Annexure- Communication Materials Prepared

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1. Posters

Three posters were designed by TERI to promote the campaign and invite volunteers for participation.

Poster-1

Poster- 2


WE CAN'T DEBATE WHEN THERE IS MICROPLASTIC ALREADY ON OUR PLATE
#RETHINK PLASTIC
Join TERI and UNEP in our quest and:
*Take action against negligent use of plastic
*Stop using single-use plastic
*Be aware of the problem
Get Involved: Become a volunteer today
Become a trainer: Spread your knowledge to others
Learn more: Contact us to know more

Poster- 3


UN environment
Counter MEASURE
FOR PLASTIC FREE RIVERS
teri
#RETHINKPLASTIC
Rethink Plastic: A Joint Initiative of TERI & UNEP
JOIN TERI AND UNEP IN THIS CAMPAIGN TO REDUCE PLASTIC POLLUTION
DID YOU KNOW ??
By 2050 there could be MORE PLASTIC in the ocean than FISH !!!
How Can We Be Responsible Citizens???
Exhibit your talents..
Register to Participate in the following
SCAN TO REGISTER FOR PARTICIPATION
Mangrove Clean up activity
Floral Rangoli
Murals using waste plastic
Awareness through traditional art
Fashion using plastic waste
SCAN TO TAKE PERCEPTION SURVEY ON PLASTIC USE
When?
2nd February 2020
10 am- 12.30 pm
Contact For Details!
Contact:
022-27580021
m.asodekar@teri.res.in
Where?
Sagar Vihar,
Sector 8, Vashi

2. Important links and QR Codes

TERI has named its campaign as 'Rethink Plastic' Campaign. This section provides links to important outreach and communication material prepared for the campaign.

2.1 Rethink Plastic App

The Android app has been designed for enabling users to register and contribute to the campaign by providing waste plastic bottles/ native tree saplings/ sapling planted in waste plastic bottles by uploading their basic information and photos of the saplings / bottles on the app. Further, using the app, users can pledge against 'Single use Plastic 'from the convenience of their home. The app also acts a platform to access information about the project and the upcoming and already conducted activities under the campaign.

Download the app using the following link:

https://play.google.com/store/apps/details?id=com.teri.RethinkPlasticApp

OR

Scan the following QR code:

2.2 Web Page

A web page has been designed by TERI for the Rethink Plastic Campaign. The page provides link to perception survey and pledge. The page also provides details about the project and the campaign. The web page can be accessed using the following link:

https://www.teriin.org/project/rethink-plastic-unep-teri-joint-initiative-mumbai-region

2.3 Google form and QR code for perception survey

https://drive.google.com/open?id=1A-VksO-GT6tZGDOF2cBr90GrTp83wohCPfyAiWyNDbM

2.4 Google form and QR code for Pledge against Single use plastic

https://forms.gle/ct7Ctd9GSP3k9c1n7

2.5 Feedback Form (Training of Trainers)

https://forms.gle/jmL9LRB1N8YtTsyn7

2.6 Feedback Form (Round Table Discussion)

https://docs.google.com/forms/d/17HR5QKNEdEM3jOgtVhoEKU06jOKKadDNKy6ZgP-JLqI/edit

2.7 Google form and QR code- Registration for World Wetlands Day 2020 Event

https://docs.google.com/forms/d/172VXhFn76Z1m0odyPSlScHFPFv91tt4ewrTbAJLtqGU/edit

3. E- Banner for Roundtable Discussion

4. Concept Note- Rethink Plastic Campaign

'Rethink Plastic Campaign' under the project 'Promotion of Countermeasures against Marine Plastic Litter in Southeast Asia and India'

Project Background- Promotion of Countermeasures for Marine Plastic Litter in Southeast Asia and India.

Southeast Asia and India have turned into hotspots of plastic leakage. Regional coordination and collaboration is of utmost importance to manage the Trans boundary problem of plastic wastes including micro plastics, as they end up in the marine environments. Major rivers of the region like the Ganges, Indus and Mekong are choking with plastics. However, there is no standard approach for identification, assessment and monitoring of the major sources and pathways of plastic leakage. Further, there is a lack of formulation and implementation of proper policy measures on plastic waste management by governments, with emphasis at the local level. Thus, on 4th March 2019 the Government of Japan and United Nations Environment Programme (UNEP) declared a joint effort to enhance the knowledge and information for developing countermeasures against marine plastic litter in Southeast Asia and India (Mumbai, Haridwar/ Rishikesh, Prayagraj and Agra).

The Energy and Resources Institute (TERI) is the outreach partner of UNEP for the project activities in Mumbai. Thus, in partnership with UNEP, TERI has launched a campaign in Mumbai titled '**Rethink Plastic**' encompassing various activities, awareness programmes mobilizing youth, cleanup activities focusing on waste collection and characterization, demonstrating Reuse of Plastic through Novel approaches and so on.

The Campaign: "Rethink Plastic": Need of the Campaign

Mumbai generates 408.27 tonnes/day plastic waste

Imagine 1,82,500 such containers (*20 ft x 8 ft x 8.6 ft*) full of plastic waste ending up in marine and land environments each year. **It's time for Action**.....Let us come together to tick off plastic waste from the environment before plastic pollution ticks us away over time!!!

1. Campaign objectives

I. To raise awareness about marine plastic litter (its sources, impacts and counter measures) among all stakeholders and instill a sense of commitment towards the environment through various outreach activities based on an action oriented approach.
II. To encourage stakeholders to pledge against the use of single use plastics.
III. To demonstrate and promote multiple reuse and responsible disposal of plastic waste while preventing plastic litter from entering the marine environment.
IV. To reuse 50,000 waste plastic bottles to raise saplings of native trees (Peepal, Banyan, Fig, etc.) to offset the carbon footprint towards production of the plastic bottles (around 3.4 tonnes CO_2e.
V. To handover the saplings to interested groups/ organizations for further nurturing and afforestation

2. Activities under the campaign and expected outcomes

The buildup activities focus on outreach, commitment, action and documentation of outcomes. **Table 1** gives an overview of the activities planned under the campaign that will culminate on 1st February 2020, as TERI's Mega Event and World Wetlands Day (WWD) Celebration in partnership with UNEP.

Table 1: Overview of activities planned under the Campaign

No	Activity	Output	Impact
1.	Training and awareness sessions Training of Trainers (TOT))	1. Trainers and volunteers for subsequent activities	1. Sensitized, motivated and aware youth/ citizens 2. The trainers/ volunteers will train their peers and also spread the word about plastic pollution, its severity, impacts and solutions.

2.	Treasure hunts for plastic bottles	1.Trainers and volunteers to participate in the Treasure hunts and collect waste plastic bottles 2.Sending plastic bottles collected, for recycling while using 50,000 of these bottles for raising saplings of native trees	1. Waste plastic bottles collected will not enter the land / marine environment Involvement of local youth and citizen in action oriented tasks 2. Demonstration of responsible reuse and disposal of waste plastic
3	Treasure Hunt for saplings/ seeds of native trees	1. 50.000 saplings of native tree species will be collected from roadsides/ cracks of walls and other such places where they do not necessarily survive	1. These saplings will be raised in plastic bottles before handing over for afforestation, thus, improving their survival rates 2. Use of native tree species- survive well in local climate, no threat of invasion and multiple ecological benefits like carbon sequestration on maturity which will help offset around 3.4 tonnes of carbon dioxide equivalent (involved in production of 50,000 PET bottles)
4	Raising and nurturing the saplings before handing over for afforestation	1. 50,000 saplings raised and nurtured in 50,000 waste plastic bottles	1.Demonstration of effective multiple reuse of waste plastic bottles 2.Better chances of survival of the nurtured saplings, when used for afforestation 3.A sense of responsibility and environmental commitment among the citizens
5	Handing over saplings for afforestation/ further nurturing	1. The saplings handed over to government departments/ organizations / willing individuals for nurturing and afforestation	1. A treasure of saplings from the roadsides which otherwise would have been wasted will be properly nurtured and given over to environmentally responsible organizations and individuals
6.	Stakeholder discussion on Plastic pollution and Role of Stakeholders	1. White paper highlighting ground realities, policy gaps and suggested interventions, based on outcomes of the discussion	1.The white paper will be communicated to the Chief Minister requesting to develop a roadmap to tackle plastic pollution in the state of Maharashtra
7	Pledge against single use plastic	1. Individuals take pledge for not using single plastic items	1.Individual commitment towards reducing plastic
8	Perception survey	1.Assessment of perception and level of awareness among the citizens	1.The survey results will help formulate better policies for plastic waste management keeping in mind the perception of citizens in regards to plastic use and management

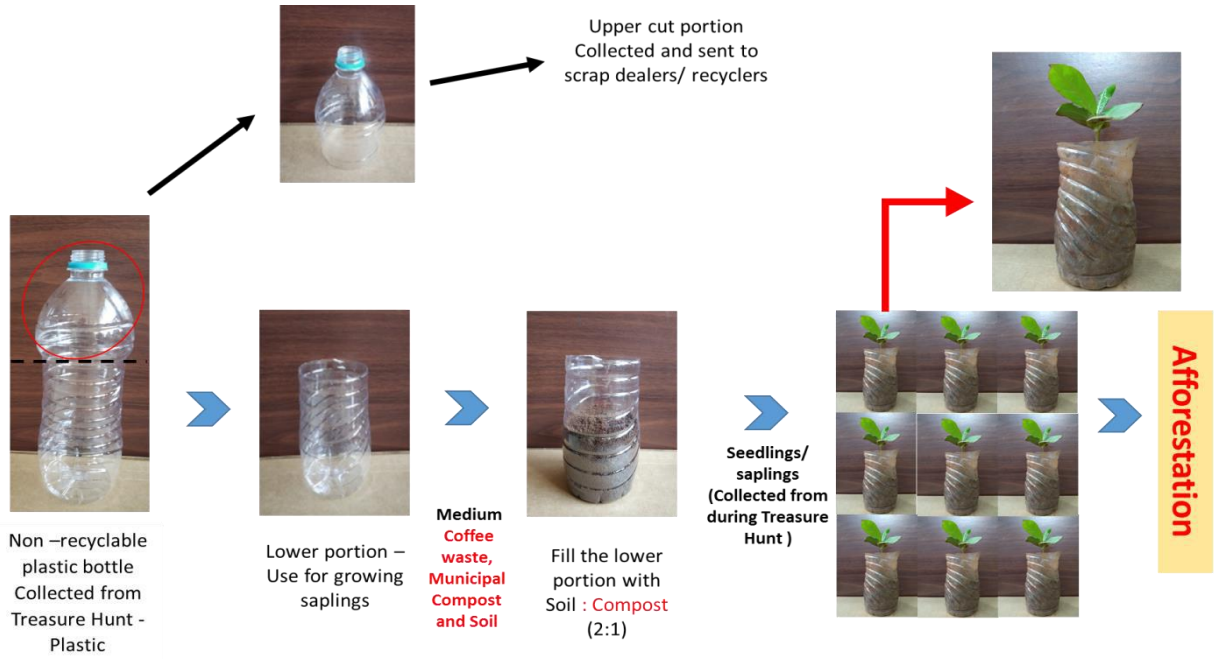

Figure 1 Use of Waste Plastic bottles for Raising Saplings

3. Campaign culmination: WWD Celebration on 1st February 2020

On this occasion, saplings raised in waste plastic bottles will be handed over to government organizations/ NGOs/ individuals for afforestation. Further, a large scale poster making/ slogan writing activity involving school students will also be organized.

Join us to make your contribution towards the Environment!!!

Download the app (Scan the QR code/ visit the link)

Take the pledge

Register as avolunteer- be a trainer/ come for cleanups/ nurture saplings and more...

Spread the word

5. Concept Note: Round Table Discussion

Round Table Discussion

Plastic Pollution and Role of Stakeholders

December 23, 2019, Mumbai
Venue: 1st Floor, Management Council, University of Mumbai, Fort Campus

Summary

Accumulation of waste plastic on land, fresh water and marine ecosystems is becoming a serious issue necessitating urgent attention of all stakeholders. Globally, the developing and developed nations are formulating policies and drawing up road maps to tackle the issue of plastic- the synthetic material of the century.

With increasing urbanization and industrialization, applications of plastic in day to day life are inevitable. With almost 7.6 billion people[1] living on this planet, no natural source would be able to fulfil the immense requirements of packaging material, fabric, medical devices, automobile industry, machines, satellites, electronic goods and so on. The list can be truly endless.

Hence in this era of Information technology, mobiles and machines, appropriate handling of plastic with critical due diligence to procurements, reuse and recycle, and disposal could be the only saviour.

The above could be achieved through public awareness, policies, appropriate infrastructure and robust scientific methodologies adopted at every stage of the process.

An open stakeholder dialogue could be the starting point to practice the proverbial-"be the change that we want to see in the world". Given this, The Energy and Resources Institute (TERI), United Nations Environment Programme (UNEP) and University of Mumbai have joined hands to organize a Round Table Discussion highlighting the theme of plastic pollution. A white paper emphasizing upon the way forward would be the outcome of the discussion.

The Context

Plastic waste is a mounting concern in India, with almost 26,000 tonnes of plastic being generated in a day, and almost 10,000 tonnes remaining uncollected2. Mumbai is one of the coastal mega cities which is also known as India's commercial capital; and is home to numerous small- and large-scale businesses, industries, educational institutes, government offices and private enterprises. Mumbai generates around 408.27 Tonnes per day of plastic waste*3* which is enough to completely fill up 500 shipping containers (size: 20 ft x 8 ft x 8.6 ft) 4 (Refer to Annexure for calculation).

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[1] https://data.worldbank.org/indicator/SP.POP.TOTL
[2] http://164.100.228.143:8080/sbm/content/writereaddata/SBM%20Plastic%20Waste%20Book.pdf httpsr
[3] Down to Earth,India's plastic consumption increases at over 10 per cent year-on-year,June 2018
[4] Volume of a container being 1360 cubic feet as per https://www.earthrelocation.com/container-dimensions

Lack of proper disposal methods and mismanagement cause a significant amount of this plastic to end up in the sea. The sea however, during storms and high tides dumps back over a thousand kilos of waste back on the sea shore[5] [6]. Plastic waste adds to the misery of Mumbai residents in the monsoons by clogging drains and sewer lines leading to water logging during monsoons[7] [8]. Further, Mumbai has sandy beaches and rocky coasts along with large mangrove stretches (66 sq. km.) along the creeks[9]. These mangroves that provide ecological benefits such as breeding ground for fishes, carbon sequestration, preventing floods, providing medicinal benefits to name a few; are also impacted by plastic waste which get stranded in the aerial roots (pneumatophores of the mangroves) and clog them. Further, this untreated plastic degrades into smaller bits i.e, micro plastics, which through many leakage points enter the food chain via fish, water or crops.

There are numerous concerns about usage and disposal of non- biodegradable materials, especially plastic which are diverse in nature and include accumulation of waste in landfills, water bodies and in natural habitats. Moreover, physical problems for animals resulting from ingestion or entanglement in plastic, the leaching of chemicals from plastic products and the potential for micro plastics to enter the food chain are increasing.

Policy Interventions and Impacts

For the Urban Local Bodies (ULBs), collection of plastic, its segregation and scientific disposal gets difficult and expensive.

Hence as an important step to curb plastic menace the Government of Maharashtra banned plastic bags of less than 50 micron through Maharashtra Plastic Carry Bags (Manufacture and Usage) Rules, 2006.

However in spite of this ban, there is continuous increase in the non-biodegradable plastic garbage waste causing damage to environment and health.

Therefore, in the year 2018, Maharashtra state issued a notification further banning Plastic and Thermocol Products (Manufacture, Usage, Sale, Transport, Handling and Storage)[10].

Although there is success reported by few ULBs, the state Government had to reconsider the impositions owing to lack of alternative materials and public demand for single use plastic.

Opportunity

In the recent past, there have been enormous efforts taken to create awareness amongst end users of plastic through campaigns run by the government, and civil society organizations. There are several citizen groups actively involved in initiatives like Beach clean-up campaigns, segregation of waste, trainings organized for responsible waste segregation and so on. The curriculum in the schools and colleges offer an opportunity to the youth to experience the harmful impacts of plastic which is getting

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[5] https://www.cntraveller.in/story/mumbai-gets-its-annual-reminder-from-the-arabian-sea-marine-drive-juhu-beach/

[6] https://www.indiatoday.in/india/story/how-mumbai-s-marine-drive-turned-into-a-necklace-of-trash-1286705-2018-07-16

[7] https://www.firstpost.com/india/mumbai-rains-environmentalists-say-flooding-will-persist-as-long-as-ill-planned-construction-plastic-pollution-continue-6965441.html

[8] https://www.hindustantimes.com/mumbai-news/will-maharashtra-s-plastic-ban-reduce-monsoon-flooding/story-Op4ENCaUHZsh9hvnye1NIO.html

[9] http://fsi.nic.in/isfr2017/isfr-mangrove-cover-2017.pdf

[10] http://www.mpcb.gov.in/sites/default/files/plastic-waste/rules/plastic_27032018.pdf

translated in a social movement against plastic. There is a good opportunity to understand the steps taken so far and chalking out a way forward through stakeholder interaction.

Objectives

A stakeholder dialogue is one of the activities of the project jointly implemented by UNEP, TERI and University of Mumbai with following objectives

1. To create a forum for the stakeholders of Mumbai to share experiences and be an integral part of the policy dialogue.
2. To understand experiences and views of policy makers, organizations working at the grass root, end users, citizen groups, manufacturers and civil society organizations.
3. To document innovations, case studies and success stories in handling plastic through reduce, reuse, and recycle.
4. Develop an action plan and a white paper through an open dialogue.

The stakeholders

The potential stakeholders for the interaction are listed below.

Potential Administrative Stakeholders

- Environment Department, Mantralaya
- Maharashtra Pollution Control Board (MPCB)
- Municipal Corporations (Mumbai, Navi Mumbai)
- Industrial Association Representatives
- Mangrove Cell

Potential Stakeholders at Institutional Level

- University of Mumbai
- Central Institute of Fisheries Education (ICAR-CIFE)
- Indian Institute of Technology (IIT) Bombay
- Institute of Chemical technology (ICT), Department of Polymer Engineering
- Indian Coast Guard
- Mumbai Port Trust

Potential Grassroots Stakeholders

- Residents Welfare Association
- Local Residents
- Local Fishing Communities
- Ferry boat owners
- Rag Picker Association

Others

- Local Citizens
- Corporates
- Plastic Manufactures
- Recyclers

Agenda for Round Table Discussion

Plastic Pollution and Role of Stakeholders

Date: 23 December, 2019, Time: 11:00 AM- 1 PM

Venue: Management Council, University of Mumbai, 1st Floor, Fort, Mumbai

Chaired by Prof. Suhas Pednekar, Vice Chancellor , University of Mumbai and Co-chaired by Mr. G. S. Gill (I.A.S.), Senior Advisor, TERI	
10.30am - 11.00 am	Registration
11.00am -11.10am	Welcome, Project Introduction and Objectives.
11.10am-12.40pm	Round Table discussion
	Topics to be discussed
	1. Plastic Pollution and its Impacts
	2. Plastic waste problem and Government Policies on Plastics in Maharashtra: Special emphasis on Mumbai
	3. Ground realities of plastic pollution: experiences of stakeholders
	4. Way Forward-
12.40pm -12.55pm	Feedback and conclusion by the Chair
12.55pm-1.00pm	Vote of thanks
2 hours	**Total time**
Lunch	

Annexure 1 for Round Table Discussion

During the clean-up activity conducted by TERI at Sagar Vihar, Vashi on 02.11.2019, it was found that, 3.6 kg of mixed plastic waste was enough to completely fill rag of 6 cubic feet volume

Applying the same quantity of mixed waste, following are the projections calculated for Mumbai City

Total Plastic waste generated by Mumbai city = 408.27 tonnes per day

= 408270 kg/day (1 Tonne = 1000 kg)

Volume in cubic feet for Mumbai city = 408270 *6/3.6

= 680450 cubic feet

Calculation for expressing Plastic waste in terms of shipping containers

Volume of the shipping container: 1,360 cubic feet[11]

Number of shipping containers for storaging daily Plastic waste = Volume occupied by mixed plastic waste (cubic feet)/ Volume of the shipping container (cubic feet)

Number of shipping containers required for Mumbai: 680450 /1360 = ~ 500

Multimedia for further reference

- **It's a Plastic World https://vimeo.com/100694882**
- **Albatross https://vimeo.com/218502282**
- **All the Way to the Ocean https://youtu.be/lWRrpFkJDo8**
- **Bag It: Is your Life too Plastic? https://youtu.be/MRjPkl_4lmM**
- **The Story of Bottled Water https://youtu.be/Se12y9hSOM0**
- **Sea of solutions https://www.unenvironment.org/events/conference/sea-solutions-2019**
- **https://www.unenvironment.org/news-and-stories/video/plastic-pollution-how-humans-are-turning-world-plastic**
- **https://www.unenvironment.org/news-and-stories/video/give-gift-ocean**
- **https://www.cleanseas.org/about**

[11] https://www.earthrelocation.com/container-dimensions

6. Concept Note: Campaign to Promote Multiple Reuse of waste plastic bottles to offset their carbon footprint through an Innovative Approach

February 2, 2020

Campaign to Promote Multiple Reuse of waste plastic bottles to offset their carbon footprint through an Innovative Approach

An attempt for Limca Book of Records

Submitted to
United Nations Environment Programme
(UNEP)

Background

Look around and you will find something or the other that is made of plastic. From homes to offices and from institutes to malls, multiplexes, temple complexes and airports; there is plastic everywhere. It has become an inseparable, integral part of our lives. However, this boon to mankind has turned into a threat to the environment as well as human health. Today, plastic waste is transboundary problem that has spread on the land and deep into the rivers, seas and oceans. It comprises up to 87% of the total marine litter[12]. Major sources of plastic litter and debris include waste dumping in oceans, marine/ beach tourism, fishing activities, plastics on land that get dispersed by winds[13]. Various studies have claimed the ill effects of plastic. On an average, humans are reported to ingest around 5g plastic every week, owing to micro plastics which end up in the food chain[14]. It also severely affects the marine life forms[15,16]. According to Werner and O'Brien (2017), nearly 800 marine species have shown damaging interactions with marine litter in the form of entanglement and ingestion of plastics[17]. Nearly 17% species impacted by marine plastic debris are listed on near threatened species as per the IUCN Red List[18]. Thus, considering the severity of impacts of marine plastic litter on man and environment, it becomes important to mitigate this problem at local, national, regional and global levels at the earliest.

Introduction

The problem of plastic waste is a mounting concern in India, with almost 26,000 tonnes of plastic being generated in a day, and almost 10,000 tonnes remaining uncollected[19]. Further, India has an extensive coastline of **7516.6 km** along which, there are numerous ports, harbors, towns, villages, megacities and sites of tourist interests[20]. Mumbai is one of the coastal mega cities which is also known as India's commercial capital; and is home to numerous small- and large-scale businesses, industries, educational institutes, government offices and private enterprises. It has a huge population of over 20 million [21] and covers 167 km of the Indian coastline along the Arabian Sea[22]. The amount of plastic waste generated by the city is ~243 metric tons/ day. Lack of proper disposal and mismanagement cause a significant amount of this plastic end up in the sea. The sea however, during storms and high tides dumps back over thousand kilos of waste back on the sea shore[23] [24].

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[12] Galgani et. al, 2019. Impacts of marine litter

[13] Napper et. al, 2019. Marine Plastic Pollution: Other Than Microplastic

[14] https://wwf.panda.org/wwf_news/press_releases/?348337/Revealed-plastic-ingestion-by-people-could-be-equating-to-a-credit-card-a-week

15 Smith et al., 2018. Microplastics in seafood and the implications for human health

[16] Acampora et. al., 2016. The use of beached bird surveys for marine plastic litter monitoring in Ireland

[17] Werner and O'Brien, 2018. Marine Litter

18 Gall and Thompson 2015. The impact of debris on marine life. Marine pollution bulletin

[19] https://economictimes.indiatimes.com/news/politics-and-nation/how-india-is-drowning-in-plastic/articleshow/69706090.cms?from=mdr

[20] http://iomenvis.nic.in/index2.aspx?slid=758&sublinkid=119&langid=1&mid=1

[21] http://worldpopulationreview.com/world-cities/mumbai-population/

[22] http://abrahamjohnarchitects .com/the-bombay-coastal-project

[23] https://www.cntraveller.in/story/mumbai-gets-its-annual-reminder-from-the-arabian-sea-marine-drive-juhu-beach/

[24] https://www.indiatoday.in/india/story/how-mumbai-s-marine-drive-turned-into-a-necklace-of-trash-1286705-2018-07-16

Plastic waste adds to the misery of Mumbai residents in monsoons by clogging drains and sewer lines leading to water logging during monsoons[25] [26]. Further, Mumbai not only has sandy beaches but also has rocky beaches and large mangrove stretches (66 sq. km.) along the creek[27]. These mangroves that provide ecological benefits such as breeding ground for fishes, carbon sequestration, preventing floods, providing medicinal benefits to name a few; are also impacted by plastic waste which gets stranded in the aerial roots (pneumatophores of the mangroves) and clogs them. This makes Mumbai an important location where initiatives to tackle marine plastic pollution must be taken not only by governing bodies but also by every individual. There is a need for awareness about proper management of plastic waste and alternatives to plastics and a need to practice 5 "R" namely Retain, Refuse, Reduce, Reuse, Recycle leading to Responsible use and disposal with respect to plastics.

UNEP has appointed The Energy and Resources Institute (TERI) as one of the partner organization as part of this project. TERI's Western Regional Centre (WRC), Mumbai will be responsible for implementing the outreach campaign in Mumbai. Numerous workshops, panel discussions, clean up drives and other outreach activities will be conducted by TERI -in collaboration with other partners and local stakeholders.

One of the major events will be demonstrating the reuse of waste plastic bottles to raise native tree saplings and use these saplings for afforestation/ reforestation. The details of the event are elaborated in subsequent sections.

Resource Circularity

50,000 bottles= only 0.3 % of monthly utilization in Mumbai= 3391 Kg of CO_2e

[25] https://www.firstpost.com/india/mumbai-rains-environmentalists-say-flooding-will-persist-as-long-as-ill-planned-construction-plastic-pollution-continue-6965441.html

[26] https://www.hindustantimes.com/mumbai-news/will-maharashtra-s-plastic-ban-reduce-monsoon-flooding/story-Op4ENCaUHZsh9hvnye1NIO.html

[27] http://fsi.nic.in/isfr2017/isfr-mangrove-cover-2017.pdf

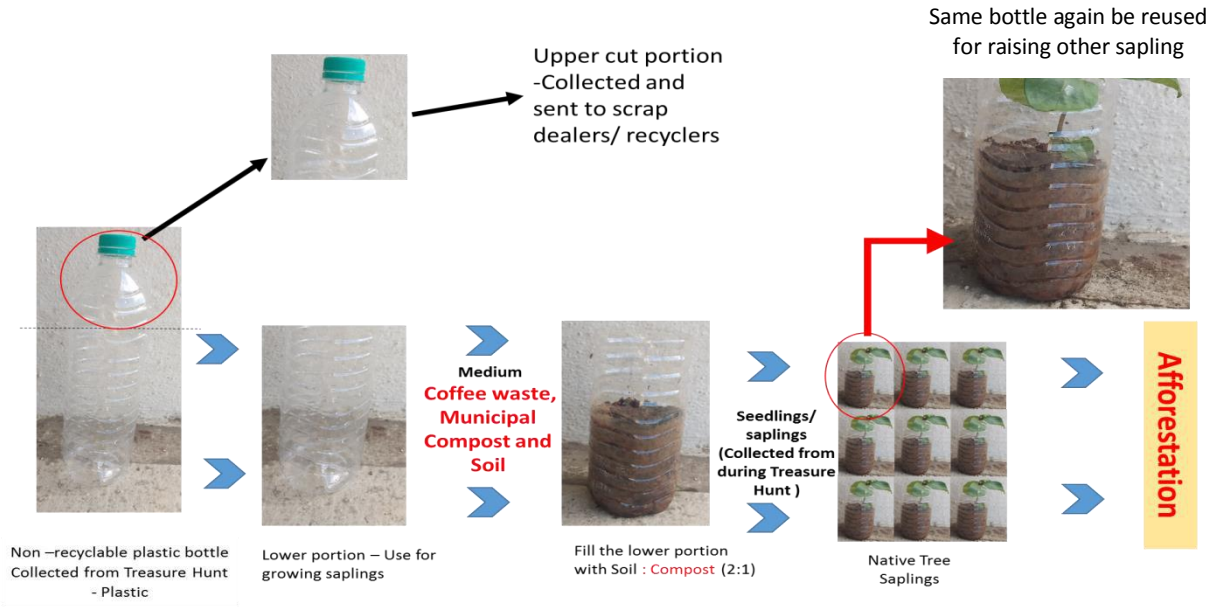


Figure 1: Resource Circularity overview

Significance and Objectives of the event

With an objective to achieve the active stakeholder participation, TERI proposes an event on February 2, 2020 which is marked globally as the world Wetlands Day which would be preceded by several build up activities, promotion campaigns, and awareness and outreach programs, media campaigns and so on. The finer objectives of this event are outlined in Table 1.

Table 2: Objectives and Outcomes

Sr. No.	Objective	Rationale	Expected outcome
1.	**To design a large scale campaign spanning over a period of 3.5 months**		
a	Demonstrate meaningful multiple reuse of non-recyclable plastic bottles which otherwise end up in the marine environment	• 40 % of discarded plastic is not recycled*[28] • Plastic litter entering the marine environment has severe impacts on marine organisms • Plastic bottles of 1l or more capacity which cannot be recycled will	Integration and emphasis on value of responsible disposal and reuse of plastic bottles Ensuring multi stakeholder participation

In 2014-15, the average per capita consumption of plastic waste in India was recorded to be 11 kg/year. Out of which Mumbai accounted for approximate 0.2 million tonnes/year. Out of total plastic waste collected in India only 60% of the plastic is recycled[28]. However, remaining 40% ends up in landfills, dump yards and the marine environment.

Sr. No.	Objective	Rationale	Expected outcome
		be collected to be reused for planting saplings • These bottles can be used multiple times for raising saplings and later be handed over to pyrolysis/ gasifier facilities	
b	Offset the carbon footprint of these bottles by raising and nurturing saplings of native trees in these bottles	• Waste bottles are helping nurture trees which would help offset carbon footprint	Offset the carbon footprint of these bottles by using saplings raised in them for afforestation/ reforestation
c	To provide a target oriented objective to the stakeholders to ensure maximum participation	• Activity based campaigns provide better opportunity and results	• Commitment for participation, • Engagement of print, electronic and social media
d	To organize multiple build up events such as Treasure Hunts.	• To encourage stakeholder participation	• Build up for the event and outreach through print, electronic and social media
d.1.	Training of Trainers (ToT)	• Train volunteers to collect bottles and saplings (Treasure Hunt) for the event • They in turn will train other participants for the Treasure Hunts	• Awareness about the programme • Preparing trainers to train other volunteers
d.2.	Treasure Hunt for Plastic	• Scattered Plastic in marine environments needs to be channelized for responsible disposal. • Awareness and impact of the message could be compounded if citizens are sensitized to ground realities.	• Plastic bottles collected will be prevented from entering marine environment and reused for the cause of Afforestation • Collect at least 50,000 Plastic Bottles

Sr. No.	Objective	Rationale	Expected outcome
d.3	Treasure Hunt for Native tree saplings	• Saplings of native tree species growing along the roadsides and in cracks of walls/ buildings do not necessarily survive to mature into full grown trees. • These will be collected and planted and nurtured in plastic bottles before handing over for reforestation/ afforestation	• Saplings which otherwise do not necessarily survive, will be able to flourish as mature trees and provide various ecological services • Collect at least 50,000 saplings of native trees
e	Planting and storing the saplings	Nurturing saplings in plastic bottles to enhance their chances of survival on being transplanted for afforestation/ reforestation	• Nurtured saplings available for afforestation/ reforestation
2	**To organize an event on the occasion of World Wetlands Day (WWD), 2nd February 2020**	World Wetland Day	• Endorsement from Ramsar convention would help in greater outreach at national and international level • Awareness about marine plastic pollution in wetland/ sea as an ecosystem • Media coverage
a.	To hand over the nurtured saplings for afforestation to Government departments and stakeholders	• Use of native trees for afforestation/ reforestation • Increased green cover and other ecological services • Offsetting of carbon from the production of plastic bottles	• The nurtured saplings when planted at afforestation sites have better chances of survival and maturing into healthy trees

Sr. No.	Objective	Rationale	Expected outcome
b.	Documentation and application for entry to Limca Book of Records for reusing at least 50,000 plastic bottles to raise 50,000 thousand saplings and handing them over to organizations/ individuals for afforestation/ reforestation	• Outreach about the event and its overall outcome at national and international level. • A cause of encouragement and motivation for the participants.	• Setting an example for people and communities at national and international level to come together and volunteer for the project objectives

Approach

The approach for the event would be to cover larger objectives of the project, such as community engagement, outreach and reduction of marine litter by involving stakeholders as volunteers for the programme; and through build up events and media campaigns to highlight the menace of plastic waste and ways in which each and every stakeholder can contribute to fight this problem. The main build up events will be:

Treasure Hunt- Plastic Bottles

TERI proposes to use at least 50,000 such bottles for raising native tree saplings. These could be bottles which are spoiled due to exposure to sunlight or salty water or have layers of oil/ grease/ algal growth and are of low-quality plastic.

Treasure Hunt- Native tree saplings

The saplings that TERI proposes to raise in these bottles are of native tree species (e.g. Neem, Peepal, Banyan, Ficus etc.) that can be found growing along road sides or in cracks on wall and buildings and other such non conducive places (Figure 2). These saplings do not necessarily survive and flourish into full grown trees due to lack of conducive growth environment. If properly nurtured initially and planted at reforestation/ afforestation sites or gardens, these have the potential to mature into full grown trees and provide ecological benefits (Figure 3) such as carbon sequestration.

Figure 2 Saplings growing along roadsides

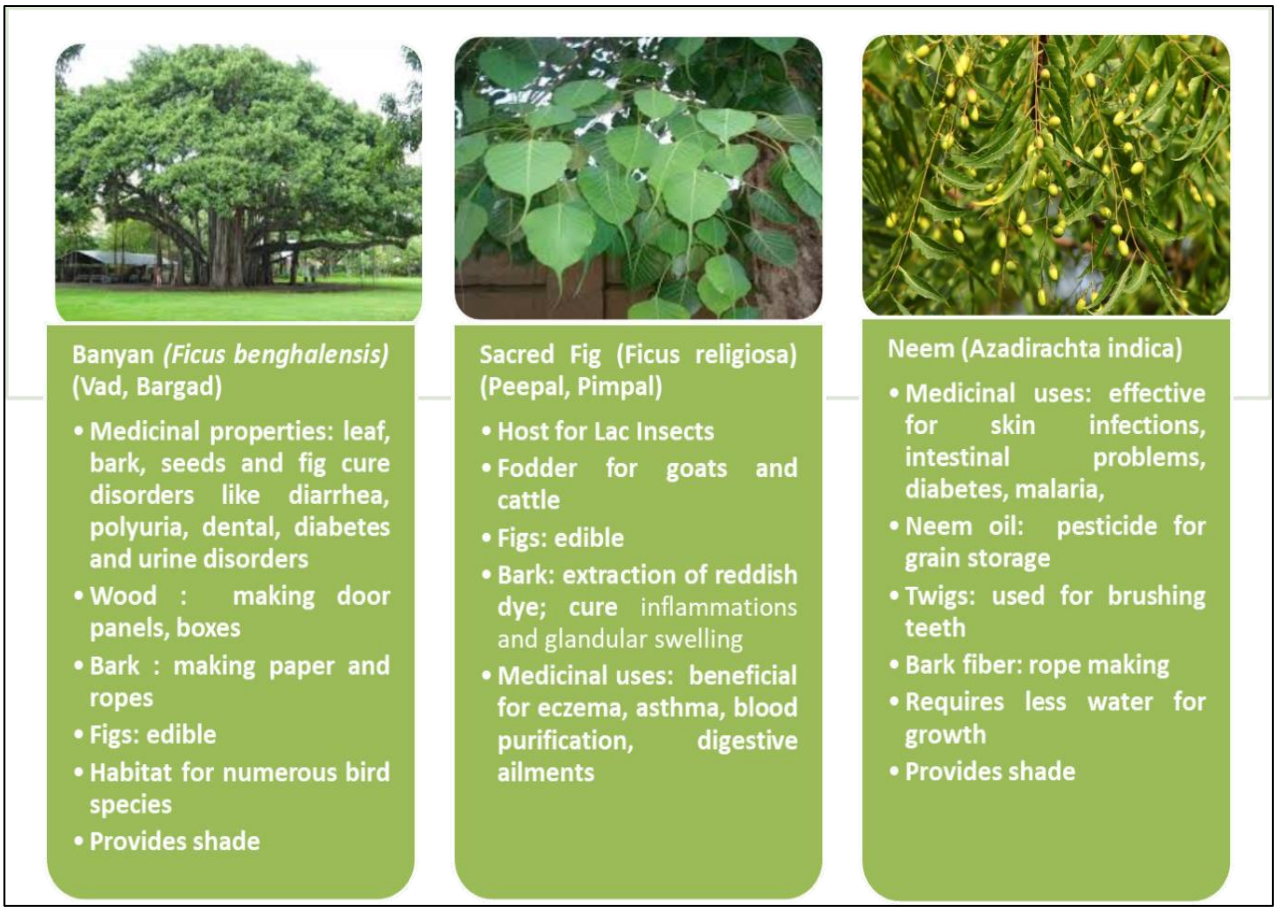


Figure 3 Uses of native tree species of Mumbai

Carbon Footprint of the Bottles[29][30].

For Offsetting Carbon footprint of 50,000 PET bottles,
at least 100 Mature Neem (*Azadirachta indica*) Trees are required.

Carbon dioxide emissions during plastic bottle manufacturing

Raw Materials → **PET (Polyethylene terephthalate)** → **Bottle***

2.33kg/CO_2 | 0.79 kg/CO_2

Total emissions in CO_2e = 2.33 + 0.79 = 3.12kg CO_2e/kg

Weight of 1 PET plastic bottle of 1 litre = 22 grams. 46 1 lit bottles = 1 kg
Thus, 3.12kg CO_2e emission generated during production of 46 1 lit bottles

Amount of emission involved in manufacturing of 50,000 bottles= around 3.4 tonnes
(3391.30 kg CO_2e to be exact)

1 mature Neem tree sequesters up to 33.61 kg/day
Thus, 12.27 tonnes of carbon /year.

Methodology

To begin with, TERI shall conduct following build up activities:

- Getting participation confirmation in the form of Letter of Intent (LoIs) or Commitment letters from various stakeholders like schools/ colleges/ Residents Welfare Associations/ Associations of fishing communities or street vendors or ferry boat drivers/ NGOs/ corporates, etc. stating the number of bottles/ saplings/ volunteers that each group/ individual/ organization would provide at a minimum. (Figure 4)
- A number of sessions of training of trainers (ToT) will be conducted. These trainers will train the volunteers about which saplings and bottles to collect and how to do so, how to nurture the saplings and other requisites.
- After the ToT, the volunteers will do a treasure hunt for the bottles and saplings around the city.

[29] http://wwwmaterials.eng.cam.ac.uk/energyforschools/downloads/DPackagingRecycling.pdf
[30] https://neempedia.com/neem-safeguard-environment/

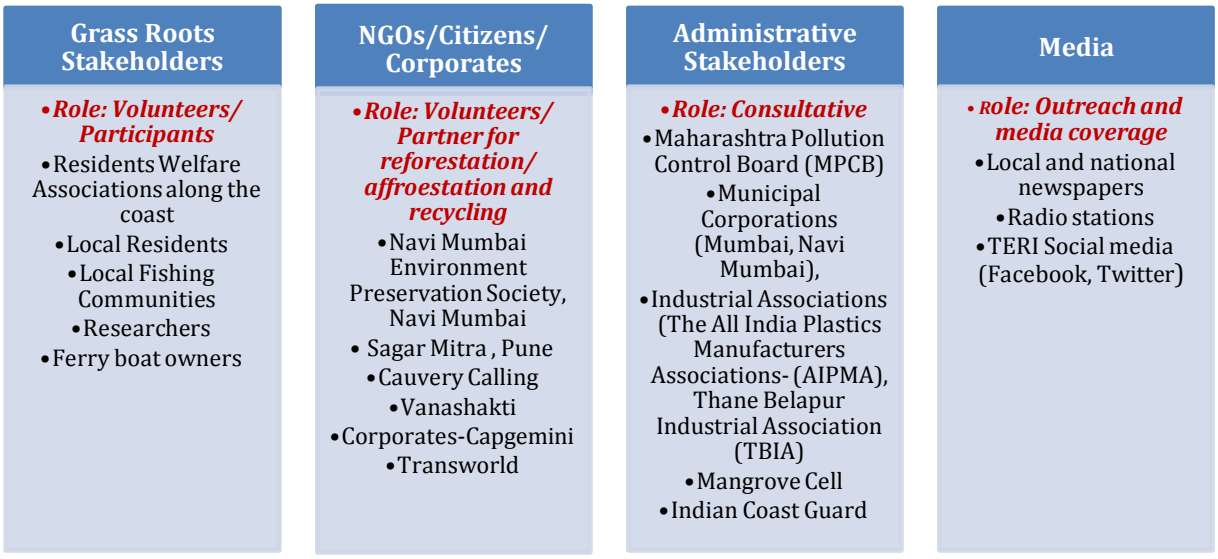


Figure 4 Potential stakeholders for the event

Table 3: Sourcing of PET bottles for the Event

Plastic Bottles can be collected from Beach/Mangrove Area/ Roadside				
Location	Treasure Hunt – Navi Mumbai	Treasure Hunt – Mumbai	Treasure Hunt – Thane	Treasure Hunt – Mumbai Suburban
Target (Bottle Nos.)	15,000	20,000	15,000	20,000
	Multiple Treasure Hunt for waste plastic bottles and roadside saplings			
	Sapling Nurturing by Volunteers for 15 days to 1 month			
Space for Nurturing provided by	Navi Mumbai Municipal Corporation (NMMC)	Mumbai University (MU)	Thane Municipal Corporation (TMC)	Brihan Mumbai Municipal Corporation (BMC)

Expected Outcomes

The expected outcomes of the event will be:

- Community engagement and establishing linkages with potential stakeholders at grassroot, administrative and institutional levels.
- Awareness among the stakeholders about marine plastic pollution, its impacts and solutions.
- Emphasis on value of responsible disposal and reuse of plastic bottles and plastic waste at large.

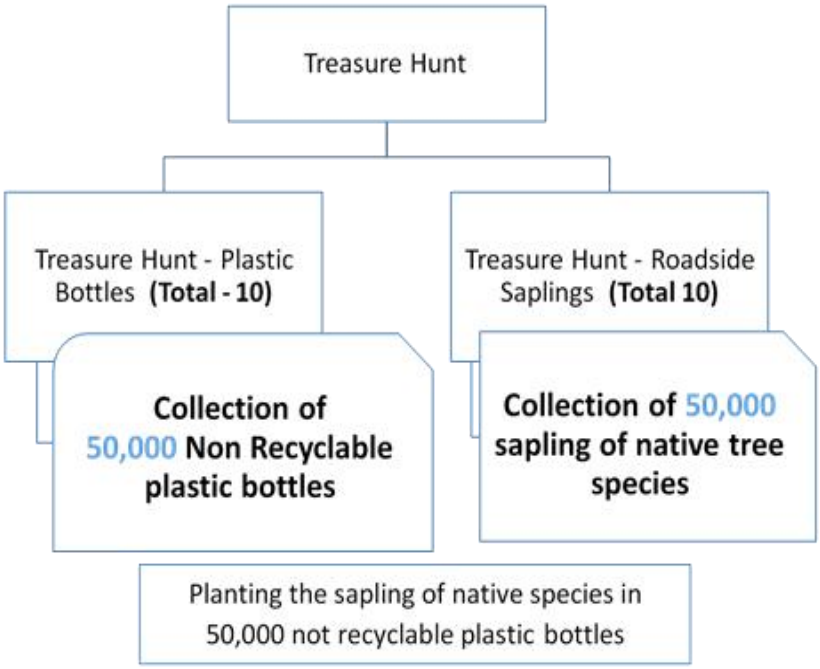
Preparatory Phase

November to 1st Week of December 2019

- Preparatory material (Brochures, Posters, Pamphlets, Banners in local language and English)
- Stakeholder Interaction (Communicating the pledge and dissemination of information material)
- Training of trainers

Implementation Phase

December 2019 to January 2020



Event

2nd February 2020

- Handling over the saplings to various stakeholders
- Limca Book of Record and Documentation

Annexure 1 for Concept Note: Campaign to Promote Multiple Reuse of waste plastic bottles to offset their carbon footprint through an Innovative Approach

Overview of Carbon Sequestration calculation

Description	Units	Quantity	Calculation
Per capita consumption (2014-15)	kg/person	11	
Mumbai population (2014-15)	Number	19315737	
Amount of Plastic consumption	kg	212473107	
Non recycled plastic (40%)	kg	84989243	
Total Carbon Emission (FROM 40% NON RECYCLED WASTE)*	Tonnes of CO_2/ year	265166.44	(84989243 *3.12 /1000)
Carbon sequestration by one mature Neem tree**	Tonnes/year	12.27	Source -2
Amount of mature tree required to offset from Non recycled plastic	Trees	21611	

Note: 3.12 kg of CO_2/kg - emission from raw material to PET bottle

Source: * (http://www-materials.eng.cam.ac.uk/energyforschools/downloads/D-PackagingRecycling.pdf)

** https://neempedia.com/neem-safeguard-environment/

7. Concept Note: World Wetlands Day Event 2020

World Wetlands Day (WWD) Celebration- 2020

Theme- Save Wetlands from Marine Plastic Litter

Venue: Sagar Vihar, Vashi, Navi Mumbai, Date: February 2, 2020, Time: 10 am – 12.30 pm

1. World Wetlands Day-2020

According to the Ramsar Convention, wetlands are defined as areas of marsh, peat land or water that may be natural or artificial, permanent or temporary, with flowing or static, fresh / brackish/ saltwater, including areas of marine water[1]. Wetlands also include riparian and coastal zones adjacent to the wetlands such as coastal beaches, rocky shores, mud flats; and islands lying within the wetlands[1] [2] [3]. They are important ecosystems that harbor a rich biodiversity and also provide numerous ecosystem services to sustain life on earth. In order to mark the anniversary of adoption of the Ramsar Convention for conservation of wetlands and raise global awareness regarding the importance of wetlands for humans and the environment, WWD is observed on the 2nd of February every year.

The wetland ecosystems are under tremendous stress due to the rapidly growing population and pollution, especially plastic pollution, and need to be conserved. With plastic waste ending up in wetlands and other marine environments through waste dumping, marine tourism, fishing activities, plastics on land getting dispersed into the sea by winds; the issue is a growing environmental and health concern[4]. Plastic comprises up to 87% of the total marine litter. On an average, humans are reported to ingest around 5g plastic every week, owing to micro plastics which end up in the food chain[5]. Various studies have claimed the ill -effects of plastic on human beings. Unsurprisingly, it also severely affects the marine life forms[6,7]. According to Werner and O'Brien (2017), nearly 800 marine species have shown damaging interactions with marine litter in the form of entanglements and ingestion of plastics[8]. Nearly 17% of the species impacted by marine plastic debris are listed as near

[1] https://www.ramsar.org/sites/default/files/documents/library/info2007-01-e.pdf

[2] https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/coastal-wetland

[3] https://www.environment.gov.au/system/files/resources/21499ab3-dbc5-445d-ab82- ed727019de31/files/coastal-marine-wetlands.pdf

[4] Napper et. al, 2019. Marine Plastic Pollution: Other Than Microplastic

[5] https://wwf.panda.org/wwf_news/press_releases/?348337/Revealed-plastic-ingestion-by-people-could-be- equating-to-a-credit-card-a-week

[6] Smith et al., 2018. Microplastics in seafood and the implications for human health

[7] Acampora et. al., 2016. The use of beached bird surveys for marine plastic litter monitoring in Ireland

[8] Werner and O'Brien, 2018. Marine Litter

threatened species as per the International Union for Conservation of Nature's (IUCN) Red List[9]. Thus, considering the severity of impacts of marine plastic litter on man and the environment, it becomes important to mitigate this problem at the local, national, regional and global levels at the earliest.

2. Rethink Plastic- A joint initiative of The Energy and Resources Institute (TERI) and United Nations Environment Programme (UNEP)

The UNEP has initiated a project named 'Promotion of countermeasures against marine plastic litter in Southeast Asia and India', sponsored by the government of Japan. The project is aimed at raising awareness about the issue and to suggest doable countermeasures to tackle marine plastic pollution. In India, the project is being implemented at Haridwar, Agra, Prayagraj (Allahabad) and Mumbai (Annexure- A: Project Description). The UNEP has partnered with TERI to implement the project in Mumbai.

A.Why Mumbai?

Mumbai is a coastal megacity in India, situated along the coast of Arabian Sea. It has a coastline of 167 km10 and mangrove ecosystem spread across 66 sq. km area, which is an important buffer zone for the city11. The amount of plastic waste generated in the city is ~243 metric tons/ day12. Lack of proper disposal mechanisms and mismanagement cause a significant amount of this plastic waste to end up in the sea and mangroves. This becomes evident when, during storms and high tides, the sea dumps over a thousand kilos of waste back on the sea shore13. Further, choked drains and sewers lead to severe water logging in the city during the monsoon14 15. Thus, awareness about the importance of wetland ecosystems, the threat of plastic litter and active citizen participation for their conservation is of utmost importance in Mumbai.

[9] Gall and Thompson 2015. The impact of debris on marine life. Marine pollution bulletin

[10] http://abrahamjohnarchitects.com/the-bombay-coastal-project

[11] http://fsi.nic.in/isfr2017/isfr-mangrove-cover-2017.pdf

[12] https://portal.mcgm.gov.in/irj/go/km/docs/documents/MCGM%20Department%20List/Environment/Docs/MCGM%20ESR%20English%20Report.pdf

[13] http://abrahamjohnarchitects .com/the-bombay-coastal-project

[14] https://www.firstpost.com/india/mumbai-rains-environmentalists-say-flooding-will-persist-as-long-as-ill-planned-construction-plastic-pollution-continue-6965441.html

[15] https://www.firstpost.com/india/mumbai-rains-environmentalists-say-flooding-will-persist-as-long-as-ill-planned-construction-plastic-pollution-continue-6965441.html

B. Rethink Plastic Campaign

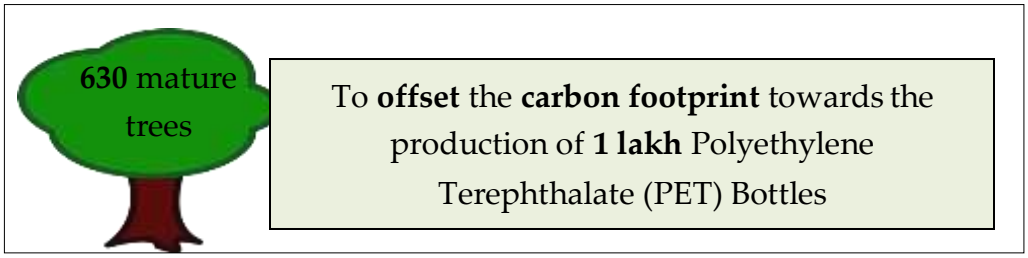
The program implemented in Mumbai under the aforementioned project, is in the form of an action oriented outreach campaign- the 'Rethink Plastic Campaign' (November 2019-March 2020) (Annexure B: Campaign Details).

The campaign has following major components:

1. Creating awareness about plastic pollution and reaching out to at least 20,000 stakeholders from grass roots communities such as fisher folks, ferry boat owners, academia, corporates, and Civil Society Organizations (CSOs) during the campaign period (November2019- March 2020) and engaging them in action oriented campaign activities like:

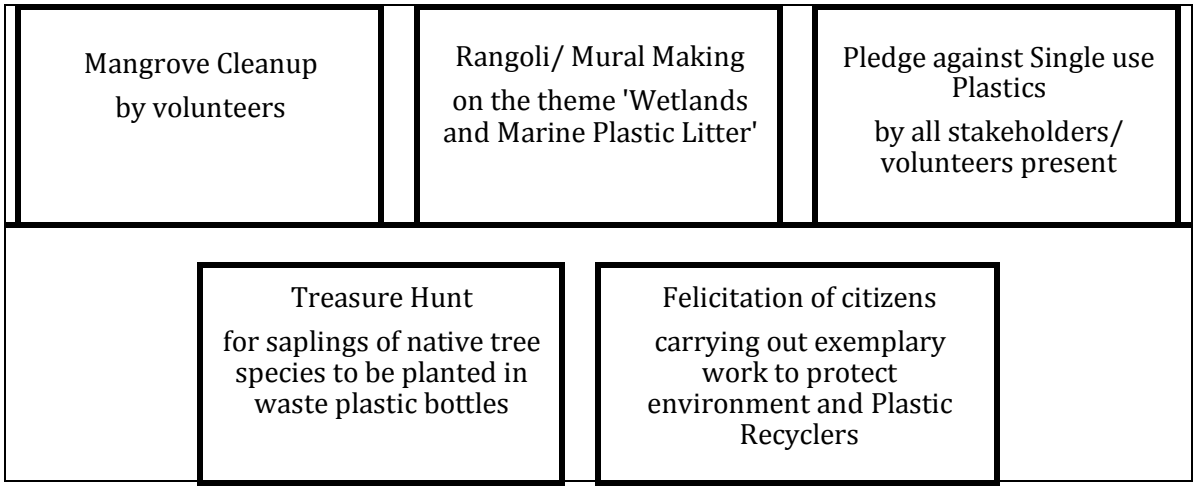
    A. Taking pledge against single use plastics
    B. Taking perception survey on plastic use
    C. Participating in cleanup activities
    D. Stakeholder discussions and focused group discussions
    E. Awareness programmes/ workshops and more.

2. Communicating the outcomes of stakeholder discussions and perception survey to the State Government for taking further policy action.
3. Demonstrating effective reuse of at least 50,000 waste PET bottles to raise saplings of native trees. Towards the end of the campaign, these would be handed over to a wide network of stakeholders for nurturing and afforestation. The latter is expected to offset the carbon emissions (Foot Print) towards production of the PET bottles.



3. Details and Agenda of WWD Celebrations on 2nd February 2020

TERI – UNEP will jointly celebrate the WWD 2020 at Mumbai. The event will be an opportunity to highlight the outcomes of the campaign, while emphasizing upon the current scenario of plastic pollution, with respect to marine plastic litter, its impacts on the ecosystems; and encouraging the stakeholders to extend their support by taking a pledge to minimize the use of single use plastic and contribute towards the conservation of wetlands and marine ecosystems. The following activities have planned for the WWD event.



The tentative agenda for the WWD event is presented in Table1.

Table 1 Tentative Agenda: WWD Event on 2nd February 2020

World Wetlands Day Event 2020 Venue: Sagar Vihar, Vashi, Navi Mumbai Date: February 2, 2020 Time: 10 am – 12.30 pm	
10 Min	Registration
15 Min	Welcome and Project Introduction (TERI- UNEP)
10 Min	Inauguration by the Guest of Honor (# Mayor/ Commissioner,- Navi Mumbai Municipal Corporation (NMMC)
15 Min	Speech by dignitaries (UNEP, TERI, Guest of Honor)
5Min	Pledge against single use plastic by all stakeholders
10 Min	Briefing for clean-up activity
60 Min	Cleanup activity, Rangoli and mural making, Treasure Hunt for native tree saplings*
15 Min	Felicitation of citizens carrying out exemplary work to protect environment and Plastic Recyclers
5 Min	Vote of thanks (TERI-UNEP)
	Refreshments
***Clean up , Treasure Hunt for native saplings and Rangoli/ Mural making activities will be conducted simultaneously by the respective groups of volunteers and experts # Confirmation Awaited**	

Annexures

Annexure A: Project Background

UNEP Project Background: Promotion of Countermeasures for Marine Litter in Southeast Asia and India

Southeast Asia and India have turned into hotspots of plastic leakage. Regional coordination and collaboration is of utmost importance to manage the trans boundary problem of plastic wastes including micro plastics, as they end up in the marine environments. Major rivers flowing through the region like the Ganges, Indus and Mekong are choking with plastics. However, there is no standard approach for identification, assessment and monitoring of the major sources and pathways of plastic leakage; along with formulation and implementation of proper policy measures on plastic waste management by governments, with emphasis at the local level. Thus, on 4th March 2019, the Government of Japan and United Nations Environment Programme (UNEP) declared a joint effort to enhance the knowledge and information for developing countermeasures against marine plastic litter in Southeast Asia and in India. In India, the locations identified for the project implementation are: Mumbai, Haridwar/ Rishikesh, Prayagraj (Allahabad) and Agra.

Role of TERI

TERI Western Regional Center Mumbai has been appointed as implementation partner for outreach activities in Mumbai. This would involve:

- Partnering with local stakeholders for outreach and on-ground campaigns to reduce plastic pollution
- Engaging local communities through outreach and awareness activities
- Design and dissemination of outreach material through various media and approaches
- River/coastal clean-up activities and data collection on plastic pollution
- Collection of visual records pre and post intervention

Annexure B: The TERI - UNEP Campaign 'Rethink Plastic'

Broad Objectives

Figure 1: The broader project objectives.

Expected outcomes of the campaign

- ✓ Collection and reuse of at least 50,000 waste PET plastic bottles for raising saplings: These would be the bottles that remain uncollected from marine environments or are spoiled due to exposure to sunlight, salt water or algal growth, oil coating and so forth. Using plastic bottles to raise saplings will extend their usability and offset the carbon foot print of these bottles which may otherwise end up as litter in rivers/ seas (Figure 1).
- ✓ Collection and nurturing of at least 50,000 seeds/saplings of native tree species: These will be seeds/ saplings found/grown alongside roads, in cracks and crevices on building walls and so on, where they do not necessarily germinate/ survive. Thus, the activity also ensures maximum utilization of seeds/saplings and better survival of uncared for saplings.
- ✓ Using the raised saplings for afforestation by volunteers/ organizations: This will lead to multiple ecological benefits while raising awareness about plastic waste.
- ✓ Closing the plastic loop: by Reuse and Recycle of waste plastic bottles while also offsetting their carbon footprint through afforestation.
- ✓ Entry into the LIMCA book of Records for collecting and reusing at least 50,000 waste plastic bottles to raise saplings which will be used for afforestation.
- ✓ Pledge by at least 20,000 individuals to act against plastic waste and stop using single use plastic.
- ✓ A white paper based on inputs from stakeholder roundtable discussions (involving

multiple stakeholders – grassroots, administrative, NGOs, academia and others), perception survey and cleanup drives.

- ✓ Cleanup drives along beaches and in mangrove patches with the help of volunteers to prevent the leakage of marine plastic litter sand develop a sense of responsibility and consciousness towards the environment.
- ✓ Perception survey- To assess the perception and awareness of local citizens with respect to plastic pollution- its impacts on humans and environment, alternatives to plastics and their use in daily life, laws and policies, and plastic management practices at individual and society/ community levels.

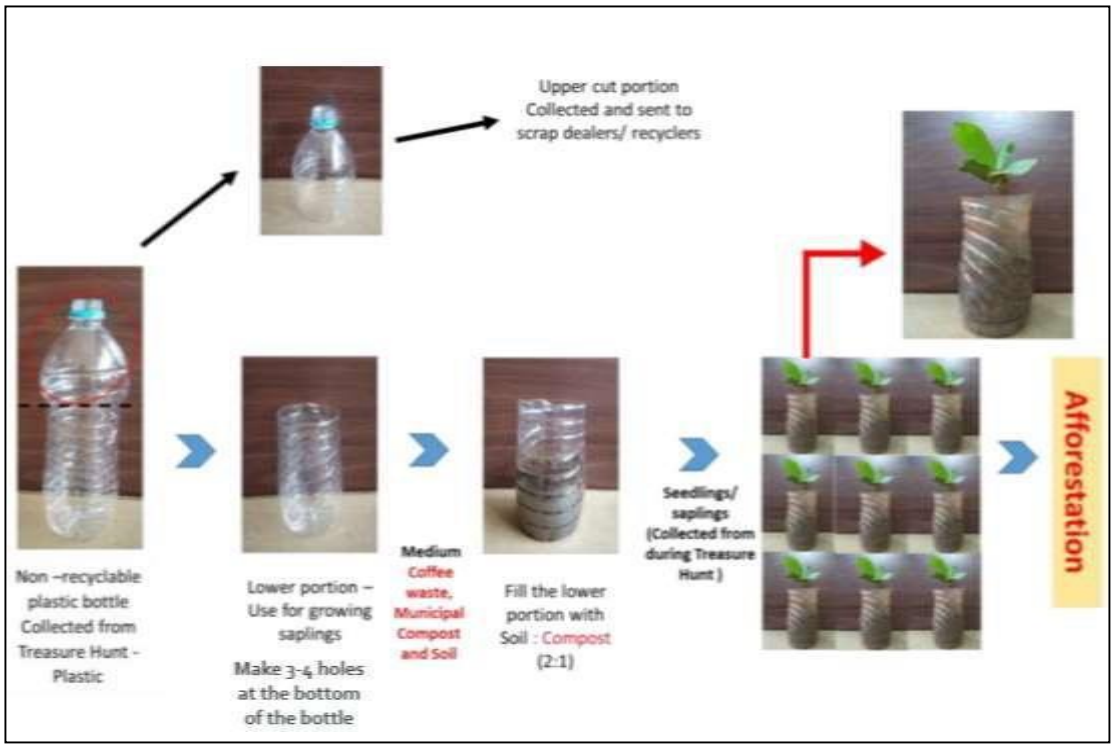


Figure 2 Raising saplings of native tree species in waste plastic bottles

8. Banners

Banner- 1 Clean up (Waste collection and characterization) activities

Banner- 2


Promotion of Countermeasures Against Marine Plastic Litter in Southeast Asia and India
RETHINK PLASTIC
World Wetlands Day- 2020
2nd February, 2020
Sagar Vihar, Vashi, Navi Mumbai

9. Standees for Kalaghoda Art Festival

Standee-1

Standee-2


UN environment
United Nations Environment Programme
Counter MEASURE FOR PLASTIC FREE RIVERS
RETHINK PLASTIC
teri
#RETHINKPLASTIC
Rethink Plastic: A Joint Initiative by TERI & UNEP
Promotion of Countermeasures Against Marine Plastic Litter in Southeast Asia and India
JOIN US IN THIS CAMPAIGN TO REDUCE PLASTIC POLLUTION
BE THE MOTIVATOR
Participate in Training of Trainers (ToT)
SCAN TO TAKE PERCEPTION SURVEY ON PLASTIC USE
COMMIT YOURSELF
Take a pledge, fill the perception survey and spread the word
SCAN TO TAKE THE PLEDGE AGAINST SINGLE USE PLASTICS
TAKE ACTION
Raise native saplings in waste plastic bottles to offset the carbon footprint
SCAN TO DOWNLOAD APP TO COMMIT FOR RAISING SAPLINGS
SCAN TO VISIT OUR WEBPAGE FOR MORE DETAILS
DID YOU KNOW ??
• By 2050 there could be MORE PLASTIC in the ocean than FISH !!!
• Humans may be consuming about 50,000 micro-plastic particles a year!!!

10. Outreach through TERI's Social Media Accounts

P and on TERI's Twitter handle (Bottom)

The Energy and Resources Institute
www. teriin.org