

Cumulative impact dams and climate change on the hydrology of the Mekong River

Dr. Binh Doan, Vietnamese-German University, Vietnam

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Abstract:

The Mekong provides an essential source of food, job security, biodiversity, and livelihoods for its riverine population of 70 million people. More than 1,000 hydropower and irrigation reservoirs/ponds have been built in the Mekong basin, and another 350 hydropower and irrigation dams are proposed. Dams in the upper Mekong, together with climate change, are the main drivers of flow alteration in the lower Mekong, especially after 2009. Notably, dams trap almost the entire sediment load transported from the upper basin. Six Lancang cascade dams were found to contribute to 40% out of 74% of sediment reduction in the Vietnamese Mekong Delta (VMD) in 2012-2015 from the pre-dam period. If all planned dams in the Mekong are built, the sediment load of the VMD will reduce by 96%. On the other hand, climate change is likely to increase rainfall in the Mekong basin by the end of this century, resulting in enhancing sediment supply and flood risk downstream. However, dams are expected to dampen climate change impacts. Collectively, sediment is likely to continue decreasing due to the compound impact of dams and climate change. The reduced sediment load induced by dams + climate change, accompanied by sand mining, has caused erosion of river banks, beds, and coastline in the lower Mekong. Riverbed incision, in turn, together with sea-level rise, has caused increasing salinity intrusion in the VMD. Although playing as the world's rice bowl, the VMD is drowning; thus, we

should act properly and invest more in research to save the VMD.

Speaker biography:

Dr. Doan Van Binh is a full-time lecturer in Hydraulic Engineering, Master Program in Water Technology, Reuse and Management, Faculty of Engineering at the Vietnamese-German University, Vietnam. He was a lecturer at Thuyloi University and a Postdoc researcher at Kyoto University, Japan. He obtained his Ph.D. in Urban Management in 2019 from Kyoto University and his Master in Environmental Sciences and Civil Engineering in 2015 from Saitama University, Japan. He specialises in Water Resources Engineering/Management, Hydraulics, sediment, salinity intrusion, and geomorphology. Dr. Binh has a great interest in quantifying the effects of dams and climate change on the flow regime, sediment, geomorphology, and salinity intrusion in mega-rivers, especially in the Mekong River basin. He is experienced in hydro-sediment-morpho dynamic numerical modelling in the tidal river system. He is also knowledgeable about using various apparatus in physical modelling and field surveys. He is interested in applying Remote sensing and Machine learning to solve water-related issues. His group is developing low-cost AIoT systems for environmental monitoring to serve timing and precision agriculture. Dr. Binh is interested in publishing high-impact papers in high-ranking international journals.