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Economic Valuation of Nanoplastics from X-Press Pearl Ship Accident

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Abstract

The X-Press Pearl ship accident resulted in one of the most devastating environmental catastrophes in the region, marked by extensive release of hazardous chemicals, oil, and a significant discharge of nurdles into the marine ecosystem. Nurdles, which are microplastics, can be weathered into nanoparticles which range in size from 1 to 1000 nm during the photodegradation process. A significant research gap exists in understanding the economic consequences of this plastic pollution, which is vital for designing recovery and preventive strategies. Recent studies have found that nano plastics have a significant impact on the health of fish consumers, but no global economic valuation of nano plastics has been conducted yet. Therefore, this study aims to estimate the damage due to nano plastics generated from the X-Press Pearl ship accident, on public health and to determine how the socio-economic factors impact the Willingness to Pay (WTP). Employing the Contingent Valuation Method (CVM), the study assesses the public's WTP to prevent future incidents similar to the X-Press Pearl ship accident. A household survey was conducted using a pre-tested questionnaire for a sample of 800 households in Western Province through one-to-one interviews. A stratified sample was created based on the population of each district and the double bounded dichotomous choice format was used as the elicitation method. Respondents were asked whether they were willing to pay a specific amount towards the scenario proposed and depending on their answer, a follow-up question was asked. It includes a lower bid if the answer given to the first question was negative, and higher otherwise. Annual mean WTP per household considering the impacts on human health was calculated using the estimated bivariate probit model. The econometric model indicates that individuals with higher incomes and those in younger age categories are more likely to pay. The findings of this study can be used to inform policymakers to allocate financial resources to prevent these types of incidents in the future.

Keywords: *Nano plastics, Willingness to pay, Economic valuation, Health, Ecosystem*