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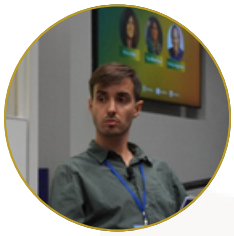

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Modelling mercury risks in the Amazon with new evidence for policy action

Mercury contamination from gold mining in the Amazon is posing a serious threat to biodiversity and public health, particularly for traditional communities such as Indigenous and riverine populations who rely heavily on fish as their main source of protein. The lack of data remains a challenge to properly manage contamination. In this context, the US EPA's SERAFM probabilistic model was used to estimate mercury bioaccumulation in fish across 8,259 sub-basins in the Branco, Tapajós and Xingu River basins, covering 27% of the Brazilian Amazon's territory. The findings reveal a pattern of increasing mercury bioaccumulation downstream in the watersheds, driven more by methylation dynamics and ecological characteristics, such as the presence of wetlands, than by the spatial location of mining sites alone. Risk assessments indicate that at least 27.5% of the territory may not comply with national regulatory limits, rising to over 50% in some basins. When local dietary habits are considered, the scenario becomes more critical: up to 49.8% of Indigenous communities in the most affected basins face extremely high health risks, even where current legal thresholds are technically met. These results highlight the urgent need to revise national and international standards, which fail to reflect the Amazon's unique ecological and social realities. We advocate for a shift from fixed contamination thresholds toward regionally adapted, risk-based regulations, along with investment in long-term monitoring, strengthened environmental governance, and culturally appropriate fish consumption advisories. This shift could provide an opportunity to integrate environmental management, public health, and scientific evidence into pragmatic commitments and coordinated action to protect the Amazon ecosystems and people from mercury pollution.

Biography

Vitor Sousa Domingues completed his second Master's degree in Environmental Technology at Imperial College London, where he was awarded the Nigel Bell Prize for the best thesis on pollution management. He has worked for 10 years at the Brazilian federal environmental agency (Ibama) and has coordinated consultancy projects on mercury pollution control in the Amazon for WWF and The Nature Conservancy.

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