A damming assessment of Mekong development

Dams on tributaries worse for fish than those on the main river.

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Dams on the tributaries of the Mekong River could have a greater negative effect on fish biodiversity and food security than those on the main river, researchers say.

Courtesy of PNAS

Dams on tributaries of the Mekong River can be more harmful to fish than those on the main river.

Hydropower developments on Mekong tributaries are not subject to the same level of scrutiny as their counterparts on the main river. “Most of the attention has been on proposed dams on the Mekong mainstream, such as the highly controversial Xayaburi dam in Laos,” says lead author Guy Ziv, an environmental scientist now at Stanford University in California. “The impact of tributary dams is little studied.”

The findings, published today in *Proceedings of the National Academy of Sciences*[1], “point to a desperate need to reconsider hydropower development in the entire Mekong River basin”, says Ame Trandem, the Southeast Asia programme director for the environmental group International Rivers in Bangkok.

With a watershed of 800,000 square kilometres, the Mekong River basin supports the world’s largest inland fishery and is home to 65 million people in six countries: China, Myanmar, Laos, Thailand, Vietnam and Cambodia. “Most of the people are poor and get 81% of their protein from subsistence fisheries,” says Ziv.

The steep topography of the region makes the Mekong an attractive place for hydropower development. Driven by increasing demand for electricity and a desire for economic development, 11 dams are being planned on the main river, with 41 on the tributaries expected to be completed within the next 4 years. Another 10–37 tributary dams are likely to be built between 2015 and 2030.

Using a fish migration model, Ziv and his colleagues found that if all of the proposed dams were constructed, they would reduce fish productivity by 51% and endanger 100 migratory fish species.

They then focused on the 27 tributary dams whose fate is yet to be determined, and were surprised to find, says Ziv, that the losses in fish biodiversity and production would be greater than for the proposed dams on the upper reach of the lower Mekong River.

“Individual dams may not make a big difference,” says Ziv. “But if you add all 27 dams together, you may get a catastrophic impact.” This is not only because of the total area that will be blocked for fish migration, but also because some regions are more important fish passages than others, he says.

One area of particular importance, the study shows, is the 3S river system in northeastern Cambodia, southern Laos and central Vietnam that is dominated by three major Mekong tributaries — the Se San, Se Kong and Sre Pok Rivers. Dams in this region would hit fish migration the hardest. The planned Lower Se San 2 Dam in Cambodia, for instance, would cause a 9.3% drop in fish biomass basin-wide. “The impact would be catastrophic,” says Ziv.

“Dams at different locations have different trade-offs between power generation and the loss in fish biodiversity and productivity,” says Ziv. “The Lower Se San 2 Dam will have the highest environmental cost per unit of energy produced.”

The team has created a simple matrix for deciding which dams to build throughout the basin. The tool estimates the loss of fish productivity at different levels of total electricity generation and ranks each dam in terms of its trade-offs. “Dams with better trade-offs can be built first when the energy demand is relatively low,” says Ziv. “And you really should avoid building those with the worst trade-offs, such as the Lower Se San 2 Dam.”

Ziv stresses that the study is just a “starting point” and that other aspects of potential impact, such as effects on sediment, agriculture and the displacement of people and communities, must be incorporated into the scheme for comprehensive trade-off analyses.

According to the 1995 agreement of the Mekong River Commission (MRC), an international body responsible for the sustainable development of the river, each member country is required to consult other nations for any major development projects on the Mekong itself. But there is no such requirement for projects on the tributaries.

To many, the latest findings call for a change in that policy. “It’s really time for the MRC to take a basin-wide approach to assessing the consequences of dams in the region,” says Trandrem.

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References

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Li Wu • 2014-04-22 01:02 PM

Title: Increasing Dam Construction in the Yangtze Affiliation: Anhui Normal University The Nature News âA damming assessment of Mekong developmentâ (Posted by Jane Qiu, 05 March 2012) highlights potentially serious negative consequences of dams on the tributaries of the Mekong river on fish biodiversity and food security than those on the main river. In China, another similar problem is dam construction in the Yangtze has been increasing all the time. Now, negative impacts are being exposed and seem to be causing many ecological problems (1). The Yangtze River (also named as the Changjiang River) is the third longest river in the world, and is also the mother river of the Chinese nation. It flows through the vast Chinese land on forever without stopping, and has raised billions of Chinese people. The Yangtze River is the golden waterway and economically developed river basin that Chinese people have been proud of it. However, since the end of last century, the reservoir and dam construction are growing at an alarming rate in the Yangtze River Valley. According to the statistical data from the Changjiang Water Resources Commission, there are 12,929 dams or reservoirs in the upper Yangtze River area, and their water storage capacity reached 234 billion cubic meters; there are also 29,639 dams or reservoirs in the middle Yangtze River area, with the water storage capacity reaching 1,165 billion cubic meters. As of 2005, there have been a total of 42,568 dams or reservoirs in the upper and middle Yangtze River area. At present, the dam or reservoir construction is increasingly intensified in the upper Yangtze River. Since 1950 more than 48,000 dams have been built in the catchment, among which the Three Gorges Dam is the largest (2). These dams or reservoirs provide a certain electric power resources for our country. The annually income of electricity selling from the Three Gorges Dam can be up to 18.1~21.9 million RMB Yuan, which was equivalent to 1/2000 of the national GDP (a total of 40 trillion RMB Yuan) in 2010. However, on the whole, these dams or reservoirs bring huge damages to water resource, water environment and ecosystem of the Yangtze River Valley. Before the construction of the Three Gorges Dam, the water quality of the Three Gorges reach was the second class water, and was one of the best water in Chinaâs rivers. After the completion of the Three Gorges Dam, the water quality of some parts of the Three Gorges Reservoir has deteriorated into the fourth class water, even the fifth class water. The riverâs transport function and self-purification function by erosion and deposition is losing. The number of fish and other aquatic species declined dramatically (3, 4, and 5). Because of the sharply decline of sediment discharge in the upper Yangtze River, the erosion process of the Yangtze Estuary is accelerating (6). For the Three Gorges Dam construction, the hidden danger of geological disasters such as landslide and earthquake, etc. increases. Today, the Yangtze River is not in the true sense of the river. It is an artificial Yangtze canal, which has been artificially truncated at will as with severe âintestinal obstructionâ. The Chinese name âChangjiangâ also can be changed into âChangquâ in the future. A variety of phenomena show that the ecological disaster of the Yangtze River Valley brought by the increasing dam construction is likely to be irreversible. Tens of thousands of dams or reservoirs have been a serious threat to the national security and sustainable development. In contrast to the increasing dam construction in the Yangtze, U.S. and European countries have launched a dam removal movement since the end of last century. Although the cities of the U.S. Great Lakes region are 1600 km far from the east coast, people are also easy to take a boat from the Atlantic Ocean and the Mexico Gulf to the cities of the Great Lakes region. The U.S. and European successful experiences of river irrigation, shipping, ecological conservation, comprehensive development and utilization are worthy of serious consideration of our country. Letâs wake up and save our mother river. References 1. X. Xu, Y. Tan, G. Yang, Earth-Science Reviews 124, 124 (2013). 2. S. Gao, Y. P. Wang, Continental Shelf Research 28, 1490 (2008). 3.

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