



LMI: Managing Sediment, Climate Change in Mekong Basin Dams

JULY 2011

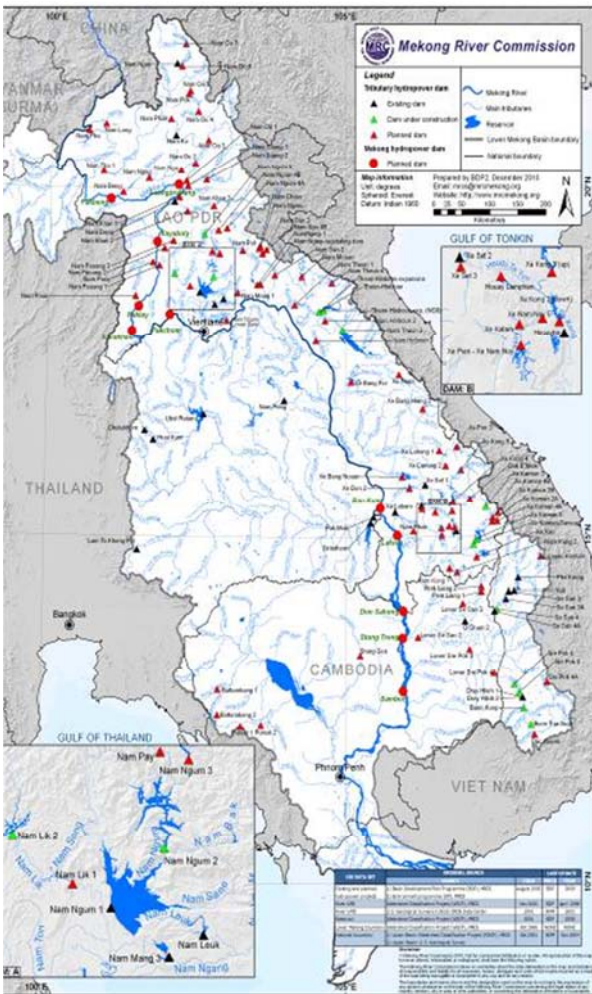
BACKGROUND

The Mekong is among the world's longest rivers, flowing 4,800 kilometers from the Tibetan plateau through six nations to its delta in Vietnam. The river and its tributaries contain the largest freshwater fishery in the world, producing 2.6 million tons annually, a food chain that relies on the nutrient rich sediment carried by the river. The river contains between 1,200 and 1,700 species of fish, making it the second most biodiverse river in the world. Many of these species must migrate a thousand kilometers or more upriver in order to spawn. This vast fishery supports some 60 million people along the Mekong and its watersheds, directly and indirectly, of whom 40 percent still live in poverty. Many of them depend on protein from the fish and the food grown along the river's banks and floodplain, which receive nutrients during annual floods.

The potential value of the water resources in the Lower Mekong (the part of the river south of China) and its tributaries is not limited to its fisheries. Laos, Thailand, Cambodia and Vietnam – the states that comprise the Lower Mekong Initiative (LMI) all recognize the river's enormous potential for hydropower and the key role electric power plays in economic and social development. By 2015, the LMI states will have some two dozen dams on Mekong River tributaries, with an additional 40 to 50 additional tributary dams planned by 2030. China has already constructed 3 dams on the river, north of the LMI states, with 5 more planned. While no mainstream dams have been built on the Lower Mekong yet, the LMI states are actively considering proposals made through the Mekong River Commission (MRC).

These proposed dams will have enormous consequences on the sediment movement in the basin, potentially trapping sediment in reservoirs, diminishing nutrients for fisheries and flood plains, intensifying erosion of the Mekong delta, and destabilizing the foundations of infrastructure along the river course. Although there is contention about the need for some dams, there is consensus among both developers and environmentalists that any dams and reservoirs that are built should be designed to minimize the trapping of sediments. When sediment is trapped behind a dam, the volume of the water in the reservoir behind it is necessarily reduced. This means less water can be released in dry seasons and less hydropower can be produced. It also means the loss of nutrients for both fish and agricultural lands and the erosion of the Mekong Delta, which is maintained by annual sediment accumulation.

Like all estuaries, the lower reaches of the Mekong are threatened by climate change, as this will magnify the man-made impacts noted above. If, as expected, the level of the sea rises, the Mekong Delta will be among the first to suffer. The UN Intergovernmental Panel on Climate Change



Existing and Planned Hydropower dams in the Mekong Basin



Photo: www.shutterstock.com

The impacts of climate change can be reduced through improved siting, design, and operation of hydropower dams.

estimates that with a meter of sea level rise, between 15,000 and 20,000 square kilometers of land will be lost in the Delta. Here, too, the best hope is sediment: the more that reaches the Delta, the more it is built up.

Much the region's success, therefore, will depend on balancing its need for power with the need to keep millions of tons of sediment flowing in the river throughout its long journey to the sea.

All of these factors put an enormous premium on the proper planning and construction of any dams that may be built on the Lower Mekong. This is precisely what USAID's Building Climate Resilience at Mekong Hydropower Dams Program aims to do, working closely with the MRC and the national water resources institutes of the four LMI countries.

PROGRAM ACTIVITIES IN THE LOWER MEKONG BASIN

Target Countries: Cambodia, Laos, Thailand, and Vietnam

Under the Lower Mekong Initiative, the \$2 million, three-year *Building Climate Resilience at Mekong Hydropower Dams* program will strengthen the four LMI states' capacity to manage sediment flows and plan future dam construction in ways that mitigate the anticipated impacts of climate change. This includes siting potential dams at the best possible locations and installing sluice gates in the dams at precise depths that allow flushing of sediment. Installing these sluice gates properly and having operational plans for their use are essential to ensure that the life-giving sediment flows downriver.

USAID's partner organizations, led by the Natural Heritage Institute, will work specifically with the MRC and the water resource authorities of the Lower Mekong countries on these important goals. The program will focus on hydrologic modeling, which, when done correctly, can promote natural patterns of river flow and sediment transport, while protecting vital fisheries and natural resources.

Planned activities to bolster the environmental sustainability and resilience of both existing and any future dams include the following:

- Create a U.S.-Lower Mekong partnership among governments, NGOs, and technical research institutions;
- Enhance the MRC's analytical tools to simulate hydrologic, geomorphic, and biologic processes throughout the river basin;
- Use those models to evaluate optimal site location, design, and operation of existing and future dams;
- Conduct economic feasibility analyses for best alternatives; and
- Broadly disseminate the results to inform future decisions on basin infrastructure.

PARTNERS

The Natural Heritage Institute, The Nature Conservancy, Conservation International, World Wildlife Fund, several Chinese research institutes