



Planning Approaches for Water Resources Development in the Lower Mekong Basin

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Executive Summary

Governments in the Lower Mekong Basin (LMB) face decisions that involve trade-offs between, for example, the economic benefits from hydropower generation and potentially irreversible negative impacts on the ecosystems that provide livelihoods and food security to the rural poor. These decisions involve complex problems that are both poorly understood in scientific terms and subject to rapid, potentially catastrophic change over time. A comprehensive, whole systems approach that adequately addresses the risks and uncertainties involved is necessary, but this is a daunting challenge for researchers, decision makers, and managers. They must develop the capacity to plan, coordinate, and implement a program that improves sustainable societal well-being across national boundaries in the face of these uncertainties, which include impacts on native capture fisheries, biodiversity, wetlands and other biological resources, ecosystem services (i.e., the ecological characteristics, functions, or processes that directly or indirectly contribute to human well-being), and indigenous cultures and ways of life.

Significant effort has gone into analyzing these trade-offs and attempting to find the appropriate balance. A 1995 agreement mandated that the Mekong River Commission (MRC) develop a Basin Development Plan (BDP) with the objective of promoting the coordinated development and management of water and related resources at the basin level using the principles of Integrated Water Resources Management (IWRM). The first phase of the BDP Program (2001–2006) focused on establishing processes and a framework for participatory planning and improving the knowledge base and tools for water resources development. The second phase (2007–2010) of the BDP (BDP2) formulated and assessed basin-wide development scenarios, which facilitated the establishment of a shared understanding of development options in the LMB. Reflecting IWRM principles, the BDP2 planning scenarios are designed to cover not only hydropower but also other uses of the Mekong River as currently planned by all the LMB governments. The assessment of these scenarios under BDP2 was a dialogue tool in developing the IWRM-based Basin Development Strategy for the LMB, which was negotiated and agreed by all the member countries in January 2011. It is intended that this basin-wide, integrated planning will be a continuing, evolving process. Implementation of the Strategy and development of a subsequent Basin Action Plan will be core activities of the BDP 2011–2015 program.

An additional planning tool was the Strategic Environmental Assessment (SEA) to address the environmental issues surrounding the eleven planned mainstream dams. Commissioned by a different program within the MRC, the SEA provides detailed analysis on the potential impacts of the dams, thus complementing the BDP in providing a basis for discussion and negotiation of mutually beneficial levels of water resources development and their associated levels of transboundary environmental and social impacts. Full details of the BDP and SEA reports and the Strategy are available at <http://www.mrcmekong.org/>.

Both the BDP and SEA processes are part of the MRC inputs for LMB policy makers to reach an acceptable balance between development of the basin and maintenance of its ability to sustain livelihoods and environmental values. Recognizing the challenge and complexity of these processes in the LMB, our assessment is an effort to provide guidance on how these efforts can continue to evolve, improve, and be better integrated in future versions of the LMB plans. This assessment looks at:

1. how to deal with risk, uncertainty, and discounting the future;
2. a review of changes in fisheries that can result from planned developments in the basin, including hydropower development;
3. a review of methods to internalize the value of the ecosystem services currently being provided in the LMB and how these estimates might change under different development scenarios and different assumptions about key variables; and
4. some suggestions for how to better integrate and model all of these elements in an evolving planning process that incorporates a broader set of scenarios and a higher degree of stakeholder participation.

As one element of this assessment, a sensitivity analysis of the benefit-cost analysis (BCA) of certain BDP scenarios was undertaken. By changing some key assumptions in the BDP about discount rates, the value of lost capture fisheries, future aquaculture production in the LMB, and the value of lost ecosystem services from wetlands to reflect the full range of uncertainty, at the extremes, there could be a reversal of the net present value (NPV) estimates of the scenarios from positive to negative. This report considers the impact of applying some extreme, yet plausible, assumptions and estimates as a way to reflect the boundaries of this uncertainty. These estimates include: (1) changing from a 10 percent to a 1 percent discount rate for natural capital (but not aquaculture since it requires investment similar to other built capital); (2) assuming a \$3/kg value of lost capture fisheries and aquaculture and reservoir fisheries gains (rather than \$0.8/kg); (3) assuming that aquaculture may only replace 10 percent of lost capture fisheries (rather than most); and (4) using a value of ecosystem services from lost wetlands of \$3,000/ha/yr (rather than \$1,200/ha/yr). With these assumptions the overall NPV for the maximum development scenario would change from positive \$33 billion to negative \$274 billion.

While all BDP scenarios considered in the BCA had negative social and environmental outcomes, the possibility of a negative economic outcome should change the decision-making dynamics considerably. In addition, the distribution of benefits and costs in all scenarios was quite skewed. For example, after applying all the alternative assumptions, in nearly all scenarios Lao PDR had a positive NPV, while other LMB countries were often negative. Methods to compensate Lao PDR for foregone benefits from water resource development might be one way to achieve a better basin-wide outcome.

In addition, low probability but high impact events like earthquakes, mega-storms, and dam failures need further assessment as they could wipe out any potential gains.

Given this uncertainty, and the highly negative results that *could* occur (based on sensitivity analysis and experience in other countries), it is advisable to adopt a more precautionary approach and delay major decisions on infrastructure construction until a more thorough and comprehensive analysis can be performed, and institutions can be put in place to mitigate impacts. This is consistent with the recommendations of the IWRM-based Strategy, the SEA report, and the stated goals of the MRC.

As the Strategy has acknowledged, planning for major hydropower development in the LMB, whether on the mainstream or on the tributaries, needs to move beyond traditional linear

thinking to a more comprehensive, basin-wide, transboundary, participatory, “adaptive management” approach. It needs to recognize the breadth of uncertainties involved and develop policies and institutions that can take them more adequately into account. However, it also is recognized that the means by which to influence development decisions must be founded on transparent and mutually accepted analytical methodologies amongst the decision makers, an approach which the MRC has fully accepted.

Recommended next steps include:

1. A more comprehensive, integrated human and natural systems framework and adaptive management approach to LMB planning and development that deals with the entire watershed.
2. A more comprehensive analysis and treatment of risk and uncertainty. For example, dam developers could be required to post recoverable assurance bonds large enough to cover the worst case damages, as one method of shifting the burden of proof about impacts from the public to the developers.
3. A more thorough assessment of the value of direct and indirect ecosystem services. These services contribute extensively to sustainable human well-being in the region and need to be properly assessed and valued. Additional research along these lines would be highly beneficial. In addition, impacts of developments on indirect ecosystem services of the Mekong—both negative (e.g. loss of provisioning, regulating, and cultural services of the river) and positive (e.g. the multiplier effect of hydropower provision)—should be assessed in the next phase of BDP.
4. A broader set of scenarios that embody alternative models of development. In particular, models and assumptions that adopt the goal of sustainable human well-being more broadly conceived (rather than merely economic growth in the conventional sense) and employ alternative sources of energy should be part of the broader range of scenarios investigated.
5. Better treatment of the effects of infrastructure construction on local cultures and the poor. These effects should not only be noted, but should be prevented, mitigated, or, at minimum, compensated for before construction is approved.
6. Related to this, it appears that the benefits of hydropower construction, even in our worst-case scenario in the sensitivity analysis, are still positive for Lao PDR, while they are negative for all other countries. One approach that might be tried is to implement a form of “payment for ecosystem services” (PES) to Lao PDR (from the other countries in the LMB as well as elsewhere) that would be larger than the foregone benefits from dam construction. A similar approach has been proposed by Ecuador, in return for leaving major Amazonian oil reserves in the ground, and by Indonesia for leaving native forests intact, although these plans have yet to be implemented in either country.

The need for some of these steps was recognized in the BDP2 and they are consistent with, and build on, the recently released IWRM-based basin development strategy (MRC 2011). The Strategy states that there is “potential for some mainstream hydropower development, provided that uncertainties and risks are fully addressed and transboundary assessment and approval processes followed; although potential benefits are high, so are potential costs, including transboundary impacts” (MRC 2011, ii). Implementation of these steps in the next phase of BDP is strongly endorsed.