File No.: 11/36/2022-HSM
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(HSM Division)
*****

Indira Paryavaran Bhawan,
Jal wing, Second floor,
Aliganj, Jor Bagh Road,
New Delhi-110003
Dated: 21st November,2023

To,
The Registrar General,
Principal Bench,
National Green Tribunal,
Coparnicus Marg, New Delhi-110001

Subject:Report in the matter filed by Ministry of Environment, Forest and Climate Change, Government of India in the matter Original Application No. 251/2022 In re : News item published in The Hindu dated 29.03.2022 titled "Detecting microplastics in human blood"- before Hon'ble NGT, Principal Bench, New Delhi-reg.

Sir,

In compliance to the order dated 01.03.2023 and 09.10.2023 passed by the Hon'ble National Green Tribunal in OA no. 251 of 2022, In re : News item published in The Hindu dated 29.03.2022 titled "Detecting microplastics in human blood", a report is hereby attached with a request to put up before the Hon'ble National Green Tribunal for consideration.

This issues with the approval of the Competent Authority.

Enclosure: As above

Yours Sincerely,

डा0 अमित लव
DR. (Amit Love)
Scientist 'E'
SCIENTIST 'E'/ADDITIONAL DIRECTOR
पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय
Minisrtry of Environment Forest & Climate Change
भारत सरकार / Govt. of India
नई दिल्ली / New Delhi

Report filed by Ministry of Environment, Forest and Climate Change, Government of India in the matter Original Application No. 251/2022 In re : News item published in The Hindu dated 29.03.2022 titled "Detecting microplastics in human blood"- before Hon'ble NGT, Principal Bench, New Delhi-reg.

1. The Hon'ble NGT, had initiated the suo-motu proceedings in the matter Original Application No. 251/2022 in re : News item published in The Hindu dated 29.03.2022 titled "Detecting microplastics in human blood" and two related matters. The Hon'ble NGT vide order dated 05.04.2022, directed a report to be prepared in the matter along with ICMR, Central Institute of Petrochemicals Engineering & Technology (CIPET), NCSCM, and any other expert institutions as required, under the Nodal coordination of CPCB.

2. CPCB had submitted the report on behalf of the Committee on 13.02.2023. Subsequently, vide order dated 01.03.2023 Hon'ble NGT observed the following:

"*7. The report appears to be based on scientific basis and can be acted upon subject to objections, if any. The report shows clear potential of particulates of MP entering blood cells of human beings which can have adverse health impact, there is need for further remedial action for enforcing the 'Sustainable Development' and 'Precautionary' principles by way of preventive and remedial measures to*

neutralize anticipated harm to environment and public health, pending further scientific investigations for laying down standards, as suggested in the report".

It was also directed to consider the above report of CPCB and subject to any objections in the report it may be raised before the Tribunal, interventions may be introduced at the earliest, preferably within four months from today by the Secretary, MoEF&CC in consultation with CPCB,ICMR,CIPET,NCSCM, and any other expert institutions. The relevant para is quoted herein below:

> *"9. Thus, while proposed studies may be undertaken expeditiously and completed at the earliest, interventions need to be immediately introduced as short-term measures in future designing and manufacturing of products which are potential threat for generating MP like Textiles, Tyres, and Complementary Products (laundry detergents, road surfaces, and vehicles), manufacture and sale of certain personal care and cosmetic products containing MP, household, commercial, or industrial washing machines. Such other measures as may be identified may also be taken. For this purpose, the concerned Ministries need to consider the above report of CPCB and subject to any objections to the report which may be raised before the Tribunal, interventions may be introduced at the earliest, preferably within four months from today by the Secretary, MoEF&CC in consultation with CPCB, ICMR, Central Institute of Petrochemicals Engineering & Technology (CIPET), NCSCM, and any other expert institutions as required."*

3. The Honble NGT vide order 9th October 2023 directed that MoEFCC to file a compliance report within one month. The next date of hearing in the matter was fixed on 22nd November 2023.

4. A pro foma was prepared by the MoEFCC having Ministry – wise categorization of conclusions mentioned in order of NGT dated 1st March 2023. The pro-forma with Ministry-wise categorization was shared with the concerned Ministries/Department/Body on 20th October 2023.

5. A meeting was held on 26th October 2023 to review the steps taken pursuant to orders of the Hon'ble NGT in OA no. 251 of 2022 on **'detecting microplastics in Human Blood',** by concerned central ministries. A copy of the list of participants in annexed as **Annexure I.**

6. During the meeting, a brief about the matter was given to the participants. It was informed that, the as per order of Hon'ble NGT concerned Ministries need to consider the above report of CPCB and subject to any objections to the report which may be raised before the Tribunal, interventions may be introduced at the earliest, preferably within four months from 1st March 2023, by MoEF&CC in consultation with CPCB, ICMR, Central Institute of Petrochemicals Engineering &

Technology (CIPET), NCSCM, and any other expert institutions as required. Further, Hon'ble NGT as a matter of last opportunity on 9th October 2023 directed that a compliance report be filed within one month. The next date of hearing is on 22nd November 2023. During the meeting it was emphasized that the concerned Ministries/ Bodies may provide their action plan as per Ministry wise pro-forma in order to allow Ministry to submit a compliance report for consideration of the Committee.

7. Central Pollution Control Board made a presentation on behalf of the Committee having representatives of Indian Council of Medical Research (ICMR), Central Institute of Petrochemicals Engineering & Technology (CIPET), National Centre for Sustainable Coastal Management, with respect to conclusions drawn in the report. The presentation by the Central Pollution Control Board is annexed at **Annexure II**.

8. With regard to health risk assessment of microplastics, it was informed by CPCB, that Committee Report has inter alia referred to Microplastics in Drinking water: WHO Report 2019. The WHO report has highlighted the following issues:

- Plastic polymers being insoluble, they are unlikely to be absorbed from the gastrointestinal (GI) tract and generally do not interact with biological matrices

- 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.

- Investigation of potential risks related to particles indicate that it is possible that 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 and evidence suggests that microplastics pass through the GI tract into the faeces.

- 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.

- 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.

- Routine monitoring of microplastics in drinking-water is not recommended at this time, as there is no evidence to indicate a human health concern.

9. After detailed deliberations, the following emerged based on conclusions drawn in the report:

(a) Proposed studies on human health effects of microplastics, standardization of methodology for sampling and analysis microplastics, availability of technologies for removal of microplastics and standard development

(i) Long term studies on health effects of microplastics and ecotoxicological studies under Indian conditions need to be performed using standardized methodologies, before development of any environmental standards, as required, based upon scientific data.

(ii) Central Pollution Control Board to coordinate with the expert institutions /technical experts, if required beyond those mentioned in the pro-forma, for development of uniform methodology and availability of technologies for removal of microplastics. Central Pollution Control Board may also involve expert institutions/technical experts, beyond those mentioned in the Ministry wise pro-forma, as required.

(iii) Indian Council of Medical Research along with the Central Pollution Control Board and other relevant institutions may initiate long-term under Indian conditions, keeping in view national and international literature available on the topic. It was noted that causal relationship between micro plastics and adverse health effects has not been shown. WHO report of 2109 has also mentioned the same.

(b) Source directed interventions

(i) The concerned Ministries/bodies, to consider source directed interventions as per pro-forma, based upon principle sustainable development and scientific evidence on micro plastic releases, and submit comments and action plans, as appropriate. It was noted that the report does not provide data on releases of microplastics form these sectors under Indian conditions.

(c) Waste management, end-of-life interventions and other best practices

(i) The conclusions covered in the NGT order dated 1st March 2023 and the report of the Committee is to be considered by all the concerned Ministries, as per the NGT order, keeping in view ongoing initiatives.

10. The Ministry – wise action plan as well as actions taken pursuant to order dated 9th October 2023 of Honble NGT in Original Application no. 251/2022 on "Detecting micro plastic in Human Blood" is annexed at **Annexure III**.

11. The above measures being taken by the Government will reduce pollution caused by littered and unmanaged plastic waste.

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Annexure-I

List of Participants

S.no.	Name	Designation and Organization	Signature/Contact no./Email
1)	Dr. Pravakar Mishra	Scientist-G, MoEFCC/ NCCR, Chennai.	+91 9444054364 mishra@nccr.gov.in
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16)	Dr. KR Mangalaa	Scienist-C, MoES	+91, 8870399581 mangalaa.kr@gov.in
17)	Dr Smita Mohanty,	Director & Head (Pr. Scientist)	+ 91, 9338053123 larpm@cipet.gov.in,

Annexure II

Meeting on Hon'ble NGT Order on “Detecting Micro plastics in human blood” (O.A. No. 251/2022)

CPCB

October 2023

INTRODUCTION

- **NGT Order dated 05.04.2022 in O.A. No. 251/2022**

  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

- **Three meetings of the Committee representing CPCB, ICMR, CIPET&, NCSCM**

- **Report in Compliance of NGT Order submitted**

Report Coverage

1. Background
2. Sampling and Analytical Methods
3. Assessment of Microplastics
4. Risk Assessment
5. Remediation techniques
6. Initiatives taken to reduce Microplastics
7. Conclusions

1.0 Background

-Microplastics are plastic particles with an upper size limit of 5 mm (UNEP).

-Microplastics have been reported from oceans, sediments, surface water, ground water, wastewater, tap water, bottled water, air, food products, aquatic organisms, and human.

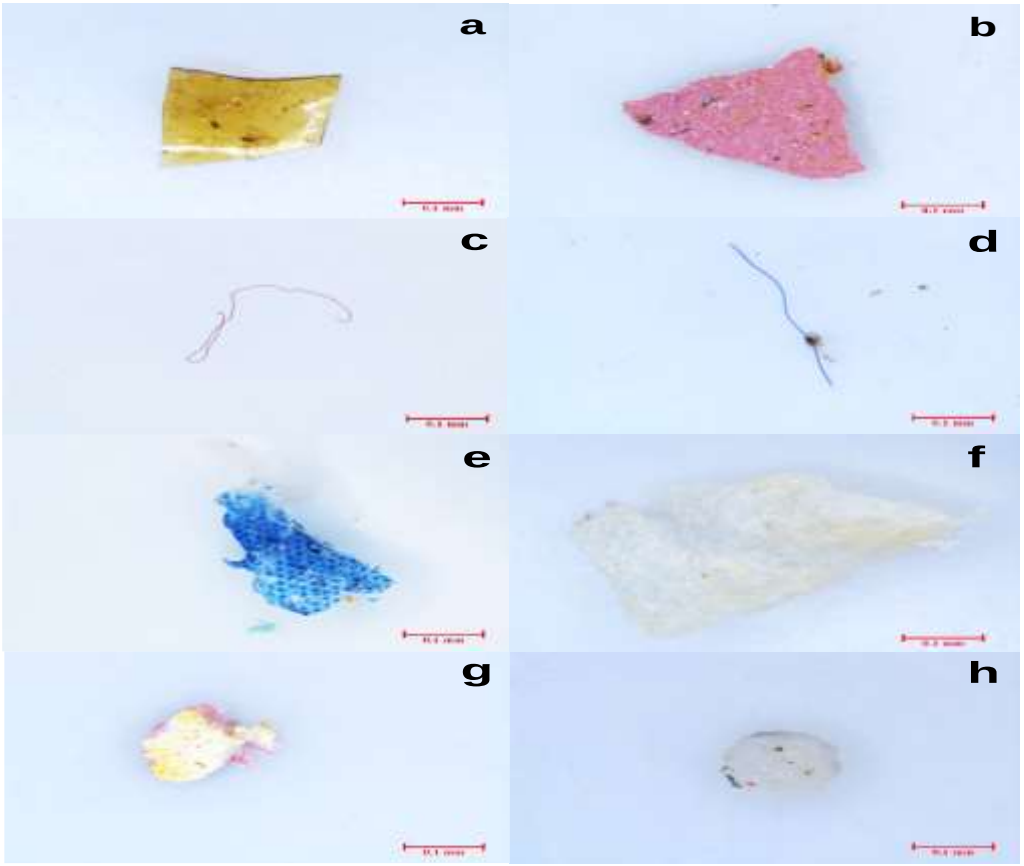
-Micro plastics can be categorized into primary and secondary micro plastics.

-Primary micro are intentionally manufactured in size < 5 mm to be used in various applications such as cosmetics, clothing and other textiles, fishing nets, etc.

-Secondary micro plastics originate from the breakdown of discarded plastic waste by solar radiation, mechanical degradation, microbial action etc.

1.0 Background

Microplastic particles may be of various shapes such as fragments, pellets, beads, and fibres



1.0 Background

Classification of micro plastics on the type of plastic and its density

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

i. **Sampling** : using trawl nets drawn across the surface of the water, or throu collection of water samples from which the particles are extracted.

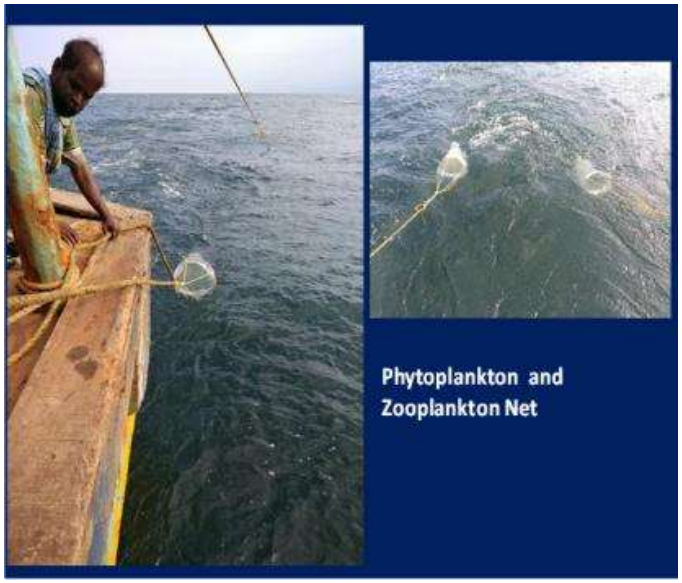
ii. **Sample extraction and isolation** : involves filtration, extraction process such as density separation & purification which may require chemical or enzymatic methods to remove organic or inorganic contaminants (biofouling).

iii. **Identification, characterization and quantification (Analysis**) :

- **Count of Micro plastics : Using** optical microscopy/electron microscopic technique quantification is achieved through manual counting.
- **Chemical Composition :**
  - **Spectroscopic methods**: to identify the specific chemical structure of polymers by comparing their absorption or emission spectra with reference spectra.(Technique: FTIR/Raman Spectroscopy)
  - **Thermo-analytical methods :** sample is pyrolysed under inert conditions, so that specific decomposition products of the individual polymers can be analysed(Technique: chromatography/mass spectrometry (GC/MS))

2.0 Sampling & Analysis Methods followed in India

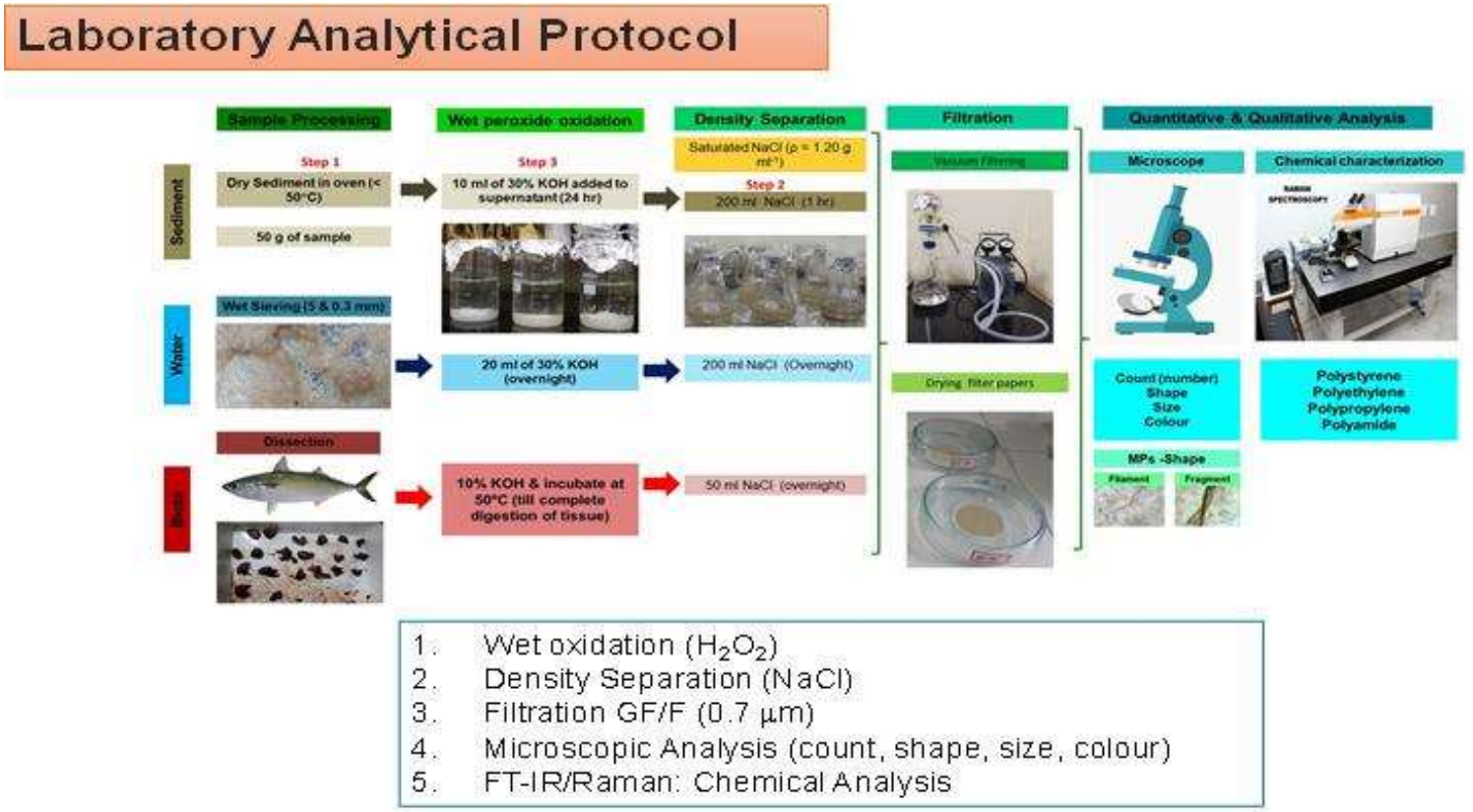
1. Ministry of Earth Sciences



Sampling Methods

2.0 Sampling & Analysis Methods followed in India

1. Ministry of Earth Sciences



Sample Extraction & analysis

2.0 Sampling & Analysis Methods followed in India

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: For various shape and sizes of micro plastics.
- 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 micro plastics found in the sample.

Number of micro plastic samples found in per litre of sample in each location analysed along with various shapes and colours.

2.0 Sampling & Analysis Methods followed in India

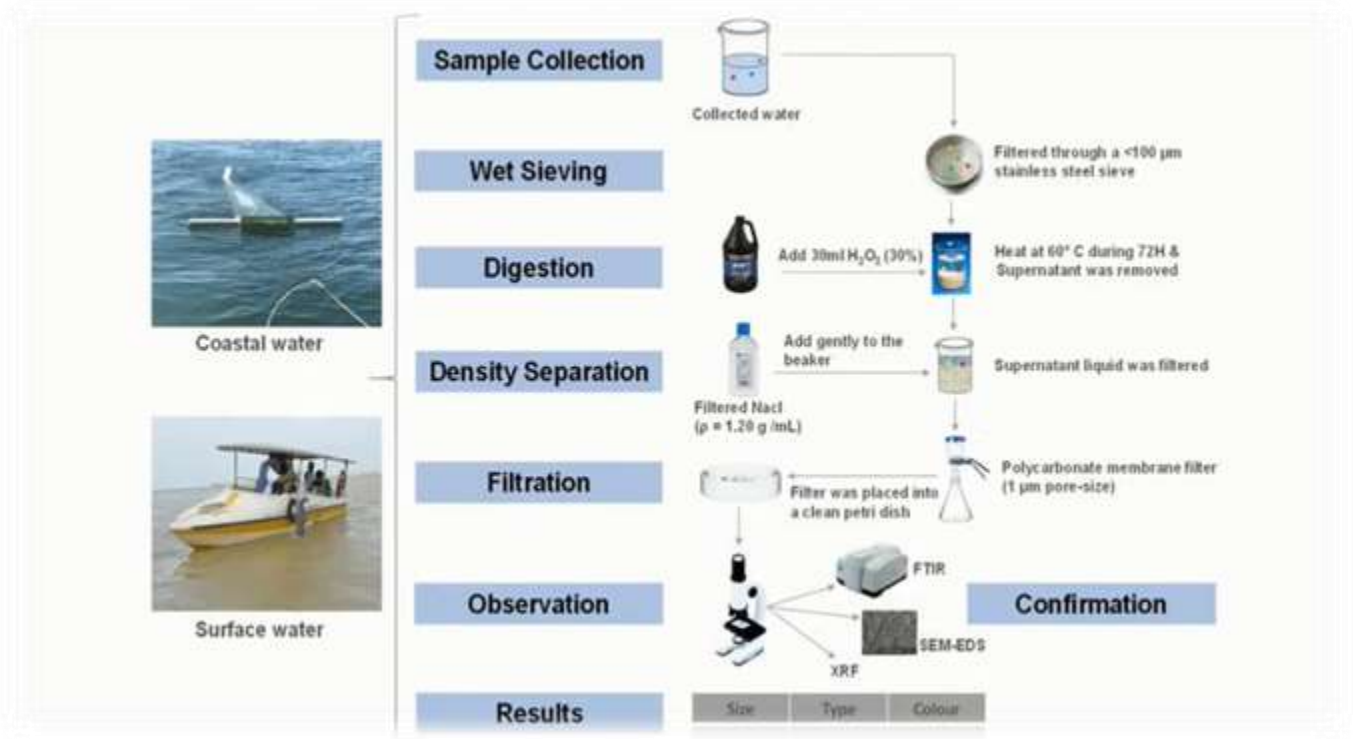
3. NCSCM

Sample Extraction & analysis (Sediments)

2.0 Sampling & Analysis Methods followed in India

3. NCSCM

Micro plastic Analysis in Water



2.0 Sampling & Analysis Methods followed in India

2. NCSCM

Microplastics analysis in Biota

2.0 Sampling & Analysis Methods followed in India

Observations

- Standard method for Sampling & Analysis not available
- Sampling and analytical methods adopted by different institutions in India are similar with minor variations
- Standard Methods developed by BIS/ISO essential to formalize further action on monitoring reports.

3.0 Assessment of Microplastics (Water)

- Microplastics (both primary and secondary) pollute drinking water sources through discharge of sewage/wastewater treatment plant effluent and surface run-off.
- Various industries use (primary) microplastics for their applications, such as medicines, cosmetics etc. which get washed off and become a part of the domestic wastewater
- Sewage/wastewater treatment plants are not equipped for the complete removal of microplastics, Hence the effluent released from these plants contains microplastics (Amrutha and Warrier 2020).
- Microplastics become part of the fresh/drinking water supply chain though mixing of effluent with the freshwater sources.
- Many components of water treatment plants and water distribution system are made up of plastic materials, hence, these further contribute towards microplastic generation in the water.
- The treated bottled water is also reported to contain microplastics. Evidence suggests that it is the bottling process and/or packaging of the plastic bottles/caps that largely contributes to the generation of microplastics

3.0 Assessment of Micro plastics (Air & soil)

- Suspended microplastic particles have been isolated from various places, such as, urbanized city centres, indoor households, and remote outdoor regions and these particles are inhaled by the humans.
- Soil can get affected from plastics through various means such as plastic mulch films, municipal solid waste, sewage sludge, fertilizers coated with plastics etc.
- Correlation has been seen between the rate of sludge applied onto the soil and concentration of microplastic particles in the soil.

Assessment of Micro plastics

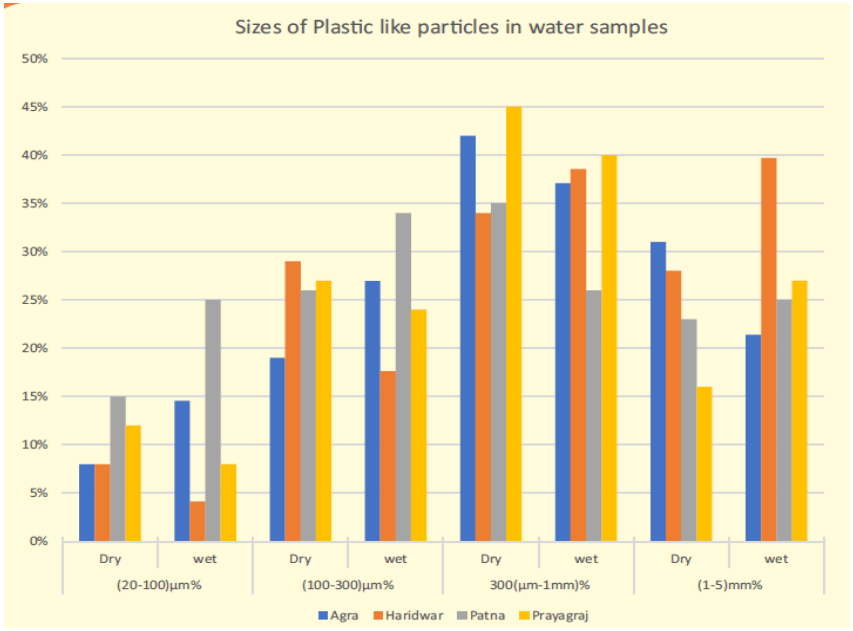
S.N.	Class	Category		Description	Analysis data	Reference
1.	**Generation of Micro plastics**					
a	Industry	(i)During production	Toothpaste		NA	UNEP
			Cosmetics	Microbeads in skin care	NA	UNEP
			Printer , ink, spray, injection moulding		NA	UNEP
			Plastic production	Emissions/spillages	NA	UNEP
			Ship breaking		NA	UNEP
			Cigarette filters		NA	UNEP
		(ii)During Usage	Synthetic textiles	Use & washing	100 microfibers/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 Bottles (mineral water) •Glass •Single use PET •Reusable PET (Oßmann et al)	Particles/L in sample (average) 3074-6292 2649 4889	WHO
			Synthetic Soles of Shoes		NA	WHO

3.0 Assessment of Micro plastics

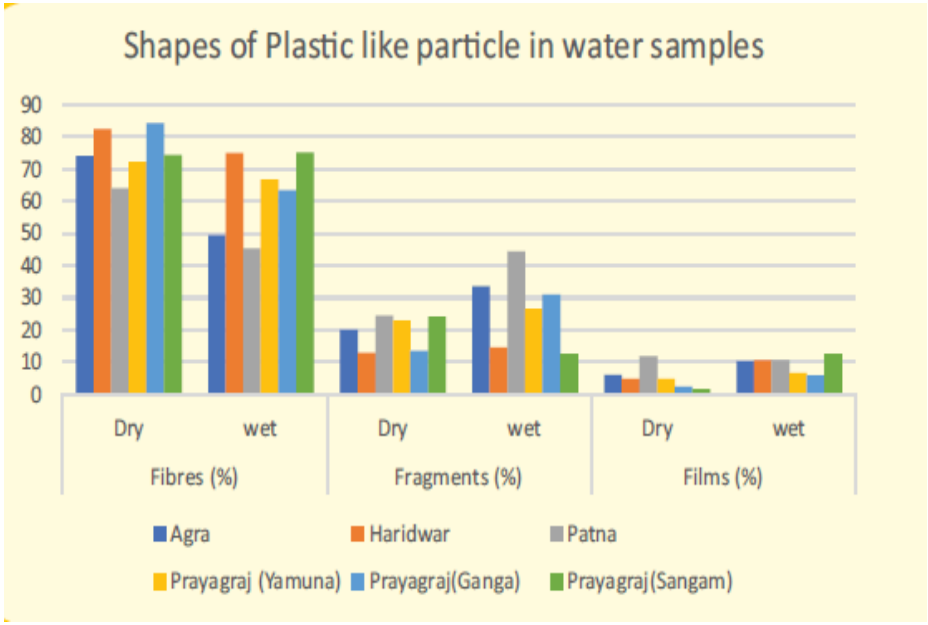
Generation of Micro plastics					
S.N.	**Class**	**Category**	**Description**	**Analysis data**	**Reference**
b	Improper waste management	(i) Land Litter	Degradation under specific temp & UV rays	NA	UNEP, WHO
		(ii)Dumpsites	Degradation under specific temp & UV rays	NA	UNEP, WHO
		(iii)Marine litter	Degradation under specific temp & UV rays	NA	UNEP
c	Ocean Activities		Fishing Nets, Boxes, Rope, galley waste;	NA	UNEP, MoES
			Aquacuture - 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 micro plastics , 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	Kodungaiyur, India 0.75 to 16.2 particles/L Perungudi, India 0.8 to 32 particles/L	CPCB

3.0 Assessment of Micro plastics

2	Transfer of Microplastics		
S.N.	**Class**	**Reference**	**Analysis data**
a	Surface Water	WHO, **NPC**	



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



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

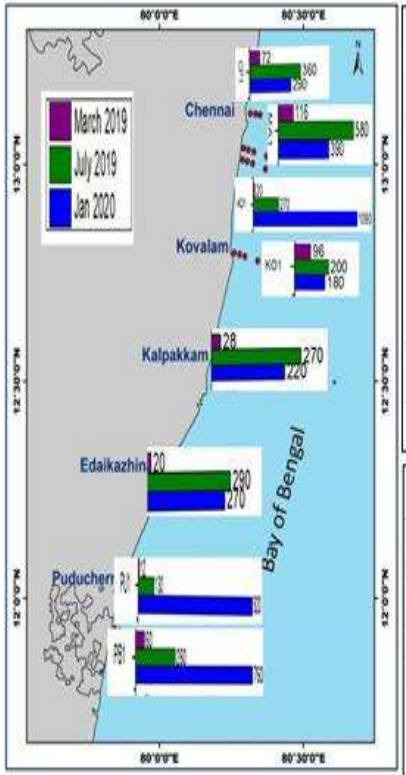
3.0 Assessment of Micro plastics

2	Transfer of Microplastics		
S.N.	Class	Reference	Analysis data
a	Surface Water	**WHO**, NPC	Table below

Location	Results reported (particles/L)	Sieve size (µm)	Study
Groundwater, Germany	Average:[b]0.7×10^{-3} Range:[b]$0\text{-}7\times10^{-3}$	3	Mintenig et 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

Assessment of Micro plastics

2	Transfer of Microplastics		
S.N.	Class	Reference	Analysis data
b	Soil / Beach Sediment	**MoES**, NCSCM	Section 3.4



March'19:
Kovalam-1km: 96/kg Puducherry Univ
10km: 12/kg
July'19:
Adyar-1km: 270/kg
Mahabalipuram-10km: 110/kg
Jan'20:
Adyar-1km: 1090/kg
Kovalam-10km: 80/Kg

Average Abundance: (No of Particles/ Kg)

Jan' 20(408/kg) > July' 19(203/kg) > March'19(46/kg)

INFERENCE

✓ March (RF-45mm); July (RF-430mm); January (RF-893mm)

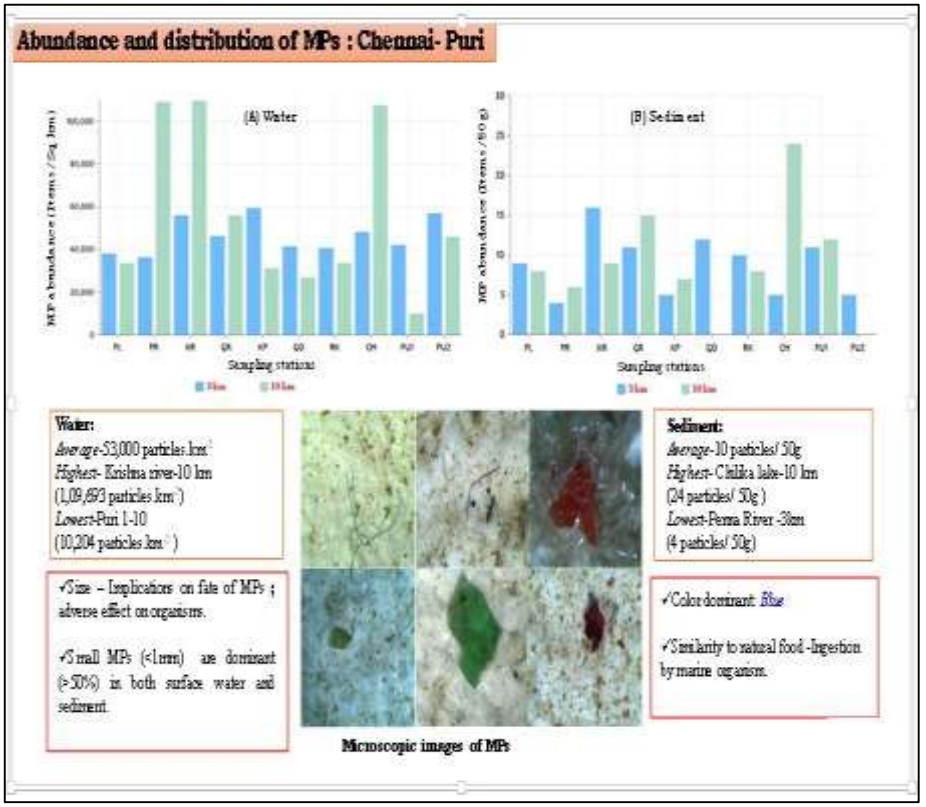
✓ Adyar: Riverine Input

✓ Puducherry University: 12 ~920 (Lowest to Highest)

✓Kovalam :

↑(From March 2019 – July2019);

↓(July 2019 – Jan 2020)



Micro plastic sediments –Chennai-Puducherry

3.0 Assessment of Micro plastics

2	Transfer of Microplastics		
S.N.	Class	Reference	Analysis data
b	Soil / Beach Sediment	MoES, NCSCM	Table give below

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

Beach sample reported from different parts of the world along the Tamil Nadu coast

3.0 Assessment of Micro plastics

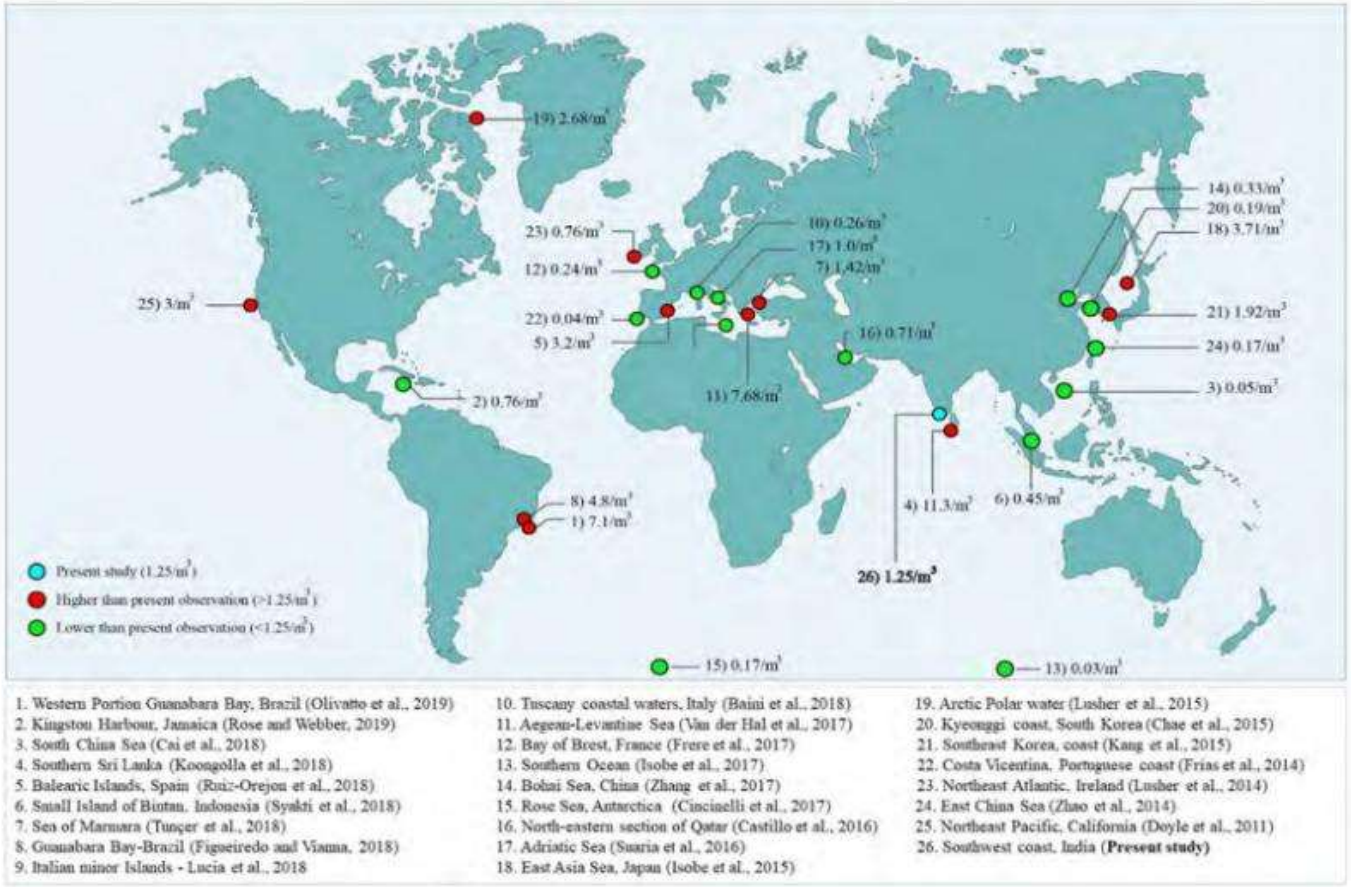
2	Transfer of Microplastics		
S.N.	Class	Reference	Analysis data
b	Sludge	NA	NA
C	Fish	MoES NCSCM	Given below

MPs in biota - Chennai coast

- 7- Finfish & 3- Shellfish
- Average ingestion of MPs was higher in Shellfish (28.2±10.9 Nos./Ind.) than finfish (1.3±1.1 Nos./Ind.)
- Shape - Dominant - Fibres.
- Dominant size range - 1-1000 µm
- Red MPs (finfish), black MPs(Shellfish) are predominant
- Major polymers - Polyamide (PA), Polyethylene (PE), and Polypropylene (PP)

Assessment of Micro plastics

2	Transfer of Microplastics		
S.N.	Class	Reference	Analysis data
b	Coastal Water	MoES NCSCM	Abundance ranged between 0.22 and 3.58 particles/m3 with an average of 1.25 ± 0.88 particles/m3 (n = 14)



Micro plastics in Coastal Water (Global distribution of mean micro plastic particles (particles/m') in the coastal waters and comparison)

3.0 Assessment of Micro plastics

3	**End use**		
S.N.	Class	Analysis data	Reference
a	Ground Water	Given below	**CPCB**, WHO

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	Praagh et al. 2018
Alfsnes, Iceland	Leachate	4.51 particles/L	Praagh et 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	Samandra et al. 2022
Karst, US	Groundwater	15.2 particles/L	Panno et al. 2019
Kodungaiyur, India	Groundwater	0.87 particles/L	CPCB study, 2022
Perungudi, India	Groundwater	2.1 particles/L	CPCB study, 2022

Microplastics in Groundwater (CPCB)

Assessment of Micro plastics

3	End use			
S.N.	Class	Description	Analysis data	Reference
c	Ambient Air	Tyre & Road wear dust	Given below	WHO, CPCB

Location	Samples Type	Method	Microplastics conc. (particles/m^3)	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	Dris et al. 2017
Asaluyeh County, Iran	Industrial area	ECHO PM ambient filter sampler	0.3–1.1	Abbasi et 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

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

3.0 Assessment of Micro plastics

3	**End use**		
S.N.	Class	Description	Reference
b	Drinking Water	Microplastics have been identified in drinking-water as small as 1 µm, 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	WHO

3.0 Assessment of Micro plastics

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

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

- Plastic polymers being insoluble, they are unlikely to be absorbed from the gastrointestinal (GI) tract and generally do not interact with biological matrices
- 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.
- Investigation of potential risks related to particles indicate that it is possible that 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 and evidence suggests that microplastics pass through the GI tract into the faeces.
- 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.
- **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**.**
- **Routine monitoring of microplastics in drinking-water is not recommended at this**

4.0 Risk Assessment

ICMR

Not carried out any study on impact of microplastics on human health so far.

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; Avg. concentration: - 0.33 MP/individual	Not reported
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 celebral& epithelial cells	In-vitro		Size studied: 3-16 microm; Concentration – 50 microg/L- 10 mg/L; Type:PE&PS	Oxidative stress was reported

4.0 Risk Assessment

ICMR

- 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.

4.0 Risk Assessment

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

5.0 Remediation techniques

Available technology for Microplastic removal

- Removal methods in case of air and soil matrices have not been reported yet.

- Treatment technology options for microplastics in water are given below:

- Conventional Water treatment system:
  - Include Primary and secondary treatment processes
  - 50 – 98% of microplastics could be removed during primary treatment and 0.2 – 14% during secondary treatment.
  - Significant reduceduction by ultrafiltration and reverse osmosis
  - Combination of secondary and tertiary treatment processes has also been useful in the removal of microplastics.

- Microbial Degradation (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.

5.0 Remediation techniques

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.
- 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:
  - ✓ Banned all single-use plastics from 1st July 2022.
  - ✓ mandate to increase the thickness of plastic carry bags to over 120 microns from December 31.
  - ✓ Banned imports of solid plastic waste from March 2019

7.0 CONCLUSIONS AND RECOMMENDATIONS

- Independent studies regarding microplastics have been conducted by various organizations in the country and at international level (CPCB, MoES-NCCR, NCSCM, NPC and CIPET in country and by WHO, UNEP , OECD)
- The studies have focussed on monitoring microplastics (concentration, polymer type, colour, shape) in various environmental matrices.
- 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.
- Currently no standard method for sampling and analysis of microplastics in the environment. ISO is currently working on the subject.
- 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.
- The Committee members involved in microplastic analysis (CIPET, NCSCM, MoES-NCCR) may develop the procedure for sampling &microplastic analysis, which can be adopted uniformily across the country.
- 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.

7.0 CONCLUSIONS AND RECOMMENDATIONS

- 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.
- Microplastic concentration in end use areas including ambient air, drinking water and ground water is available.
- Source monitoring, transfer end use of all possible sources to be covered. Emphasis to be laid on such areas for which no information is available.
- 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)
- Microplastic leakages and pathways may be monitored in order to identify further sources and hotspots of microplastics.
- Uniform procedure for sampling & analysis as finalized by this Committee may be adopted for such studies till the time ISO Standards are finalized
- 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.
- Health impact of emerging contaminants, and long term studies are required to

7.0 CONCLUSIONS AND RECOMMENDATIONS

- Studies should cover different type, concentration and shapes of microplastics. Impact of chemicals /biofilms associated with Microplastics on human health to be
- Bioassays may be conducetd to assess the Eco-toxicological impact of microplastics on animal life.
- Standards development (Source & ambient) for microplastics may be taken up following establishment of the cause-effect relationship of microplastics on human health.
- Available technologies to be assessed for their efficacy for removal of microplastics.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Source-directed interventions to be initiated which include

- Sustainable design and manufacturing of textiles, tyres, and complementary products 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.

End-of-life interventions, effective solid & plastic waste management practices, to prevent waste leaking into the environment and potentially contributing to microplastics generation;

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

Other Best practices may be followed:

- Install physical barriers such as screens and filters on STP/WWTP systems.
- Support sustainable fishing practices
- Implementation of Clean-up efforts for beaches and rivers

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

Hon'ble NGT Order

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/ suggestionsmay 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*

THANKYOU

Annexure III

Ministry – wise action plan vide order dated 9th October 2023 of Honble NGT in Original Application no. 251/2022 on "Detecting micro plastic in Human Blood"

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
1.	Uniform procedure for sampling & analysis may be developed by organizations involved in microplastic analysis (CIPET, NCSCM, MoES-NCCR) which can be adopted uniformily 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 Coastel Research (NCCR)	CPCB had two meetings with representatives of the concerned organizations (NCCR, CIPET, NEERI, IITR, ICMR-NIREH, NCSCM), on 9.11.2023 and 17.11.2023 pursuant to the meeting held on 26th October 2023
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	Points 2-6, 13, 14, 20 • Preliminary listing of all points to be monitored. • Proposed SOP for monitoring • Compilation of technologies for microplastic removal • Meeting with stakeholders • Awarding of work • Execution of work
3.	Microplastic concentration in transfer media is available for	As above	As above

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
	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		
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 on such areas for which no information is available.	As above	As above
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)	As above	As above
6.	Microplastic leakages and pathways may be monitored in order to identify further sources and hotspots of microplastics.	As above	As above
7.	Uniform procedure for sampling &	CPCB, CIPET/DCPC, NCSCM/MoEFCC, NCCR/MoES,	Covered in 1

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
	analysis as finalized by this Committee may be adopted for such studies till the time ISO Standards are finalized.	CSIR- IITR and CSIR-NEERI	
8.	Health impact of emerging contaminants and long term studies are required to establish Cause effect relationship of microplastics on human health	Nodal agency Indian Council of Medical Research -National Institute of Environmental Health Research /DHR, CPCB, CIPET/DCPC, NCSCM/MoEFCC, NCCR/MoES	a compilation of studies on presence of microplastics/ emerging contaminants in human body will be made for chalking out the methodology/ scope of work with respect to studying cause effect relationship for physiological impacts, dose-response assessment etc. .
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.	As above	As above
10.	The aforementioned studies	As above	As above

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
	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..		
11.	Bioassays may be conducted to assess the Eco-toxicological impact	CPCB, CSIR-IITR, CSIR-NEERI	Bioassays to assess CSIR IITR provided list of already available bioassays which

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
	of micro plastics on animal life.		can be used to assess the Eco-toxicological impact of micro plastics on animal life on payment basis:. 1. Daphnia sp. Acute Immobilisation test (OECD TG 202) 2. Fish, Acute Toxicity Test (OECD TG 203) 3. Earthworm, Acute Toxicity Test (OECD TG 207) 4. Daphnia magna Reproduction Test (OECD TG 211) ¬ 5. Earthworm Reproduction Test (OECD TG 222) 6. Fish early life stage toxicity test (OECD TG 210) 7. Freshwater Alga and Cyanobacteria, Growth Inhibition Test (OECD TG 201) ¬ 8. Avian Acute Oral Toxicity Test (OECD TG 223) 9. Avian Acute dietary Toxicity Test (OECD TG 205)
12.	Standards development (Source & ambient) for microplastics may be taken up following establishment of the cause-effect relationship of	CPCB, ICMR/DHR	Post completion of activities listed in item 2 to 11

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
	micro plastics on human health		
13.	Available technologies to be assessed for their efficacy for removal of microplastic	CPCB, CIPET/DCPC,NCSCM/MoEFCC, NCCR/MoES, CSIR- IITR and CSIR-NEERI	Points 2-6, 13, 14,26 • Preliminary listing of all points to be monitored. • Proposed SOP for monitoring • Compilation of technologies for microplastic removal • Meeting with stakeholders • Awarding of work • Execution of work
14.	Technologies to be developed for removal of micro plastics from Air & Soil	As above	As above
15.	Source-directed interventions, Sustainable design and manufacturing of textiles, tyres, and complementary products (laundry detergents, road surfaces, and vehicles), to minimize the tendency ofproducts to contribute to microplastics generation;	‘ • Ministry of Textiles, • Department of Promotion and Industry and Internal Trade, • Ministry of Heavy Industries, • Ministry of Road Transport and Highways, • Department of Chemicals and	The concerned Ministries/bodies, to consider source directed interventions as per pro-forma, based upon principle sustainable development and scientific evidence on micro plastic releases, and submit comments and action plans, as appropriate. It was noted that the report does not provide data on releases of microplastics form these sectors under Indian conditions.

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
		Petro-Chemicals	
	Restrictions on microplastics in the manufacture and sale of certain personal care and cosmetic products containing microplastics.	• CDSCO/Department of Health and Family Welfare, • Department of Pharmaceuticals	As per information provided by Drug Controller General (India). the Restrictions on the use of microplastics in the manufacture and sale of certain personal care and cosmetip products are available in Amendment No. 2, November 2017 (Fourth Revision) of lS 4707 Pan 2. 2017 under Classification of Cosmetic Raw Materials and Adjuncts. As per S. No. 1373 of Annex-A, Plastic microbeads: 5 mm or less, water-insoluble, solid plastic particles used to exfoliate or cleanse in rinse-off personal care products are not recognized as safe for use in Cosmetics.
	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	Department of Promotion and Industry and Internal Trade	The concerned Ministries/bodies, to consider source directed interventions as per pro-forma, based upon principle sustainable development and scientific evidence on micro plastic releases, and submit comments and action plans, as appropriate. It was noted that the report does not provide data on releases of microplastics form these sectors under

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			Indian conditions.
16.	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; • 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	• Department of Drinking Water and Sanitation, • Ministry of Housing and Urban Affairs, • MoEFCC	• Already, the Ministry of Environment, Forest and Climate Change, Government of India, have taken steps for reducing pollution caused by littered and unmanaged plastic waste, along with State Governments, local bodies and Central Pollution Control Board and State Pollution Control Board and Pollution Control Committees. • In order to reduce pollution caused by littered and unmanaged plastic waste, the Ministry has banned identified single use plastic items which have high littering potential and low utility and extended producer responsibility on plastic packaging is being implemented. Identified single use plastic items, which have low utility and high littering potential, have already been

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			prohibited, with effect from 1st July, 2022, vide Plastic Waste Management Amendment Rules, 2021 notified on 12th August 2021. • The Ministry of Environment, Forest and Climate Change notified the Guidelines on Extended Producer Responsibility (EPR) for plastic packaging vide Plastic Waste Management (Amendment) Rules, 2022, on 16th February 2022. The Guidelines stipulate mandatory targets on EPR, recycling of plastic packaging waste, reuse of rigid plastic packaging and use of recycled plastic content. The guidelines provide for moving towards sustainable plastic packaging and reducing the plastic foot print. The implementation of ban on identified single use plastic items coupled with extended producer responsibility on plastic packaging will reduce pollution caused by littered and

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			unmanaged plastic waste. • The single use plastic ban has triggered development of innovative eco-alternatives, new business models, increase in the manufacturing capacity and uptake of eco-alternatives, at scale. Already, Startups and manufacturers are manufacturing eco-alternatives such as cutlery made bagasse and rice and wheat bran, straws made from dried coconut leaves, straws made from paper, at scale. In keeping with the development of eco-alternatives, Bureau of Indian Standard has notified Indian Standard IS 18267 for Food Serving Utensil Made from Agri By-Products. Reduction in the use of single plastic items is one of the key focus areas under Mission LiFE - Lifestyles For Environment - launched by Honble PM at COP 26 of UNFCCC at Glasgow in 2021. • The Guidelines for Extended

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			Producer Responsibility (EPR) on plastic packaging were notified in February 2022 for environmentally sound management of plastic packaging till end of its life by producers, importers and brandowners, who introduce the plastic packaging in the market. For ease of doing business the EPR framework is implemented through a centralized online portal. • The Guidelines stipulate mandatory targets on EPR, recycling of plastic packaging waste, reuse of rigid plastic packaging and use of recycled plastic content. The guidelines provide steps for moving towards sustainable plastic packaging and reducing the plastic foot print. The EPR Guidelines also provide for sustainable plastic packaging and implementation of new models for waste collection such as Deposit Refund System and buy

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			back model have been given a boost through the EPR Guidelines. • Due to the clear framework laid down by EPR Guidelines notified in February 2022, and on account of effective implementation, till date 31401 Producers , Importers and Brand Owners (PIBOs) and 2290 Plastic Waste Processors (PWPs) have registered on the centralized EPR portal developed by CPCB, as opposed to 300 in 2021. The cumulative EPR obligation of registered PIBOs for the year 2022-23 is around 3.07 million tonnes for the year 2022-23, which is a significant proportion of plastic waste generated in the country. • As per the EPR portal dashboard, EPR certificates for around 4.6 million tonnes of plastic packaging waste have been generated by plastic waste processors after processing of

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			plastic packaging waste, of which, already around 3.32 million tonnes of EPR certificates have been exchanged with producers, importer and brand-owners.. • The following steps have been taken to strengthen implementation of Plastic Waste Management Rules, 2016 and to implement ban on identified single use plastic items: (i) All thirty-six States/UTs have constituted the Special Task Force under the chairpersonship of the Chief Secretary / Administrator for elimination of identified single use plastic items and effective plastic waste management. A National Level Taskforce has also been constituted by the Ministry for taking coordinated efforts to eliminate identified single use plastic items and effective implementation of Plastic Waste Management Rules, 2016. Four meetings of

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			the National Task Force have been held. (ii) Twenty-Four State /UT Governments and concerned Central Ministries/Departments have already developed a comprehensive action plan for elimination of single use plastic and implement it in a time bound manner. (iii) Directions have been issued under Section 5 of the Environment (Protection) Act, 1986 for setting up of institutional mechanism for enforcement of provisions of Plastic Waste Management Rules, 2016 to all State Pollution Control Boards / Pollution Control Committees. Directions have also been issued to E-commerce companies, leading single use plastic sellers/users, and plastic raw material manufacturers with respect to phasing out of identified single use plastic items. Separately, custom authorities have been asked to stop the import of

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			banned SUP items (iv) For effective monitoring of ban on identified single use plastic items and plastic waste management in the country the following online platforms are in operation (a) National Dashboard on for monitoring of comprehensive action plan implementation, (b) CPCB Monitoring Module for Compliance on Elimination of Single Use Plastic, and (c) CPCB Grievance Redressal App. (v) Regular enforcement drives have been undertaken by CPCB, SPCBs/PCCs to implement ban on identified single use plastic items and on plastic carry bags having thickness less than one hundred twenty microns. (vi) In order to provide assistance to MSME enterprises transitioning away from single use plastic items to eco-alternatives, Ministry of Micro, Small and Medium Enterprises has made provisions in their ongoing schemes. A National

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			Expo on eco-alternatives to banned single use plastics items and Conference of Startups - 2022 was organized jointly with Government of Tamil Nadu in Chennai on 26-27th September 2022 to raise awareness on alternatives. Awareness generation and capacity building programmes have been organized for elimination of single use plastics.
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 inthe country	Department of Drinking Water and Sanitation	Central Government is implementing Jal Jeevan Mission.

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
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.	• Department of Drinking Water and Sanitation, • Ministry of Housing and Urban Affairs. • Department of Water Resources, River development and Ganga Rejuvenation,	MoEFCC has included the activity of putting barriers for stopping ingress of plastic waste into water bodies under the template of Comprehensive action plan shared with states and UTs for effective plastic waste management and elimination of single use plastics
	Support sustainable fishing practices to reduce the amount of microplastic entering rivers from fishing equipment.	• Department of Fisheries	
	Implementation of Clean-up efforts for beaches and rivers	Ministry of Earth Science and MoEFCC, NCC	Pan India beach clean up activities have been carried out at more than 150 beaches since 2017 and to be continued through the adoption of beaches by local institutions/universities / colleges / NGOs/ agencies for regular clean up and monitoring. Swachh Sagar Surakhshit Sagar

S.No.	Conclusions of the Report prepared by CPCB, ICMR,CIPET and NCSCM	Concerned Ministries/Department/ Body	Action Plan/Action Taken
			and Puneet Sagar Campaign has been undertaken.
20.	Training and capacity building including microplastic monitoring, analysis, health impact studies may be taken up for effective implementation of aforementioned points."	CPCB, DCPC/CIPET, MoEFCC/NCSCM, MoES/NCCR	Short term and long term trainings to be implemented by NCSCM. MoES – Workshop has been planned in February 2024 to provide detailed training on sampling and analysis of microplastics to various stakeholders. Several dissertation students/research scholars have been trained in microplastic analysis. CPCb will also provide training as per training schedule.