

We assess the water budget of the Mahadayi river, an inter-state basin on India's west coast with a long-running dispute. We seek to answer the following question: What is the discharge at any given location along the Mahadayi river or its tributaries on any given day? After presenting the dispute and the decisions of the tribunal, we describe the modelling framework, which is able to simulate the high rainfall gradients in the neighbourhood of the ridge associated with the Sahyadris, the high discharge during the summer monsoon, the much weaker discharge following the monsoon, and the high abstraction during monsoon onset. The model is not designed to simulate the negligible dry-season discharge. The simulation yields the daily time series of discharge at any location along the Mahadayi or its tributaries. For the Kalasa nala, there is a significant impact of the permitted diversion in the northern part of the Mhadei Wildlife Sanctuary, but the impact on the Mahadayi discharge or the Mandovi estuary is less than the natural variability. The Bhandura diversion has a minor impact on the discharge at the Goa–Karnataka border. Based on the simulated water budget, we suggest possible solutions to resolve the dispute.