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Addressing Persistent Toxic Substances and Emerging Chemicals: Ecological and Health Implications in a Changing Environment

Ming Hung Wong[1,2*]

[1] Consortium on Health, Environment, Education, and Research (CHEER), The Education University of Hong Kong, Hong Kong, China

[2] Soil Health Laboratory, Southern Federal University, Rostov-on-Don, Russia

ABSTRACT

The presentation delves into the significant ecological and health impacts of Persistent Toxic Substances (PTS) and Emerging Chemicals of Concern (ECCs). PTS, including heavy metals and persistent organic pollutants, pose severe risks due to their bioaccumulation and persistence in the environment. The critical pathways these toxins infiltrate food chains are highlighted, leading to various health issues. Three key case studies illustrate these concerns: (1) Arsenic Contamination**:** In Southeast Asia, high arsenic levels in drinking water and agricultural products lead to serious health risks, including arsenicosis. The study emphasizes the need for comprehensive assessments of arsenic exposure and its effects on local populations. (2) Mercury in Fish**:** The bioaccumulation of mercury in fish and the subsequent biomagnification in the food chain, particularly through industrial contamination, poses risks to human health. Fish-fed commercial feed pellets that contained contaminated fishmeal also exacerbated the problem. (3) Toxic Emissions from E-Waste Recycling**:** Severe human health hazards are associated with electronic waste recycling. Toxic chemicals released during dismantling and processing lead to respiratory issues, neurological disorders, and increased cancer risks among workers and nearby communities. Emerging chemicals, particularly plastics and microplastics, represent another critical concern. Substances like bisphenol A (BPA) and phthalates are notorious for their endocrine-disrupting properties and potential health impacts, posing risks to human health and wildlife. In conclusion, addressing the challenges posed by PTS and ECCs requires a multifaceted approach involving robust regulatory frameworks, public awareness, and international collaboration to safeguard health and protect the environment.

Keywords: bioaccumulation, biomagnification, toxicology, health risks, sustainability

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***Corresponding Author:**

Ming Hung Wong, Consortium on Health, Environment, Education, and Research (CHEER), The Education University of Hong Kong, Tai Po, Hong Kong, China.
Email: minghwong@eduhk.hk