Bhawan, East Arjun Nagar, Delhi-110032



ATTESTED  
 NOTARY  
 DELHI (INDIA)

29 OCT 2024

# GUIDELINES FOR ONE-TIME FINANCIAL SUPPORT FOR ESTABLISHING RECYCLING PLANTS & MACHINERY FOR ABANDONED, LOST & DISCARDED FISHING GEARS AND HIGH LITTERING PLASTIC WASTES IN COASTAL AREAS

Annexure-I



**In Pursuit of Clean Environment**

**CENTRAL POLLUTION CONTROL BOARD**

**Ministry of Environment, Forest & Climate Change**

**Government of India**

**September, 2024**



**GUIDELINES FOR ONE-TIME FINANCIAL SUPPORT FOR ESTABLISHING RECYCLING PLANTS & MACHINERY FOR ABANDONED, LOST & DISCARDED FISHING GEARS AND HIGH LITTERING PLASTIC WASTES IN COASTAL AREAS**

**TABLE OF CONTENT**

<b>S. No.</b>	<b>Title</b>	<b>Page No.</b>
<b>A.</b>	<b>Background</b>	<b>1</b>
<b>B.</b>	<b>Objectives</b>	<b>4</b>
<b>C.</b>	<b>Details Of Plastic Recycling Facilities</b>	<b>4</b>
<b>D.</b>	<b>Eligibility Criteria</b>	<b>6</b>
<b>E.</b>	<b>Inclusions &amp; Exclusion</b>	<b>7</b>
<b>F.</b>	<b>Process Of Application, Evaluation &amp; Approval</b>	<b>7</b>
<b>G.</b>	<b>Financing Structure</b>	<b>9</b>
<b>H.</b>	<b>Purpose-Bound Fund Condition</b>	<b>10</b>
<b>I.</b>	<b>Oversight Mechanism</b>	<b>11</b>
<b>J.</b>	<b>Other Terms &amp; Conditions</b>	<b>15</b>

## **Guidelines for One-Time Financial Support for Establishing Recycling Plants & Machinery for Abandoned, Lost & Discarded Fishing Gears (ALDFGs) and High littering Plastic Wastes in Coastal Areas**

### **A. BACKGROUND**

Marine litter is defined as any persistent, manufactured or processed solid material discarded, disposed or abandoned in the marine and coastal environment<sup>1</sup>. Plastic is the most dominant component in marine litter<sup>2</sup>, comprising of fishing nets, plastic packaging and other items that are either deliberately discarded or accidentally lost into the sea or onto beaches. Additionally, plastic materials can be carried indirectly to the sea through rivers, sewage, stormwater or winds<sup>3</sup>. The increasing quantity of plastic waste, combined with the slow degradation of plastic litter, has become a significant environmental concern along the country's extensive coastline.

The fishing sector is known to be a substantial contributor to marine litter in the oceans<sup>4</sup>. With a large number of fleet, India is the third largest fish producing country worldwide<sup>5</sup>. Plastic is used in the fishing industry for a variety of purposes such as fishing nets, rope, monofilament lines, buoy, floater, traps<sup>6</sup>, etc. The primary way by which commercial fishing generates plastic litter is through Abandonment, Loss, or Discard of Fishing Gear (ALDFGs), which is a significant threat to marine biodiversity. ALDFGs are generally made of non-biodegradable synthetic materials, such as High Density Polyethylene (HDPE), Polyethylene Terephthalate (PET), Polyamide/ nylon (PA), polypropylene (PP), etc. that persist in the marine environment

<sup>1</sup> <https://www.imo.org/en/MediaCentre/HotTopics/Pages/marinelitter-default.aspx#:~:text=Marine%20litter%20consists%20of%20items,%3B%20or%20deliberately%20left%20by>

<sup>2</sup> Sivadas, S.K., Mishra, P., Kaviarasan, T., Sambandam, M., Dhineka, K., Murthy, M.R., Nayak, S., Sivyier, D. and Hoehn, D., 2022. Litter and plastic monitoring in the Indian marine environment: A review of current research, policies, waste management, and a roadmap for multidisciplinary action. *Marine Pollution Bulletin*, 176, p.113424.

<sup>3</sup> <https://www.unep.org/topics/ocean-seas-and-coasts/regional-seas-programme/marine-pollution#:~:text=Marine%20litter%20consists%20of%20items,at%20sea%20in%20bad%20weather>

<sup>4</sup> <https://plasticoceans.org/wp-content/uploads/2017/11/UNEP-research.pdf>

<sup>5</sup> <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1910415#:~:text=India%20is%20the%20third%20largest,12.12%20Million%20Tonnes%20from%20Aquaculture>

<sup>6</sup> Daniel, D.B., Thomas, S.N. Abandoned, Lost and Discarded Fishing Gear from the Fishing Sector of Kerala, India. *Ocean Sci. J.* 57, 398–410 (2022). <https://doi.org/10.1007/s12601-022-00074-y>

for years or decades<sup>7</sup>. In India, fishing nets are made from these synthetic fibers in different forms, such as braided or twisted<sup>8</sup>.

The quantity of fishing net waste varies in States/ UTs depending on factors such as the size of the fishing industry, the length of the shoreline, and local waste management practices. Further, they are generally replaced every 1-3 months influenced by factors such as rocks, damage due to boats, machine boat impact and interference from crabs and other species.

According to the information submitted in the Annual Report, 2022–23 by thirteen State Pollution Control Boards / Pollution Control Committees (SPCBs/PCCs) located in coastal areas, a total of 2.37 million tonnes of plastic waste was generated in the States/ Union Territories (UTs). According to the data from the Centralized Extended Producer Responsibility (EPR) portal for plastic packaging, a total of 1.63 million tonnes of plastic waste had been recycled till August 2024 in eleven States/ UTs of coastal area<sup>9</sup>. There are total 899 number of plastic waste recycling units in these states/UTs, with the highest number in Gujarat (426), followed by Maharashtra (218) and Karnataka (94).

Based on the information received from respective SPCBs/PCCs, the estimates suggest that quantity of fishing net waste is 75 kg per annum in Puducherry, about 1.5 tonnes per annum in Goa, 17.51 tonnes per annum in Odisha, 800 to 1,000 tonnes per annum in Gujarat, and 7,342 tonnes per annum in Karnataka. The variation of quantity of collection of fishing net may be due to variation in marine demographics, coastal length, fishing intensity, fishing practice, etc. Presently, various actions are underway to manage ALDFGs generated in the country, which includes establishing designated collection centers (e.g., Kasimedu in Chennai, Veraval and Porbandar in Gujarat, Udupi in Karnataka), setting up recycling facilities (e.g., Madurai in Tamil Nadu, Porbandar in Gujarat, Puducherry), and others. However, in light of the estimated increase in ALDFGs and marine plastic litter in the coming years, there is need for additional waste management actions apart from ongoing measures.

---

<sup>7</sup> Gunasekaran, K., Mghili, B., Bottari, T., Mancuso, M. and Machendiranathan, M., 2024. Ghost fishing gear threatening aquatic biodiversity in India. *Biological Conservation*, 291, p.110514.

<sup>8</sup> <https://krishi.icar.gov.in/jspui/bitstream/123456789/78825/1/Assam%20Training%20Manual-6-408-164-169.pdf>

<sup>9</sup> The data for recycling of plastic packaging for the state of Odisha and the Andaman & Nicobar Islands is not available

The Blue Flag Beach Criteria<sup>10</sup> specifies that the beach must comply with the Blue Flag requirements which includes no floating plastics, providing facilities for separation of recyclable waste materials at the beach and local authority/beach operator must indicate facilities for the recycling of waste. If no such facilities exist, the applicant must apply for a dispensation from this criterion. Further, Blue Flag encourages all local authorities/beach operators to promote recycling and waste separation at the beach, even if the community does not have a local recycling facility. In India, there are following twelve Blue Flag certified beaches located across six States and three Union Territories.

1. Shivrajpur, Devbhumi Dwarka District, Gujarat
2. Ghoghla (Diu) Dadara Nagar Haveli and Daman & Diu
3. Padubidri, Udupi District, Karnataka
4. Kasarkod, Karwar District, Karnataka
5. Kappad, Kozhikode District, Kerala
6. Kovalam, Kanchipuram District, Tamil Nadu
7. Eden, Puducherry District, Puducherry
8. Rushikonda, Vishakhapatnam District, Andhra Pradesh
9. Golden, Puri District, Odisha
10. Radhanagar (Havelock), Andaman & Nicobar Islands
11. Minicoy Thundi Beach, Lakshadweep
12. Kadmat Beach, Lakshadweep

*(Source: PIB press release July 21 2022, October 26, 2022)*

In order to facilitate and enhance control of pollution in coastal areas, these guidelines have been developed to provide one-time financial support to project proponents towards capital costs of setting up recycling plant & machinery for Abandoned, Lost & Discarded Fishing Gears and other plastic waste with high littering potential in coastal areas. The units can be single plastic, multi-plastics or multi-plastics with nylon recycling facilities The objective is to protect and conserve

<sup>10</sup> <https://beachawards.ie/wp-content/uploads/2021/05/Blue-Flag-Beach-Criteria-2021.pdf>

the marine ecosystem from plastic litter. The focus is on enhancing and establishing plastic waste recycling facilities in the twelve Blue Flag certified beaches having gaps/limited or non-existing infrastructure to improve waste management in these pristine regions.

## B. OBJECTIVES

1. Enabling reduced plastic waste and ALDFGs littering in the twelve Blue Flag certified beaches in the country, by facilitating establishment of plastic recycling facilities and thus, encouraging channelization of plastic waste from collection to recycling.
2. Reducing usage of virgin plastics, encouraging and promoting a circular economy

## C. DETAILS OF PLASTIC RECYCLING FACILITIES<sup>11,12</sup>

The plastic can be recycled through two process routes, mechanical and chemical recycling.

Mechanical Recycling – Mechanical recycling is generally a main method of plastic waste recycling, which involves processing of plastic waste into secondary raw materials without significantly altering the chemical composition of the material. The process involves the following steps:

1. Collection and Segregation: Plastic materials have varying densities, so they are separated using a flotation process.
2. Cleaning and Drying: Plastic waste must be thoroughly cleaned and dried.
3. Sizing (Grinding): The cleaned plastic waste is then ground into flakes. These flakes are fed into an extruder, where they are heated until molten and forced through a die to form continuous polymer strands.
4. Pelletizing: The strands are cooled with water and cut into pellets, resulting in reprocessed granules.

<sup>11</sup> <https://openknowledge.fao.org/server/api/core/bitstreams/f126ddd0-b423-430d-89c8-488667a9add9/content>

<sup>12</sup> Shanker, R., Khan, D., Hossain, R. et al. Plastic waste recycling: existing Indian scenario and future opportunities. *Int. J. Environ. Sci. Technol.* 20, 5895–5912 (2023). <https://doi.org/10.1007/s13762-022-04079-x>

5. Fabrication into end product: The reprocessed granules are used as raw materials to produce final products.

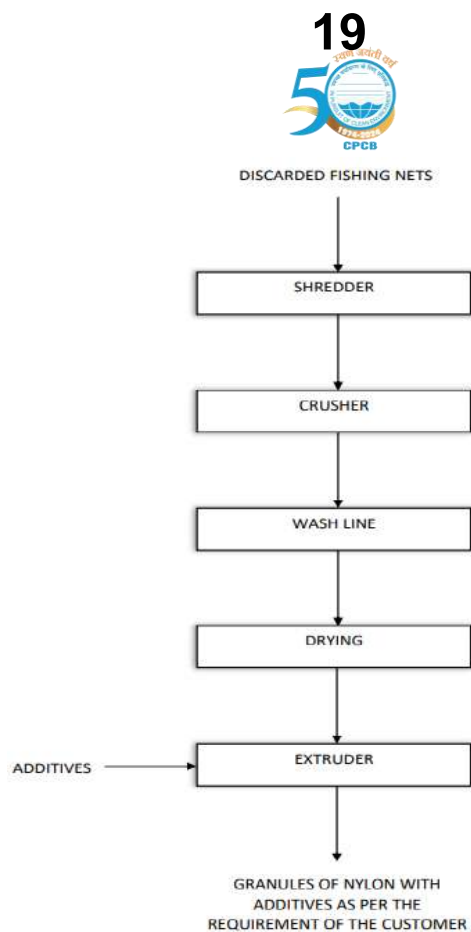
Chemical Recycling<sup>13</sup> – Chemical recycling is a process in which a plastic or polymer is broken down into its basic components, i.e. monomer. This process is called de-polymerization. The monomers may be used as raw materials for manufacturing a new polymer. There are various chemical recycling processes, such as pyrolysis and gasification, which converts plastic into gases, and hydrolysis and purification which breaks polymers into monomers and raw materials. The de-polymerization process reverses polymerization by breaking down plastics into their monomers or shorter fragments (oligomers). The resulting monomers are of comparable quality to those used in the original polymer production, making the recycled plastics nearly equivalent to virgin materials. However, de-polymerization is primarily effective for 'condensation' polymers such as PET and polyamides.

It is important to note that Nylon-6 is a commonly used polyamide for making fishing gear and nets. The process diagram of Nylon fishing net recycling facility is presented below (Figure 1). The challenge in recycling of the nylon fishing nets is the removal of contamination such as moisture, algae and sand in the nodes of the net. As nylon is sensitive to temperature variation during extrusion, temperature of 200 – 250°C is maintained. Thus, the fishnet recycling unit differs from plastic waste processing unit and machineries such as shredder, crusher, wash line and extruders are modified according to the requirement of nylon recycling. Also, drying process is a requirement for nylon recycling.

The plastic waste recycling facilities produce wastewater from washing lines. It is encouraged to install a closed loop effluent system to ensure reuse of the wastewater. Based on quantity and quality of effluent generated a typical Effluent Treatment Plant (ETP) may comprise screening & settling mechanism, anaerobic / aerobic treatment system and tertiary treatment units, as needed.

---

<sup>13</sup> <https://www.bpf.co.uk/plastipedia/chemical-recycling-101.aspx>



**Figure 1 – Process diagram of nylon fishing net recycling facility<sup>14</sup>**

#### **D. ELIGIBILITY CRITERIA**

1. New plastic waste recycling units for recycling of fishing gears/ nets and other plastic waste with high littering potential to be established by entities, entrepreneurs, or companies
2. The unit should have a valid Consent to Establish from concerned SPCB/PCC for establishing a plastic waste recycling unit.
3. The Unit located beyond Coastal Regulation Zone (CRZ) and permissible under local bylaws and extend regulations will be eligible for one-time financial assistance under CPCB Extended Producer Responsibility (EPR) funds including Environmental

<sup>14</sup> M/s. Sun Polymers, Shivaganga, Tamilnadu

Compensation as well as through Environmental Protection Fund<sup>15</sup> created under the Environmental (Protection) Act, 1986.

4. The unit should have its own valid land possession letter or lease agreement of minimum 10 years<sup>16</sup>.
5. Preference will be given to new plastic recycling units proposed to be located optimally closer to beach, harbor, fishing hotspots, high tourist footfall area and any other strategically important area where no restriction is imposed by any of the Government institution/body for setting up the unit.
6. Priority will be given to registered fishermen's societies interested in setting up fishing gear/ net recycling units.

#### **E. INCLUSIONS & EXCLUSION**

One-time financial assistance is only towards the plant and machinery cost which includes cost of washing line, grinder/ shedder/ crusher, drying, agglomerator, extruder and pollution control device (including Effluent Treatment Plant) as per regulatory requirements. Cost of land for setting up of aforementioned facilities including other civil and electrical works shall be borne by the proponent. However, no assistance will be provided for meeting O & M costs, or any other recurring expenses. Any financial liability that may rise due to time and cost over runs shall be borne by the proponent.

#### **F. PROCESS OF APPLICATION, EVALUATION & APPROVAL MECHANISM**

##### **a. Step 1 – Process of application & Screening by SPCB/ PCC**

The proponent shall submit completely filled application in the prescribed format (Annexure I) to the Member Secretary of the concerned SPCB/PCC of the coastal State / UT where the plastic waste recycling unit is proposed to be established. The application

---

<sup>15</sup> Section 16(3) (b) of the Environment (Protection) Act, 1986 amended through **The Jan Vishwas (Amendment of Provisions) Act, 2023**, states, “The Fund shall be applied for— the expenses for achieving the objects and for purposes of the Air (Prevention and Control of Pollution) Act, 1981(14 of 1981) and under this Act”;

The E(P) Act aims to provide for the protection and improvement of the environment and related matters

<sup>16</sup> Considering 03 years duration of the scheme and 07 years of continual operation of the plant.

form shall be accompanied with Financial Statement of the proponent for past three financial years<sup>17</sup> and land possession letter/ lease agreement.

A committee shall be constituted within the SPCB/PCC, chaired by the Member Secretary of the SPCB/PCC and comprising members from the State Coastal Zone Management Authority (SCZMA), Fisheries Department and relevant Urban Local Bodies. This committee will review the application and eligibility conditions, address issues related to prioritizing proposals in cases of competing demands, and resolve conflicts concerning the prioritization of applicants. Besides suggested committee members from the institutions/ Organizations, if registered fisherman society/association exists in the State/UT, representative from the same may be included as one of the members in the Committee.

The Project Proponent shall make a presentation to the Committee and additional details may be sought, if required. In the case of a favorable recommendation, Member Secretary, SPCB/PCC shall forward the application to CPCB along with the recommendation letter mentioning proposed recycling capacity, process type and estimated item-wise cost of machinery within 30 days of receipt of the application. SPCB/PCC shall ensure that proponent is fulfilling all essential regulatory conditions for setting up the plastic waste recycling unit, prior to forwarding the recommendation to CPCB. In case of unfavorable recommendation, the SPCB/PCC shall inform the same to the project proponent.

**b. Step 2 – Evaluation of application by Central Committee & Accord of Approval**

The applications and the recommendations of the respective SPCB/PCC shall be evaluated within 30 days of receipt from SPCB/ PCC by a Central Committee to be chaired by Member Secretary, CPCB and comprising representative (s) from National Coastal Zone Management Authority (NCZMA), National Centre for Sustainable Coastal Management (NCSC), Department of Fisheries and concerned official from CPCB. After evaluation, in case of favorable recommendations from the Central Committee, the proposal may be placed to the Competent Authority, CPCB, for approval for release of funds.

---

<sup>17</sup> Exemptions as per applicable regulation for eligible Startups and MSEs



## G. FINANCING STRUCTURE

The one-time financial assistance will be provided from CPCB Extended Producer Responsibility (EPR) funds including Environmental Compensation as well as through Environmental Protection Fund<sup>18</sup> created under the Environmental (Protection) Act, 1986.

### a. Quantum of financial support for capital expenditure for plants and machinery

Financial support will be provided as a one-time grant of either, Rs. 19 lakhs per TPD of production capacity or 40% of the capital cost of the plastic waste recycling plant and machinery, whichever is lower, subject to a maximum of Rs. 38 lakhs per proposal.

This is based on average estimated cost available from existing recyclers for installing plastic waste recycling machinery such as plastic scrap grinders, shredders, cutters, crushers, wash lines, dryers, agglomerators, extruders, and pollution control devices (including Effluent Treatment Plant).

For setting up nylon fishing gear/ net recycling plant, onetime financial support will be provided of either, Rs. 24 Lacs per TPD of production capacity, or 40% of the capital cost of nylon fishing gears/net recycling plant & machinery, whichever is lower, subject to a maximum of Rs. 48 lakhs per proposal.

A total of 25 units are planned to be established near Blue Flag certified beaches under the scheme, including 13 nylon fishing gear/net recycling units and 12 plastic waste recycling units.

### b. Cost sharing ratio – The cost shall be borne in the ratio of 40:60, by CPCB and project proponent, respectively. Proponent may avail financial grant from other schemes, however,

---

<sup>18</sup> Section 16(3) (b) of the Environment (Protection) Act, 1986 amended through **The Jan Vishwas (Amendment of Provisions) Act, 2023**, states, “The Fund shall be applied for— the expenses for achieving the objects and for purposes of the Air (Prevention and Control of Pollution) Act, 1981(14 of 1981) and under this Act”; The E(P) Act aims to provide for the protection and improvement of the environment and related matters

40% cost of total plant and machinery is required to be borne by the applicant, so as to ensure responsible ownership and operation of the unit.

**c. Mechanism of disbursement and the number of instalments**

After the accord of approval by Competent Authority, CPCB, the funds shall be transferred into the EPR account of the concerned SPCB/ PCC within 30 days. The first instalment shall be released only after ascertaining that the unit possesses a valid Consent to Establish and verification of the unit through a physical inspection by the concerned SPCB/PCC. The funds shall be released directly by SPCB/PCC into the proponent’s account as per the following installment schedule<sup>19</sup>,

- I. 40 % of the payment shall be released by SPCB/ PCC to the project proponent within 30 days of receipt of funds from CPCB
- II. 30% of the payment shall be released on submission of interim physical and financial progress reports
- III. 20% of the payment shall be released on commissioning of the unit
- IV. 10% of the payment shall be released only after operationalization of the unit

**H. PURPOSE-BOUND FUND CONDITION**

To ensure that the funds are used effectively and appropriately for their intended purpose, the proponent must submit Bank Guarantees (BG) in favour of the concerned SPCB/PCC, totaling the amount of financial support in four parts. The conditions for both the submission and release of bank guarantees at different stages of the installment schedule are outlined as below,

---

<sup>19</sup> As approved during 203<sup>rd</sup> Board Meeting of CPCB dated May 08, 2024, and suitably modified for present scheme

Submission of Bank Guarantees	Release of Bank Guarantees
BG 1 for 40% of the support amount to be furnished along with request for release of first installment	BG 1 and 2 will be released upon the issuance of a valid Consent to Operate by the concerned SPCB/PCC
BG 2 for 30% of the support amount to be furnished along with request for release of second installment	
BG 3 for 20% of the support amount to be furnished along with request for release of third installment	BG 3 will be released on generation of first invoice for the sale of product
BG 4 for 10% of the support amount to be furnished along with request for release of fourth installment	BG 4 will be released thereafter three months of production

## I. OVERSIGHT MECHANISM

### a) Scope of SPCBs/ PCCs

- Once sanctioned, SPCB/PCC shall monitor the progress of the project and ensure its timely completion.
- SPCB/ PCC shall submit stage wise completion/ commissioning report to CPCB. Based on satisfaction of completion of work, disbursement as per the instalment may be made by SPCB/PCC to the project proponent and shall intimate the same to CPCB.
- Post-commissioning, SPCB/PCC shall periodically monitor the plastic recycling unit to ensure that it is recycling plastic wastes collected from blue flag certified beach and fishing nets/ gears. It can also recycle other plastic wastes available and process waste from fishing net yarn subject to availability of the adequate recycling capacity. Additionally, SPCBs shall periodically monitor the unit to verify compliance to relevant provisions under the Plastic Waste Management Rules, 2016 including EPR guidelines (as applicable) and amendments from time to time.



- CPCB/SPCB/PCC shall have the powers of physical inspection of the units after its commercial operation to ensure effective implementation of the guidelines.
- SPCBs/PCCs shall have the authority to verify the relevant records at any time. If it is found that the conditions outlined in these guidelines or those imposed by the concerned SPCB/PCC are not complied with, or if there has been misuse of funds, the bank guarantee submitted by the proponent may be forfeited, and the amount deposited with the CPCB in CPCB-EPR account.
- Copy of the Annual Report (Annexure II) shall be forwarded by SPCB/ PCC to CPCB before 31st May of every year.
- The SPCBs/PCCs shall ensure that following conditions are adequately covered or addressed in the Consent to Operate issued to Fishing gear recyclers and Marine Plastic Waste Recycler,
  1. The unit shall be considered under orange category for the purpose of validity period of consent.
  2. The unit shall use only discarded fishnets, pre manufacture waste from fishnet manufacture industries and marine plastics waste as raw material.
  3. The unit shall maintain adequate ventilation and lights to maintain good working conditions.
  4. The workers shall be provided with adequate safety gears/personal protective equipment (PPEs).
  5. The unit shall ensure adequate fire extinguishing system.
  6. The unit shall treat and dispose domestic wastewater in line with consent condition. The trade effluent shall be recycled for washing/process purpose after necessary treatment. In case of need of disposal of excess treated trade effluent, the mode of disposal, applicable norms and required treatment facility shall be clearly prescribed in the consent.
  7. The conveyor system having potential for generation of fugitive emissions shall be covered with required enclosure.
  8. Agglomerators and extruders shall be provided with adequate suction hood connected with vent routed through charcoal column scrubber to treat the volatile emissions.
  9. There shall not be any flue gas or process gas generation from the process.
  10. The unit shall take adequate measures to control noise levels from its own source within the premises so as to maintain ambient air quality standards.



11. The unit shall maintain proper records of quantity of discarded fishnets, pre manufacture waste from fishnet manufacture industries and marine plastics used as raw material, processed and quantity of recycled product/granules sold. The records shall be submitted to CPCB and SPCB on half yearly basis.
12. The raw material shall be transported in dry condition so that leakage/seepage of leachate or liquid waste does not take place. Truck/lorries used for transportation of waste shall be properly covered with tarpaulins.
13. The unit shall obtain NOC from designated Authorities as per the prevailing Rules of the State in case the source of water is bore well/ground water.
14. The electromagnetic flow meters shall be installed at raw water intake, proper records and log books shall be maintained.
15. The electromagnetic flow meters shall be installed at inlet & outlet of ETP. Records or Logbooks shall be maintained for effluent generated, treated effluent recycled or reused; excess treated effluent disposed as per consent condition.
16. The unit should put up two sign boards (6x4 ft. each) at publicly visible places at the main gate indicating the products, effluent discharge standards, air emission standards, hazardous waste quantities and validity of CTO and exhibit the CTO order at a prominent place in the factory premises.
17. The solid waste generated, if any from the process/activity should be disposed in line with consent conditions or conditions imposed by local authority. The waste should not be dumped/thrown/littered or burnt.
18. The industry shall develop green belt all along the periphery to maximum extent possible and in the available vacant land.
19. The industry shall maintain the following records and the same shall be made available to the inspecting officers of the Board:
  - ✓ Daily receipt of discarded fishnets, pre manufacture waste from fishnet manufacture industries and marine plastics waste and daily production details.
  - ✓ Power/energy consumption details.
  - ✓ Log Books for pollution control systems.
  - ✓ Solid waste generated, recycled/disposed.
20. Other conditions can also be added as per local requirements.



### **b) Scope of CPCB**

- CPCB shall review the Annual Report submitted by SPCBs/ PCCs and may at any time direct withdrawal of financial support or forfeiture of the bank guarantee submitted by Project Proponent, if the terms and conditions of these guidelines have been violated or if there has been misuse of funds. In such case, the fund shall be deposited back to CPCB-EPR account.
- A dedicated portal shall be established for monitoring project progress, generating electronic annual reports, and managing the disbursement of funds including tracking of financial transactions.

### **c) Scope of Urban Local Bodies (ULBs)<sup>20</sup>**

ULBs shall establish and implement mechanisms for the collection, storage, and transportation of discarded fishing gears/nets and plastic waste from the 12 blue flag certified beaches. ULBs may collaborate with fishing communities, startups, civil society, and informal sector to develop effective collection and transportation systems, to ensure availability of wastes for the recycling units.

### **d) Monitoring Committee**

For effective monitoring of implementation of the projects sanctioned under this scheme following monitoring Committee shall be constituted at State/ UT level:

- 1) Official from Regional Office of SPCB (Regional Officer)
- 2) Official from Department of Fisheries
- 3) Official from Regional Directorate of CPCB (Not below the rank of Scientist B)

The Committee shall inspect the unit once in six months and submit the joint inspection report to SPCB/CPCB. The Committee shall verify records of raw material procured, processed and product sold. All pollution control measures shall also be verified to ensure proper functioning.

---

<sup>20</sup> Provisions under Rule 6 of the Plastic Waste Management Rules, 2016 (as amended)



## J. OTHER TERMS & CONDITIONS

- Applications will be considered on first-come-first-serve basis.
- Unit shall comply with conditions prescribed in the consent issued.
- Preference shall be given to proposals having agreements with local authorities, fishing communities, or any other agency for the assured availability of fishing nets/gears and plastic wastes from Blue Flag certified beaches.
- Preference will be given to proposals planning to install plant and machinery manufactured under 'Make in India' program.
- Machinery should be purchased and plant shall be made operational within 01 year of transfer of funds. Bills/ invoices shall be submitted to SPCBs/PCCs subsequently.
- CPCB shall have the powers to modify the guidelines in any manner as may be deemed necessary for its successful implementation and for removing any difficulties in its operationalization.
- There is no provision for retrospective funding. Units possessing Consent to Operate (CTO) dated prior to the issuance of these guidelines are ineligible for financial assistance under the scheme.
- In case of any dispute, the decision of Chairman, Central Pollution Control Board would be final.

**Annexure – I**

**APPLICATION FORM FOR ONE- TIME FINANCIAL ASSISTANCE FOR SETTING UP RECYCLING UNITS FOR FISHING NETS AND OTHER PLASTIC WASTE HAVING HIGH LITTERING POTENTIAL IN THE COASTAL AREAS**

**A. General Information**

1. Name of the Project Proponent:
2. Permanent/ registered address of the proponent:
3. Mobile number:
4. Email address:
5. Aadhar Number:
6. PAN Card:
7. GST Number:
8. Previous projects, if any, (attach relevant documents):

**B. Brief Description of the Recycling Facility proposed to be established**

1. Title of the proposed recycling facility:
2. Address and GPS coordinates of the location:
3. Distance from Coastal Regulation Zone and permissible areas as per local bylaws (in Km):
4. Any strategically important landmark near proposed facility (beach, harbor, fishing hotspots, high tourist footfall area or any other (mention travelling distance in Km):
5. Copy of land possession letter / lease agreement (attach):
6. Copy of financial statements for past three financial years:
7. Details of valid Consent to Establish (CTE) (attach document):
8. Production capacity (TPH):
9. Details of plant and machinery proposed to be installed and processing capacity of each machinery:
10. Item-wise estimated cost of plant and machinery (attach supporting document or price quotation):
11. Recycling Process flow chart:



12. Identified Source of Plastic Waste:
13. Potential market for selling the product:
14. Details of funding commitment received from other sources, if applicable (attach relevant documents):
15. Any agreements with local authorities, fishing communities, or any waste management agency for the assured availability of fishing nets/gears and plastic wastes from Blue Flag certified beaches (If yes, attach document):
16. Plant and machinery manufactured under 'Make in India' program (If yes, attach relevant document)
17. Attach copy of project proposal:

#### SELF DECLARATION

I .....(name), ..... (designation), ..... (name of the unit) hereby declare that all the information provided in the application form and supporting documents is true, accurate, and complete to the best of my knowledge and belief. I understand that any false information or misrepresentation may lead to the rejection of my application. I confirm that any financial support granted under this scheme will be utilized solely for the purpose of setting up and operating the aforementioned recycling unit, as detailed in the application.

.....

Signature

Name & Designation

Date & Place

#### NOTE

Please send the duly filled up Application Form to the Member Secretary of concerned SPCBs/PCCs, in hard or soft copy clearly marked as 'Application for Establishing Recycling Plants & Machinery for Abandoned, Lost & Discarded Fishing Gears (ALDFG) and High littering Plastic Wastes in Coastal Areas'.



## Annexure – II

### FORMAT FOR ANNUAL REPORT TO BE SUBMITTED BY SPCB/ PCC

*To be submitted to CPCB before May 31<sup>st</sup> of every year, for three years from sanctioning of the project(s)*

Name of Scheme: One- time financial assistance for establishing recycling plants & machinery for Abandoned, Lost & Discarded Fishing Gears (ALDFG) and High littering Plastic Wastes in Coastal Areas

1. For the Financial Year:
2. Report Date:
3. Name of State Pollution Control Board / Pollution Control Committee:
4. Project Title(s):
5. Project Proponent(s):
6. Details of fund received in FY:
7. Details of payment released in FY:
8. Unused balance in FY:
9. Machinery wise status of installation and commissioning, EPR registration status (as applicable) & Payment released for each unit:

S. No.	Name of unit	Details of plant & machinery installed	Operational Status	Payment released (Rs.)	EPR registration status

10. In case unit(s) is operational now, provide following details:

	<b>Targeted (as per installed production capacity)</b>	<b>Actual</b>	<b>Target for Next FY</b>
Plastic waste recycled (tonnes)			
Fishing gears/ fishing nets recycled (tonnes)			
Recycled plastic recovered (tonnes)			
Revenue generated from sale of product by the beneficiary unit(s) (Rs)			

Name of the Authorized Signatory from SPCB/ PCC

Designation

Date

Attachments: As needed



**Central Pollution Control Board**  
Ministry of Environment, Forest & Climate Change  
Government of India



Parivesh Bhawan, East Arjun Nagar, Delhi-110032



Website

<https://cpcb.nic.in/index.php>



**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,  
Principal Bench, New Delhi**

Original Application No. 251/2022

In re: News item published in The Hindu dated 29.03.2022 titled "Detecting microplastics in human blood"

Index

S. No.	Particulars	Page No.
1.	<b>Report</b> in compliance of order dated 05.04.2022 in OA No. 251/2022, In re: News item published in The Hindu dated 29.03.2022 titled "Detecting microplastics in human blood".	
2.	<b>Annexure-1:</b> A copy of Minutes of Meeting on "Committee Meeting in compliance of Hon'ble NGT order in the matter of O.A. No. 251 of 2022" with CIPET/ICMR /NCSCM held on April 19th, 2022.	
3.	<b>Annexure-2:</b> A copy of Hon'ble NGT order dated 05.04.2022.	



(Divya Sinha)  
Scientist E

Central Pollution Control Board  
Delhi-110032

Date: 10.02.2023

Place: Delhi

**CENTRAL POLLUTION CONTROL BOARD**  
**DELHI**

Date: 08.02.2023

**Report in the matter of Tribunal on its own motion SuoMotu based on the news item published The Hindu titled “Detecting Microplastics in human blood” dated March 29, 2022 (O.A. No. 251/2022)**

**A. BACKGROUND**

Vide order dated 05.04.2022 in aforesaid matter, Hon'ble NGT issued the following directions

*Para4: There is need for further studies, considering the studies already conducted, to be steered by the Committee comprising of CPCB, ICMR, Central Institute of Petrochemicals Engineering & Technology (CIPET), NCSCM, and any other expert institutions as required, under the Nodal coordination of CPCB. Such studies and recommendations/ suggestions may cover standards for safe environment, remedial steps to reduce menace of micro plastic and addressing other incidental issues. CPCB may incur expenditure on studies and other incidents out of Environmental Compensation funds*

**B. ACTION TAKEN REPORT**

Three meetings of the Committee members representing CPCB, ICMR, CIPET & NCSCM were held on April 19, July 27 & August 5, 2022 respectively through Video Conferencing. Issues related to microplastics were discussed during the Meetings. The Minutes of the Meetings are enclosed at Annexure I. Detailed assessment of the work done by individual organization as well as available information on Microplastics has been completed and the outcome of the same is enumerated below:

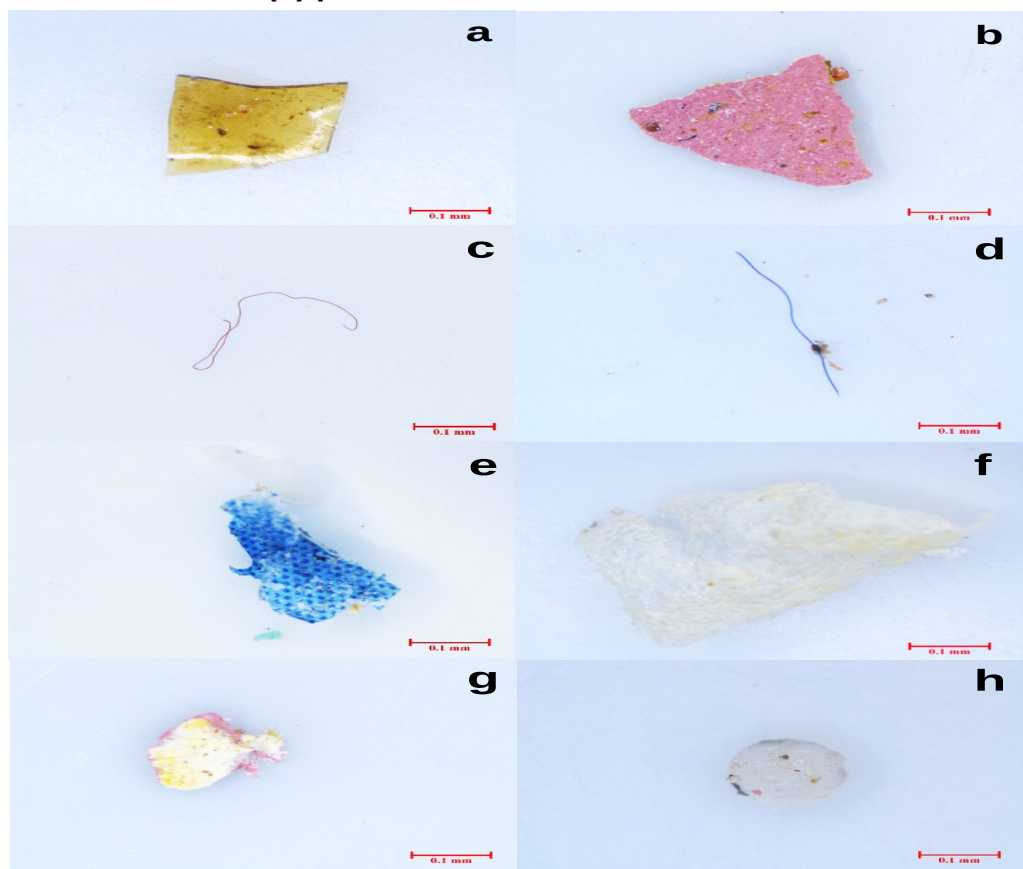
**1.0 About Microplastics**

Microplastics is used extensively to describe plastic particles with an upper size limit of 5 mm (UNEP). Occurrence of microplastics has been reported from oceans, sediments, surface water, ground water, wastewater, tap water, bottled water, air, food products, aquatic organisms, and human (Microplastics in Drinking Water WHO 2019). Based on their origin; microplastics can be categorized into primary and secondary microplastics. Primary microplastics are intentionally manufactured in size < 5 mm to be used in various applications such as cosmetics, clothing and other textiles, fishing nets, etc. (Mai et al.

2018). Secondary microplastics originate from the breakdown of discarded plastic waste by solar radiation, mechanical degradation, microbial action etc. (Rodrigues et al. 2018; Wagner and Lambert 2018).

These microplastic particles may be of various shapes such as fragments, pellets, beads, and fibres. (Figure1.1). Further classification of microplastics on the type of plastic and its density is given in Table 1.1

**Figure 1.1: Micrographs showing different types of microplastics: (a&b) fragments, (c&d) fibre/line, (e&f) film (g) foam and (h) pellet.**



**Table 1.1: Type & Density of Microplastics**

Common Polymers of Microplastics	Common applications	Specific Gravity
Polyethylene (PE)	Plastic bags, six-pack rings,	0.91-0.94

↑ Flo  
ati  
ng

	gear		
Polypropylene (PP)	Rope, bottle caps, gear, strapping	0.90-0.92	
Polystyrene (expanded) (PS)	Bait boxes, floats, cups	0.01-1.05	
Seawater		~1.02	
Polystyrene (PS)	Utensils, containers	1.04-1.09	Sinking
Polyvinyl Chloride (PVC)	Film, pipe, containers	1.16-1.30	
Polyamide or nylon	Gear, rope	1.13-1.15	
Polyethylene terephthalate (PET)	Bottles, strapping, gear	1.34-1.39	
Polyester resin + glass fibres	Textiles	>1.35	
Cellulose acetate	Cigarette filters	1.22-1.24	

## 2.0 Sampling & Analysis of Microplastics

There is currently no standard method for sampling and analysis of microplastics in the environment. ISO is currently working on the subject (WHO Report :Microplastics in Drinking Water: 2019)

Sampling and analysis of microplastics, based on available literature, involves the following three steps:

- a) Sampling;
- b) Sample extraction and isolation &
- c) Identification, characterization and quantification

### 2.1 Sampling

Microplastic samples can be acquired using trawl nets drawn across the surface of the water, or through collection of water samples from which the particles are extracted later.

### 2.2 Sample Extraction

Sample purification usually involves filtration, followed by some sort of extraction process such as density separation, in which samples are mixed with a liquid of defined density, allowing microplastic particles to float and heavier particles to sink. Further purification may require chemical or enzymatic methods to remove organic or inorganic contaminants (biofouling). The extent of the preparation is dependent on the nature of the samples: dirtier samples will require more preparation.

### 2.3 Analysis

### 2.3.1 Count of Microplastics

The simplest and the most common technique to quantify the microplastic particles is the optical microscopy where quantification is achieved through manual counting. Though this technique is simple, it poses limitations in terms of misidentification and reduced accuracy (underestimation (Loder et al. 2015) / overestimation (Lenz et al. 2015)). However, application of electron microscopic techniques, such as scanning electron microscopy can overcome this limitation up to some extent (Eriksen et al. 2013)

### 2.3.2 Chemical Composition

Two different approaches are available to determine the chemical composition: spectroscopic & thermoanalytical.

- **Spectroscopic methods:** Used to identify the specific chemical structure of polymers by comparing their absorption or emission spectra with reference spectra. Fourier transform infrared spectroscopy (micro FTIR) Fourier transform infrared spectroscopy and Raman spectroscopy are utilized for this purpose.
- **Thermo-analytical methods,** the sample is pyrolysed under inert conditions, so that specific decomposition products of the individual polymers can be analyzed. Pyrolysis-gas chromatography/mass spectrometry (GC/MS) can provide information on additives as well as the polymer

## 2.4. Sampling & Analysis Methods followed in India

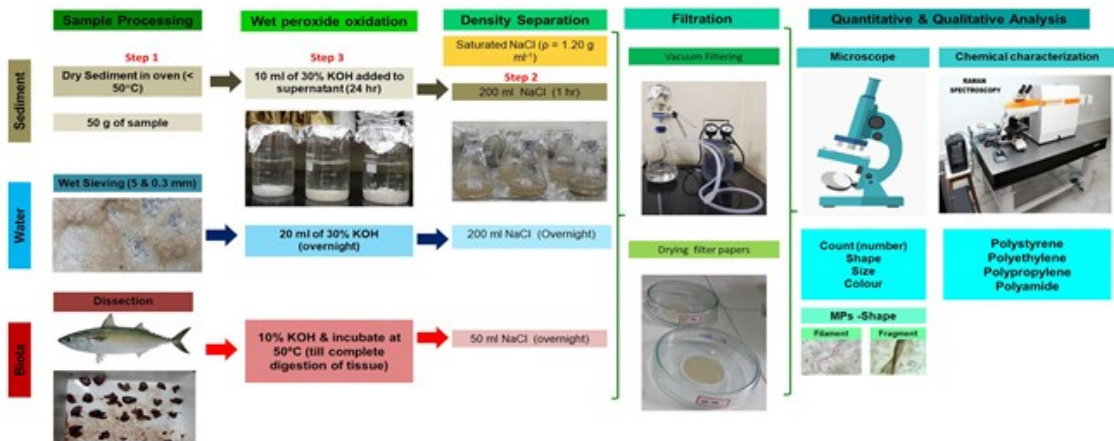
### 2.4.1 Ministry of Earth Sciences (National Center for Coastal Research (NCCR))

#### (a) Sampling Methods



(b) Sample Extraction & analysis

**Laboratory Analytical Protocol**



1. Wet oxidation (H<sub>2</sub>O<sub>2</sub>)
2. Density Separation (NaCl)
3. Filtration GF/F (0.7 µm)
4. Microscopic Analysis (count, shape, size, colour)
5. FT-IR/Raman: Chemical Analysis

2.4.2 CIPET

(a) Sample extraction techniques:

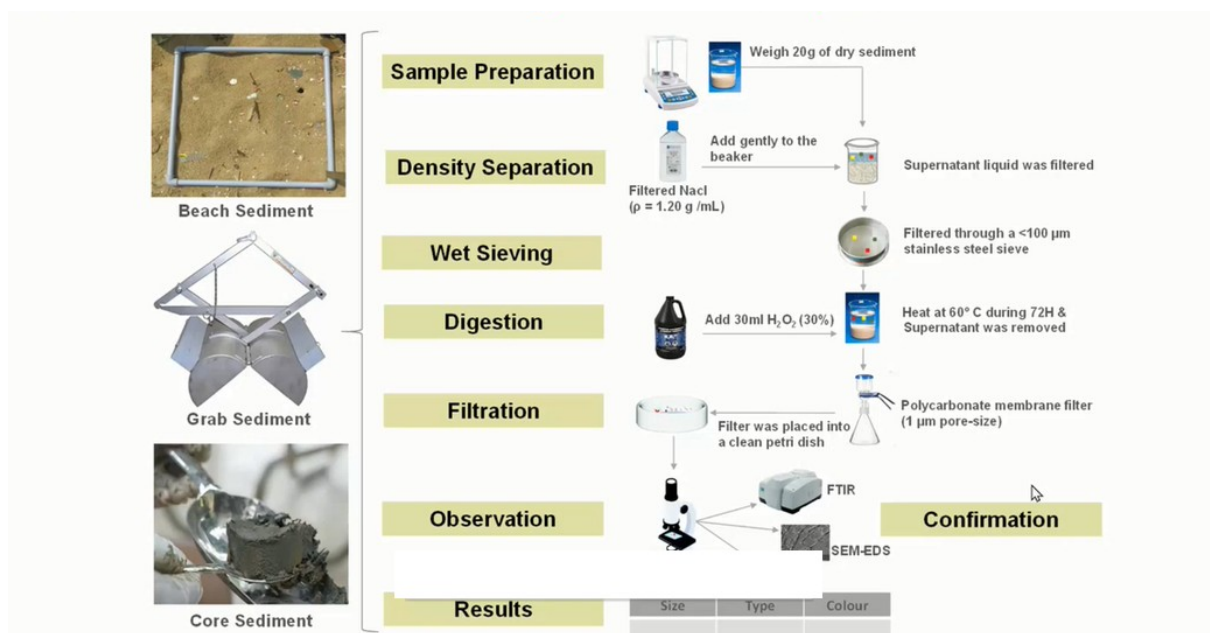
- Quality Control (Running blank samples)
- Preparation of salt solution:
- Density Separation
- Wet Peroxide Oxidation
- Sieving
- Vacuum Filtration

(b) Qualitative analysis:

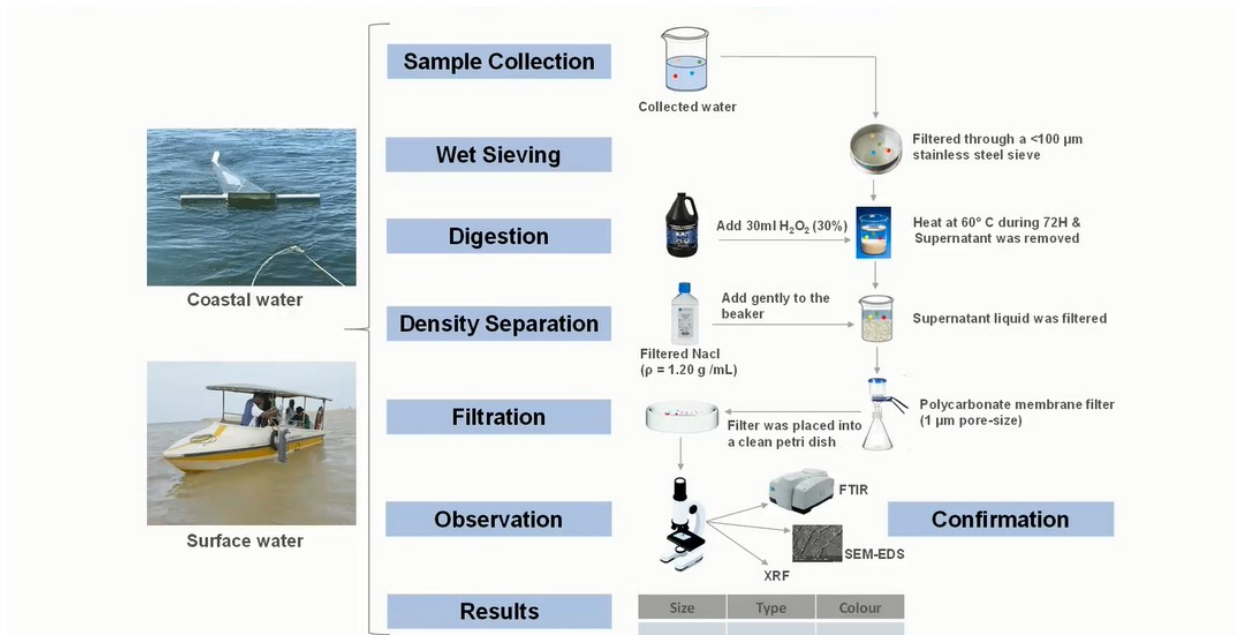
- Optical Microscope: The analysis is done through different magnification ranges i.e. 5x,10x and 20x to for various shape and sizes of microplastics.
- Micro-FTIR: In this technique, the spectra obtained by of targeted microplastics are analysed through the peaks obtained and analysing them through the functional group.
- Pyrolysis GC-MS: The thermal technique is used for the knowledge of degradation products of the microplastics found in the sample.
- Number of microplastic samples found in per litre of sample in each location was analysed along with various shapes and colours.

### 2.4.3 NCSCM

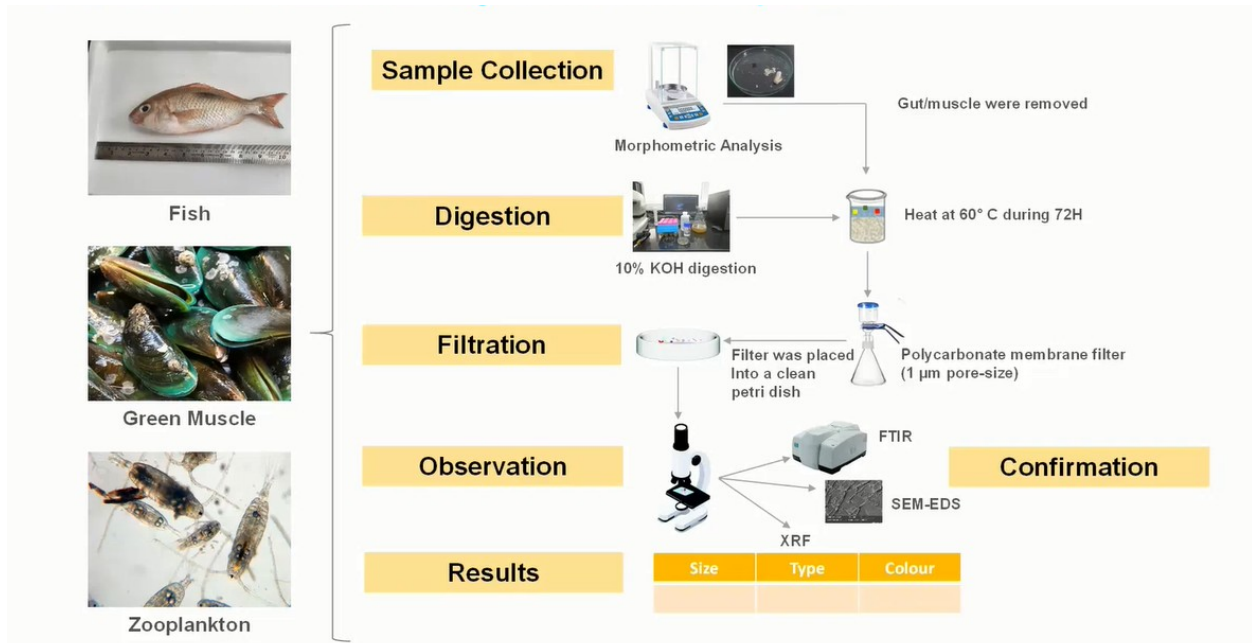
#### (a) Sample Extraction & analysis (Sediments)



#### (b) Microplastic Analysis in Water



a. Microplastics analysis in Biota



2.5 Observations

- (a) Sampling and analytical methods adopted by different institutions in India are similar with minor variations
- (b) Standard method for Sampling & Analysis developed by BIS/ISO is essential to formalize further action on monitoring reports.

3.0 Assessment of Microplastics

Microplastics (both primary and secondary) pollute drinking water sources primarily through discharge of sewage/wastewater treatment plant effluent and surface runoff. There are large numbers of industries that use (primary) microplastics for various applications, such as medicines, cosmetics etc. After their use, these primary microplastics get washed off and become a part of the domestic wastewater (Singh et al. 2021). As the sewage/wastewater treatment plants are not equipped for the complete removal of microplastics, the effluent released from these plants contains substantial quantity of microplastics (Amrutha and Warriar 2020). Upon mixing of this effluent with the freshwater sources, microplastics become part of the fresh/drinking water supply chain (Magnusson and Noren 2014; Novotna et al. 2019). It is also important to note that many components of water treatment plants and water distribution system are usually made up of plastic materials, such as high density polyethylene, polyvinyl chloride, polypropylene etc. (Mintenig et al. 2019) and hence, these further contribute towards microplastic generation in the water they carry. The treated bottled water is also reported to contain microplastics (Mason et al. 2018; Pivokonsky et al. 2018). Nevertheless, the smallest microplastic particle reported in case of drinking water is 1  $\mu\text{m}$  (WHO 2019). Evidence suggests that it is the bottling process and/or packaging of the plastic bottles/caps that largely contributes to the generation of microplastics.

In the air, suspended microplastic particles have been isolated from various places, such as, urbanized city centres, indoor households, and remote outdoor regions. As there is wide range of microplastics' size, it is highly likely that these particles are inhaled by the humans (Jenner et al. 2022).

Soil can get affected from plastics through various means such as plastic mulch films, municipal so waste, sewage sludge, fertilizers coated with plastics etc. (McCormick et al. 2014; Blasing and Amelung 2018; Liu et al. 2018). A significant positive correlation has been seen between the rate of sludge applied onto the soil and concentration of microplastic particles in the soil (Zhang et al. 2020).

Various organizations including CIPET, NCSCM, NCCR (MoES), NPC & CPCB have conducted microplastic monitoring. Further international organization including UNEP, WHO and OECD have worked extensively on Microplastics and published comprehensive Reports. Based on aforementioned Sources of generation of microplastics, transfer media and end use areas have been identified. Further details of microplastics (concentration, type etc) for these areas have been compiled. Details are given in Table 3.1

**Table 3.1 : Sources of Generation & Analysis of Microplastics**

S.N.	Class	Category	Subcategory	Description	Analysis data	Reference
1.	Generation					

S.N.	Class	Category	Subcategory	Description	Analysis data	Reference
	<b>of Microplastics</b>					
a	Industry	(i) During production	Toothpaste		NA	UNEP
			Cosmetics	Microbeads in skin care	NA	UNEP
			Printer , ink, spray, injection moulding		NA	UNEP
			Plastic production	Emissions/ spillages	NA	UNEP
			Ship breaking		NA	UNEP
			Cigarette filters		NA	UNEP
		(ii) During Usage	Synthetic textiles	Use & washing	100 microfibrils/L	UNEP, OECD
			Horticulture	Plastic Sheeting / Tube	NA	UNEP
			Road Transport	Tyre & Road wear particles	NA	OECD, WHO
			Paint from Building & Ships		NA	OECD
			Bottled Water	Caps & bottle	Section 3.1	WHO
			Synthetic Soles of Shoes		NA	WHO
b	Improper waste management	(i) Land Litter		Degradation under specific temp & UV rays	NA	UNEP, WHO
		(ii) Dumpsites		Degradation under specific temp & UV rays	NA	UNEP, WHO

S.N.	Class	Category	Subcategory	Description	Analysis data	Reference
		(iii) Marine litter		Degradation under specific temp & UV rays	NA	UNEP
c	Ocean Activities			Fishing Nets, Boxes, Rope, galley waste;	NA	UNEP, MoES
				Aquaculture - nets, floating	NA	UNEP
				Coastal Tourism	NA	UNEP NCSCM
				Offshore Oil & Gas Platform	NA	UNEP
d	Outflow from sewage treatment plant			Waste water treatment plant can effectively remove microplastics , but in most area adequate sewage treatment systems not provided	NA	WHO
e	Agricultural Runoff			When waste water sludge is used as compost	NA	WHO
f	Stormwater drains			Carrying Road dust	NA	WHO
g	Leachate			Leachate	Section 3.2	CPCB
<b>2</b>	<b>Transfer of Microplastics</b>					
a	Surface Water				Section 3.3	CPCB, NPC
b	Soil / Beach Sediment				Section 3.4	MoES, NCSCM
c	Sludge				NA	
d	Fish				Section 3.5	MoES <b>NCSCM</b>
e	Ocean				Section	MoES,

S.N.	Class	Category	Subcategory	Description	Analysis data	Reference
	water				3.6	NCSCM
<b>3</b>	<b>End use</b>					
a	Ground Water				Section 3.7	CPCB. WHO
b	Drinking Water			Microplastics have been identified in drinking-water as small as 1 $\mu\text{m}$ , based on the smallest particle size detected by current methods. Large particles occur less frequently than small particles. The predominant particle shapes are fragments and fibres. The predominant plastic types are PET and PP	Table 3.1	WHO
c	Ambient Air			Tyre & Road wear dust	Section 3.8	WHO, CPCB

### 3.1: Drinking Water & Bottled Water

#### (a) WHO

**Table 3.2 : MP concentration in Tap Water / Bottled Water**

Author	Water type	Lower size bound ( $\mu\text{m}$ )	Particles/L in sample (average)	Particles/L in blanks (average)
Oßmann et al.	Bottles (mineral water)	1	3074-6292	384

	<ul style="list-style-type: none"> <li>•Glass</li> <li>•Single use PET</li> <li>•Reusable PET</li> </ul>		2649 4889	
Pivokonsky et al. (2018)	DWTP from surface water sources (3 sites)	1	628 338 369	<5% of counts in samples
Schymanski et al. (2018)	Bottles <ul style="list-style-type: none"> <li>•Single use</li> <li>•Returnable</li> <li>•Glass</li> <li>•Beverage carton</li> </ul>	5-20	14 118 50 11	14±13
Mason, Welch and Neratko (2018)	Bottled	6.5-100 Lower bound based on microscope and software	315	23.5
Strand et al. (2018)	Tap from ground-water sources	10-100	0.2, 0.8 and 0.0 (LoD = 0.3) <sup>4</sup>	Unknown
Mintenig et al. (2019)	Tap from ground-water sources.	20	0.0007	0.67 particles/L 0.3 fibres/L
Uhl, Eftekhardakhah, and Svendsen (2018)	Tap from 24 sources	60	Average not reported since only a single result above LoQ (that result was 5.5)	0.5 (LoQ = 4.1 LoD= 0.9)
Mason, Welch and Neratko (2018)	Bottled	>100	10.4	4.15
Strand et al. (2018)	Tap from ground-water sources	>100 (10 µm sieve size)	0.312 (LoD = 0.58)	0.26
Kosuth, Mason and Wattenberg (2018)	Tap from unspecified sources	100 lowest reported	5.45	0.33 (based on 5 particles in 30 blanks (ea. 500mL))

### 3.2 Leachate from Dumpsite

Table 3.3. : Leachate (CPCB)

Location	Type of water	Microplastics concentration (particles/L)	Reference
South China	Leachate	3 to 25 particles/L	Wan et al. 2022
Suzhou, China	Leachate	235.4 ± 17.1 particles /L	Sun et al. 2021
China	Leachate	0.42 to 24.58 particles/L	He et al. 2019
Shanghai, China	Leachate	4 ± 13 particles/L	Su et al. 2019
Lahti, Finland	Leachate	1.97 particles/L	Praaghet al. 2018
Alfsnes, Iceland	Leachate	4.51 particles/L	Praaghet al. 2018
Kodungaiyur, India	Leachate	0.75 to 16.2 particles/L	CPCB
Perungudi, India	Leachate	0.8 to 32 particles/L	CPCB

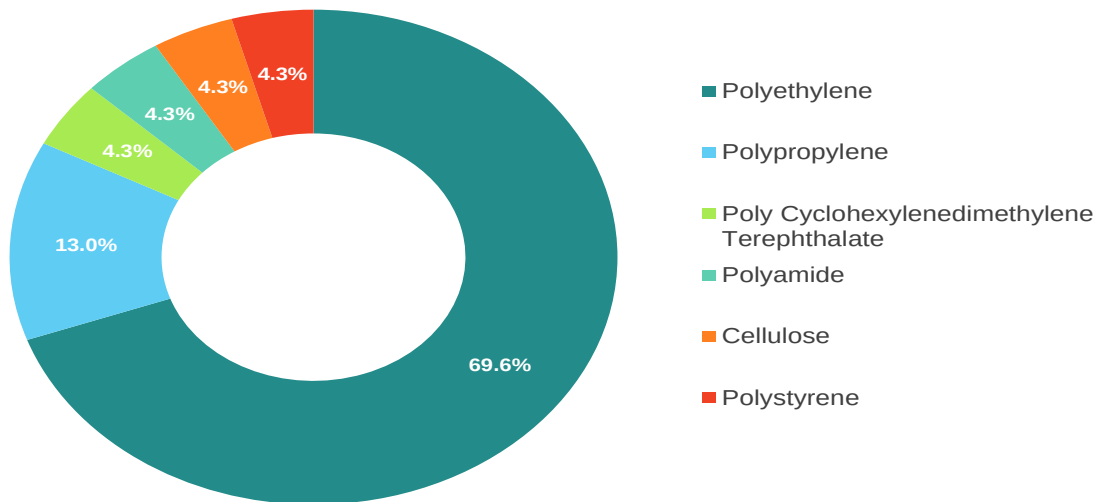
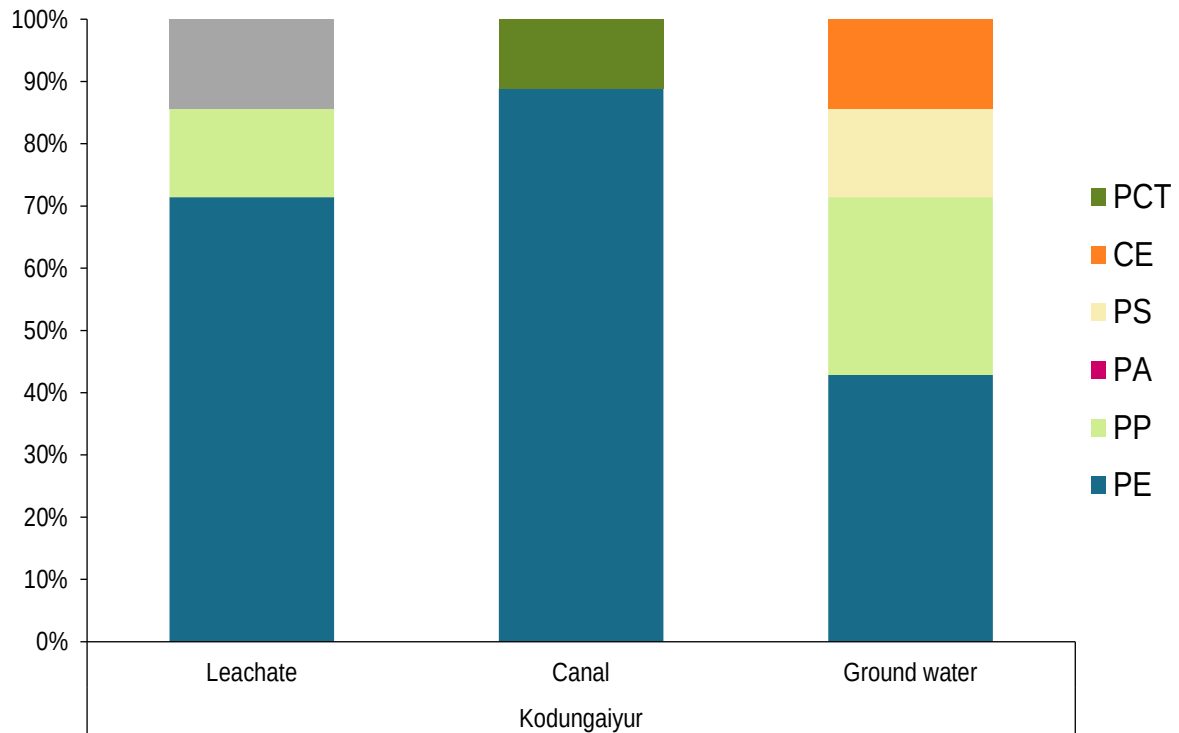


Figure 3.1 : Percentage composition of different types of plastics found in Leachate (CPCB)



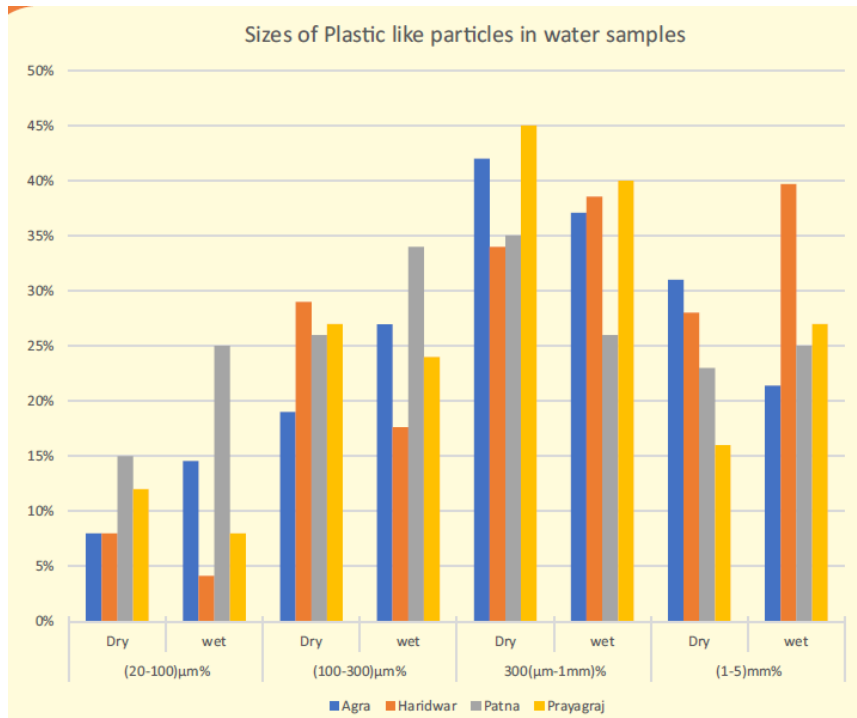
**Figure 3.2: Percentage composition of microplastics in leachate, canal and groundwater samples around in dumpsite (CPCB)**

### 3.3 Surface water

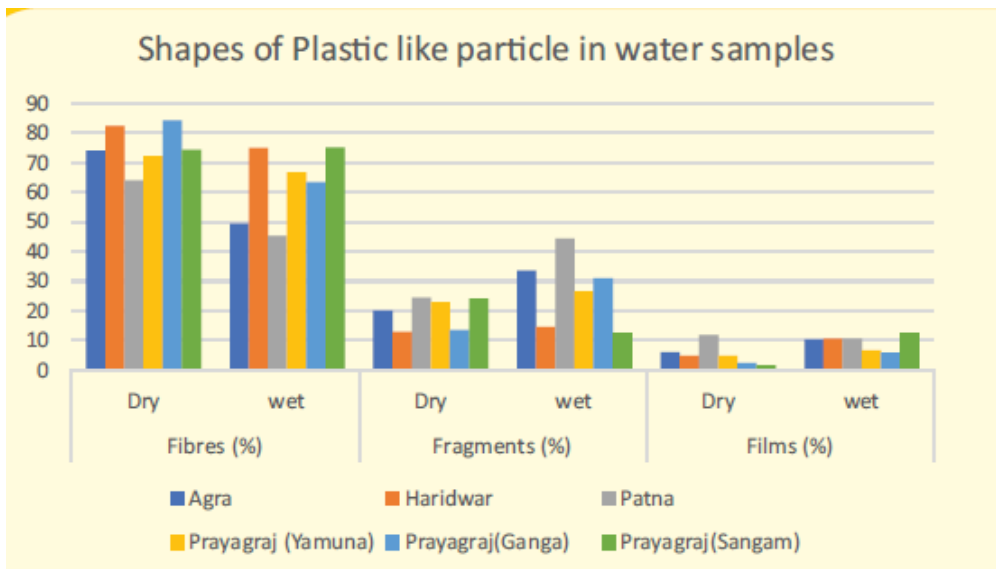
**Table 3.4 Microplastics in Surface Water (WHO )**

Location	Results reported (particles/L)	Sieve size ( $\mu\text{m}$ )	Study
Groundwater, Germany	Average: <sup>b</sup> $0.7 \times 10^{-3}$ Range: <sup>b</sup> $0-7 \times 10^{-3}$	3	Minteniget al. 2019
Three Gorges Reservoir, China	Average: 4.7 Range: 1.6 – 12.6	48	Di and Wang, 2018
Dongting Lake and Hong Lake, China	Averages: 1.2 and 2.3 Ranges: 0.9-2.8 and 1.3-4.7	50	Wang et al. 2018
Wuhan, China	Range: 1.6-8.9	50	Wang et al. 2017
Rhine river, Switzerland, France, Germany, Netherlands	Average: 0.0056	300	Mani et al. 2015
Western Lake Superior, USA	Average: 0.00026	333	Hendrickson, Minor, and Schreiner, 2018

**Figure 3.3 Microplastics identified in the River**  
 (Sizes of Plastic like Particles in Water Samples in percentage in four cities)( NPC)

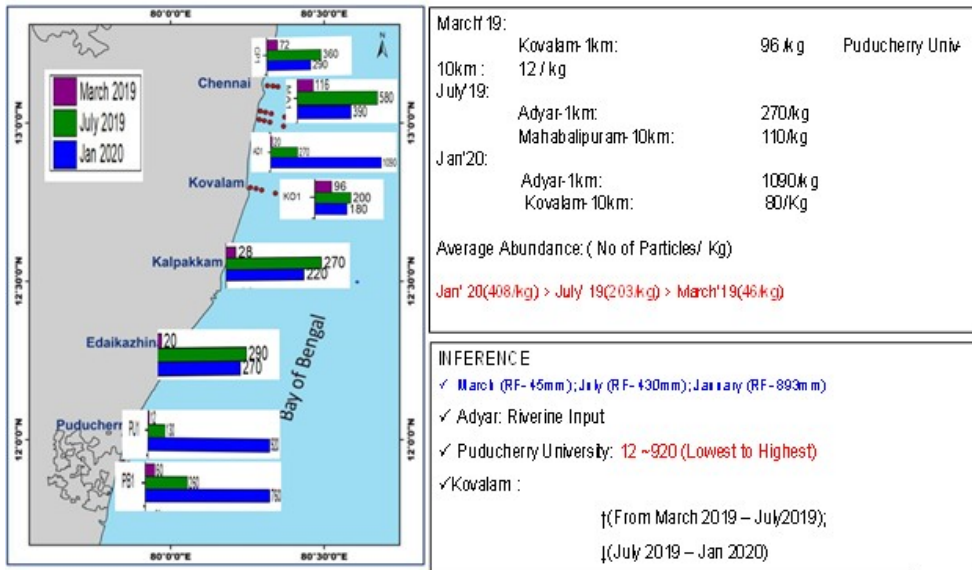


**Figure 3.4 Microplastics identified in the River**  
 (Shapes of Plastic like Particles in Water Samples amongst Fibres/Fragments/Films in percentage in four cities) ( NPC)

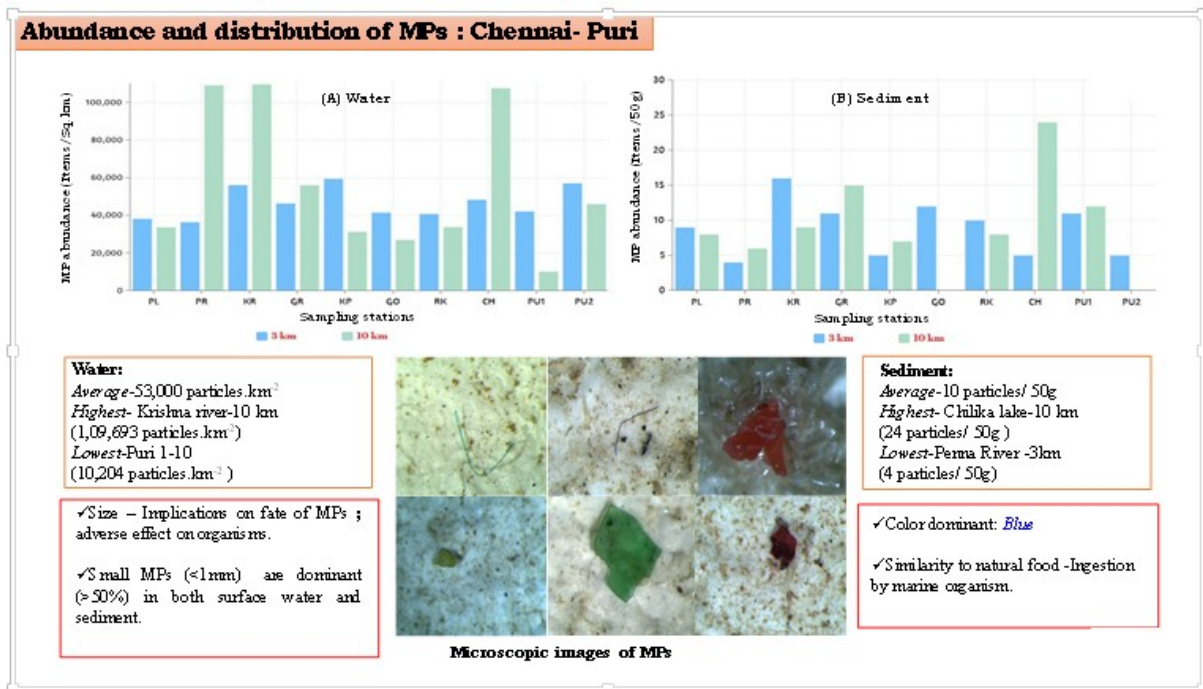


**Section 3.4 :Beach Sediment/ Deep Sea Sediments**

**(a) Figure3.5 Microplastics (MoES- NCCR)**  
 (Microplastic sediments –Chennai-Puducherry)



(b) Figure 3.6 Microplastics (MoES- NCCR) (Microplastic sediments –Chennai-Puri)



(c) Beach sediments (NCSCM)

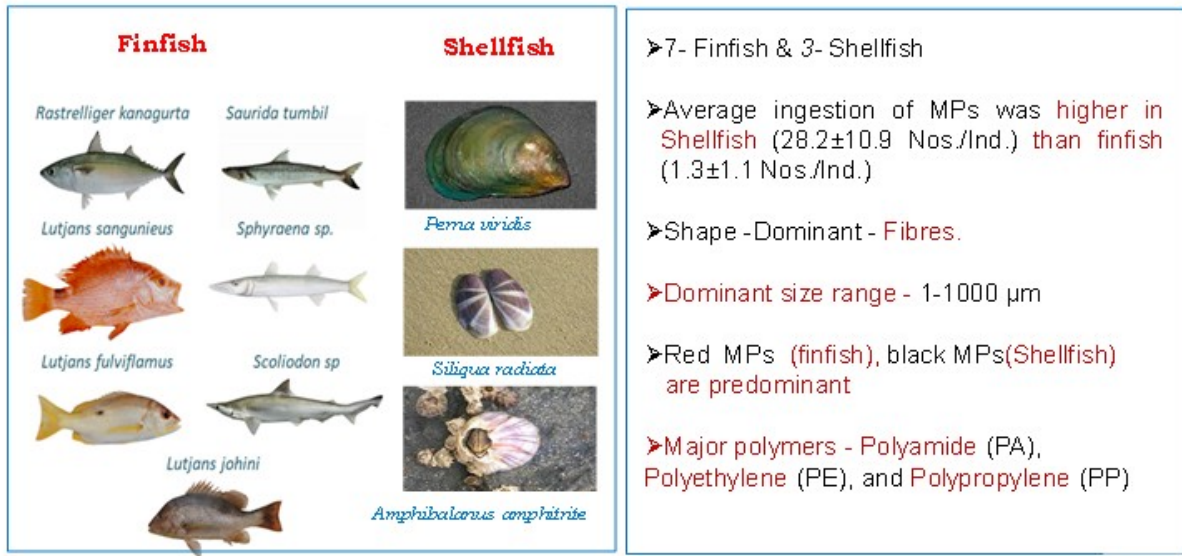
Abundance of microplastics in terms of numbers of particles and their range, in the beach sample reported from different parts of the world and long the Tamil Nadu coast () Table 3.5

S.No	Location	Range	Mean $\pm$	Reference
.				

1.	Charleston, Harbor, USA	42 to 1196/m <sup>2</sup>	413.8 ± 76.7/m <sup>2</sup>	Grayet al. 2018
2.	Winyah Bay, USA	51 to 441/m <sup>2</sup>	221.0 ± 25.6/m <sup>2</sup>	Grayet al. 2018
3.	Guanbara Bay, Brazil	12 to 1300/m <sup>2</sup>	-	Carvalho and BaptistaNeto, 2016
4.	Bostanu, Persian Gulf	-	1258 ± 291/kg	Najiet al. 2016
5.	Gorsozan, Persian Gulf	-	122 ± 23/kg	Najiet al. 2016
6.	Norther Gulf on Mexico	-	50.6 ± 9.96/m <sup>2</sup>	Wessel et al.2016
7.	South Korea	2 to 92,217/m <sup>2</sup>	8205/m <sup>2</sup>	Lee et al. 2013
8.	Chile	1 to 169/m <sup>2</sup>	30 ± 2.6/m <sup>2</sup>	Hidalgo-Ruz and Thiel, 2013
9.	Easter Island	-	800 ± 320/m <sup>2</sup>	Hidalgo-Ruz and Thiel, 2013
10.	South Korea	-	976 ± 405/m <sup>2</sup>	Heo et al. 2013
11.	Mumbai, India	12 to 960/m <sup>2</sup>	68.8/m <sup>2</sup>	Jayasiriet al. 2013
12.	Otzias beach, Eastern Mediterranean	20 to 1218/m <sup>2</sup>	575/m <sup>2</sup>	Kaberiet al. 2013
13.	Portugal coast	1 to 137/m <sup>2</sup>	26.6 ± 32.5/m <sup>2</sup>	Martins and Sobral, 2011
14.	Malta, Central Mediterranean	0 to 1462/m <sup>2</sup>	33.3/m <sup>2</sup>	Martins and Sobral, 2011
15.	Belgium	-	91.9/kg	Claessens et al. 2011
16.	Hawaiian Archipelago	4 to 17,645/m <sup>2</sup>	-	McDermid and McMullen, 2004
17.	Tamil Nadu Coast, India	2 to 178/m <sup>2</sup>	46.6 ± 37.2/m <sup>2</sup>	R. Karthik et al.



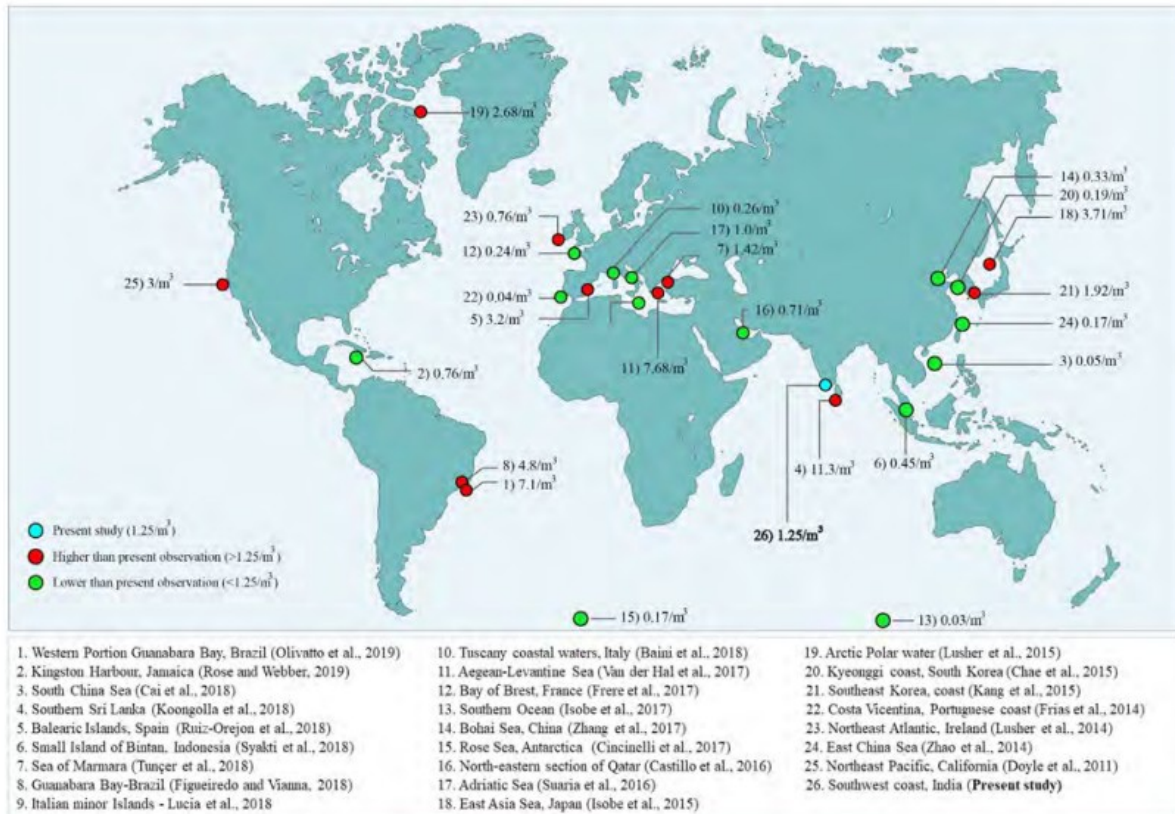
### MPs in biota - Chennai coast



### Section 3.6 Coastal Water

Abundance ranged between 0.22 and 3.58 particles/m<sup>3</sup> with an average of 1.25 ± 0.88 particles/m<sup>3</sup> (n = 14) (NCSCM).

**Figure 3.9 Microplastics in Coastal Water** (Global distribution of mean microplastic particles (particles/m<sup>3</sup>) in the coastal waters and comparison )



**Section 3.7 Microplastics in Groundwater**

**Table 3.6: Microplastics in Groundwater (CPCB)**

Location	Type of water	Microplastics concentration (particles/L)	Reference
South China	Leachate	3 to 25 particles/L	Wan et al. 2022
Suzhou, China	Leachate	235.4 ± 17.1 particles /L	Sun et al. 2021
China	Leachate	0.42 to 24.58 particles/L	He et al. 2019
Shanghai, China	Leachate	4 ± 13 particles/L	Su et al. 2019
Lahti, Finland	Leachate	1.97 particles/L	Praaghet al. 2018
Alfsnes, Iceland	Leachate	4.51 particles/L	Praaghet al. 2018
Kodungaiyur, India	Leachate	0.75 to 16.2 particles/L	CPCB study 2022
Perungudi, India	Leachate	0.8 to 32 particles/L	CPCB study 2022
South China	Groundwater	11 to 17 particles/L	Wan et al. 2022
Australia	Groundwater	16 to 97 particles/L	Samandraet al. 2022
Karst, US	Groundwater	15.2 particles/L	Pannoet al. 2019
Kodungaiyur, India	Groundwater	0.87 particles/L	CPCB study 2022
Perungudi, India	Groundwater	2.1 particles/L	CPCB study 2022

### Section 3.8 Microplastics in Ambient Air

**Table 3.7: Microplastics concentrations detected in the air at Dumpsites in India vs Microplastics measured at different locations across the globe (CPCB)**

Location	Samples Type	Method	Microplastics conc. (particles/m <sup>3</sup> )	Reference
Shanghai, China	Urban megacity	KB-120F type intelligent middle flow total suspended particulate sampler	0–4.18	Liu et al. 2019a
Paris, France	Indoor and outdoor of Residential area of Paris city	Simple vacuum filtration array	0.3–1.5	Driset al. 2017
Asaluyeh County, Iran	Industrial area	ECHO PM ambient filter sampler	0.3–1.1	Abbasiet al. 2019
West Pacific Ocean	Coastal area	KB-120F type intelligent middle flow total suspended particulate sampler	0.13 ± 0.24	Liu et al. 2019a
Cal State University, USA	Across 100 km of coastal Southern California, Semi-urbanized landscape	Simple vacuum filtration array	0.7–19.6	Gaston et al. 2020
Kodungaiyur, Chennai, India	Urban area, landfill site	High Volume Air Sampler	0.37–0.92 (PM10) 0.50–0.97 (PM2.5)	CPCB study 2022
Perungudi, Chennai, India	Urban area, landfill site	High Volume Air Sampler	0.22–0.72 (PM10) 0.50–3.88 (PM2.5)	CPCB study 2022

### 3.9 Observations

- Quantification of Microplastic generation at source has not been done for most of the Sources
- Variation in Microplastic concentrations units reported by different organizations observed
- Most of the monitoring has been done in Coastal Areas

### 4.0 Risk Assessment

Microplastics can present several unique challenges for traditional human health risk assessment approaches. Findings of World Health Organization and ICMR are highlighted in this section

#### 4.1 WHO

**WHO in its report** on Microplastics in Drinking water: WHO Report 2019” has highlighted the following issues

- Microplastics can present several unique challenges for traditional human health risk assessment approaches. Plastic polymers are generally considered to be of low toxicity. Being insoluble, they are unlikely to be absorbed from the gastrointestinal (GI) tract and generally do not interact with biological matrices, although particle size may influence absorption and toxicity (i.e. smaller particles may represent a greater hazard). However, plastics can contain additives and unbound monomers, which may leach out either into the surrounding water environment prior to human consumption or potentially, into the GI tract to become bioavailable under some circumstances. Further, plastic particles can sorb chemicals from the environment, some of which are of toxicological concern.
- Investigation of potential risks related to particles indicate that it is possible that some smaller plastic particles may be able to pass through the gut wall and translocate to tissues remote from the mucosa, although this may not necessarily translate to a health risk. Humans have always ingested particles and have ingested plastic particles for decades with no related indication of adverse health effects. In addition, a good deal of evidence suggests that microplastics pass through the GI tract into the faeces.
- There is currently a paucity of information to quantitatively assess any potential risk associated with exposure to microplastic particles. Most toxicological tests of microplastics have focused on aquatic organisms or ecotoxicology. No epidemiological or human studies on ingested microplastics

have been identified. Data from studies on laboratory animals are scant and inadequate to confirm human health risk assessment of microplastics ingestion. **There are no studies on the impacts of ingested microplastics on human health and there are only a limited number of animal studies of questionable reliability and relevance**

- There is currently no evidence to suggest a human health risk from microplastic associated biofilms in drinking-water. The risks from pathogens in microplastic-associated biofilms is considered far lower than the well-established risk posed by the high concentrations and diversity of pathogens present in human and livestock waste, which often make their way into drinking-water sources with inadequate treatment
- **Routine monitoring of microplastics in drinking-water is not recommended at this time, as there is no evidence to indicate a human health concern**

#### 4.2 ICMR

ICMR has informed that they have not carried out any study on impact of microplastics on human health so far. However, as per the study carried out so far, Microplastics have been reported in human saliva, blood, placenta , colon, stool and lungs. Overview of the findings of the study carried out on impact of Microplastics on human health , as reported by ICMR, is given below:

	No. of Studies	No. of Human Samples	MP Reported	Impact on Human Health
Blood	1	22	1.6 microgm/mL	Not reported
Placenta	1	6	12 particles in 4 out of 6 samples tested	Not reported
Lungs	2	13 ( First Study)	0.69±0.85 gm/L of Lung tissue; 39 particles in 11/13 samples tested	Not reported
		20 ( Second study)	37 particles in 13 out of 20 samples tested	Not reported
Stool	2	8 (First Study)	2 particles per gm of Stool	Not reported
		24 (Second study)	1-36 particles per gm of stool	Not reported
Saliva	1	2000	No. of sample in which MP reported: 650;	Not reported

			Avg. concentration: - 0.33 MP/individual	
Genotoxic& cytotoxic effects of MP in Human blood	In-vitro	2	Size studied: 10-45 microm; Concentration – 25,50, 100, 250, 500 microg/L; Type:PE	Genomic instabilities were reported
Cytotoxic effect of MP with metal nano particles in human cerebral& epithelial cells	In-vitro		Size studied: 3-16 microm; Concentration – 50 microg/L-10 mg/L; Type:PE&PS	Oxidative stress was reported

It was further informed by ICMR that studies are only about the presence of microplastics in human body and not about their physiological or psychological impact. Studies showing genotoxic& cytotoxic impacts are invitro studies conducted on only two individuals. Health impact of emerging contaminants are chronic and long term studies are required to establish Cause effect relationship. It would not be appropriate to set standards for drinking water for microplastics without establishing the cause-effect relationship

#### 4.3 Observations

- Further studies are required understand the uptake and impact of microplastics on human health
  - Influence of particle size, shape and chemical composition of microplastics to be studied in detail
- Studies are also required to assess the impact of associated chemicals & biofilm on human health

### 5. Remediation techniques:

#### 5.1 Available technology for Microplastic removal

Microplastic treatment technologies are in the nascent stage. Removal methods in case of air and soil matrices have not been reported yet. Treatment technology options for microplastics in water include the

- Conventional Water treatment system: In the conventional water treatment technology, primary and secondary treatment processes help in the removal of microplastics 50 – 98% of microplastics could be removed during primary treatment and 0.2 – 14% during secondary treatment (Sun et al. 2019). Microplastic concentration can be significantly reduced by ultrafiltration and reverse osmosis (Ziajahromi et al. 2017). Combination of secondary and tertiary treatment processes has also been useful in the removal of microplastics.
- Microbial Degradation (Biodegradation): Environmental friendliness, cheap cost and low energy input, as well as a reduced carbon footprint, are all advantages of biodegradation. Plastics can be used by microorganisms as carbon and nitrogen sources, allowing them to survive and reproduce.
- Photodegradation/ Photocatalytic degradation: Photocatalytic degradation of typical microplastics can be carried out by UV light radiation and degradation for various sizes of microplastics will be studied.

## 5.2 Observations

- Available technologies for removal of microplastics need to be studied in detail to assess their efficacy
- Research studies to be conducted for removal of microplastics from air & soil

## 6.0 Initiatives taken to reduce Microplastics

- The Microbead-Free Waters Act has been notified in US which prohibits the manufacture and distribution of nonprescription drugs that are also cosmetics and that contain plastic microbeads for the purposes of exfoliating or cleansing any part of the human body. Common examples of rinse-off nonprescription drugs that are also cosmetics include, but are not limited to, anti-cavity (fluoride) toothpastes, acne scrubs, anti-bacterial soaps, and anti-dandruff shampoos
- **BIS 2017** : Plastic microbeads of diameter 5 mm or less, that are insoluble in water, and solid plastic particles used to exfoliate or cleanse in personal care products have been listed in the banned list
- **Plastic Waste Management (Second Amendment) Rules, 2022:**
  - a. Banned all single-use plastics from 1<sup>st</sup> July 2022.
  - b. mandate to increase the thickness of plastic carry bags to over 120 microns from December 31.
  - c. Banned imports of solid plastic waste from March 2019

### C. Conclusions

1. Independent studies regarding microplastics have been conducted by various organizations in the country including CPCB, MoES-NCCR, NCSCM, NPC and CIPET . Further international studies have been conducted by WHO, UNEP , OECD and others.
2. The studies have primarily focussed on monitoring microplastics (concentration, polymer type, colour, shape) in various environmental matrices.
3. Occurrence of microplastics has been reported in oceans, sediments, surface water, ground water, wastewater, tap water, bottled water, air, food products, aquatic organisms, and human beings
4. There is currently no standard method for sampling and analysis of microplastics in the environment. ISO is currently working on the subject
5. Sampling and analytical methods adopted by different institutions in India are similar with minor variations. Variation in Microplastic concentrations units reported by different organizations has been observed
6. Uniform procedure for sampling & analysis may be developed by organizations involved in microplastic analysis (CIPET, NCSCM, MoES-NCCR) which can be adopted uniformly across the country till the time ISO standard is finalized.
7. Source of generation of microplastics including industries, waste management , waste water treatment, ocean activities etc. have been identified. However, exact quantum of microplastics generated from the identified source has not been determined.
8. Microplastic concentration in transfer media is available for soil/beach sediment, surface water bodies, biota and ocean water. Microplastic concentration for sludge , specifically when it is converted to compost for land application is not available
9. Microplastic concentration in end use areas including ambient air, drinking water and ground water is available.
10. Source monitoring, transfer end use of all possible sources listed in Table 3.1 to be covered. Emphasis to be laid on such areas for which no information is available.
11. Regular monitoring of various water quality parameters to be conducted to provide insight into the presence and concentration of microplastics in environmental matrices(water, sediments, biota)
12. Microplastic leakages and pathways may be monitored in order to identify further sources and hotspots of microplastics.
13. Uniform procedure for sampling & analysis as finalized by this Committee may be adopted for such studies till the time ISO Standards are finalized

14. Studies conducted on the matter have reported about the presence of microplastics in human body. Physiological or psychological impact has not been reported in these studies.
15. Health impact of emerging contaminants and long term studies are required to establish Cause effect relationship of microplastics on human health
16. The aforementioned studies should cover different type, concentration and shapes of microplastics. Impact of chemicals /biofilms associated with Microplastics on human health to be covered. The studies may include the following:
  - Estimation of the duration and frequency of human exposure to microplastics. Microplastic monitoring as required may be conducted for the same
  - Once the exposure assessment is done precisely, dose-response assessment may be carried out, where the minimum concentration (of microplastics) responsible for any observable effect (on human) shall be assessed..
17. **Bioassays** may be conducted to assess the Eco-toxicological impact of microplastics on animal life.
18. Standards development ( Source & ambient) for microplastics may be taken up following establishment of the cause-effect relationship of microplastics on human health
19. Available technologies to be assessed for their efficacy for removal of microplastics.
20. Technologies to be developed for removal of microplastics from Air & Soil
21. **Source-directed interventions,**
  - Sustainable design and manufacturing of textiles, tyres, and complementary products (, laundry detergents, road surfaces, and vehicles), to minimise the tendency of products to contribute to microplastics generation;
  - Restrictions on microplastics in the manufacture and sale of certain personal care and cosmetic products containing microplastics.
  - Product requirements for household, commercial, or industrial washing machines. For instance, Australia and France have introduced measures to phase in microfibre filters on new washing machines
9. **End-of-life interventions,** effective solid & plastic waste management practices, to prevent waste leaking into the environment and potentially contributing to microplastics generation including the following;
  - (a) **Reducing the amount of plastic waste that enters landfills and dumpsites** through the implementation of waste reduction policies and

initiatives, such as waste-to-energy programs and increased recycling. Microplastics can also be reduced by supporting the development and use of biodegradable plastic alternatives

**10. End-of-pipe interventions,** wastewater, stormwater, and road runoff management and treatment, to retain the emitted microplastics before these reach water bodies.

11. Maximizing clean drinking water supply to all citizens in the country

12. Other Best practices as listed below for minimizing microplastics in environment may be followed:

- (a) Install physical barriers such as screens and filters on STP/WWTP systems to help reduce the amount of microplastics that enter rivers, lakes, and oceans.
- (b) Support sustainable fishing practices to reduce the amount of microplastic entering rivers from fishing equipment.
- (c) Implementation of Clean-up efforts for beaches and rivers

13. Training and capacity building including microplastic monitoring, analysis , health impact studies may be taken up for effective implementation of aforementioned points



**Figure 6.1 : Best practices for litter management in marine**

**Minutes of Meeting on “Committee Meeting in compliance of Hon'ble NGT order in the matter of O.A. No. 251 of 2022” with CIPET/ICMR /NCSCM held on April 19<sup>th</sup>, 2022**

A Committee meeting was held virtually via video conferencing on April 19, 2022 in compliance of Hon'ble NGT order in the matter of O.A. No. 251 of 2022 for study of microplastics impact on environment and human health. The meeting was coordinated by UPC-II division, CPCB, Delhi. Various stakeholders including representative of CIPET, ICMR, and NCSCM participated in the meeting (List of participants is placed as **Annexure-I**).

DH UPC-II briefly explained directions of NGT for the study to be conducted which covers standards for safe environment, remedial steps to reduce menace of micro plastic and addressing other incidental issues.

She also explained the steps taken by CPCB with regards to microplastics which mainly include assessment of microplastic with NCSCM in Ground Water & Ambient Air in compliance of NGT's order O.A. no. 99 of 2021. She also informed about the study undertaken by National Productivity Council on assessment of microplastics in river Ganga. It was further informed that Ministry of Science and Technology has constituted a committee and working on methods for removal of micro-plastics from water. It was proposed that the as the objective of the two Committees are interlinked, this committee may include representation from NEERI and DST.

The report submitted in O.A. No. 99 of 2021 was shared by CPCB with committee members and it was emphasized that study to should focus on identification of source of micro-plastic in water bodies, standardisation of monitoring techniques, risk assessment or health impact of micro plastics, methods of remediation and mitigation measures.

Dr. Mohanty from CIPET informed about the various studies being conducted regarding micro plastics are given below:

- Estimation of micro plastics in Tapi and Damanganga under Indo-Norway joint project( INOPOL) in Gujarat region in which it was observed t that land based resources are main contributor for the micro plastics.

- Standards for micro plastics determination being developed by ISO are at draft stage.
- Study for estimation of Micro plastic due to Compostable plastic is under way.

She also said that the CIPET can undertake study related to analysis of microplastic in water, soil, oceans etc part can be taken care by CIPET. Effect of microplastics on water content can be correlated with the releavant ISO Standards.

Dr Raj Narayan Tiwari from ICMR, Bhopal informed that they have taken up the studies for identification of micro plastic in different matrices in Bhopal. He further informed that articles published in Journals which highlight genotoxicity and cytotoxicity due to Microplastica. However health related studies due to microplastics in India have not been carried out so far.

Mr. Mrinal K. Biswas, RD Kolkata, CPCB discussed that the study shall be conclusive and it should include source, quality, quantity, impact on environment & human health and finally development of the standards for micro plastics. He also pointed out that the current available studies as well as journals are required to be considered for framing of action plan for the study to be carried out. Apart from that, study is required to be done in short term and long term manner to propose standards for microplastics.

Mr Robin form NCSCM, informed that they are working in coastline riverine system of India for characterisation, quantification and ecotoxical aspects of microplastics. He said leakage study i.e. quantity of micro plastic from leachate, landfills and sewage entering into nearby water body and ground water are required to be conducted in this field.

Further Ms. Divya Sinha -DH, UPC-II concluded the discussions and informed that the study shall cover inventorization, method of analysis, risk assessment or health impact of micro plastics, standards for treated sewage, drinking & ground water and methods of remediation and mitigation measures. She also informed that the standard for micro plastics in air is being developed by Air Quality Division CPCB. It was also important to identify which type plastics contribute maximum to the

generation of micro plastics

All the group members were requested to share the information and studies carried out in field of micro plastics with the Committee as well as provide any further inputs on the subject . Mr Mrinal K Biswas RD Kolkata was requested to to prepare draft Action Plan covering the Action Points discussed during the meeting as identifying the roles to be assigned to different organization. The same shall be circulated to the Committee members for finalization

The meeting ended with vote of thanks to the chair.

Annexure-I**List of Participants**

S.N.	Name and Designation
1.	Dr. Raj Narayan Tiwari, Director, ICMR-NIREH, Bhopal
2.	Dr.R.S.Dhaliwal, Scientist G & Head, NCD, ICMR Hqrs
3.	Dr. Smita Mohanty, Director & Head (Principal Scientist) CIPET Bhuwadeshwar
4.	Dr Robin , NCSCM Chennai
5.	Ms. Divya sinha Additional Director & I/c UPC-II, CPCB
6.	Mr. Mrinal Kanti Biswas Scientist "E" & Regional Director, CPCB
7.	Ms. Yogesh Chandra Scientist- B, CPCB

Sl.No	Action Point Description		Responsible Organization	Timeline (tentative)	
1	Compilation of existing information on Microplastics	a	Committee members shall share information available with them	CPCB CIPET ICMR NCSCM	30.4.22
		b	Compilation of information	CPCB- RD Kolkata	7.5.22
		c	Identification of Gap Areas	CPCB – RD Kolkata	7.5.22
2	Standardization of methodology for monitoring, characterization & analysis of microplastics. Parameters for characterization to include size, type of plastic etc. Instruments required for monitoring / analysis and testing protocols to be delineated		CIPET/ NCSCM	15.5.22	
3	Assessment of microplastics covering source, transfer media & end use. Available information as per Section 1 above shall be compiled and emphasis shall be on areas not covered as well as at the end use points. Number of samples to be collected shall be limited by the available infrastructure for monitoring as well as time		Assessment to be carried out by CIPET/ NCSCM – depending upon the available infrastructure. CPCB/Concerned SPCB/PCC to provide requisite support for the monitoring. Assessment to be coordinated & Report to be prepared by CPCB – RD Kolkata	15.6.22	
	Source Monitoring	a	Source emissions from industries /activities - Identification of specific industrial sectors contributing to microplastics through literature survey and monitoring microplastics at source		
		b	Leachate from		

			dumpsite/ landfill site		
		c	Sewage treatment plant inlet / outlet		
	Transfer media	c	Surface Water bodies		
		e	Soil		
		f	Marine water		
		g	Fish		
	End- use	f	Water Supply plants ( Inlet & Outlet )		
		g	Ground water		
		h	Ambient Air		
4	Source identification of microplastics based on Assessment report			CPCB	
5	Risk Assessment : To be carried out based on the Assessment report specifically w.r.t microplastic concentration at end use point .Parallely reports in media on adverse impact of microplastics may be reviewed and study taken up as per requirement. Recommendation of safe level of microplastics in drinking water based on literature survey/ experimental studies			ICMR / BIS	15.6.22
6	Development of treatment methods for remediation of microplastics from water / wastewater.			NEERI/ DST/ CPCB	15.6.22
7	Recommendation of measures for reduction of microplastics in environment based on Assessment report including the following: <ul style="list-style-type: none"> <li>• Measures for Control of coastal zone/ deep sea pollution due to marine litter</li> <li>• Developing regulatory &amp; market based instruments for preserving riverine and marine ecosystems</li> </ul>			CPCB	15.7.22
8	Identification of areas where standards have to be notified ( drinking water standards, effluent discharge standards & ambient air quality standards)			CPCB	31.7.22
9	Training of SPCBs/PCC/CPCB staff on monitoring and analysis of microplastics &			CIPET / NCSMS	31.7.22

	including identification of measures/ for strengthening of laboratory infrastructure ( Parallel activity )		
10	Submission of report to MoEF&CC	CPCB	15.8.22

**Minutes of Meeting on “Second Committee Meeting in compliance of  
Hon'ble NGT order in the matter of O.A. No. 251 of 2022” with  
CIPET/ICMR /NCSCM held on July 27<sup>th</sup> , 2022**

Second Committee meeting was held virtually via video conferencing on July 27, 2022 for study of micro plastics impact on environment and human health. Various stakeholders including representative of CIPET, ICMR, and NCSCM participated in the meeting (List of participants is placed as **Annexure-I**).

RD Kolkata, CPCB made brief presentation on research gap in Indian scenario based on the research document shared by CIPET, ICMR, and NCSCM. Gaps in Standardization of Qualitative and Quantitative techniques, gaps in Matrices covered under the published literature from various Geographical regions, were highlighted during the presentation. Presentation made is enclosed as **Annexure-II**.

Further discussions regarding need for future research was held by the members and DH UPC-II requested to all the group members to make brief presentation in next meeting as per details given below:

- RD Kolkata, CPCB
  - Methodology for development of standards covering sample requirement
  - Source of micro plastic
  - Areas of monitoring
  - Requirement for sampling methods and analysis
  - Capacity building
  - Availability and Gaps
- CIPET and NCSM
  - Available resources of monitoring sampling and analysis
  - Possible coverage for monitoring with existing resources
  - Institutional mechanism to fulfill additional sampling/analysis requirements, if any.
- ICMR
  - Existing studies on impact of micro plastic on human health
  - Identification of areas for further intervention to assess impact of micro plastic on human health.

The meeting ended with vote of thanks to the chair.

**Annexure-I**

**List of Participants**

S.N.	Name and Designation
1.	Dr. Raj Narayan Tiwari, Director, ICMR-NIREH, Bhopal
2.	Dr. Surya Singh ICMR-NIREH, Bhopal
3.	Dr.R.S.Dhaliwal, Scientist G & Head, NCD, ICMR Hqrs
4.	Dr. Smita Mohanty, Director & Head (Principal Scientist) CIPET Bhuwneshwar
5.	Dr Robin , NCSCM Chennai
6.	Ms. Divya sinha Additional Director & I/c UPC-II, CPCB
7.	Mr. Mrinal Kanti Biswas Scientist "E" & Regional Director, CPCB
8.	Ms. Yogesh Chandra Scientist- B, CPCB



**Minutes of Meeting on “Third Committee Meeting in compliance of  
Hon’ble NGT order in the matter of O.A. No. 251 of 2022” with  
CIPET/ICMR /NCSCM held on August 5<sup>th</sup>, 2022.**

Third Committee meeting was held virtually via video conferencing on August 5<sup>th</sup>, 2022 in compliance of Hon’ble NGT order in the matter of O.A. No. 251 of 2022 for study of micro plastics impact on environment and human health. Various stakeholders including representative of RD Kolkata, CIPET, ICMR, and NCSCM participated in the meeting (List of participants is attached as **Annexure-I**).

Mr Mrinal K Biswas, RD Kolkata, CPCB, described the action plan for development of standards for microplastics. He provided examples from other countries which already have their own practices for managing microplastics. RD Kolkata ended their presentation with the proposed execution plan and the roles to be assigned to different organizations, for developing environmental standards. (The presentation is here attached as **Annexure-II**)

The meeting progressed with the second presentation by NCSCM, where the information about protocol for analysis of microplastic in sediment, water & biota was briefly explained by them. They also explained the importance of surrounding environment from which sample has been taken, for analysis of microplastic.

Last presentation of the meeting was given by ICMR-NIREH Bhopal, where the results from the studies which have already been done on the presence of microplastic and their possible effects on human body, were discussed. Instruments which may be used for estimating the concentration of microplastics were also discussed during the presentation. (The presentation is here attached as **Annexure-III**)

Ms. Divya Sinha -DH, UPC-II concluded the discussions with request to provide detailed information as annexed below, latest by **22/08/2022**, regarding the efficient methodologies adopted by CIPET & NCSCM for analysis of samples for microplastics in the environment.

The meeting ended with vote of thanks to the chair.

CIPET and NCSCM are required to provide the following information, latest by 22/08/2022, on testing and analysis of microplastics for drinking water, groundwater, compost/leachate samples:

<b>Heads</b>	<b>Drinking water Sample</b>	<b>Groundwater Sample</b>	<b>Compost/leachate Sample</b>
<b>Methodology for testing and analysis</b>			
<b>Instruments Required</b>			
<b>Time period required for analysis</b>			
<b>Cost incurred per sample</b>			
<b>Presence/Coverage area of Organization</b>			
<b>Studies available</b>			

## Annexure I

List of Participants	
S. No.	Name and Designation
1.	Mr. Mrinal Kanti Biswas Scientist "E"; Regional Director, CPCB
2.	Dr. Raj Narayan Tiwari, Director, ICMR-NIREH, Bhopal
3.	Dr. Surya Singh, ICMR-NIREH, Bhopal
4.	Dr. Smita Mohanty, Director & Head (Principal Scientist), CIPET Bhuwaneshwar
5.	Mr. Himalaya Vardikar, CIPET LARPM, Bhuwaneshwar
6.	Ms. Divya sinha, Additional Director & I/c UPC-II, CPCB
7.	Ms. Yogesh Chandra, Scientist- B, CPCB
8.	Mr. Madnesh Kumar Dubey, Scientist- B, CPCB
9.	Mr. Mayank Raj Purbey, Scientist- B, CPCB

# 3<sup>rd</sup> Meeting of the expert committee<sup>36</sup> on “Development of standards for Microplastics”

केन्द्रीय प्रदूषण नियंत्रण बोर्ड  
CENTRAL POLLUTION CONTROL BOARD  
(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार)  
(Ministry of Environment, Forest & Climate Change, Government of India)  
क्षेत्रीय निदेशालय, कोलकाता  
Regional Directorate, Kolkata



-By-

Central Pollution Control Board  
Regional Directorate, Kolkata



- ❑ As per the Hon'ble NGT order dated 05.04.2022 pertaining to OA no. 251/2022 of 2022, where it has been directed that:

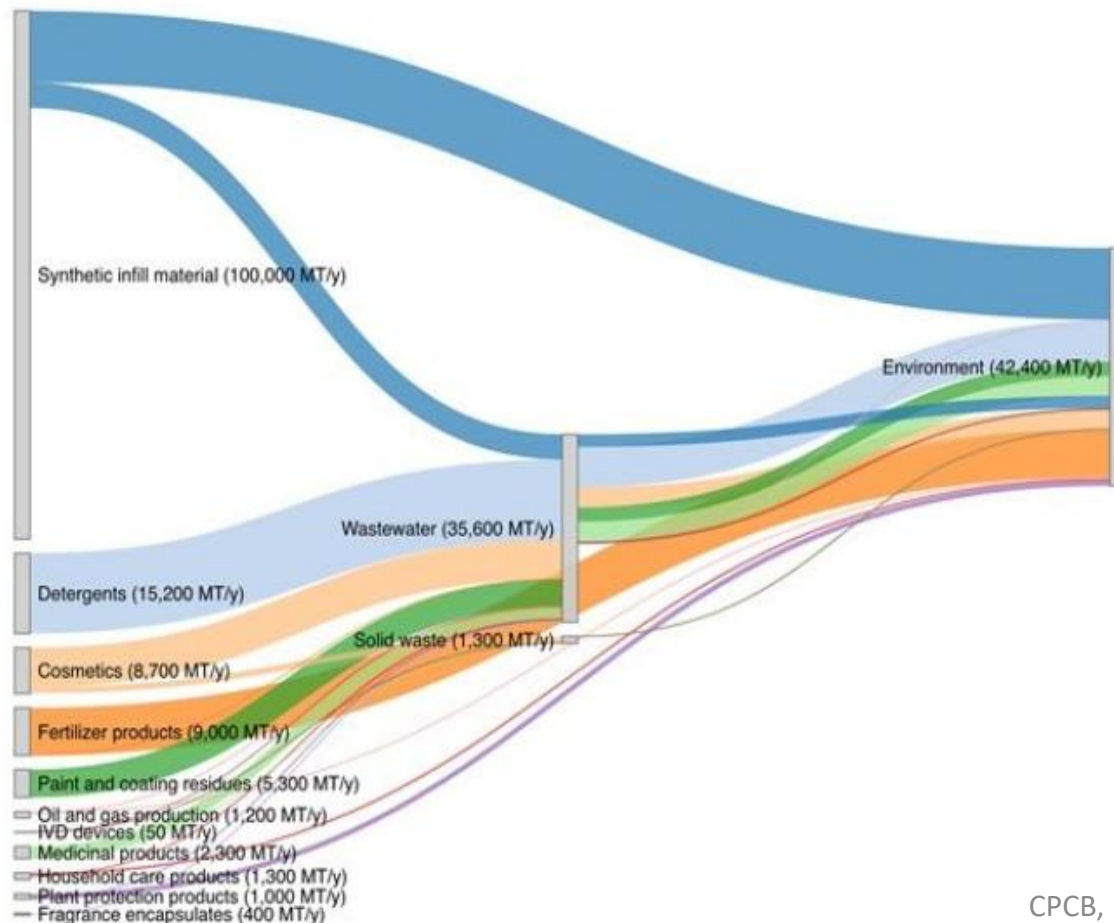
*“There is need for **further studies**, considering the studies already conducted, to be steered by the Committee comprising of CPCB, ICMR, Central Institute of Petrochemicals Engineering & Technology (CIPET), NCSCM, and any other expert institutions as required, under the Nodal coordination of CPCB. Such studies and recommendations/ suggestions **may cover standards for safe environment, remedial steps to reduce menace of micro plastic and addressing other incidental issues**. CPCB may incur expenditure on studies and other incidents out of Environmental Compensation funds.”*

&

- ❑ *“ Having regard to the media report that violation of environmental norms in handling of plastics is resulting in serious adverse health effect on human beings, it appears to be necessary to **ensure strict compliance of environmental norms** and to undertake **further study** to consider **whether the existing policies of enforcement of environmental norms need to be revisited in any manner in the interest of human health.**”*

## Regulations to control the pollution:

- Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- Committee for Socio-Economic Analysis (SEAC)



- Sankey plot showing major sources and sinks of primary microplastic emissions in the EU. Emissions to the environment include those to both the aquatic and terrestrial compartment. (Rheinberger et al., 2021)

# .....International initiatives till date – Europe

- ❑ In 2018, Commission adopted European Strategy for Plastics – a Circular Economy, about €100 million (for 2 yrs) has been allocated for implementation of plastics strategy and R&D projects.
- ❑ In January 2019, ECHA(European Chemical Agency) proposed a wide-ranging restriction on microplastics expecting to **prevent** the release of **5,00,000 tonnes of microplastics over 20 years.**
- ❑ **Development in 2022.....**

Specific laws with partial objectives	Directives for unintentional formation of microplastics	Production & release into the environment, both directly and indirectly
<ol style="list-style-type: none"> <li>1. Marine Strategy Framework</li> <li>2. Fertilising Products Regulation</li> <li>3. REACH restriction proposal</li> </ol>	<ol style="list-style-type: none"> <li>1. Plastics Waste Framework strategy</li> <li>2. Waste Framework Directive</li> <li>3. Marine Strategy Framework Directive</li> </ol>	<ol style="list-style-type: none"> <li>1. Eco-design Directive</li> <li>2. Waste Framework</li> <li>3. Urban Waste Water Treatment Sewage Sludge</li> <li>4. Directive on air quality</li> <li>5. Industrial Emissions</li> <li>6. Regulation on tyre labelling</li> <li>7. Regulation on motor vehicle type approval</li> </ol>

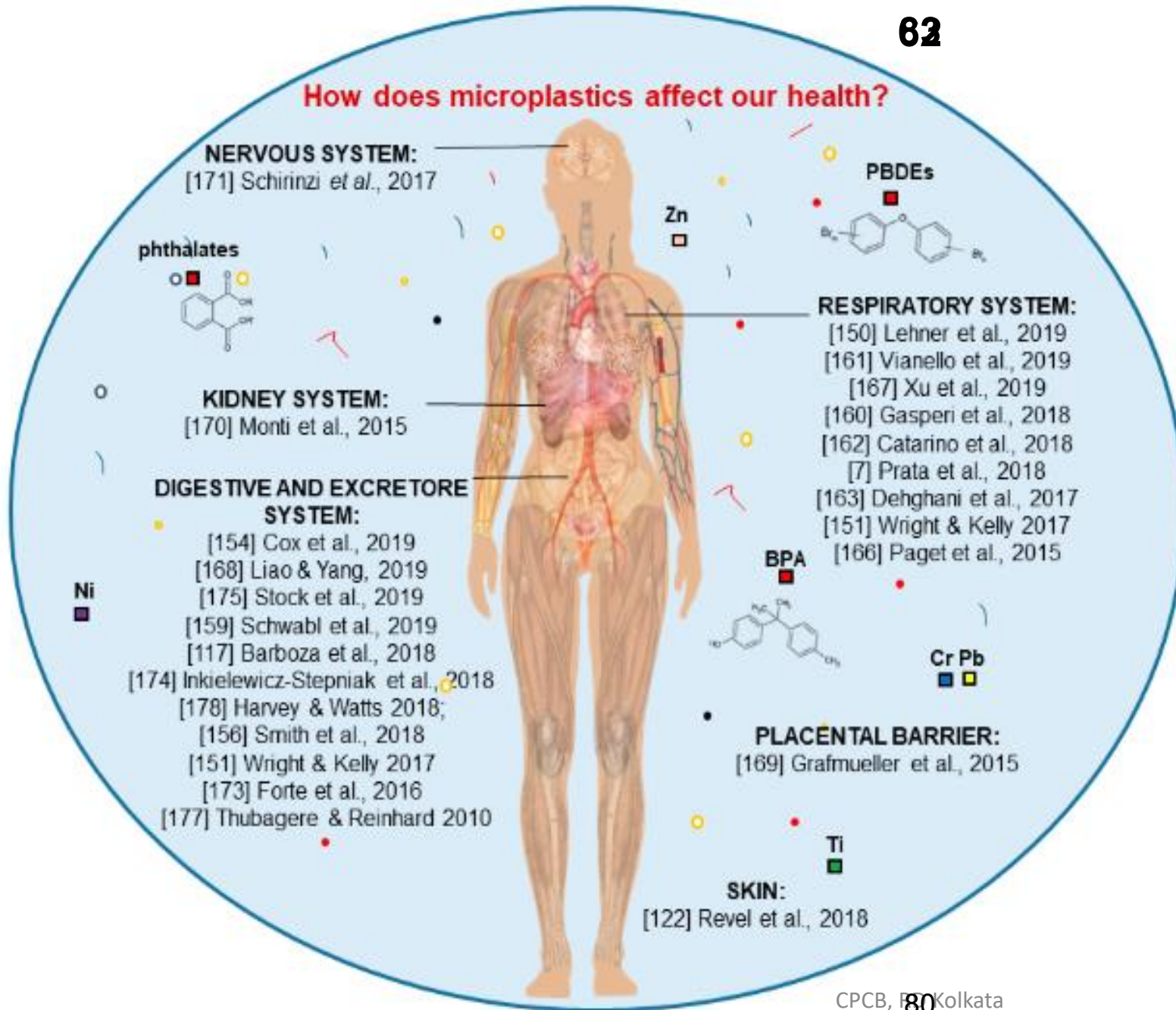
- December 18, 2015, Congress amended the Federal Food, Drug and Cosmetic Act (FD&C Act) by passing the **Microbead-Free Waters Act of 2015**.
  - ❖ Prohibits manufacturing, packaging, and distribution of rinse-off cosmetics containing plastic microbeads.
  - ❖ This new law also applies to products that are both cosmetics and non-prescription (also called “over-the-counter” or “OTC”) drugs, such as toothpastes.

**BIS 2017** : Plastic microbeads of diameter 5 mm or less, that are insoluble in water, and solid plastic particles used to exfoliate or cleanse in personal care products are banned

**Plastic Waste Management (Second Amendment) Rules, 2022:**

- a. Banned all single-use plastics from 1<sup>st</sup> July 2022.
- b. mandate to increase the thickness of plastic carry bags to over 120 microns from December 31.
- c. Banned imports of solid plastic waste from March 2019

Why do we need a standard?



Overview of scientific studies focused on the effects of micro and nanoplastics on human health.

Colored squares represent pollutants (organic and inorganic) that could be present in environmental matrices (free or associated with micro and nanoplastics) and that could enter into the human body through different entry routes.

**Campanale *et al.*, 2021**

Pollutants being carried by MP

Organism exposed to MP

# How to develop a standard?

- (a) Knowledge of the hazard: involves identification and characterization of microplastic.
- (b) Evaluation of the risk: establishes the probability and severity of potential adverse effects of microplastic on health and safety.
- (c) Assessment of hazard: determination routes of microplastic exposure and estimation of the number of people exposed.

## 2. Political and administrative stage

- (a) Acceptance to the tolerable risk
- (b) Determination to safeguard the public
- (c) Consideration of human ecology
- (d) Choice of control technology requires both formulations of strategy and selection
- (e) Legislation standards consider the existing national legal framework and identify necessary legal strategies.
- (f) Economics

# Segments for Developing Environmental standard

84

Segment	Execution plan
1. Identification of priority pollution issue	<ul style="list-style-type: none"> <li>❑ <b>Standard methodology for Sampling, processing and analysis</b></li> <li>❑ <b>Finalization of the matrix: Assessment of Quality &amp; Quantity</b> <ul style="list-style-type: none"> <li>A. Water (River, Lakes, Dams, Marine, Leachates &amp; Ground Water)</li> <li>B. Solid ( Sediments, Sludge, Soil)</li> <li>C. Air (Rural, Urban &amp; fugitive industrial emission)</li> <li>D. Biota (Fishes, Micro invertebrates)</li> <li>E. Packaged foods/drinks</li> <li>F. Existing water and waste water treatment facilities</li> </ul> </li> </ul>
2. Information on health effects	<b>ICMR-NIREH</b>
3. Assessment of exposure	<p>Through Outcome of 1 &amp; 2:</p> <ul style="list-style-type: none"> <li>A. Major Sources &amp; budgeting</li> <li>B. Quality &amp; Quantity</li> <li>C. Impact (includes risk) on Environment &amp; Human</li> <li>D. Removal efficiencies of existing facilities</li> </ul>
4. Strategies for prevention and control	<ul style="list-style-type: none"> <li>A. Identification &amp; Banning of selective additives usage and processes</li> <li>B. Technological intervention for removal MP and reuse of Plastic</li> <li>C. Issuance of directives restricting production and release</li> <li>D. Source control by legislation and awareness programs</li> <li>E. Promoting alternatives</li> </ul>

# .....Segments for Developing Environmental standard

Segment	Execution plan
5. Legal framework	<ol style="list-style-type: none"> <li>1. Nature of the decision</li> <li>2. Scope and development of environmental legislation</li> <li>3. Content and structure of regulation</li> <li>4. Institutional consideration</li> <li>5. Geographical dimension of environmental problems</li> <li>6. Supporting measures for regulatory strategy</li> </ol>
6. Consequences of different approaches to environmental health protection	<ol style="list-style-type: none"> <li>1. Optimisation of Preventive methods and socio-economic impacts</li> </ol>
7. Decision-making process	<ol style="list-style-type: none"> <li>1. Interaction between science and policy</li> <li>2. Constraints affecting development of the country</li> <li>3. Finalization of the standards for               <ol style="list-style-type: none"> <li>a) <b>Discharge into</b> <ol style="list-style-type: none"> <li>i. Inland surface water,</li> <li>ii. Public Sewers,</li> <li>iii. Land for irrigation and</li> <li>iv. Marine coastal areas</li> </ol> </li> <li>b) <b>Acceptable limits</b> for drinking water supply</li> </ol> </li> </ol>

# Work Distribution for identification & exposure study

- Distribution to cover the Matrices, Locations to address the gap

Sl no	Segment	Institutional Distribution
1	Spatial Analysis of Water, Soil & biota STPs/WTP, Solid waste Dump sites	Eastern Zone: CPCB – RD Kolkata Western Zone: CPCB – RD Vadodara Central Zone: ICMR – NIREH, Bhopal Northern Zone: CPCB Delhi Southern Zone: NCSCM, Chennai
2.	Air pollution	CPCB Delhi
3.	Coastal & Marine pollution	NCSCM, Chennai
4.	Health effect study	ICMR – NIREH, Bhopal
5.	Cosmetics, Packaged food & drinks	CIPET

*CIPET having adequate infrastructure and network, may initiate sampling and analysis in all the 4 zones (except south), till capacity building is done in other participatory institutes*

# Matrix and Location wise work plan: River

Sl. no.	Matrix	Segment	Existing study (Approx.) by independent researcher		Proposed representative study area (Water, Sediment & Biota)			
					Control group		Polluted stretch	
			Number	Name	Number	Name	Number	Name
1.	Water, Sediment & Biota, Water intake points	River	9	1. Ganga* 2. Brahmaputra* 3. Meghna 4. Adyar 5. Kosasthalaiyar 6. Multhirappuzhayar 7. Netravati 8. Alakananda 9. Indus  * Few locations covered only	1	Umngot /Dawki	17	1.Ganga 2. Damodar 3. Bidyadhari 4. Yamuna 5. Cauvery 6. Mahanadi 7. Godavari 8.Krishna 9. Narmada 10. Tapi 11. Mandovi & Zuari 12. Netravati & Sharavathi 13. Kochi Backwaters 14. Neendakara 15. Perumadhura

Sl no	Matrix	Segment	Existing study (Approx) by independent researcher		Proposed representative study area (Water, Sediment & Biota)			
					Control group		Polluted stretch	
			Number	Name	Number	Name	Number	Name
2.	Water, Sediment, Biota Water intake points	Lakes	5	1. Veeranam lake, TN 2. Red hills Lake, TN 3. Vembanad lake, Kerala 4. Renuka lake, HP 5. Anchar lake, Northwest Himalaya	2	Kankaria lake, Gujrat  Gurudongme r, Sikkim	15	1. Mirik lake, WB 2. Santragachi, WB 3. Ambazari Lake, Maharashtra 4. Puskar Lake, Rajasthan 5. Naraina Lake, Gujarat 6. Dal lake, J&K 7. Bellandur Lake, Bangalore 8. Naini lake, UK 9. Hussain Sagar, Telangana 10. Chilika Lake, Odisha 11. Vembanad lake, Kerala 12. Pulicat Lake, AP 13. Kolleru Lake, AP 14. Upper lake, MP 15. Lower lake, MP

Sl no	Matrix	Segment	Proposed representative study area (Water, Sediment & Biota)	
			Polluted stretch	
			Number	Name
3.	Water, Sediment & Biota, Water intake points	Dams	10	1. Panchet, WB 2. Mythan, Jharkhand 3. Hirakund, Odisha 4. Nizam Sagar Dam, Telangana 5. Sardar sarovar, Gujarat 6. Tehri, UK 7. Tungavadra, Karnataka 8. Uri Hydroelectric Dam, J& K 9. Gandhi Sagar Dam, MP 10. Kolar Dam, MP 11. Idukki Dam, Kerala 12. Govind Ballabh Pant Sagar Dam , UP 13. Jayakwadi Dam, Maharashtra

# Ground water & Marine water

Sl no	Matrix	Segment	Existing study (Approx) by independent researcher		Proposed representative study area (Water, Sediment & Biota)
			Number	Name	Polluted stretch
4.	Water, Sediment & Biota	Ground Water (water extraction point)	2	Chennai, TN Punakayal, TN	State wise, representative data collection considering both urban and rural areas.
	Water, Sediment & Biota	Marine water & Coastal Pollution	41	Karnataka Kerala Tamilnadu Andaman Nicobar Lakshyadweep	Sampling point: <ol style="list-style-type: none"> <li>1. Transect at every 200km interval along the coastal line of West Bengal, Odisha, AP, Goa, Maharashtra, Gujarat</li> <li>2. Upto 200m depth contour (continental shelf)</li> </ol>

Sl no	Matrix	Segment	Existing study (Approx) by independent researcher		Proposed study area	
					Polluted location	
			Number	Name	Number	Name
5.	Soil, Leachate & affected GW	Solid waste Dumpsite	0	none		State wise 1 or 2 major dumpsite
6.	Air	Urban	4	Chennai, TN Patna , Bihar Nagpur, Maharashtra Varanasi, UP	<b>As per the ongoing study by CPCB</b>	
7.	Health effect	Animal study Clinical study Human study	11	Arthropod and fishes	<b>Plan to be developed by ICMR NIREH</b>	

# Evaluation of existing treatment technologies

Sl. No.	Treatment	Matrix	Technology wise evaluation (State wise evaluation)	
			Conventional	Advanced
1	Sewage treatment plants	Water & sludge	AL OP ASP TF	SBR MBBR FBAS MBR & others
2	Water treatment plants		State-wise evaluation	State-wise evaluation

## **Preparation and submission of interim report to Hon'ble NGT:**

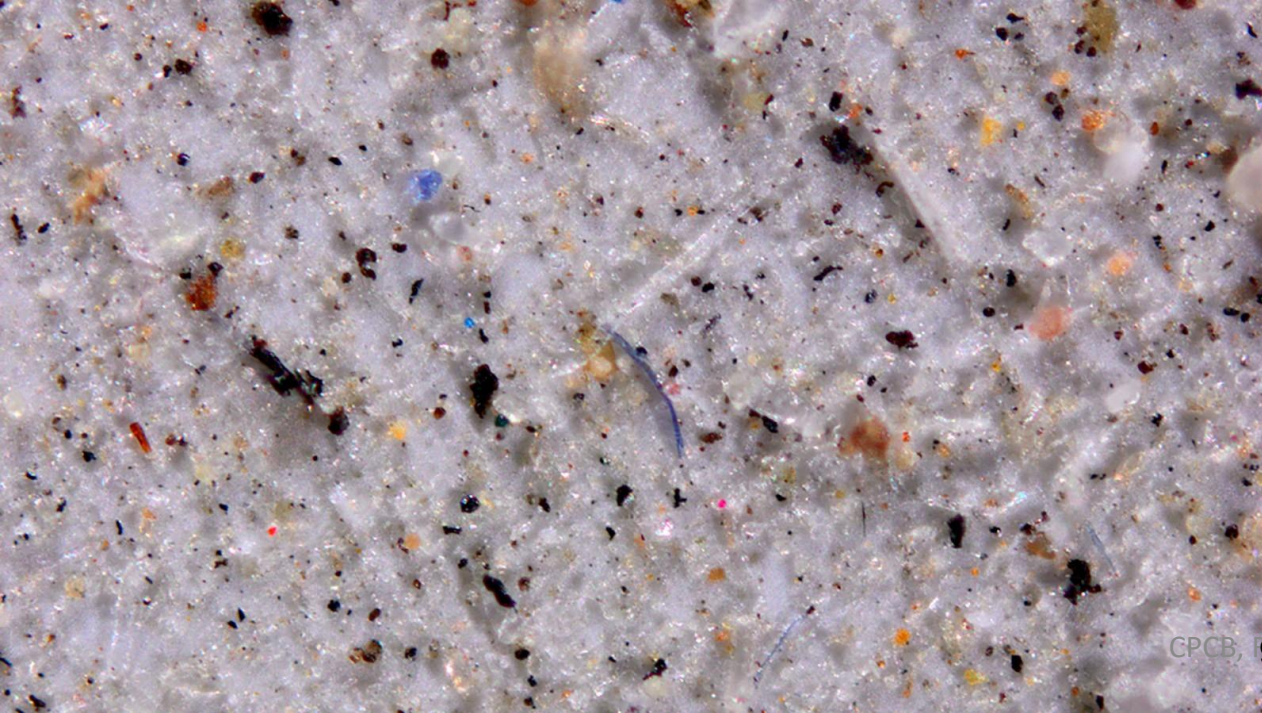
1. Distribution of microplastics in the environment – based on LIMITED studies in Indian context.
2. Impact on Environment – based on international studies
3. Impact on Human Health – based on international studies
4. Gap analysis & proposed methodology for the study indicating requirement for establishing a strong database, budgeting, impact, prevention and control.



96



94



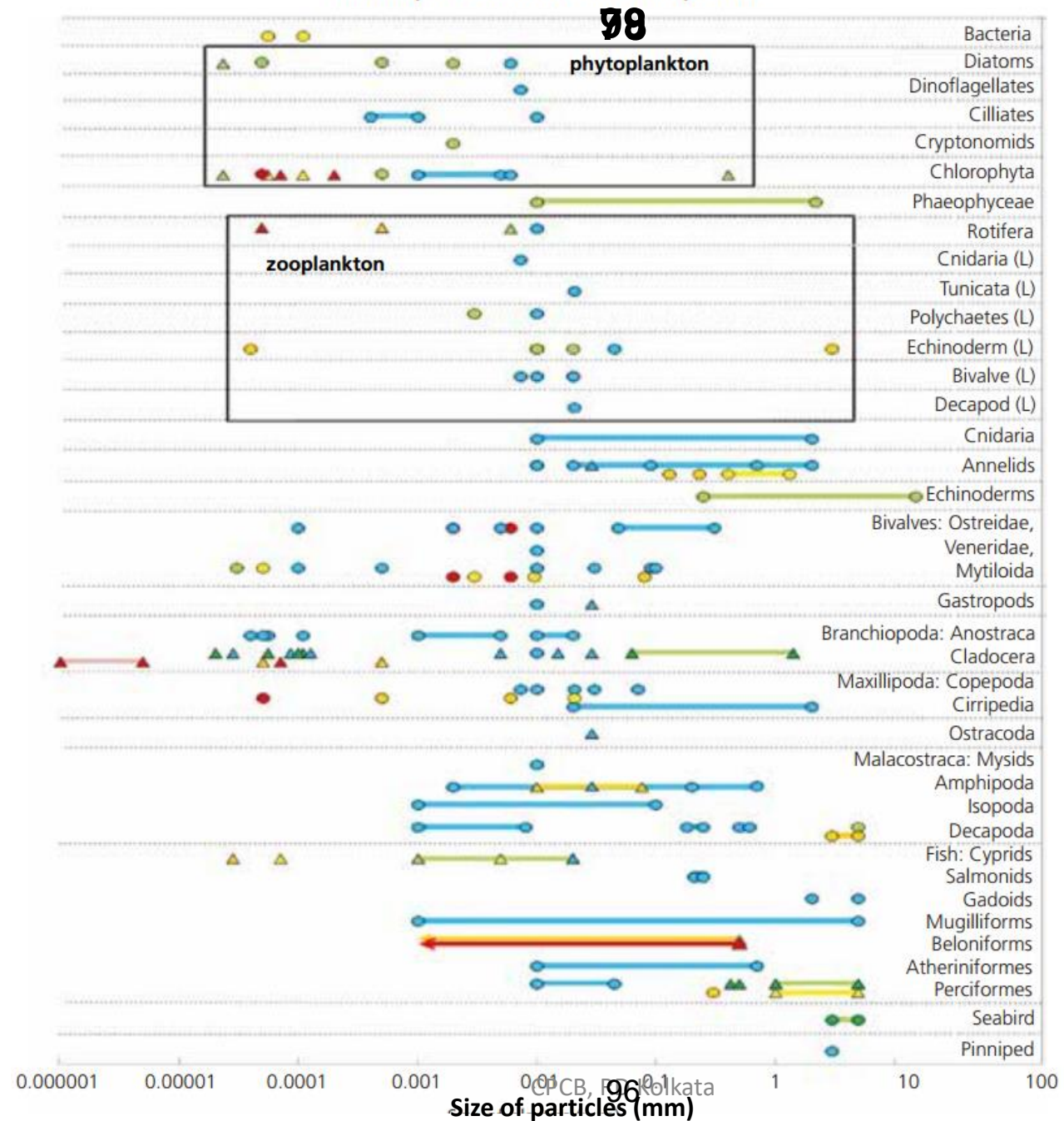
**Thank You**

**Table 2** Types of pollutants carried by different types of microplastics

Microplastic	Pollutant	Reference	
PA	Benzene derivative	Rehse et al. (2018)	
PBAT	Heavy metals	Kedzierski et al. (2018)	
PE	Lubrication oil	Haghi and Banaee (2017)	
	PAH	Oliveira et al. (2013)	
	Paraquat	Rochman et al. (2013b)	
	PBDE	Llorca et al. (2018)	
	PCB	Wang et al. (2015)	
	Per- and polyfluoroalkyl substances	Fisner et al. (2017)	
	PFOSA	Zhan et al. (2016)	
	PPCP	Hu et al. (2017)	
	Triclosan	Frydkjær et al. (2017)	
	PET	Heavy metals	Rochman et al. (2013a)
PP	Heavy metals	Rochman et al. (2013b)	
	PAH	Fisner et al. (2017)	
PS	Antibiotic	Wen et al. (2018)	
	Cadmium	Zhang et al. (2019b)	
	Lubrication oil	Llorca et al. (2018)	
	PCB	Wang et al. (2015)	
	Per- and polyfluoroalkyl substances	Guo et al. (2018)	
	PFOSA	Zhan et al. (2016)	
	Roxithromycin	Hu et al. (2017)	
	PVC	17 $\alpha$ -Ethinylestradiol	Qu et al. (2018)
		Antibiotic	Sleight et al. (2017)
		Benzene derivatives	Kedzierski et al. (2018)
Heavy metals		Rochman et al. (2013a)	
Odesmethylvelafaxine		Pascall et al. (2005)	
PCB		Wu et al. (2016)	
PFOSA		Guo et al. (2018)	
Phenanthrene			
Venlafaxine			
LDPE		Heavy metals	Rochman et al. (2013a)
HDPE	Heavy metals	Holmes et al. (2014)	

98  
95  
CPCB, Kolkata

PBAT polybutylene adipate terephthalate, HDPE high-density polyethylene, PFOSA perfluorooctanesulfonamide, PPCP pharmaceuticals personal care product



ANNEXURE-III  
97

# 3<sup>RD</sup> MEETING OF THE EXPERT COMMITTEE ON MICROPLASTICS

(w.r.t. Hon'ble NGT OA No. 251/2022 of 2022)

Convened by  
Central Pollution Control Board, Delhi



Presented by

ICMR – National Institute for Research in Environmental Health (NIREH), Bhopal



Microplastics have been reported and estimated in:

- Human saliva
- Human blood
- Human placenta
- Human colon
- Human stool
- Human lungs

Total number of studies till date: 1

No. of human samples: 2000

Instrument:  $\mu$ Raman Spectroscopy

Total number of particles reported: 650

Concentration of MP reported: 0.33 particles / individual

Impact on health: Not reported



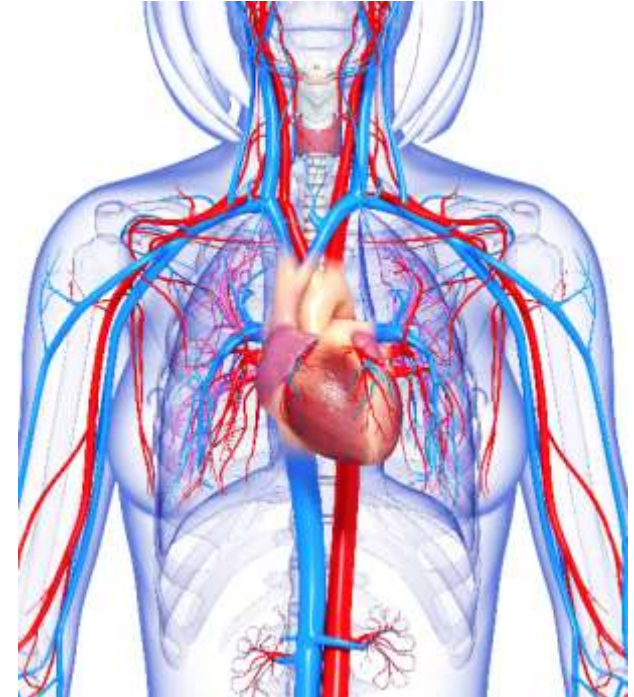
Total number of studies till date: 1

No. of human samples: 22

Instrument: Pyr GC – MS (limitation 700 nm)

Concentration of MP reported: 1.6  $\mu\text{g} / \text{mL}$

Impact on health: Not reported



Total number of studies till date: 1

No. of human samples: 6

Instrument:  $\mu$ Raman Spectroscopy (limitation 5  $\mu$ m)

No. of MP particles reported: 12 particles in 4 samples out  
of 6 tested

Impact on health: Not reported



No. of human samples: 11

Instrument: FTIR Microscope

Concentration of MP reported:  $28 \pm 15.4$  particles / g  
colon tissue



No. of MP particles reported: 331 particles / individual specimen

Impact on health: Not reported

## First Study

No. of human samples: 8

Instrument: FTIR microspectroscopy (limitation 50  $\mu\text{m}$ )

Concentration of MP reported: 2 particles / g of stool

Impact on health: Not reported

## Second Study

No. of human samples: 24

Instrument: FTIR microspectroscopy

No. of MP particles reported: 1 particle / g - 36 particles / g of stool

Impact on health: Not reported



## First Study

No. of human samples: 13

Instrument:  $\mu$ FTIR Spectroscopy (limitation 3  $\mu$ m)

Concentration of MP reported:  $0.69 \pm 0.84$  particles / g lung tissue

No. of MP particles reported: 39 particles in 11 samples out of 13 tested

Impact on health: Not reported

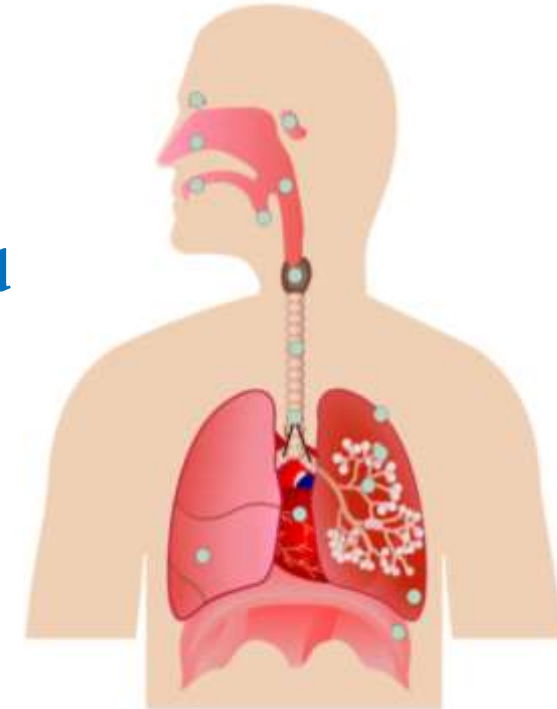
## Second Study

No. of human samples: 20

Instrument: Raman Spectroscopy (limitation 20  $\mu$ m)

No. of MP particles reported: 37 particles in 13 samples out of 20 tested

Impact on health: Not reported



# Human Health Research Scenario in the Area of Microplastics



icmr  
INDIAN COUNCIL OF  
MEDICAL RESEARCH

105  
NIREH  
NATIONAL INSTITUTE FOR RESEARCH  
IN ENVIRONMENTAL HEALTH

## Genotoxic and cytotoxic effects of microplastics in human blood lymphocytes

No. of human samples: 2

Size of microplastic particle studied: 10 – 45  $\mu\text{m}$

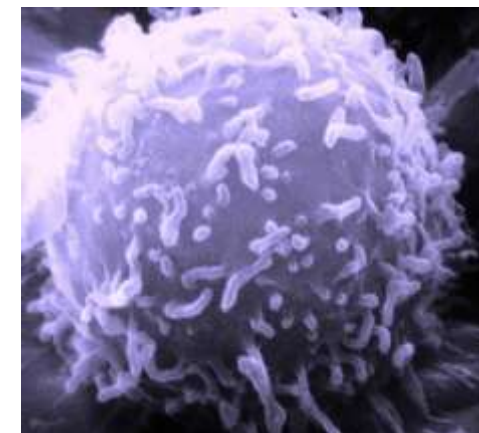
Type of microplastic particle studied: Polyethylene

Concentrations of MP studied: 25, 50, 100, 250, 500  $\mu\text{g/mL}$  of blood

Type of study: *in-vitro*

Result: Genomic instabilities were reported

Mechanism: Unknown



# Human Health Research Scenario in the Area of Microplastics



icmr  
INDIAN COUNCIL OF  
MEDICAL RESEARCH

106  
NIREH  
NATIONAL INSTITUTE FOR RESEARCH  
IN ENVIRONMENTAL HEALTH

Cytotoxic effects of microplastics accompanied by metal nanoparticles in human cerebral and epithelial cells

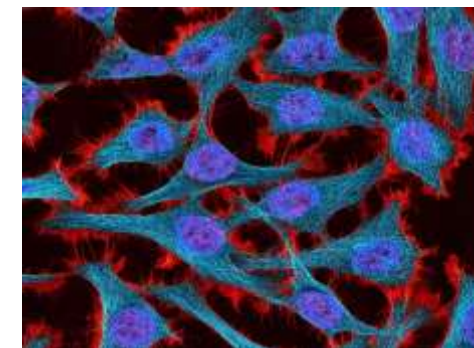
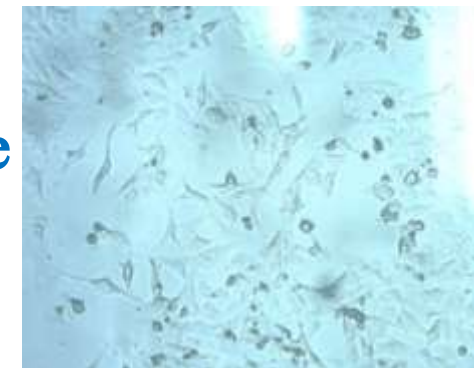
Size of microplastic particle studied: 3 – 16  $\mu\text{m}$

Type of microplastic particle studied: Polyethylene & polystyrene

Concentrations of MP studied: 50  $\mu\text{g/L}$  to 10  $\text{mg/L}$

Type of study: *in-vitro*

Result: Oxidative stress was reported



*Studies are only about the presence of microplastics in human body, NOT about their physiological / psychological impact*

*Studies showing the genotoxic and cytotoxic impacts of the microplastics are in-vitro studies, conducted over ONLY two individuals*

*Health impacts of emerging contaminants (e.g. MPs) are chronic. So, long-term studies are required to establish CAUSE-EFFECT RELATIONSHIP*

*Without establishing cause-effect relationship, it would not be appropriate to set STANDARDS for drinking water having microplastics*

Item No. 06

(Court No. 1)

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

(By Video Conferencing)

Original Application No. 251/2022

In re: News item published in The Hindu dated 29.03.2022 titled  
**“Detecting microplastics in human blood”**

Date of hearing: 05.04.2022

**CORAM: HON’BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON  
HON’BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER  
HON’BLE MS. JUSTICE PUSHPA SATHYANARAYANA, JUDICIAL MEMBER  
HON’BLE PROF. A. SENTHIL VEL, EXPERT MEMBER**

**ORDER**

1. Proceedings have been initiated in light of captioned media report to the effect that in absence of enforcement of environmental norms on the subject, small particles of plastics enter the blood cells of human being through food, having adverse health impact.
2. Having regard to the media report that violation of environmental norms in handling of plastics is resulting in serious adverse health effect on human beings, it appears to be necessary to ensure strict compliance of environmental norms and to undertake further study to consider whether the existing policies of enforcement of environmental norms need to be revisited in any manner in the interest of human health.
3. It appears from the record that the Southern Bench of NGT has taken up *Suo Moto* based on similar media reports in OA No. 99/2021(SZ), *Tribunal on its own motion Suo Motu based on the news*

item in *The Times of India Newspaper, Chennai Edition dt. 05.04.2021*, “Chennai, you are breathing micro plastic” vs. *The Chief Secretary to Government of Tamil Nadu Chennai and Ors.* and OA No. 174/2021(SZ), Tribunal on its own motion *Suo Motu* based on the news item in *The Times of India Newspaper, Chennai Edition dt. 27.07.2021*, “High level of metals PM 2.5 found in city’s air you’re breathing” vs. *The Chief Secretary to Government of Tamil Nadu Chennai and Ors.*, wherein CPCB carried out study on analysing micro plastic in ground water in context of landfills leachate and analysis through National Centre for Sustainable Coastal Management (NCSCM), Chennai. To avoid conflicting orders, the said matters stand transferred to the Principal Bench of this Tribunal for being dealt alongwith the present matter. Counsel appearing in the said matters be informed by e-mail. If they have any objection, they are at liberty to move this Tribunal. Record of the said matters be called for in the form of scanned documents. It is not necessary for the time being to call for the original record which may be retained at Chennai Bench. The date fixed in the said matters will stand deferred to 19.10.2022 on which the present matter will now be listed. The titles of the said matters be now modified as *In re: News Item published in The Times of India, Chennai dated 05.04.2021 titled “Chennai, you are breathing micro plastic”* in OA No. 99/2021(SZ) and *In re: News Item published in The Times of India, Chennai dated 27.07.2021 titled “High level of metals PM 2.5 found in city’s air you’re breathing”* in OA No. 174/2021(SZ).

4. There is need for further studies, considering the studies already conducted, to be steered by the Committee comprising of CPCB, ICMR, Central Institute of Petrochemicals Engineering & Technology (CIPET), NCSCM, and any other expert institutions as required, under the Nodal coordination of CPCB. Such studies and recommendations/ suggestions

may cover standards for safe environment, remedial steps to reduce menace of micro plastic and addressing other incidental issues. CPCB may incur expenditure on studies and other incidents out of Environmental Compensation funds.

5. The report of the study with suggestions for remedial action may be filed before this Tribunal by e-mail by August 31, 2022 with a copy to the Secretary, MoEF&CC as input for consideration of policy on the subject. MoEF&CC may file its action taken report in the matter before the next date by e-mail at [judicial-ngt@gov.in](mailto:judicial-ngt@gov.in) preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.

List for further consideration on 19.10.2022.

A copy of this order along with the media report be forwarded to CPCB, ICMR, CIPET, NCSCM, Chennai and MoEF&CC by e-mail for compliance.

Adarsh Kumar Goel, CP

Sudhir Agarwal, JM

Pushpa Sathyanarayana, JM

Prof. A. Senthil Vel, EM

April 05, 2022  
Original Application No. 251/2022  
SN

**Annexure-III****Action Plan**

<b>S.No.</b>	<b>Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM</b>	<b>Concerned Ministries/Department/ Body</b>	<b>Action plan with time line</b>
1.	Uniform procedure for sampling & analysis may be developed by organizations involved in microplastic analysis ( CIPET, NCSCM, MoES-NCCR) which can be adopted uniformly across the country till the time ISO standard is finalized.	CPCB to develop uniform procedure for sampling and analysis along with Central Institute of Petrochemicals, Engineering & Technology (CIPET), National Centre for Sustainable Coastal Management (NCSCM) and National Centre for Coastal Research (NCCR), CSIR- IITR and CSIR-NEERI	<ul style="list-style-type: none"> <li>i. First meeting for finalization of uniform methodology for sampling and analysis of micro plastics conducted on November 09, 2023( Minutes placed at Annexure I )</li> <li>ii. Second meeting proposed to be during November 2023 to finalize Uniform procedure for sampling &amp; analysis</li> </ul>
2.	Source of generation of microplastics including industries, waste management, waste water treatment, ocean activities etc. have been identified. However, exact quantum of microplastics generated from the identified source has not been determined.	CPCB, CIPET/DCPC, NCSCM/MoEFCC, NCCR/MoES, CSIR- IITR and CSIR-NEERI	Point 2-6, 13,14, 26 <ul style="list-style-type: none"> <li>i. Preliminary listing of all points to be monitored.</li> <li>ii. Proposed SOP for monitoring.</li> <li>iii. Compilation of technologies for Micro plastic removal.</li> <li>iv. Meeting with Stake holders</li> <li>v. Awarding of work</li> <li>vi. Execution of work</li> </ul>
3.	Microplastic concentration in transfer media is available for soil/beach sediment, surface water bodies, biota and ocean water. Microplastic concentration for sludge, specifically when it is converted to compost for land application is not available	CPCB, CIPET/DCPC, NCSCM/MoEFCC, NCCR/MoES CSIR- IITR and CSIR-NEERI	
4.	Source monitoring, transfer end use of all possible sources listed in Table 3.1 of the report to be covered. Emphasis to be laid	CPCB, NCSCM/MoEFCC, NCCR/MoES, CSIR- IITR and CSIR-NEERI	

	on such areas for which no information is available.		
5.	Regular monitoring of various water quality parameters to be conducted to provide insight into the presence and concentration of microplastics in environmental matrices (water, sediments, biota)	CPCB, NCSCM/MoEFCC, NCCR/MoES, CSIR- IITR and CSIR-NEERI	
6.	Microplastic leakages and pathways may be monitored in order to identify further sources and hotspots of microplastics.	CPCB, NCSCM/MoEFCC, NCCR/MoES, CSIR- IITR and CSIR-NEERI	
7.	Uniform procedure for sampling & analysis as finalized by this Committee may be adopted for such studies till the time ISO Standards are finalized.	CPCB, CIPET/DCPC, NCSCM/MoEFCC, NCCR/MoES, CSIR- IITR and CSIR-NEERI	Covered in 1
8.	Health impact of emerging contaminants and long term studies are required to establish Cause effect relationship of microplastics on human health	Indian Council of Medical Research /DHR, CPCB, CIPET/DCPC, NCSCM/MoEFCC, NCCR/MoES	Nodal Agency - ICMR
9.	Studies conducted on the matter have reported about the presence of microplastics in human body. Physiological or psychological impact has not been reported in these studies.	ICMR/DHR	Nodal Agency - ICMR
10.	The aforementioned studies should cover different type, concentration and shapes of microplastics. Impact of chemicals/biofilms associated with Microplastics on human health	Indian Council of Medical Research /DHR, CPCB, CIPET/DCPC, NCSCM/MoEFCC, NCCR/MoES	Nodal Agency – ICMR

	<p>lth to be covered. The studies may include the following:          Estimation of the duration and frequency of human exposure to microplastics. Microplastic monitoring as required may be conducted for the same.          Once the exposure assessment is done precisely,          dose- response assessment may be carried out, where the minimum concentration(of microplastics) responsible for any observable effect (on human) shall be assessed..</p>		
11.	Bioassays may be conducted to assess the Eco- toxicological impact of micro plastics on animal life.	CPCB, CSIR-IITR, CSIR-NEERI	Nodal Agency – ICMR
12.	Standards development (Source & ambient) for microplastics may be taken up following establishment of the cause-effect relationship of micro plastics on human health	CPCB, ICMR/DHR	Post completion of Activities listed at 2-11
13.	Available technologies to be assessed for the efficacy for removal of microplastic	CPCB, DCPC/CIPET, MoEFCC/NCSCM, MoES/NCCR, CSIR- IITR and CSIR-NEERI	
14.	Technologies to be developed for removal of micro plastics from Air & Soil	CPCB, DCPC/CIPET, MoEFCC/NCSCM, MoES/NCCR, CSIR-NEERI, CSIR- IITR and CSIR-NEERI	
15.	Source-directed interventions, Sustainable design and manufacturing of textiles, tyres, and complementary products (laundry detergents, road	Ministry of Textiles, Department of Promotion and Industry and Internal Trade,	

	<p>surfaces, and vehicles ), to minimize the tendency of products to contribute to microplastics generation;</p> <p>Restrictions on microplastics in the manufacture and sale of certain personal care and cosmetic products containing microplastics.</p> <p>Product requirements for household, commercial, or industrial washing machines. For instance, Australia and France have introduced measures to phase in micro fibre filters on new washing machines</p>	<p>Ministry of Heavy Industries, Ministry of Road Transport and Highways, Department of Chemicals and Petro-Chemicals</p> <p>CDSCO/Department of Health and Family Welfare, Department of Pharmaceuticals</p> <p>Department of Promotion and Industry and Internal Trade</p>	
16.	<p>End-of-life interventions, effective solid &amp; plastic waste management practices, to prevent waste leaking into the environment and potentially contributing to microplastics generation including the following;</p> <p>Reducing the amount of plastic waste that enters landfills and dumpsites through the implementation of waste reduction policies and initiatives, such as waste-to-energy programs and increased recycling.</p> <p>Microplastics can also be reduced by supporting the development and use of biodegradable plastic alternatives</p>	<p>Department of Drinking Water and Sanitation, Ministry of Housing and Urban Affairs,</p>	

17.	End-of-pipe interventions, wastewater, stormwater, and road runoff management and treatment, to retain the emitted microplastics before these reach water bodies.	Department of Water Resources, River development and Ganga Rejuvenation,  Department of Drinking Water and Sanitation,  Ministry of Housing and Urban Affairs	
18.	Maximizing clean drinking water supply to all citizens in the country	Department of Drinking Water and Sanitation	
19.	Other Best practices as listed below for minimizing microplastics in environment may be followed: Install physical barriers such as screens and filters on STP/WWTP systems to help reduce the amount of microplastics that enter rivers, lakes, and oceans.  Support sustainable fishing practices to reduce the amount of microplastic entering rivers from fishing equipment.  Implementation of Clean-up efforts for beaches and rivers	Department of Drinking Water and Sanitation, Ministry of Housing and Urban Affairs. Department of Water Resources, River development and Ganga Rejuvenation,  Department of Fisheries  Ministry of Earth Science	
	Training and capacity building including microplastic monitoring, analysis, health impacts studies may be taken up for	CPCB, DCPC/CIPET, MoEFCC/NCSCM, MoES/NCCR, CSIR- IITR and CSIR-NEERI	

	effective implementation of aforementioned points.”		
	Other conclusions given in the report		
20.	Independent studies regarding microplastics have been conducted by various organizations in the country including CPCB, MoES- NC CR, NCSCM, NPC and CIPET .Further international studies have been conducted by WHO, UNEP , OECD and others.		
21.	The studies have primarily focused on monitoring microplastics (concentration, polymer type, colour, shape) in various environmental matrices.		
22.	Occurrence of microplastics has been reported in oceans, sediments, surface water, ground water, wastewater, tap water, bottled water, air, food products, aquatic organisms, and human beings		
23.	There is currently no standard method for sampling and analysis of microplastics in the environment. ISO is currently working on the subject		
24.	Sampling and analytical methods adopted by different institutions in India are similar with minor variations. Variation in Microplastic concentrations units reported by different organizations has been observed		

26.	Microplastic concentration in end use areas including ambient air, drinking water and ground water is available.		
-----	--	--	--

Item No. 03

Court No. 1

**BEFORE THE NATIONAL GREEN TRIBUNAL  
PRINCIPAL BENCH, NEW DELHI**

Original Application No. 1063/2024

News Item titled "Pollution control board reels in ghost nets" appearing in the Times of India dated 04.08.2024.

Date of hearing: 14.08.2024

**CORAM: HON'BLE MR. JUSTICE PRAKASH SHRIVASTAVA, CHAIRPERSON  
HON'BLE MR. JUSTICE ARUN KUMAR TYAGI, JUDICIAL MEMBER  
HON'BLE DR. A. SENTHIL VEL, EXPERT MEMBER**

**ORDER**

1. This Original Application is registered *suo-motu* on the basis of the news item titled "Pollution control board reels in ghost nets" appearing in the Times of India dated 04.08.2024.

2. The matter relates to the collection and recycling of fishnets which otherwise become 'ghost nets'. As per the article, these ghost nets are the torn and discarded fishnets that drift underwater, and strangle and kill fish, coral reefs, turtles and other organisms and then they become marine debris.

3. The article explains that the HDPE (high-density polyethylene) or nylon fishnets wear out every six months to a year. If torn, the torn bit goes underwater, strangling fish such as anchovies and prawns. This affects fish reproduction and the business of fishermen. Furthermore, marine mammals such as turtles and whales that come up to breathe can get caught in ghost nets. These nets also lead to algal growth if they strangle coral reefs. It also alleges that the bundled-up, torn nets also cause sanitation and health issues, particularly during the monsoon.

4. The above news item indicates violation of the provisions of The Environment (Protection) Act, 1986 and CRZ Notification, 2019, 2.1.1 CRZ 1A.
5. The news item raises substantial issue relating to compliance of the environmental norms and implementation of the provisions of scheduled enactment.
6. Power of the Tribunal to take up the matter *suo-motu* has been recognized by the Hon'ble Supreme Court in the matter of "*Municipal Corporation of Greater Mumbai vs. Ankita Sinha & Ors.*" reported in 2021 *SCC Online SC 897*.
7. Hence, we implead following as respondents in this matter:
  - (i) Central Pollution Control Board, Through its Member Secretary, Parivesh Bhawan, East Arjun Nagar, Delhi-110032
  - (ii) Tamil Nadu Pollution Control Board, Through its Member Secretary, 76, Mount Salai, Guindy, Chennai - 600 032
  - (iii) Department of Fisheries (Government of India), Through its Secretary, Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying Krishi Bhawan, New Delhi - 110001
  - (iv) Commissioner of Fisheries, Gujarat (Agriculture, Farmers Welfare and Co-operation Department) 3rd Floor, Block no-10, Jivraj Mehta Bhavan, Gandhinagar - 382010.
  - (v) Maharashtra Department of Fisheries, Through its Commissioner, Commissioner of Fisheries, C-24 2nd floor, Mittal Tower C- wing, Nariman point near Vidhan Bhavan, Mumbai-400021
  - (vi) Goa Directorate of Fisheries, Through its Director, Dayanand Bandodkar Marg. Panaji-Goa

- (vii) Karnataka Department of Fisheries, Through its Director, Directorate of Fisheries, 3rd Floor, Podium Block, Visvesvaraya Centre, Dr. Ambedkar Veedhi, Bengaluru – 01
- (viii) Kerala Directorate of Fisheries, Through its Director, Directorate Of Fisheries, Vikas Bhavan, Thruvananthapuram, Kerala
- (ix) Andhra Pradesh Department of Fisheries, Through its Commissioner, Office of Commissioner of Fisheries, Bandar Road, Poranki, Vijayawada – 521137
- (x) Odisha Department of Fisheries, Through its Director, Nuapatna Rd, Manglabag, Mangalabag, Cuttack, Odisha 753001
- (xi) Tamil Nadu Commissioner of Fisheries and Fishermen Welfare, Through its Director, 3rd floor, Integrated office complex for Animal Husbandry and Fisheries department, No.571, Nandanam, Chennai - 600 035
- (xii) West Bengal Department of Fisheries, Through its Director, Meen Bhaban, 31, GN Block, Sector V, Salt Lake City, Kolkata-700091
- (xiii) Puducherry Department of Fisheries, Through its Director, Fishing Harbour Complex, Thengaithittu, Mudaliarpet Post, Puducherry-605 004.
- (xiv) Department of Fisheries, Through its Director, Kilthan Island, Kiltan Island, Lakshadweep
- (xv) Andaman and Nicobar Directorate of Fisheries, Through its Director, Thomas Colony, Junglighat, Port Blair, Andaman and Nicobar Islands 744101

8. Issue notice to the above respondents for filing their response/reply in the form of affidavit at least one week before the next date of hearing. If any of the respondents directly files the reply without routing it through his advocate then the said respondent will remain virtually present to assist the Tribunal.
9. List on 26.11.2024.

Prakash Shrivastava, CP

Arun Kumar Tyagi, JM

Dr. A. Senthil Vel, EM

August 14, 2024  
Original Application No. 1063/2024  
AS.