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Assessing the Impacts of Micro-Hydro Development in the Kullu District, Himachal Pradesh, India

A. John Sinclair

The Kullu District is a typical high-mountain environment with valley bottom elevation in the Manali area of about 2000 m and major summits that rise to 6500 m. This topography offers vast potential for hydroelectric development. In recent years the demand for power in India has exceeded supply, especially in the northern region, resulting in rapid exploitation of the hydropower potential of Himachal Pradesh (HP). The government of HP established the HP Energy Development Agency to encourage private sector investment in small hydro projects (3 MW and less) and to assist proponents by smoothing the process of project approval. The present study makes conclusions relevant to environmental asessment (EA) screening based on several cases in the Kullu District.

Incentives for micro-hydro development

Both the governments of India and Himachal Pradesh (HP) have developed incentive packages to encourage private investors to develop small-scale hydroelectric projects. In addition, the first micro-hydro "demonstration projects" in HP were supported by the United Nations through the United Nations Development Project–Global Environment Facility (UNDP–GEF) portfolio. The UNDP expects the benefits of these projects to include things such as reduction in fossil fuel use and land requirements for agriculture, which will reduce greenhouse gas emissions while protecting forests and biodiversity in this fragile region, enhancement of local economic opportunities, advantages for women by freeing them from collecting fuelwood and doing other household tasks, and capacity-building benefits.

Micro-hydro projects in the Kullu District

The HP Energy Development Agency (HIMURJA) has so far identified some 55 potential micro-hydro sites in the Kullu District. Officials indicate that despite the tremendous potential for hydro development, remoteness, rugged terrain, and particularly the lack of road infrastructure make it difficult to reach many potential sites. The study team visited 4 construction sites. Coincident with these, 18 other projects were in various phases of approval, with work expected to begin in the 2002 construction seasons. Of the 4 projects considered in this study, 2 were chosen for detailed case study: Kothi (200-kW capacity) and Solang (1000-kW capacity; Figure 1). These 2 projects were chosen for the following reasons: both were close to completion, allowing the study team to monitor their progress for a number of field seasons; both projects were funded under the UNDP–GEF Hilly Hydro Project; the nearby villages were familiar to the study team and easily accessible from our base in Manali; and local interest in these projects was expressed to the study team.

Local views of the potential impacts of project implementation

To gain an understanding of the local perceptions of micro-hydro projects in terms of potential human, environmental, and economic impacts, nonstructured scheduled interviews were carried out. Twenty-two individuals from Kothi, representing 12 households, and 20 individuals from Solang, representing 9 households, were involved. The total number of households in Kothi is approximately 35, with Solang having approximately 20.

In view of the importance placed on preconsultation, especially for UNDP–GEF-funded projects, interview respondents were initially asked how they first heard about the hydro project. They universally indicated that they had not been consulted before the construction of the project or after the construction began. This was illustrated by responses such as: "Nobody was consulted on this project. Only the power people will know what is going on;" and "We knew that the project was being built, but no one came and asked us about it." Comments about benefits indicate that the sole and almost universal benefit identified was more reliable power in the winter months (92%). The only other benefit noted was the potential

"We knew that the project was being built, but no one came and asked us about it." (A villager from Kullu District)

FIGURE 1 Construction of a pipeline in Solang. This steep pipe, with a diameter of 1.1 meters, leads to a 3MW potential power house over a distance of 2 km. (Photo by author)

FIGURE 2 Kothi village still relies on its forest resources despite the construction of a micro-hydro site designed to reduce local dependence on fuelwood. (Photo by author)

for new "small industries." However, only a few respondents recognized the potential for new business in their communities: "The power that we have now is fine for our needs, but if we want to build something like a sawmill we will need more power."

Most respondents felt that the project construction was having little, if any, effect on the local environment. The most common concern expressed was about the removal of trees, with some respondents also noting that blasting and walking paths affected field crops.

These micro-hydro projects were promoted on the positive environmental benefits they were going to generate—primarily by getting people to stop using wood for heating and cooking. Villagers were asked about the likelihood of electric power replacing their current use of fuelwood. Contrary to proponents' expectations, all respondents indicated that they used wood to heat their homes and cook their food and were universal in their rejection of substituting hydropower for wood in heating and cooking. Most of them indicated that they already had hydropower and did not use it for these purposes, so why would they switch even if the power was more reliable (Figure 2). Generally, hydropower is not currently used for heating and cooking because of the "high cost" of electricity. Most respondents were "fearful" of these costs going higher. All viewed wood as a free resource and did not place a value on the time that it takes to collect this wood.

Local people made it quite clear that in the current circumstances they were not going to reduce their use of wood, a necessity of life in the region that has been depended on for generations.

As with most proposed development projects, government agencies and project proponents predicted that "many local jobs" would be generated by construction and operation activities. Most respondents indicated that "All the jobs went to outsiders." A few respondents were aware that at least 1 local person had got a job as a *chaukador* (watchman) for each project. These results are supported by project proponents, as noted by the project manager at Kothi: "We currently have 30 laborers on the project—they are all from Nepal." Villagers indicate that Nepalese are used on such projects because they are "cheap labor and have few needs."

Examining maps housed with HIMRAJU makes it evident that almost all the easily, and some not so easily, reachable *nallahs* (water courses) in the district are slated for projects or have projects underway. The potential cumulative impacts seemed great. Therefore, respondents were asked if they knew of any other hydro developments coming up in the valley and their impression of such a development. About half of them said that they had heard about some other development nearby or in the district, with some expressing concern that every *nallah* would be dammed.

Conclusions

Despite the lack of public participation in the normative, strategic, and operational stages of micro-hydro development plan-

ning in the cases considered, local residents identified potential impacts from these developments at 3 broad levels—environmental, social, and economic. Concerns of the environment were few, but a number of issues were raised, including loss of and damage to trees as a result of project access, construction, and operation; stream diversion and damming, such as downstream effects; effects of blasting; noise; lack of facilities for workers such as those for bathing and sewage; and the potential combined effects of so many micro-hydro projects. From the social perspective, respondents raised issues regarding the potential interactions of locals with "imported" labor in work camps, no displacement of villagers by the project, the lack of preproject consultation, and the importance of collecting fuelwood. The economic impacts identified included the potential for increased tourism, the ability to pay for hydropower, and the potential for new job opportunities.

Although the potential effects of an individual project, as identified by local residents, "do appear to be minor," a thorough EA screening that considered all the site investigation and preparation activities, construction undertakings, and operation and maintenance would provide a much clearer picture than the existing detailed project reports (DPR) on which decisions are based (Figure 3). In fact, the government of India outlines the basic elements of a DPR that would enhance the consideration of these issues. The DPRs completed for the 2 projects considered do not give serious consideration to the potential environmental, cumulative, and social aspects of these projects. They do provide detailed construction blueprints and financial analysis along with any stream-monitoring data.

The need for local preassessments

A proper environmental assessment (EA) screening report might also have revealed to decision makers that the likelihood of the demonstration projects fulfilling the goals of UNDP–GEF and HIMURJA was quite slim. Even limited preconsultation and site visits would have indicated that the prospects of success were dubious at best. Local residents made it quite clear that the only benefit they saw from the projects was more reliable electric power in the winter. Although this is obviously very important to the people affected, it was not one of the stated goals of any of the agencies involved. Local people also made it quite clear that in the current circumstances they were not going to reduce their use of wood, a necessity that has been depended on for generations. It is worth noting that unlike other regions of India, the forests in the district are not disappearing at an alarming rate and that photo evidence indicates that the extent of forest cover is greater now than it was in the past, although the comparative health of the trees is not known.

Evaluators would also have discovered that the chance of finding cheap local labor was virtually nil because of the tourist industry in the region. The conditions for enhancing economic opportunities locally by allowing cottage industries to develop would also have been clearer. Such a preapproval assessment could have revealed the need to identify and make available at reasonable rates electric burners for cooking, stoves for heating, etc, as well as the need for education regarding the use of the forest and its maintenance for future generations. By carrying out such studies it is likely that the proponents would also have satisfied the consultation requirements they established.

Despite the rapid pace of hydro development in the Kullu District, there is still an opportunity to consider the issues outlined above by means of a more critical environmental approvals process. There is still time to make changes that may be necessary before more projects are executed. The HP Science and Technology unit has the expertise to set the framework for such evaluations and knows where to find professional assistance, both within and outside India. As is so often the case, however, such an action will require political will, and the EA record in HP is limited at best. However, the time for action is right because at least 1 foreign investor interested in a Kullu project has indicated that the government approved DPR is not acceptable.

FIGURE 3 Desilting tank in Kothi. The tank (34 × 2.5 × 1.5 m), made of reinforced concrete, desilts water on its way to two 100-kW turbines. (Photo by author)

AUTHOR

A. John Sinclair
Natural Resources Institute, University of Manitoba, Winnipeg, Canada R3T 2N2.
jsincl@ms.umanitoba.ca

A. John Sinclair is an associate professor at the Natural Resources Institute, University of Manitoba, Canada. His research interests focus on public involvement, transformative learning, and environmental assessment. He has spent considerable time in the Indian Himalayas assessing the impacts of rapid urban development.

NOTE

This article is an excerpt from an earlier, longer report that is available from the author on request. Ed.

FURTHER READING

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[HIMURJA] Himachal Pradesh Energy Development Agency. 2000. *Brochure for Entrepreneurs: Small Hydro Development in Himachal Pradesh.* Shimla, India: Himachal Pradesh State Electricity Board.

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