The Impact and Implications of Marine Plastic Debris in Indonesia

Brahmanta Satyamurti Poerwadi
Director General of Marine Spatial Management

Abdul Muhari, PhD
Directorate of Coastal and Small Islands Utilizations
Ministry of Marine Affairs and Fisheries

Activities Complexity in Coastal Area

- Coastal and small island area development for tourism, trade, and industry
  impact on pollution and environmental degradation
Plastic

- Plastic is one of the materials used for the manufacture of household appliances, automotive, etc.
- Strong and not easily damage / moldy
- Takes a long time to degraded
- Contain toxic materials

Type of Plastic (Common Uses)

- **Polyester** (PES) – Fibers, textiles
- **Polyethylene terephthalate** (PET) – Carbonated drinks bottles, peanut butter jars, plastic film, microwavable packaging
- **Polyethylene** (PE) – Wide range of inexpensive uses including supermarket bags, plastic bottles
- **High-density polyethylene** (HDPE) – Detergent bottles, milk jugs, and molded plastic cases
- **Polyvinyl chloride** (PVC) – Plumbing pipes and guttering, shower curtains, window frames, flooring
- **Polyvinylidene chloride** (PVDC) – Food packaging
- **Low-density polyethylene** (LDPE) – outdoor furniture, siding, floor tiles, shower curtains, clamshell packaging
- **Polypropylene** (PP) – Bottle caps, drinking straws, yogurt containers, appliances, car fenders (bumpers)
- **Polystyrene** (PS) – Foam peanuts, food containers, plastic tableware, disposable cups, plates, cutlery, compact-disc (CD) and cassette boxes
Type of Plastic (Common Uses)

- **High impact polystyrene** (HIPS) – Refrigerator liners, food packaging, vending cups
- **Polyamides** (PA) (Nylons) – Fibers, toothbrush bristles, tubing, **fishing line**, low-strength machine parts such as engine parts or gun frames
- **Acrylonitrile butadiene styrene** (ABS) – Electronic equipment cases (e.g. computer monitors, printers, keyboards), drainage pipe
- Polyethylene/Acrylonitrile Butadiene Styrene (PE/ABS) – A slippery blend of PE and ABS used in low-duty dry bearings
- **Polycarbonate** (PC) – Compact discs, eyeglasses, riot shields, security windows, traffic lights, lenses
- Polycarbonate/Acrylonitrile Butadiene Styrene (PC/ABS) – A blend of PC and ABS that creates a stronger plastic used in car interior and exterior parts, and mobile phone bodies
- **Polyurethanes** (PU) – Cushioning foams, thermal insulation foams, surface coatings, printing rollers (Currently sixth or seventh most commonly used plastic material, for instance the most commonly used plastic in cars)

Directorate General of Marine, Spatial Management
Ministry of Marine Affairs and Fisheries (MMAF)
**World Bank Review**

Production and Mismanaged Plastic Waste

![Bar chart showing production and mismanaged plastic waste by country, with China leading in both 2010 and projected 2025. Source: Jambeck et al., Science, 2015.]

Directorate General of Marine, Spatial Management
Ministry of Marine Affairs and Fisheries (MMAF)

---

**World Bank Review**

**Land-Based Leakage of Plastics into Indonesia's Marine Environments**

- 135 M Urban Pop
- 38 MT/yr waste generation
- 80% plastics leakage is land-based
- 17 MT/yr uncollected waste
- 45% waste disposed in waterways, parks & burned
- 1.29 MMT/yr plastic leakage to oceans
- 30% waste leakage is plastics

Source: Indonesia, 2015, World Bank Review
**World Bank Review**

**Average Waste Composition from Indonesia's Waterways**

- **Diapers**: 21%
- **Other organic waste**: 44%
- **Glass, metal**: 4%
- **Plastic bottles**: 1%
- **Plastic Bags**: 16%
- **Plastic Packaging**: 5%
- **Other plastics**: 9%

**Marine Debris**

Any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment.

**TOP 10 ITEMS COLLECTED**

1. Cigarette Butts: 2,043,470
2. Grocery Bags (Plastic): 441,493
3. Food Wrappers (Cooked rice, etc.): 1,685,422
4. Beverage Bottles (Glass): 394,796
5. Plastic Bottles: 940,170
6. Other Plastic Bags: 389,088
8. Paper Bags: 368,746
9. Straws, Stirrers: 555,007
10. Beverage Cans: 339,170

Directorate General of Marine, Spatial Management, Ministry of Marine Affairs and Fisheries (MMAF)
Entanglement in mangrove roots affect on respiratory process and disturbance to mangrove growth leading to mortality.

Covering and toxification of coral reefs affect on respiratory process and leading to mortality.
Impact to Biota

- **Macro Plastic**
  - covering mangrove roots
  - covering coral reef
  - entanglement & deaths of marine biota

- **Micro Plastic**
  - water contamination
  - consume by marine biota/ bentic organism
  - Suffocation or intestinal blockage
  - exposure of marine organisms to toxic materials

10 THINGS YOU CAN DO FOR TRASH FREE SEAS

1. **CAN IT**
   - Use a reusable bag or container for grocery shopping

2. **TAKE IT**
   - Bring your own reusable bag for groceries

3. **STOW IT**
   - Be a zero waste dinner, refuse single-use plastics, and eat locally

4. **BUTT IN**
   - Practice good waste practices and upkeep

5. **REPLACE IT**
   - Reduce, reuse, recycle, and replace

6. **REUSE IT**
   - Use products that can be reused

7. **REINVENT IT**
   - Use products that can be reused

8. **REFUGE IT**
   - Refuse single-use plastics

9. **RECYCLE IT**
   - Practice good waste practices and upkeep

10. **REPLACE IT**
    - Reduce, reuse, recycle, and replace

**Directorate General of Marine, Spatial Management**
Ministry of Marine Affairs and Fisheries (MMAF)
Government effort

- Building commitment among ministerial/local government/organization
- Building community awareness–socialization
- Facilities
- Innovation in marine plastic debris processing THAT HAVE economic values
NATIONAL ACTION PLAN FOR MARINE DEBRIS PREVENTION

- **Strategy 1.** Increased public awareness, law enforcement and stakeholder participation
- **Strategy 2.** Control of plastic waste terrestrial and coastal
- **Strategy 3.** Control of plastic waste in the Sea
- **Strategy 4.** Mechanism of funding and institutional strengthening for the control of plastic waste in the sea.

MMAF Commitment

- Conducting Public Awareness Campaign to fishermen to reduce ghost net and garbage and other plastic waste from fishing activities.
- Improve waste processing facilities and infrastructure in fishery port under the control of the Ministry of Marine Affairs and Fisheries.
- Encourage community groups that are already partners of the MMAF in mangrove area management to make regulations to limit the entry of plastics into the sea.
- Plays a role in the control of plastic waste from fishing and cultivation activities on the coast and sea.
- Improvement of hygiene facilities and infrastructure in small islands.
COMMUNITIES effort

- Participate in environmental clean act
- Reduce
- Reuse
- Recycle
- Recovery
- Replace

Activities Conducted by MMAF

- Publication Material (poster, leaflet, film)
- Gerakan Cinta Laut
- Beach Clean Up
- Facilitation in Pollution Forum
- Community Technical Assistance in Plastic Waste Processing
- Cooperation with The Navy
- Supporting plastic shredder and composter
Obstacle

- Only can cope with bottle plastic and glasses
- The selling price from a plastic shredder is not worth with the cost of production
- There are no environmentally sound technologies to destroy the thin plastic waste such as plastic bags, crackle, etc.
Expectation

- Increased production of biodegradable plastics
- Socialization and learning to reinvent the use of plastic
- Monetary incentives (tax) so can reduce the production cost
The symbol of Plastic Product

Avoid products marked as: 3 6 7

Look for safe products: 1 2 4 5

PETE  HDPE  LDPE  PP

Directorate General of Marine, Spatial Management
Ministry of Marine Affairs and Fisheries (MMAF)