ASEANO
ASEAN-NORWEGIAN COOPERATION PROJECT ON LOCAL CAPACITY BUILDING FOR REDUCING PLASTIC POLLUTION IN THE ASEAN REGION (ASEANO) 2020 – 2021

REPORT PRIMER

# SURVEY ON PLASTIC LITTER ALONG IMUS RIVER, CAVITE, PHILIPPINES

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An enormous mound of garbage along the Imus River. As a densely-populated and rapidly-developing province, Cavite produces more and more waste yearly, with insufficient disposal facilities. **(DLSU-D)**

Plastic pollution is a major environmental concern, adversely affecting habitats, organisms and people worldwide. Plastic waste is non-biodegradable, and generated by a wide range of human activities.

Rivers serve as natural channels for plastics to flow to the ocean. The extent of plastic pollution within these channels, from headwaters to river mouths, remains underexplored. The Imus River is one of six major rivers flowing through the Philippine province of Cavite, emptying out into Manila Bay.

This study assesses the extent of plastic pollution in the Imus River by quantifying and characterizing macroplastics and microplastics. The water quality of the river was also assessed based on its physicochemical characteristics to confirm the Class-C (intended for fisheries,

agriculture, and recreational use) classification of the river per DENR standards. Physicochemical parameters were correlated to the quantities of collected plastic litter.

Sampling sites were selected encompassing upstream, midstream, and downstream stretches of the entire river system, distributed within five cities or municipalities located along the Imus River: Silang, Dasmariñas City, Imus City, Bacoor City, and Kawit. The study findings confirm the following:

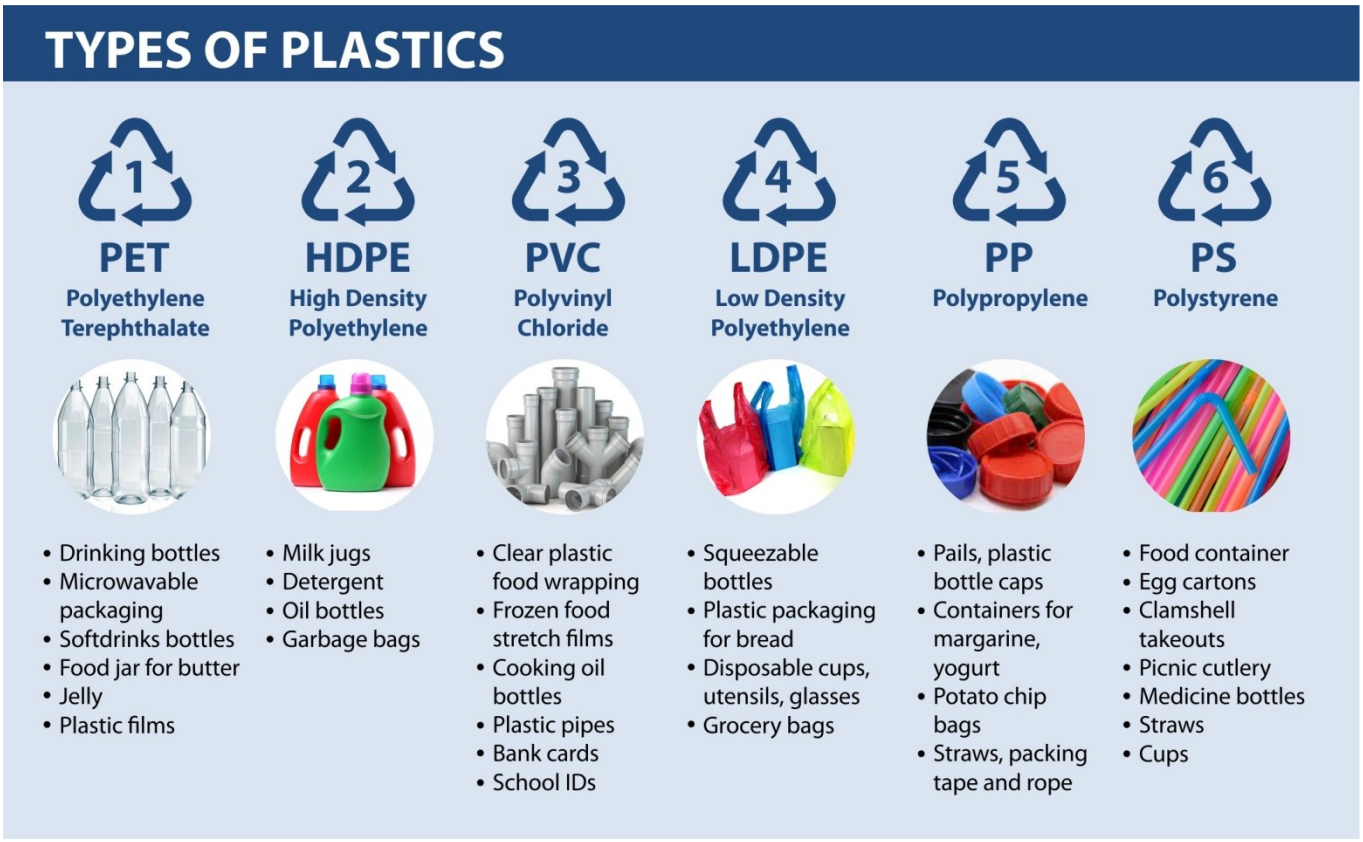
(1) **Plastic flux in the Imus River varies between stations and seasons**. The movement of macroplastics downstream is influenced by urbanization, along with environmental factors such as elevation, tides, wind, flow velocity, and river curvature.

(2) **The most commonly found macroplastics (classified by utility) were packaging, bottles, and bags during dry months, and bags and miscellaneous plastics during wet months**. HDPE, LDPE, and PP were common materials used in single-use plastics. By weight, miscellaneous plastics and plastic bottles composed of PVC, PET, and PP were the most abundant form of microplastic during both dry and wet months. The most visible waste, determined by coverage of the river's surface, was plastic packaging composed of LDPE and HDPE during dry months, and plastic bags mainly composed of HDPE during wet months.

(3) **Microplastics show an increasing concentration going downstream in both dry and wet months**. Microplastic fibers recorded the highest counts, followed by fragments, plus assorted microplastics and microbeads. Microplastics were characterized as PP, PET, HDPE, or miscellaneous through FTIR spectrophotometry.

(4) **The physico-chemical characteristics of the Imus River are generally within the DENR standards for Class-C classification, intended for fisheries, recreational, and agricultural use**. However, the values of phosphates and total suspended solids (TSS) exceeded critical limits.

(5) **Physico-chemical parameters show no correlation with counts of microplastics and macroplastics except for total dissolved solids (TDS) and water temperature**. TDS is positively correlated for both macroplastics and microplastics while water temperature is negatively correlated with microplastics.




In response, this study recommends the following:

(1) **Intensify the implementation of different laws and policies** regarding solid waste management and the conservation and protection of freshwater resources such as RA 9003 (Solid Waste Management Act of 2000) and RA 9275 (Clean Water Act of 2004), by both the national government and local government units.

(2) **Implement a scheme that will promote recycling of plastics to create a circular value chain** for plastic wherein manufacturers and sellers of plastic products are encouraged to take discarded materials and remake them for resale, as practiced in Norway and other countries.

(3) **Institute comprehensive national policy to ban the use of unnecessary plastics**. The ban should prohibit the production, use and distribution of *oxo-degradable*, *biodegradable*, and *compostable* bags nationwide. A multi-sectoral consultation must be undertaken to look for other recyclable and reusable alternatives.

(4) **Governments must mandate that manufacturing industries develop alternative materials for plastics** that will promote local and indigenous practices and resources.

These innovations can be helpful in reviving affected packaging industries by absorbing potential job losses resulting from plastic bans.

(5) **Government agencies must involve all stakeholders through information and education campaigns regarding solid waste management and plastic pollution**. Households should understand the different classification of wastes, be aware of pollution's negative impacts, and practice proper waste segregation and minimization.

(6) **DENR must conduct regular monitoring of the physicochemical characteristics of river water to manage water quality**. DENR should strictly implement the policy on requiring waste water management treatment facilities for industries and sewerage systems for households.

(7) **Conduct further research into microplastics in rivers, not only on presence in the water, but also in sediments, along with the effects on aquatic organisms**. A socioeconomic valuation of the Imus River must also be conducted to assess the economic impact a lack of protection and conservation will have.


Single-use sachets and packets are among the most conspicuous and pervasive types of litter in and along the Imus River. **(DLSU-D)**

## ABOUT PROJECT ASEANO

East Asian countries produce over half of our world's marine plastic pollution. Rivers act like conveyor belts to discharge waste to the oceans.

To stem this flow, Project ASEANO is developing practical and sustainable measures to reduce the impacts of plastic pollution and their implications on both socioeconomic development and the environment.

The ASEAN – Norway local capacity development project is a three year project that aims to enhance local capacity on monitoring and understanding the source, flow and nature of riverine waste. It aims to strengthen local enforcement and provide practical solutions to tackle problems at the local level.

The project uses an integrated solid waste management approach and focuses on the city and municipal level through two pilot sites: the Citarum River in Indonesia and the Imus River in the Philippines. For more information, Email PEMSEA ASEANO Project Manager **Thomas Bell** at **TBell@pemsea.org** or download the **Full Study** at **pemsea.org**.