

Interactive/combined effects of climate change and pollutants is a major threat to marine biota and seafood worldwide

Both climate change and pollutants are a global problem and a major threat to social, economic, and environmental sectors. Climate change stressors are rise in temperatures, ocean acidification (decrease in pH), sea-level and hypoxia (dissolved oxygen < 2.8 mg/L). High-risk pollutants are *persistent organic pollutants/POPs* (DDT, dieldrin, dioxins, PCBs), *heavy metals* (Cd, Co, Cu, Hg, Ni, Pb, Zn), *pesticides* (atrazine, chlorpyrifos, dimethoate, endosulfan, methyl-parathion), *pharmaceuticals* (17 β -estradiol (E2), 17 α ethinylestradiol (EE2), ibuprofen (NSAID)), *surfactants/detergents* (4-tert-nonyl-phenol, 4-tert-octyl-phenol), *flame retardants* (polybrominated diphenyl ethers) and oil compounds (BTEX, PAHs).

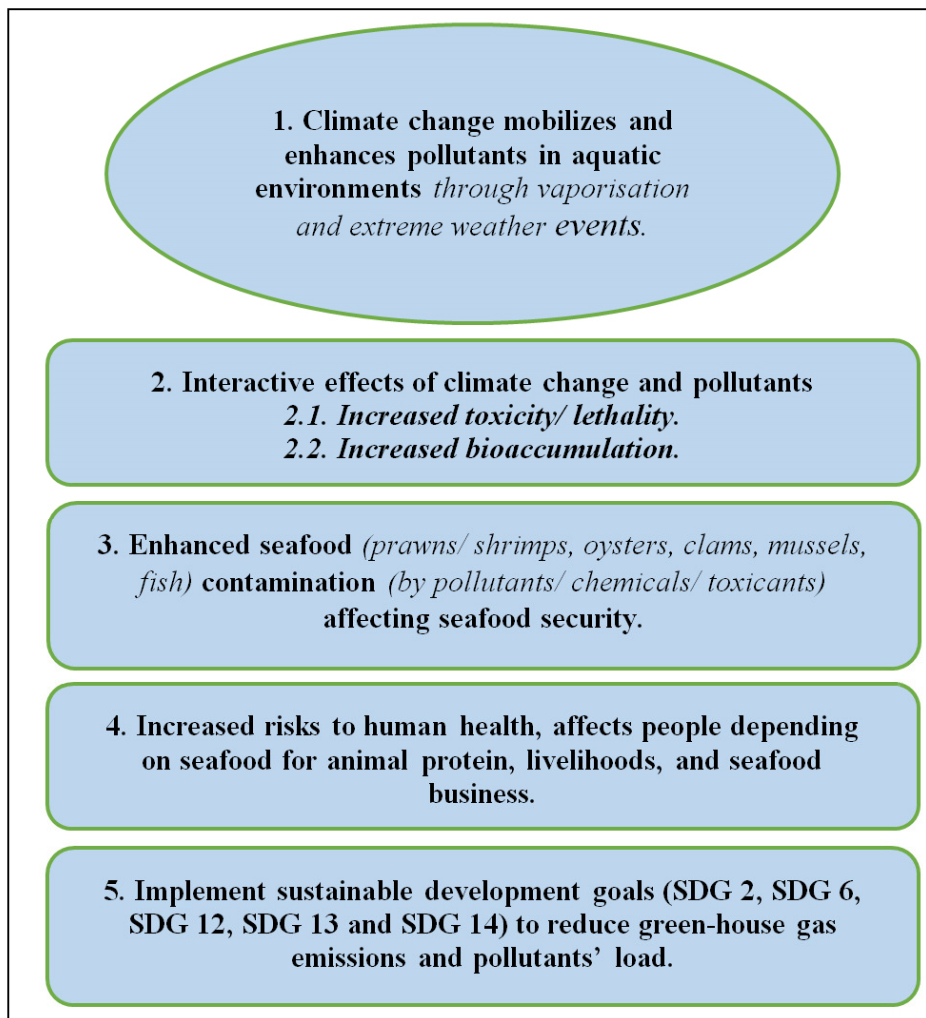


Fig. 1.

Our research reveals that the interactive/combined effects of climate change and pollutants would enhance the uptake and toxicity of pollutants to estuarine and marine biota and seafood organisms including the following:

- Climate change would increase the mobilization of pollutants into waterways via the volatilisation of pollutants and increased inputs through the increase in the frequency and intensity of cyclones/hurricanes; heavy rainfall/precipitation; floods; droughts; storms; bush fires/forest fires; and melting/thawing of snows/ice.
- The toxicity of several high-risk pollutants (POPs, heavy metals, pesticides, pharmaceuticals, surfactants, flame retardants, oil compounds) would increase with increasing levels of climate change stressors.
- The interactive/combined effects of climate change and pollutants would impair the growth, and reproduction in estuarine and marine biota, and suppress immune functions and defence activities.
- The combined effects of climate change and pollutants would enhance the bioaccumulation of pollutants (such as cancer-causing heavy metals) in seafood organisms.

Seafood (fish, prawn, oysters, crabs, mussels, clams) provides about 60% of animal protein supply in poor developing countries like Bangladesh, Maldives, and the Pacific Island Countries. Seafood is also a source of protein, vitamins (B6, B12), omega-3 fatty acids, income (employment), export (foreign exchange earnings), and support livelihoods of coastal people across the globe. However, the interactive/combined effects of climate change and pollutants would exacerbate global pollution problems and would pose significant threats and risks to the following sectors: i. aquatic ecosystems, estuarine and marine biota, seafood; ii. people depending on seafood for animal protein supply; iii. livelihoods of people associated with seafood; iv. marine export business, and v. human health. To reduce and minimise the impacts of climate change and pollutants, implementation of several sustainable development goals (SDGs) will be required including increased use of renewable energy and promoting low-carbon economic development and minimisation of high-risk pollutants' loads in the environment.

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Publication

[Climate change impacts on pollutants mobilization and interactive effects of climate change and pollutants on toxicity and bioaccumulation of pollutants in estuarine and marine biota and linkage to seafood security](#)

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