Looking beyond individual hydropower projects

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The booming economies in Asia are energy-hungry. This has prompted poorer countries with high hydroelectric potential in the uplands to invest in hydropower projects to boost their macroeconomic development. Dam projects have mushroomed, with significant local and basin-wide impacts on the livelihoods of people up- and downstream – raising serious questions about trade-offs in all dimensions of sustainable development.

Nam Ngum 2 hydropower dam, completed in 2011, in Lao PDR (A. Heinimann)

Laos is among the world's least developed countries. But in recent years, the economy of this mountainous country has grown rapidly, through the use and extraction of its natural resources. In 2011, the hydropower and mining sector made up almost half of Laos's annual GDP growth of 7.5 percent; in less than ten years, revenue from hydropower alone is expected to comprise one-fifth of GDP [1].

Laos's fast-developing and energy-hungry neighbours – China, Thailand and Vietnam – are the main investors in the hydropower sector and main buyers of the electricity generated in the country. The theoretical hydropower potential of Laos is estimated at around 28 000 MW [2], and investments in hydropower electricity, mainly for export, are thriving. Currently, 13 hydropower projects are in operation, 20 are under construction and over 60 are at different stages of planning, of which not all may materialize. Most of the existing and planned projects are located along the Mekong and its tributaries (Figure). Total foreign direct investment in the 12 foreseen Mekong mainstream dams (10 in Laos and 2 in Cambodia) is estimated at US$ 25 billion [3]; gross income from hydropower generation (over 14 000 MW) is estimated at US$ 3.7 billion per year [4].

The dams will have significant ecological, economic and social impacts on people and their livelihoods – not only on those who live close to the dam sites, but also on the millions who live downstream and are dependent on agriculture and fishery [4, 5]. This highlights the importance of moving from current project-by-project planning to a more integrative approach that considers the cumulative positive and negative environmental and social impacts of all projects [6].

The most obvious local effects of dams and reservoirs are linked to resettlement. A spatial analysis of all hydropower projects planned and under way has revealed that 105 000 people in 293 villages would have to be resettled [7]. These are almost solely upland villages with an average poverty rate of about 47 percent (compared to 34.7 percent at the national level) [8], where more than 80 percent of the inhabitants belong to ethnolinguistic minorities. Hydropower projects may offer potential development opportunities to these villages, for example through increased accessibility. But the investments raise critical questions on local cost–benefit sharing and equity issues, such as negotiation power for better local outcomes.

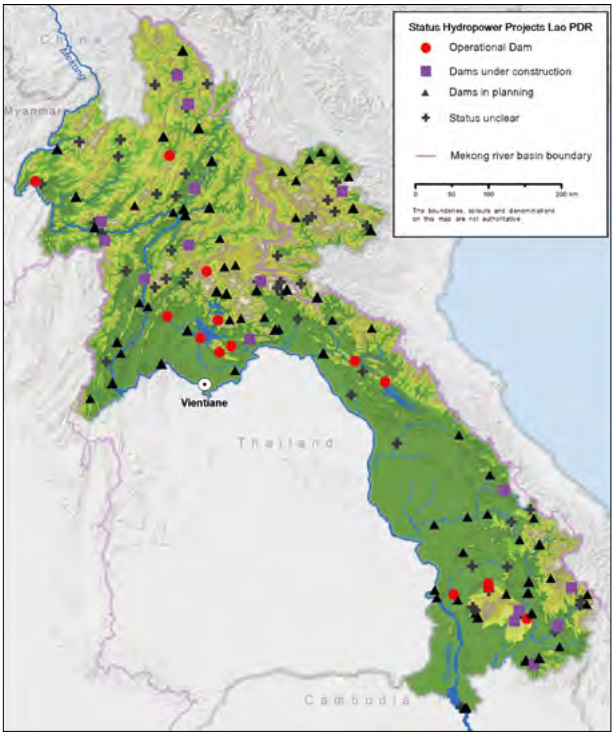
Decision-makers and planners need preliminary information about economic, social, environmental and development trade-offs when potential investment projects are first discussed. The ratio between the number of people affected by resettlements, their poverty status and the expected MW output of each planned hydropower project may provide first indications about the project's expediency (Figure). To realize the flagship hydropower project in Laos, Nam Theun 2, for example, 1.2 households per MW installed had to be resettled. This is six times lower than the average ratio of all planned plants, which indicates that more than 7 households per MW installed would have to move.

Such initial "assessments" allow a first comparison of the different projects in different geographic and social contexts. However, they cannot uncover either the actual local costs and benefits, or equity outcomes, which depend on other factors such as the nature of the actual resettlement programme and the sociopolitical context. Planning of hydropower plants thus requires spatially inclusive and comprehensive assessments that balance local and cumulative downstream costs and macroeconomic benefits, and consider equity and inclusiveness.

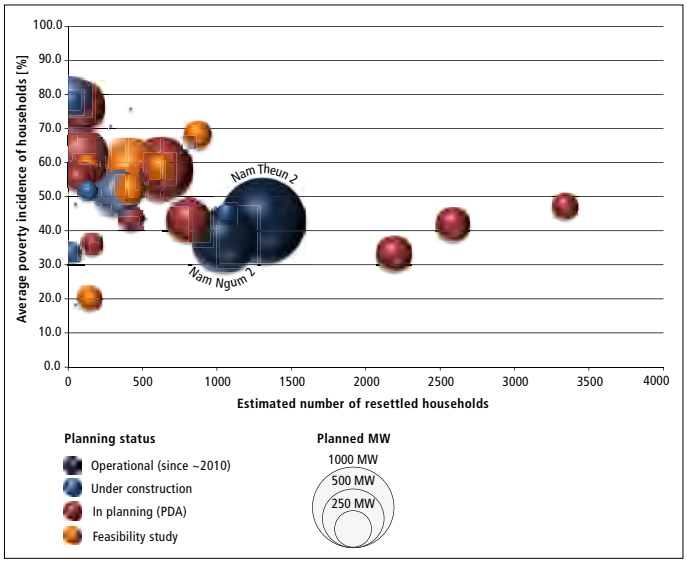
Lessons learned

- The current project-by-project approach to the development of hydropower should be expanded to take into account cumulative impacts of hydropower on the national and river-basin levels.
- Spatial planning of investments in hydropower requires an initial comparison of all projects in the planning phase, in terms of socioecological costs and macroeconomic benefits of potential locations and contexts.
- Resettlement due to planned hydropower projects affects mainly poor and marginal villages, raising concerns about local cost–benefit sharing and equity issues.

Planned and existing hydropower projects in Laos (updated based on [7])



Contextualization (poverty and resettlements) of hydropower projects at different stages of planning in Lao PDR



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