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Impact of Hydroelectric Dams on Fisheries in the Sharavathi Estuary of Uttara Kannada District, South-West India

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Power generation or multipurpose dams can cause various impacts downstream. The impact of hydroelectric projects on estuaries, rated among highest productive ecosystems, is not much documented more so from Indian west coast. The start of the Linganmakki hydel project in 1964, with an installed capacity of about 1000 MW, in the river Sharavathi flowing westwards into the Arabian Sea from the central Western Ghats of Karnataka, is known to have caused widespread downstream ecological changes due to yearlong releases of fresh water after power production, affecting mainly estuarine salinity and tidal conditions causing alterations in mangrove flora and decline in fisheries. The addition of another smaller dam at Gersoppa further downstream exacerbated the problems. Most such impacts went almost undocumented until the current study.

The impact on fisheries in the Sharavathi estuary consequent on dam discharge related salinity reduction is discussed here in comparison with the adjoining dam unaffected Aghanashini river estuary within 20-25 km north. Prevalence of typical natural estuarine conditions in Aghanashini accounts for about 90 species of fishes, in addition to shrimps, crabs and edible bivalves. These conditions include gradual reduction in salinity from the river mouth towards the upstream areas, seasonal and daily fluctuations in salinity favour entry of several marine species into the estuary at suitable times for breeding and feeding. Whereas input of vast quantities of organic nutrients, especially from Western Ghats, characterise Aghanashini, bulk of such inputs are blocked by dams in Sharavathi. Stretches of multi-species mangrove swamps and food and nutrient-rich mudflats favour higher fish diversity and catches in Aghanashini. Sharavathi estuary has barely half the number of fishes, most of low brackish water conditions or those tolerant of wider fluctuations in salinity like *Arius arius*, *Sardinella fimbriata*, *Mugil cephalus* etc. Sharks and rays and other marine fishes like kingfishes and Indian anchovies avoid Sharavathi altogether. The occurrence of fishes of fresh water or nearly fresh water conditions, like *Puntius filamentosus*, *Terapon jarbua* etc. are result of dam related fresh water flow into the estuary. Gathering of edible bivalves, a major economic activity in Aghanashini estuary has gone extinct in Sharavathi.

Whereas the open estuarine part of Aghanashini, measuring 1977 ha, excluding salt pans, rice, and aquaculture, has annual fisheries (including bivalves) to the tune of estimated Rs.1,095,072,000, at Rs.553,905/ha, in Sharavathi, 977 ha of open estuary produces only Rs.12,852,500 worth, at an abysmally low of Rs.13,155/ha in comparison. Shrimp aquaculturing is widespread in Aghanashini, while practically non-existent in Sharavathi. The study highlights the need for caution on execution of

