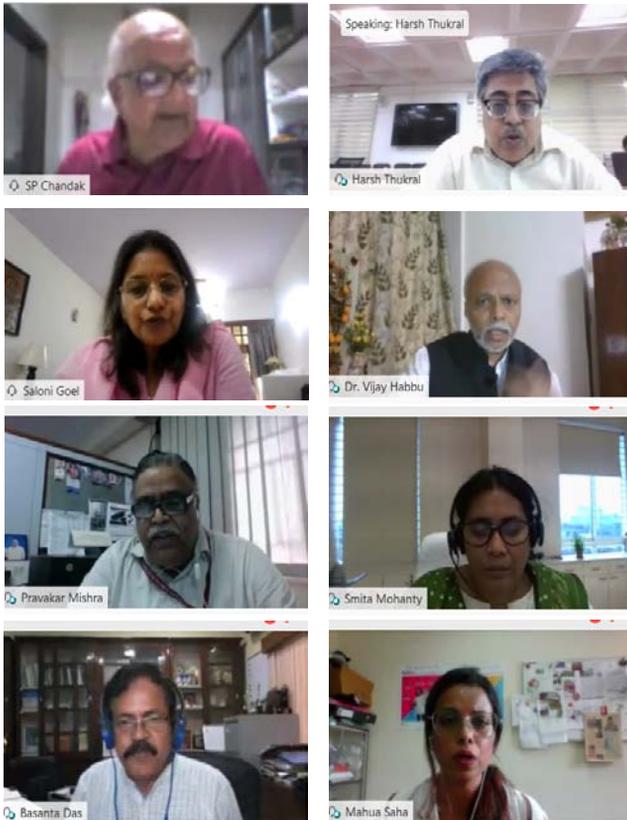


# Proceedings National Policy Workshop through Webinar on Riverine and Marine Plastic Litter in India

**12<sup>th</sup> May, 2020 | 14:30 – 17:30 hrs**



## WEBINAR 1

### The Science, Technology of Plastics & Techniques/Best Practices of Plastics Pollution Assessment and Investigation

## WEBINAR 1

### Proceeding

## The Science and Technology of Plastics & Techniques/Best Practices of Plastics Pollution Assessment and Investigation

12 May 2020 | 14:30 - 17:30 hrs

#### Moderator

**Mr. SP Chandak,**

*Former Deputy Director, UNEP & Professor Emeritus, BIMTECH*

#### Coordinator

**Dr. Harsh Thukral,**

*Deputy Director, NPC*

### INTRODUCTION

In the plastic age we are in, if plastics are not reorganized and redesigned to be maintained in a circular loop or properly managed at their end-of-life, they will find their way into the environment, a phenomenon called leakage. To increase plastic material circularity, leakage of plastic from the human technosphere must be reduced, and ultimately prevented. To effectively control the plastic waste litter, stakeholders must be able to identify and detect the leaks at different points in the plastic value chain and initiate appropriate control measures. Plastics enter the environment by one of two core streams: visible macro-plastics mainly from mismanaged waste, and a significant quantum as invisible primary micro-plastics. Currently there is a need to standardise methodology to perform plastic leakage assessments.

### SESSION HIGHLIGHTS

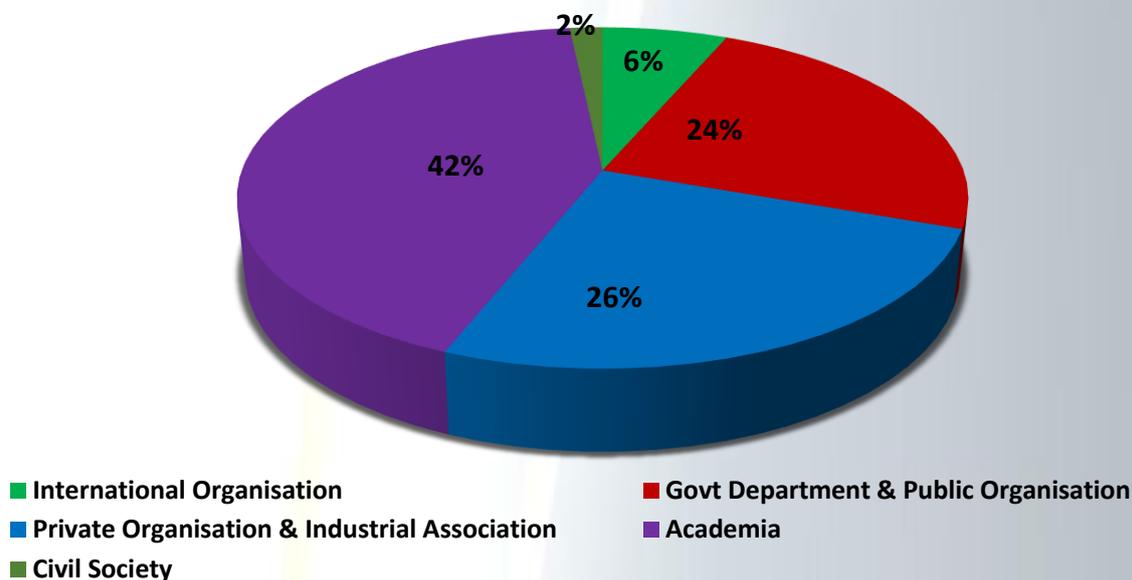
The session highlighted the science and technology features of polymers and plastics and the growing consumption aspects and generation of plastic waste including from single use plastics. Further, the initiatives in plastic waste assessment, including macroplastics and microplastics as undertaken by various institutions such as Ministry of Earth Science, National Institute of Oceanography, CIPET and the researchers was deliberated to reflect on the concerns of land based hotspots and problem of riverine and marine litter and their impacts as well as on methodologies adopted for the analyses undertaken. The session further highlighted insights from clean up initiatives in four cities as part of UNEP project. Further, the discussions led to exploring and identify gaps in plastic waste assessment (including plastics in airborne dust, tap water / RO water studies etc) that could be taken up for new projects.

### WEBINAR 1 AGENDA

Time (hrs)	Theme/Topic	Speaker
14:30 - 14:40	Introduction of the Counter Measure Project	Ms. Saloni Goel, UNEP

Time (hrs)	Theme/Topic	Speaker
14:40- 15:00	Understanding Plastics for their utility and environmentally safe handling”	Dr. Vijay G. Habbu, Adjunct Professor, Institute of Chemical Technology (ICT)
15:00 – 15:15	Problem of Marine Litter and Initiatives by MoES regarding Plastic Pollution Assessment	Dr. Pravakar Mishra, Scientist ‘F’, NCCR, MoES
15:15 – 15:30	Plastics Consumption and Disposal-Methodology for Waste Plastics Assessment in India	Dr. Smita Mohanty, Director, CIPET
15:30 – 15:45	Methodology for Micro-plastic Assessments in Rivers & Oceans	Dr. Mahua Saha, NIO
15:45 – 16:00	Approach of Sampling & Analysis in Sediments of River Ganga	Dr. Basanta Kumar Das Director, CIFRI
16:00 – 16:15	Methodology for Macro-plastic Assessments in four Cities, India	Dr. Harsh Thukral, Deputy Director, NPC
16:15 – 17:00	Panel Discussion: Recommendations for Plastic Waste Assessment Methodology and need for standardization and compilation of best practices followed in India.  Questions and Answers	Additional Panel Members: Ms. Saloni Goel, UNEP Dr. D.D. Kale, Former Prof. UDCT Mr. K.D. Bhardwaj, NPC Mr. Amit Jain, IRG System South Asia Dr. Shuklupal Maitra, NPC

The webinar was attended by 700 plus participants as located across 12 countries. The participants were from across various sectors (public / private organizations, civil society, academia, and from across a range of national and multilateral institutions such as UN Organisations and the World Bank). The Webinar has been highly appreciated by participants and is attracting attention from a wide range of stakeholders. The participant profile details are depicted in **Figure 1**.



**Figure 1: Participant Profile**

## WEBINAR PROCEEDINGS

The session was opened by the coordinator Dr. Harsh Thukral, Deputy Director, NPC, who welcomed the Moderator, all the resource speakers, panelists and attendees / participants on behalf of NPC and introduced the moderator of the session, Mr. SP Chandak, former Deputy Director, UNEP & Professor Emeritus, BIMTECH. The broad features of the UNEP – NPC project on identifying countermeasures for riverine marine plastic litter was also introduced to the participants.

Mr. Chandak thanked the organizers and appreciated the idea of the virtual National Policy workshop, and highlighted that in this way, we are able to control the carbon footprint, which would have been generated otherwise. He shared his perspectives on the webinar theme and thereafter opened the forum for the resource speakers.



Dr. Harsh Thukral



Mr. SP Chandak

## PRESENTATION 1:

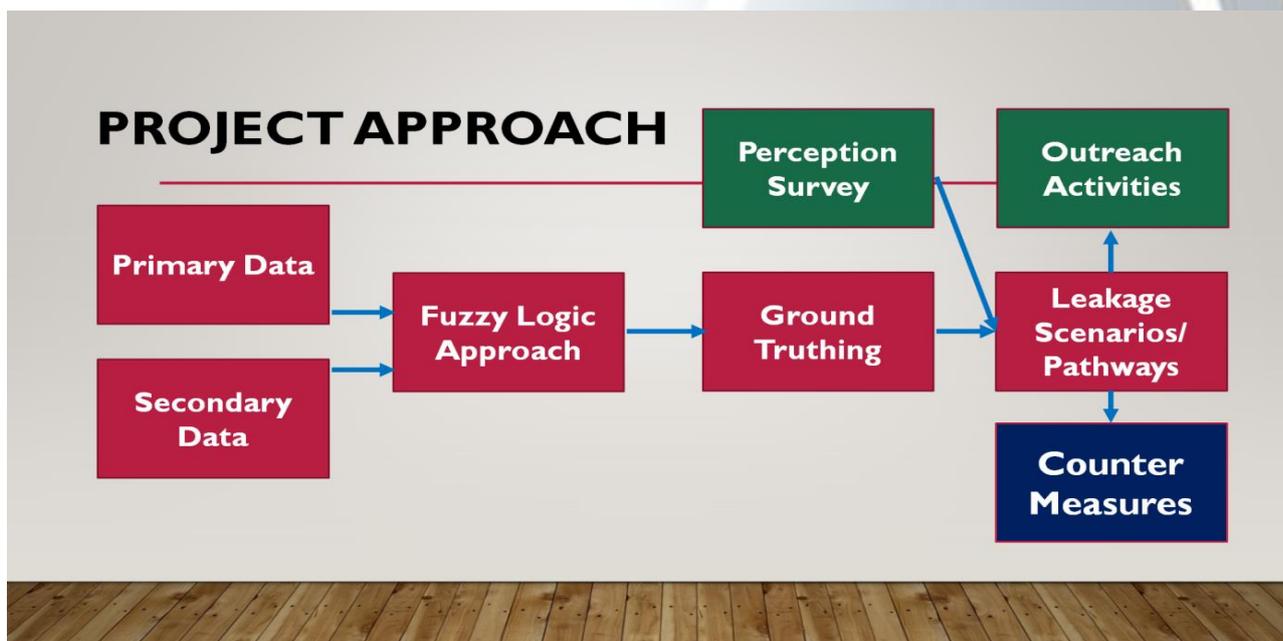
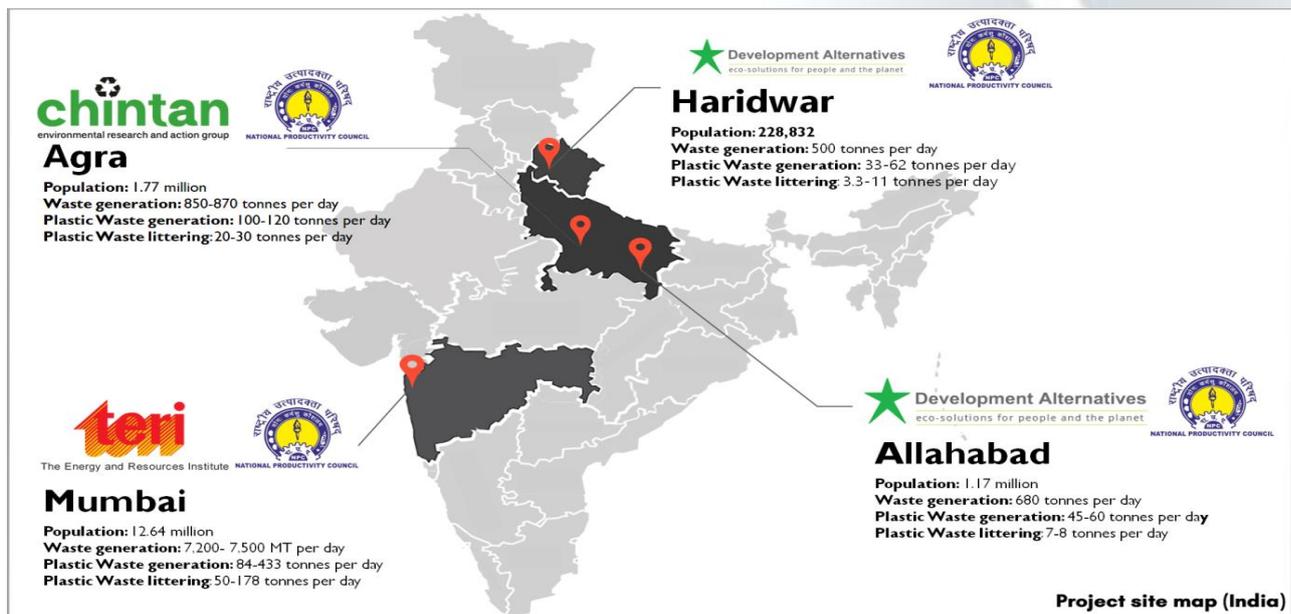
### Introduction of the Counter Measure Project by Ms. Saloni Goel, UNEP



The first presentation by Ms. Saloni Goel, UNEP reflected on the aspects of the counter measure project in India, the 4 cities which were chosen for detailed study (namely Agra, Haruidwar, Allahabad/Prayagraj and Mumbai) and the approach which was adopted during

the execution of the project. She spoke about how the primary data and secondary data were collated and with the help of fuzzy logic, a plastic leakage scenario was developed for each of the 4 cities and further it was substantiated by ground truthing.

She further deeply acknowledged the efforts of the partner agencies in this project which were engaged to carry out the perception survey studies and outreach activities as undertaken by M/s Chintan (at Agra), Teri (at Mumbai) and Development Alternatives (at Haridwar and Prayagraj). She also acknowledged the funding agency, Government of Japan, Ministry of Foreign Affairs and other UNEP initiatives on Marine Litter, like the Indo-Norway Marine Pollution Initiative, Tide Turner Challenge, and Un-Plastics Collective.



She highlighted that the outreach activities carried out under this project enabled the engagement of communities and students in the promotion of counter measures. She even

quoted an epic example of how the outreach activity created awareness amongst boatmen and they had now started keeping garbage bins in their boats to control littering of waste.

She concluded her presentation with need for attention to the following:

- Circularity needs to be strengthened- to reduce entry of virgin plastics in plastic value chain and leakage of plastic waste
- Plastic bans need to cover both production and use. Additionally, they need to be strengthened with robust regulatory and monitoring capacity. Good practices need to be documented and disseminated.
- Incentivise investment in development of alternatives.
- Strengthen incentives and mechanisms for collection of plastic waste for integration into a value chain- EPR, Deposit Refund Schemes, Garbage Cafes, Kiosks (providing mobile recharge facility) etc.
- Emphasis and incentives for innovative product design to support recyclability- easy dismantling, replaceable/changeable parts for enhanced life, alternatives to hazardous additives, compostable/re-useable/recycleable product packaging.
- Effective waste management infrastructure (littering @ 10-25% found to be significant culprit for plastic leakage).
- Civil society led clean-ups.
- Regular monitoring and evaluation network to inform local, national and regional action.

Further Madam Saloni enumerated key project outputs & outcomes as follows.

- Region Based Approach for mapping plastic leakage hotspots
- Ground data on plastic waste generation and disposal
- Leakage Scenarios and Countermeasures
- Research and technical capacity for extension in other regions
- Partnerships and capacity for sustained action
- Outreach material in English, Vernacular Languages, Braille- video, audio, written
- Recommendations for policy

## **PRESENTATION 2:**

### **Understanding plastics for their utility and environmentally safe handling by Dr. Vijay G. Habbu, Adjunct Professor, Institute of Chemical Technology (ICT)**

The second presentation was undertaken by Dr. Vijay G. Habbu, Adjunct Professor, Institute of Chemical Technology (ICT). Dr Habbu gave insights on the science and polymer component of plastic and emphasized on how there has been fascinating evolution of synthetic plastics over the past 110 years. He discussed about Polymer Identification Codes and various categories of plastics being utilized by us in our day to day lives. He also deliberated on the Plastic Articles Manufacturing Process and Growth in Global Plastics Production. It was highlighted that plastics have numerous advantages ranging from light weight, durability,

insulation, versatility to cost effectiveness and that plastics have no functional equivalents. He differentiated rigid packaging and flexible packaging varieties and key polymers that are used including mono-polymer based, multi-polymer based and multi-material based packaging.



He noted that inspite of abundant advantages, the visibility of its litter is out screaming the superiority of its eco-footprint. Dr. Habbu further explained about the EPR perspective of Plastics litter management and Plastics life-chain. He also explained how the Market for recycling plastics in India has emerged and highlighted examples of products made from recycled plastics. He acknowledged that there is enhanced focus on microplastics which has emerged as a new challenge when it comes to plastic pollution.

Towards the end of presentation, Dr. Habbu flashed how plastic is in the service of Nation in the times of COVID-19, by means of use in relief & rescue work and several PPEs which are being utilized by millions of doctors, health care staff, sanitary workers and even general public.

His key recommendations for handling plastic specified the multi-pronged approach by the :

- **Government/ Administration:** in education, awareness, infrastructure, enforcement and policy formulation
- **Citizens:** in source segregation, reduce and reuse
- **Industry:** innovative design for collectability, recycling, prevention of litter generation etc.

### PRESENTATION 3:

**Problem of Marine Litter and Initiatives by MoES regarding Plastic Pollution Assessment by Dr. Pravakar Mishra, Scientist 'F', National Center for coastal research (NCCR), MoES**

The third presentation was delivered by Dr. Pravakar Mishra, Scientist 'F', National Center for coastal research (NCCR), MoES. He began with the Scale of Plastic Problem in India and particularly how marine plastics pollution has reached at its crisis levels.

The image shows a screenshot of a webinar presentation slide on the left and a Zoom meeting interface on the right. The slide is titled "National Policy Workshop Webinar Series on Counter measures for Riverine and Marine Plastic Litter in India 12 -22 May 2020". It is for "Session 1: The Science and technology of Plastics & techniques/best practices of plastics pollution assessment and investigation". The current slide is "Page 1" and is titled "Problem of Marine Litter and Initiatives by MoES regarding Plastic Pollution Assessment" by "Dr Pravakar Mishra, Scientist F, National Center for Coastal Research (NCCR), Ministry Earth Sciences, India". The Zoom interface on the right shows a video feed of Dr. Pravakar Mishra and a list of participants including NPC INDIA (Host), Pravakar Mishra, Amit Jain, Arun Kumar Jha, Basanta Das, and odkale.

He described about the MoES program on Marine Litter & Micro plastics comprising of :

- Sources, Fate of plastic ; Quantification & Modelling
- Impact of plastic pollution on marine eco-systems
- Micro-plastics and health- Toxicity – Food chain
- Social and behavioral change / Awareness campaign
- Design and testing interventions
- Re-designing of the single use of plastics

He elaborated on Studies carried out so far along Indian coast and Marine litter along the Indian beaches and state wise composition of marine litter in India. Further he gave insights on tools and techniques for Water sample collection & Processing for microplastics, Sediment collection & Processing for microplastics. He also discussed about microplastics in coastal waters and in commercial fish species

Finally he gave A few key recommendations pertaining to

- Development of a National Marine Litter policy
- Segregation of the wastes at source
- Responsibility should be of the manufacturer / seller to recycle the used plastic products from the consumers
- Adoption of beaches for regular monitoring
- Deployment of low cost traps in rivers, creeks, canals - Cleaning and monitoring activities.
- Introduction of bio-degradable materials
- Exploring opportunities and benefits of shifting to a circular plastic economy.

**PRESENTATION 4:**

**Plastics Consumption and Disposal-Methodology for Waste Plastics Assessment in India by Dr. Smita Mohanty, Director, CIPET**



The fourth presentation was delivered by Dr. Smita Mohanty, Director, CIPET. She began with the statistics related to the plastic consumption in India and tagged the plastic products demand growth drivers in India wrt Agriculture, Infrastructure, Packaging industry , automotive appliances, medical & personal care etc.

She also delved on the statistics of plastic waste generation in India, the quantity of which is collected and the uncollected. Dr. Mohanty further shared details about categorisation of single use plastic products and careful assessment of their impact and concerns. She gave insights about innovative and collaborative approach to address the challenges of single use plastic systematically adhering to the waste management hierarchy. She briefly touched upon the recycling process and techniques adopted in India, comprising of collection, sorting, shredding, cleaning, melting and reusing.

Dr. Mohanty elaborated on the aspects of value addition of recycled plastic packaging material in India and economic aspect of recycling in India. She highlighted the facets of Extended Producer Responsibility (EPR) and significance of Design for Environment, Resource Security and about Sharing and Transfer of the responsibility/cost of collection & disposal.

## PRESENTATION 5:

### Methodology for Micro-Plastic Assessments in Rivers & Oceans and Constraints by Dr. Mahua Saha, Sr. Scientist, NIO



The fifth session was taken up by Dr. Mahua Saha, Senior Scientist, Chemical Oceanography Division (COD), National Institute of Oceanography (NIO).

She discussed about the sampling methodology undertaken during the conduct of her study as part of the project with NPC and UNEP, and also shared the details of quantification and characterization of micro plastic waste samples collected. She presented the findings and results of the micro plastic sampling and assessment undertaken by NIO at 6 locations under this project, in the river basins of Ganga, Yamuna in Agra and Prayagraj. She indicated that over 30 types of polymers were detected in a sample of microplastics samples from one of the river stretches.

She elaborated on the challenges faced in the process of surface water sampling and corrective measures to be taken.

## PRESENTATION 6:

### Approach of Sampling & Analysis in Sediments of River Ganga by Dr. Basanta Kumar Das, Director, CIFRI

The sixth presentation of session 1 was given by Dr. Basanta Kumar Das, Director, Central Inland and Fisheries Research Institute (CIFRI). He delved on plastics transport to rivers, plastic transformation in aquatic bodies and subsequently its effects on aquatic biota. He reflected on estimates of Microplastics in the World in terms of river sediment, lacustrine sediment, beach sediment and marine sediment.

The image shows a screenshot of a webinar presentation slide on the left and a Zoom meeting interface on the right. The slide features the UN Environment Programme logo, the NPC logo, and the Counter Measure for Plastic Free Rivers logo. The text on the slide reads: "National Policy Workshop Webinar Series On Countermeasures for Riverine and Marine Plastic Litter in India 12 -22 May 2020". Below this, it says "Session 1: The Science and technology of Plastics & techniques/best practices of plastics pollution assessment and investigation". A red arrow points to the title "Approach of MPs sampling and analysis in sediments of river Ganga". The presenter is identified as "Presented by Dr. B. K. Das, Director, ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata, 700120". The Zoom interface on the right shows a video feed of a man with a mustache and glasses, and a list of participants including NPC INDIA (Host), Basanta Das, Amit Jain, Arun Kumar Jha, Siddhanta, and Dr. Vijay Habbu.

The case of sediment sampling at river Ganga was explained by him in detail. He highlighted how the Sediment sampling from Ganga was carried out and how the sampling locations were frozen and the tools/ techniques used. He then presented on the methodology and key steps of sieving, density separation and peroxide digestion involved in the Extraction of Microplastics from the samples collected. The Findings of Microplastics found in River Ganga was explained. The ATR-FT-IR spectrum of microplastics found from River Ganga was shown. The quantification of Microplastics in Ganga was depicted in the presentation in terms of mass fraction of plastics and no. of plastics per kg of sediment. The results were also correlated with water pollution parameters like phosphate concentration of sediment and water, and with BOD of water. His recommendations included :-

- Immediate measures to be taken to reduce plastic load in the Indian rivers
- Need of more comprehensive study on the plastic transport, fate and toxicity toward life
- Need of extensive studies to assess microplastics contamination and their distribution in Indian rivers, associated wetlands, lakes and others
- Need of Government support and more funding to execute the research activities in this direction

#### **PRESENTATION 7:**

#### **Methodology for Macro-plastic Assessments in four Cities, India by Dr. Harsh Thukral, Deputy Director, NPC**

The final presentation of the session was delivered by Dr. Harsh Thukral, Deputy Director, NPC. He presented about the details of 19 clean up drives that were taken up by NPC for Macro plastic sampling and assessment in 4 cities of India, with the help of partner agencies and local volunteers. He elaborated on the protocols that were developed for carrying out the clean up drives.



He emphasized that the Standard operating procedures were developed to structure the over all clean up drive and define the step wise activities to be performed within a specific time frame. Since the clean-up activities were executed with the help of local volunteers comprising of representatives of partner agencies, local NGOs, sanitary workers etc., the SOP helped in enabling the participants/volunteers of clean up group to acquaint with the proceedings and accomplish the tasks. The procedure reflected on aspects of demarcation of boundary for clean-up area, wearing of personal protective equipment, collection of mixed waste, filling in gunny bags, labelling of gunny bags, segregation of plastic waste and weighing of waste in two key stages, categorizing the plastic waste collected etc. The posters were developed showcasing the various categories of plastic and non plastic waste to be collected and segregated. The Do's and Don'ts were also developed for the clean up drive.

Further, he explained about the trash data sheet that was maintained in all clean ups to maintain the uniformity in reporting the categories of waste plastics found during clean ups. The prominent product based plastic waste litter types found during Clean Ups in 4 cities was highlighted by him besides the fact that about 53 varieties of plastic litter types were identified during the 19 clean – up exercises.

He concluded the presentation indicating the way ahead in terms of Integrating primary data based research and econometric studies of various focus areas with secondary data and data obtained via IoT system / devices, Continual application of GIS tools and modeling components for site selection and assessments and recording inputs for analysis, Assessment needed at all nodes of waste disposal and reverse logistics chain and Encouraging FMCG companies, manufacturers of plastics packagings and components and plastics products producers, including brands, to engage in product composition declarations including for plastics content

## KEY QUESTIONS RAISED BY ATTENDEES / PARTICIPANTS

The session was concluded by answering of a series of questions by the speakers and panellists that were put up by several participants in the workshop.

The nature of questions that were received and reflected upon by the speakers and panellists is indicated in the set of questions below :-

1. If any protocols were available for finding microplastic in urban atmospheric dust ?
2. If any protocols were available for measuring microplastics in SPM and in fluvial sediments in urban river
3. How can information about circular economy especially for plastics be disseminated among citizens?
4. What are the chances of releasing of microplastics from recycled plastics based products
5. How can your research be utilised for making public more aware of the micro plastics- whether any national dashboard on impact of microplastics for public data analytics exists or planned ?
6. What methodology was adopted by CIPET for assessment of plastic waste in 60 cities in India
7. What kind of polymers are found in Chips packets and what polymers are present in Tobacco sachets
8. What are instruments, tools and technologies utilised by CIPET in undertaking plastic waste assessment
9. What are the new initiatives NCCR is planning to undertake in order to assess and prevent marine plastic litter?
10. Is RO drinking water having microplastics in it as used filtration media is made up of Plastic fibre material? Etc...

## SALIENT FEATURES OF THE WEBINAR 1

The sessions highlighted the following. (a) The importance of plastics and various polymers and their applications in a vast spectrum of products, and the concern that humanity has an instinct to discard especially single use plastics, and that there is a need to revisit the behavioural approach to managing plastics including towards segregation (b) While all plastics are not recyclable or most have limits to degrees of recyclability, there is a need to have a system of well segregated plastic waste collection and recycling initiatives and that suitable labeling of the polymer types could facilitate for products in the market including value addition back to original products and for circular economy to be realised; (c) The need to draft a national marine litter policy to control and manage the litter at the land boundary to prevent from entering the marine environment; (d) The importance of a detailed material balance of plastics production and consumption, and constructing a detailed leakage scenario; (e) Attention to periodic and geographically dispersed macroplastics assessments including the importance of polymer analysis at the plastic litter end; (f) Significance of comprehensive studies and mapping of microplastics in River Ganga and all rivers and linking / correlating to macroplastics in hotspots; (g) The development of a standardized methodology for clean-up exercises for adoption (h) The application of various methods in the analysis and

identification of macro and microplastics and identifying polymers; (i) The deliberations highlighted the methodology and framework adopted for the project, reflected on various types of plastic litter identified in trash during clean – up studies in 4 cities and indicated the efforts ongoing to develop a toolbox on plastic leakage scenario development and the need for constructing a harmonized methodology.

## ENCLOSURES

- **Press Release (s)**
- **Programme Agenda**
- **Session Flyer**
- **Concept Notes**
- **Presentation by each resource speaker**