ENVIRONMENT AND DEVELOPMENT

Mekong Hydropower Development

Pending decisions may unleash lower Mekong dam construction, despite management challenges and troubling environmental and social impacts.

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The Mekong River is one of the world's last large rivers remaining mostly undammed. But China is constructing a series of eight hydropower projects on the upper Mekong. Although there are currently no dams across the mainstream channel (not including the tributaries) in the Lower Mekong Basin (LMB), nevertheless, in September 2010, the Lao People's Democratic Republic petitioned the Mekong River Commission (MRC) to begin the formal process of approving the first of 11 proposed dams across the lower Mekong (see the figure) (*1*). Although such a cascade would provide substantial power, it would likely reduce biodiversity and ecosystem service values of the LMB, while undercutting the livelihood and food security of millions of people. Decisions on this initial proposal expected over the coming months by the MRC countries may contribute to promoting high-impact hydropower development or to a movement toward integrated, transboundary river-basin management that could serve as a model for other rivers.

Biodiversity and Human Livelihood

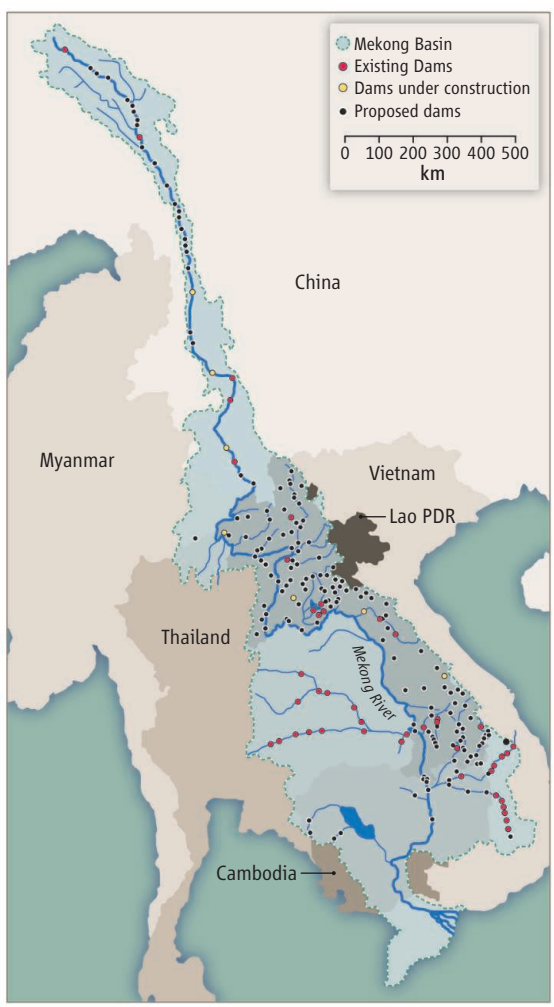
Three factors lend Laos' petition particular importance. First, Mekong River Basin planning historically has proceeded without analyses, such as MRC is now performing, that integrate existing ecosystem and human livelihood vulnerabilities with projections of development of regional natural resources and potential climate-change impacts (*2*). Reliable data on LMB natural resources have been difficult to obtain because they have not been collected and government transparency is inadequate.

But this lack of integrated planning is not solely due to lack of knowledge; much is already known about the Mekong. The river flows through an area characterized by high poverty and low development. The poverty rate (earnings of less than U.S. $1.25/day) averages 19%, 21% of the population do not have access to clean water, and some 30% lack access to closed sanitation systems (*3*, *4*). Projected impacts of climate change by 2050 range from low (e.g., reduced water availability), to moderate (e.g., increasing temperatures), to potentially high (e.g., decreasing food production and sea level rise in the Mekong Delta) (*5*).

The second factor that bears on Laos' petition is MRC's release of the first-ever Strategic Environmental Assessment (SEA) of cumulative environmental and social impacts of all proposed mainstream dams (*6*). If built, the 11 dams would generate roughly 15,000 MW of power, projected to account for 8% of regional demand by 2025. Gross income from hydropower generation might total $3.7 billion/year. Additional monies may be generated by increased regional trade and foreign direct investment, as power infrastructure is built and overall development proceeds. However, dam operators and investors would derive the most direct financial gains, because they would have exclusive rights to hydropower income during the first 25 years of dam operations. Nevertheless, Laos and Cambodia could gain annual income equivalent to about 18% and 4% of 2009 gross domestic product, respectively.

Environmental costs, however, would also be high. The SEA projects that dams would create direct costs—reduced fisheries, inundation of river bank gardens, and loss of nutrients for floodplain agriculture—equivalent to $500 million/year. Ecological impacts would be severe. The Mekong ecosystem, which experiences seasonal hydrological pulses during monsoon, harbors the second-highest fish species diversity in the world, with many highly migratory populations (*7*). But dams would turn 55% of the lower mainstream into reservoirs with slow-moving water. Despite the migratory nature of Mekong fishes, only 3 of the proposed 11 dams incorporate fish ladders, and none of these designs are adequate for local species. Fifty to 75% of total river sediments would be trapped behind dams and prevented from moving downstream to nourish river primary productivity and floodplain farms (*8*).

These ecosystem impacts relate directly to loss of human livelihoods, for the Mekong is the most productive inland fishery in the world (*9*). With fish-dependent diets, the national populations of Cambodia and Laos would lose up to 30% of their annual protein intake. The SEA projects that roughly 2.1 million people would suffer direct and indirect losses to their livelihoods. Finding that the immensity of the risks was "beyond the current capacity of the LMB



Mekong Basin Hydropower. [Map courtesy of the Consultative Group on International Agricultural Research (CGIAR) Challenge Program on Water and Food; data from MRC and the Government of Laos PDR]

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region and its governments to address," the SEA team recommended deferring all LMB mainstream dam building for 10 years.

The SEA's assessment of current governmental capacities to manage the Mekong highlights the third factor influencing Laos' petition. Others agree with the SEA that all LMB countries lack institutional capacities to manage transboundary natural resources (*10*). Yet international rivers require effective cooperative approaches if success is to be sustained over time. Exacerbating lack of governmental capacity is lack of funding to build needed management skills. In the past, much funding for river basin planning (and dam construction) came from multilateral development institutions (e.g., World Bank, International Monetary Fund, and Asian Development Bank). Now these agencies, with their commitment to some level of environmental and social impact assessment, are being replaced by investment from private and state-owned banks. These new investors, likely focused on profits, may not consider recommendations of the World Commission on Dams or other corporate social responsibility guidelines (*11*). Laos' initial Xayaburi dam, for example, would be constructed using Thai bank capital, with the electricity bound for Thailand (*12*).

River Basin Planning for Sustainability

Efforts are under way in the Mekong to implement SEA recommendations. But such planning is predicated on governments' support for a dam-building moratorium. While hydropower development is postponed, foundations can be laid for LMB planning that could also serve as a model for other Asian rivers. The first step would be to recognize political sensitivities involved with a shift from sovereign state–focused development to an integrated transboundary approach. Strengthening the MRC as a regional forum for discussing transboundary issues would help build trust that is essential to negotiate complex matters of resource use in a world of increasing scarcity, rising uncertainty, and declining resiliency (*13*). The South Asia Water Initiative Assessment is an existing forum that could serve as a useful guide.

A second step would be to focus institution building efforts on two arenas: transboundary knowledge and transgovernment parallel networks. Both would emphasize sharing benefits through the balanced provision of water and power, flood control, regional trade, and livelihood and food security (*14*). Such networks are being established by the Mekong Program on Water Environment and Resilience (M-POWER) and the MRC with its efforts to create regional data systems for information sharing and flood control center, and an early warning system. A missing piece is evaluation of non–hydropower-based energy; there has been little country or region-wide assessment of future power needs that weighs alternatives beyond dams. Data sharing cannot be completely separated from transboundary government networks for long-term management of the Mekong. China, for example, has never joined the MRC. When China's dam cascade is complete, it will have altered historical baseline low-flow levels of the Mekong (*15*).

Another essential step is enhancing transparency, public participation, and financial benefits for local peoples. This will likely remain a slow process in the Mekong, where there is a history of top-down government authority and people most affected by dams have not been part of decision-making processes (*16*). But existing water-planning frameworks where people are included from the earliest stages could be applied in the Mekong (*17*). Since 2007, Vietnam has been sharing hydropower revenues with poor rural households through a system of payments for environmental services. In 2 years, this scheme has generated $4 million, roughly 90% of which has been returned to villagers for protecting local forests.

Multilateral support to foster knowledge and governmental networks in the Mekong basin remains essential. Even the wealthiest countries (Thailand, Vietnam, and China) do not have financial resources to address current environmental vulnerabilities and future risks. A full economic accounting of such costs has never been completed in the Mekong, but the Asian Development Bank is well positioned to spearhead this work. Such a report would be useful to multilateral funding agencies. Unlike multilateral banks, private dam investors are less likely in the short term to address environmental risks. But given private financing of future dams, investors must be encouraged to commit to environmental and socially responsible assessment and implementation of hydropower projects.

Adaptive Planning and Geopolitics

The MRC has been "an amputated river basin organization" [p. 61 of (*18*)], as upstream countries are not included, and there is little assessment of tributary dam developments. Today, all the pieces are in place to create an innovative management model that could be useful across the region; transboundary environmental, livelihood, water, and food security vulnerabilities on the Ganges-Brahmaputra-Meghna and Indus Rivers are similar (*19*). Upstream, China's dams are only partially built, but they will increasingly influence dry-season flows, sediment capture, and overall transboundary hydropower management. And Chinese companies are set to finance many of the proposed new LMB dams. In 2009, the U.S. Department of State announced funding for a Lower Mekong Initiative to build capacity for a range of environmental, education, and health projects in the LMB. In an era of rising resource demands, reduced environmental resiliencies, and ongoing climate-change impacts, international cooperation across multiple scales is in the best interests of all.

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