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Characterization of Plastic Pollution in Rivers: Case of Sapang Baho River, Rizal, Philippines

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Philippines is considered as one of the top contributors of plastic wastes in the oceans globally. Lack of strict implementation of solid waste management regulations has led to mismanaged wastes, especially plastics, that eventually end up in water bodies. This study focuses on characterizing plastic waste pollution in Sapang Baho River in the province of Rizal. The river is located in an urban area and is a significant tributary of Laguna Lake, the largest lake in the country. Through this study, macrowastes and microplastics in Sapang Baho River, Rizal were characterized and analyzed to provide baseline information and to raise awareness to address plastic pollution, in macro- and micro-scale. This study also determined possible sources of microplastics by relating the particles to the plastic wastes present as well as activities in the sites. Waste analysis and characterization studies (WACS) were conducted for four sampling stations along the river. Microplastic samples were also collected from surface water and were characterized based on form such as filament, fragment, film, foam, and pellet through microscope examination. Representative samples were subjected to Raman spectroscopy testing to identify the polymer types. Results show that macrowaste samples were mostly plastic wastes (27.33%) in terms of mass. Plastic wastes were composed of film plastic (47%). Most of the microplastic particles were in the form of filaments (92.24%) which were fragmented from textile wastes and cloth washing. In terms of color, transparent particles were dominant and particles in the lower size range (0.3 mm - 0.8 mm) were predominant. Samples subjected to Raman spectroscopy were mainly polyethylene (PE), a material used in containers and packaging. Lastly, it was calculated that the surface water of Sapang Baho River contributes approximately 24 - 362 microplastic particles to Laguna Lake.