

# Hazards of Plastics

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Toxics Link  
for a toxics-free world

# Toxics Link



- Not for profit, non governmental organisation
- Environmental -health issues relating to toxics, chemicals and waste for over 20 years
- Hazardous, bio medical, municipal waste, plastic waste, e-waste, food safety and chemicals management
- International networks IPEN, ZMWG etc

# Plastics – the most wide spread material

- Synthetic or semi-synthetic polymerized products
- Hydrocarbon compound, petroleum derived product from fossil feedstock
- **Durable**, low density, lightweight, corrosion resistant, **inexpensive** and water and shock resistant



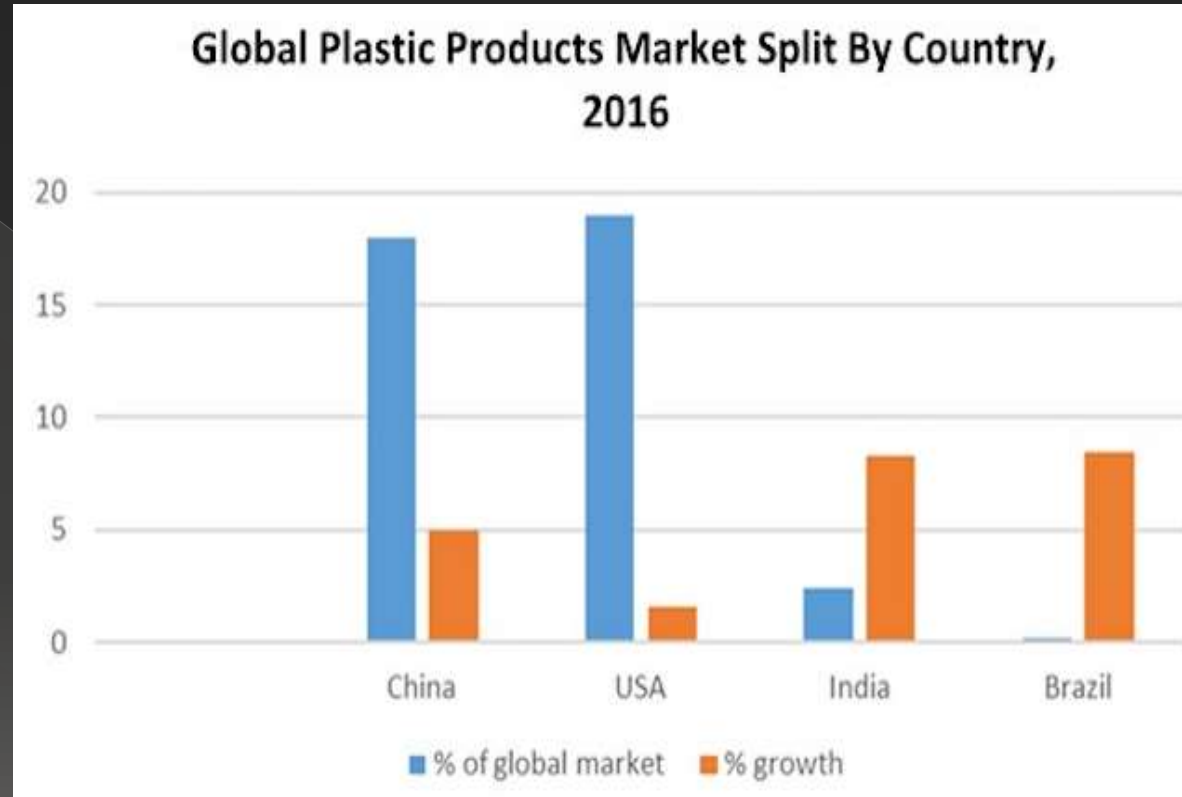
## Global plastic production...

Million tonnes, 2013



# The *ever increasing* Plastic Economy

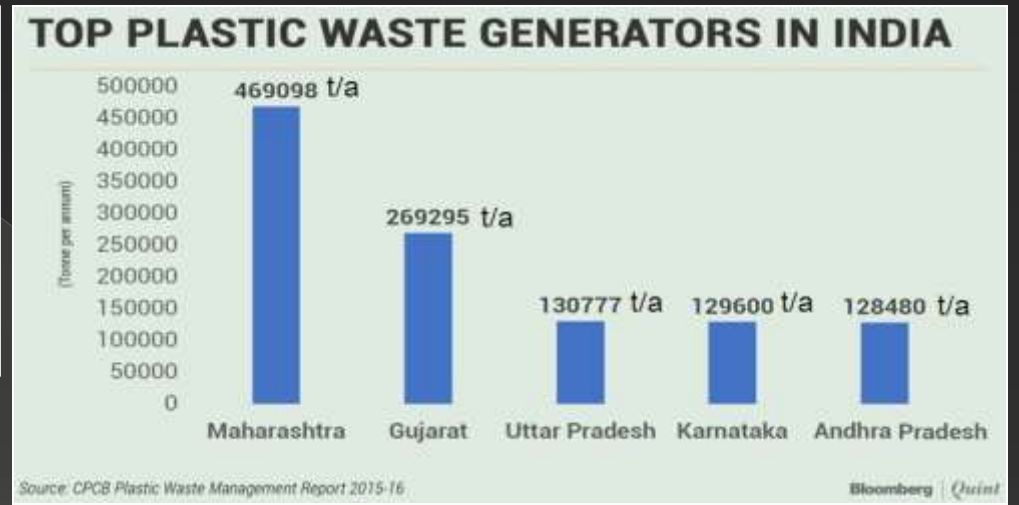
- The global plastic product market is growing @ 3% /year
- 2016: worth \$ 1.06 trillion
- 2020: worth \$ 1.175 trillion (expected)



- India's growth of Plastic market is higher than its GDP (7%)

# Plastic: the case in India

- Plastic consumption in India: 12.8 million ton/year



**DELHI PRODUCES 40% MORE PLASTIC WASTE THAN MUMBAI**



**INDIA'S PLASTIC CONSUMPTION IS A TENTH OF US'S**



Global Average: **28**

Source: CPCB

# Where are we?

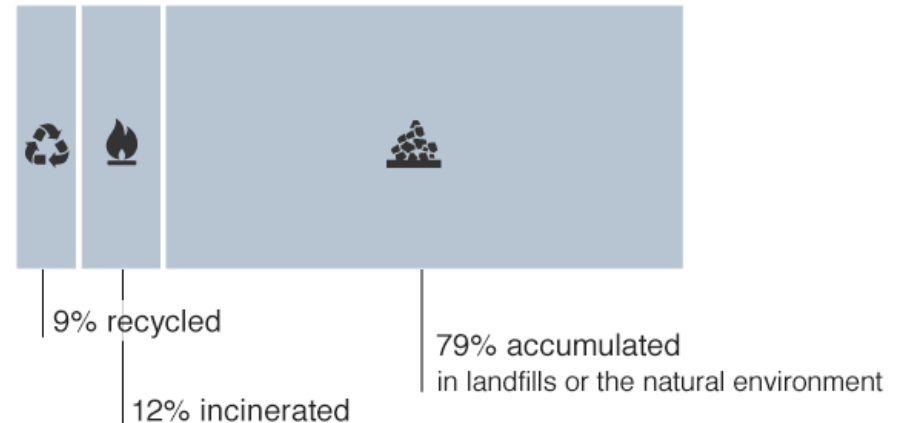
- Only 9% recycled, everything else is going to air, water or soil
- Plastic waste: mostly unmanaged, some not manageable and ever increasing

## How much plastic is there?

An estimated **8.3bn tonnes** of virgin plastic has been produced to date



As of 2015, approximately **6.3bn tonnes** of plastic waste had been generated



If current production and waste management trends continue, roughly **12bn tonnes** of plastic waste will be in landfills or the natural environment by 2050.

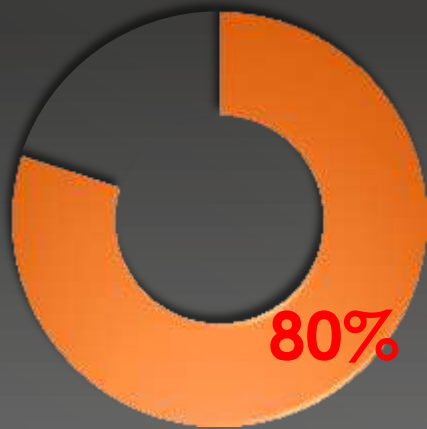


# SDG sets target for....

## SDG 14: Life below water

- ✓ By 2025, prevent and *significantly reduce marine pollution* of all kinds, in particular from land-based activities, *including marine debris...*

## Where are we?



800  
Species  
affected by  
marine debris

86%  
Sea turtles

Of all their population is suffering  
for marine plastic pollution

44%  
Sea birds

43%  
Marine  
mammals

Of all ocean litter is plastic

# Plastics in the Oceans

**More than 8 million tons of Plastic are dumped in the oceans every year**

*Equals to 1 garbage truck of plastic every minute each day*

*70-80% is from land based source*

*Total 100 million tons of plastic!*

**1 in 3 marine mammal species found entangled in marine litter**

*100,000 marine mammals and 1 million sea birds die per year due to entanglement and ingestion of marine debris*

*Over 90% of all seabirds have plastic in their stomachs*

**Reduces marine productivity & services**

*Economic loss from marine debris in the APEC region in fishing, shipping, and tourism industries estimated at US\$1.265 billion annually*



# Plastic Toxicity

## Ingredients/additives/plasticizer:

BPA, styrene, vinyl chloride, BFR, phthalates, lead compounds

Plastic products

Toxic & hazardous chemicals leach out at all stage of plastic life cycle

Doesn't decompose. Breaks down, gets smaller

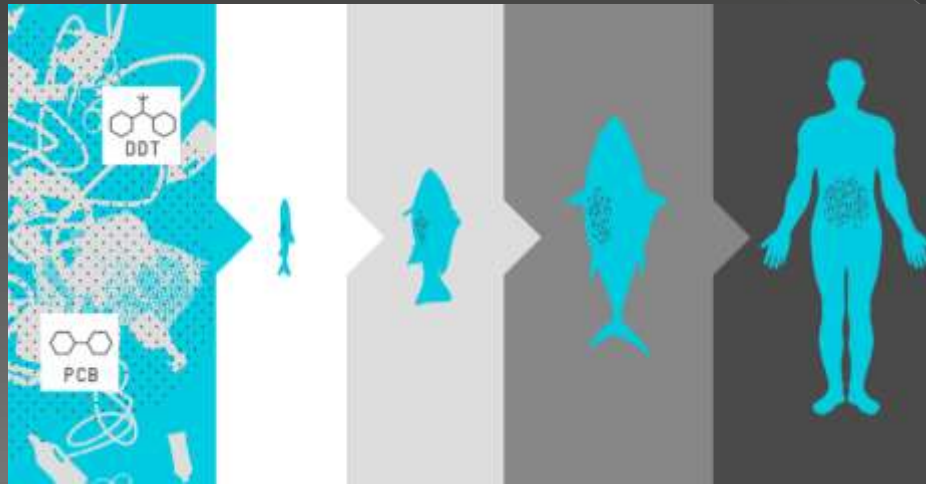
Goes to environment, contaminates water, food

Enters the food chain

Impacts health

Manufacturing byproducts:  
(PAHs)

Chemicals adsorbed:  
POPs, EDCs, PAHs

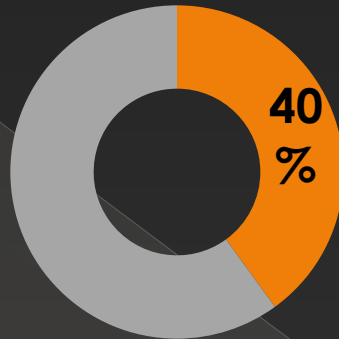


# Impacts of the Plastic Toxins!

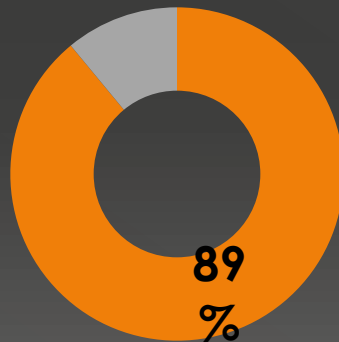
- Phthalates: estrogenic compound, disrupt endocrine function & reproductive systems, acute & chronically toxic to aquatic microbes, algae, fish, invertebrate
- BFRs: considered the most hazardous, neurotoxic effect, alter thyroid hormone function
- BPA: endocrine disruptor, neuro-, reproductive & developmental toxicity, cancer risk (breast, prostate, etc.)
- Styrene & vinyl chloride: carcinogenic, mutagenic
- Solvents, initiators, catalysts used are toxics, can be flammable, cause respiratory & skin problems
- Heavy metals- Lead, cadmium

# Hazards of Single Use Plastics

Designed to be used only once before they are disposed of or recycled



Of all plastic produced / year



Of all marine macro-plastics

These plastics:

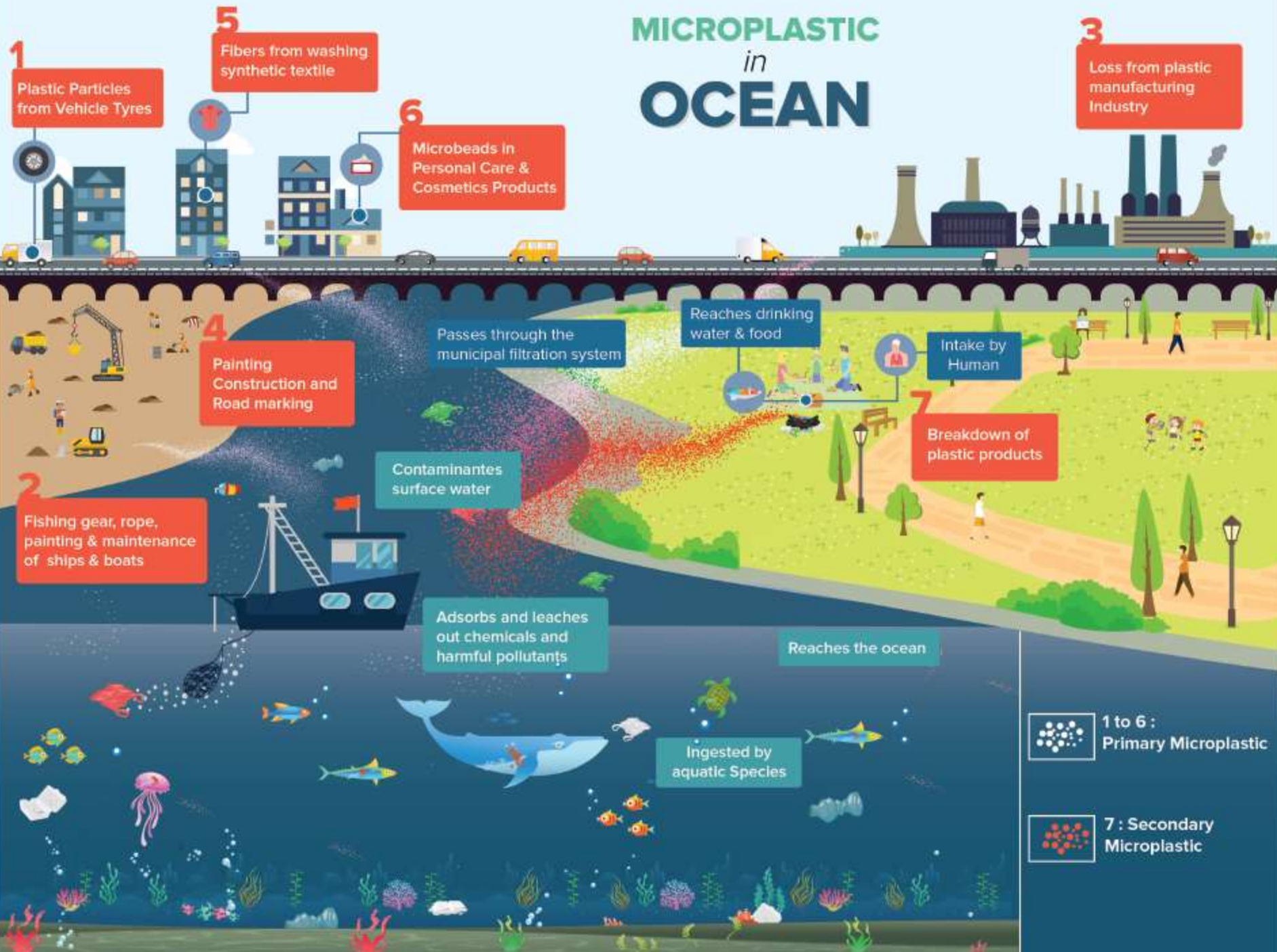
- Break up, not break down – permanent pollution
- Mostly down recycled or landfilled
- ‘ESCAPE’ & become ‘accidental litter’
- End up in waterways and the ocean
- Transfer to the food chain carrying pollutants



# Microplastics

- synthetic or semi-synthetic, solid, water insoluble, high polymer plastic particles of a size range below 5mm.
- Used both as a raw material for a number of products and produced from degradation of any plastic product
- Small size allows them to pass through wastewater treatment plants and reach the oceans through surface water bodies and rivers
- Microplastics are non-biodegradable and persistent in marine and freshwater

# MICROPLASTIC in OCEAN



1 to 6 :  
Primary Microplastic

7 : Secondary  
Microplastic

# Recent Studies on Microplastic - India

## Tap Water

- **17** tap water samples were collected from Delhi NCR
- **82 %** (14 samples) were found positive for microscopic plastic fibers

## Packaged Drinking Water

- Tested **259** individual bottles from **27** different lots across **11** brands, Purchased from **19** locations in **9** countries
- **93%** of bottled water showed some sign of microplastic contamination

## Cosmetics

- Tested rinse-off and leave-on cosmetic products
- **28%** of all the tested products contain microplastics.
- **38%** of the rinse-off products are detected with microplastics (include international)
- **50%** of the face wash products and **67%** of the facial scrubs are found to contain microplastics
- Predominating microplastics detected in the product samples is polyethylene

# Plastic waste: the way forward

## Recommended

- Research new data and Policy design
- Global action
- EPR
- Reduce single use plastics
- Recycling Infrastructure
- Use of alternative materials