



## **SE Asian freshwater fish population and networks: the impacts of climatic and environmental change on a vital resource**

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The Mekong River is the 10th largest freshwater river in the world, with the second highest biodiversity wealth, behind the much larger Amazon basin. The fisheries activity in the Lower Mekong countries counts for 2.7 million tons of fish per year, with an estimated value worth up to \$US 7 billion. For the 60 million people living in the basin, fish represent their primary source of economic income and protein intake, with an average per capita consumption estimated at 45.4 Kg.

The proposed hydropower development in the basin is threatening its sustainability and resilience. Such developments affect fish migration patterns, hydrograph flood duration and magnitudes and sediment flux. Climate change is also likely to impact the basin, exacerbating the issues created by development. As a monsoonal system, the Mekong River's pronounced annual flood pulse cycle is important in creating variable habitat for fish productivity. Moreover, the annual flood also triggers fish migration and provides vital nutrients carried by the sediment flux. This paper examines the interactions between both dam development and climate change scenarios on fish habitat and habitat connectivity, with the aim of predicting how these will affect fish species composition and fisheries catch.

The project will also employ Environmental DNA (eDNA) to quantify and understand the species composition of this complex and large freshwater system. By applying molecular analysis, it is possible to trace species abundance and migration patterns of fish and evaluate the ecological networks established between an inland system.

The aim of this work is to estimate, using process-informed models, the impacts of the proposed dam development and climate change scenarios on the hydrological and hydraulic conditions of habitat availability for fish. Furthermore, it will evaluate the connectivity along the Mekong and its tributaries, and the importance of maintaining these migration pathways, used by a great diversity of fish species. It will also present the preliminary findings on eDNA analysis for species composition and the ecological networks established along the river and particularly on the fish hotspot place for biodiversity, the Tonle Sap system in Cambodia.

**Keywords:** Mekong River, climate change, fish production, dams, eDNA analysis, numerical modelling.