Impact assessment, small hydro and environmental justice in India

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Introduction

Himachal Pradesh (HP), a state in the Indian Himalaya, has significant hydropower potential, and the public sector (state) is rapidly developing this resource in conjunction with private developers (Kumar and Katoch 2015). Because of the negative impacts associated with large-scale projects, HP has promoted small hydro, which is thought to have more abundant social and economic benefits for local residents and fewer adverse impacts (Sharma et al. 2013). Although the Government of India defines small hydro as projects with less than 25 MW of capacity, HP defines small hydro as those below 5 MW (Himachal Pradesh Energy Development Agency 2015, Mishra et al. 2015).

The regulatory context

India's national impact assessment (IA) legislation, first enacted in 1994 by a regulation passed under The Environment (Protection) Act, 1986 (Environment Impact Assessment Notification S.O.60 (E), dated 27/01/1994) (Chowdhury 2014), applies to hydropower projects with important exemptions. Assessment is compulsory for projects > 50 MW, projects between 25 and 50 MW are screened to determine if an IA is necessary, and formal IA is not required for projects < 25 MW (Erlewein 2013).

The regulatory gap created by the exemption for small hydro is filled in part by state approval processes. In HP, project proponents are required to prepare detailed reports describing geological, hydrological, engineering and financial aspects of their projects, along with the economic, environmental, and social impacts. They are also required to apply for "no objection certificates" (NOCs) from village councils (Gram Panchayats) if local communities would be affected. Up until 2014, NOCs were also required from relevant government ministries, such as Public Works, Irrigation & Public Health, and Fisheries and Wildlife (Himachal Pradesh Energy Development Agency 2015).

Environmental justice

Given the strategic importance of small hydro in HP and the adverse impacts associated with rapid growth of that sector (e.g., disruption to local irrigation systems, loss of traditional livelihood opportunities, and loss of cultural assets) (Baker 2014, Rai and Srivastava 2014, Diduck and Sinclair 2016), the purpose of this research was to examine the environmental justice implications of small hydro development. Our conceptual framework encompasses: equity in the distribution of environmental risks; impacts on wellbeing; recognition of the diversity of values and experiences in affected communities; access to information; opportunities for participation in decision making; and access to justice (Trubek 1980, Schlosberg 2004, Williams and Mawdsley 2006, Pring and Pring 2009, Schlosberg and Carruthers 2010).

Research strategy and methods

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Our research strategy involved an extensive review of small hydro in HP, with a focus on five projects, namely the Chorr, Haripur, Kathi, Kukri and Pakhnoj projects, in the Beas River watershed in the Kullu District. We chose these projects because they are of similar design (run-of-the-river), they were all initiated in the private sector, they have considerable background documentation, and there is significant local interest in them.

Our methods included systematic policy analysis, field observations, and semi-structured interviews. Data sources for the policy analysis were public records, such as legislation, policies, government reports, and project-specific approval documents. Field observations were recorded with maps, notes and photographs.

The interview participants included local residents, community activists and non-government organizations, government officials, and project proponents and their employees. 48 interviews were conducted during four field visits (July 2012, October 2013, April 2014 and April 2015). We used non-probability, purposive and snowball sampling (Creswell 2014) to recruit interview participants. Some interviews were conducted in English but an interpreter was required for most. In all instances, the interview data were recorded in field notebooks or digitally recorded in accordance with ethics approvals received beforehand.

The interview questions focused on project approvals, local participation in project development, and understandings of project impacts. Analyses began in the field and were completed in the laboratory using QSR NVivo qualitative data analysis software. The analyses took a grounded approach and involved sorting and coding data segments and identifying themes (Creswell 2014). Throughout, efforts were made to verify the data with field notes or documentary data.

Results

Growth in the small hydro sector

The small hydro sector in HP has seen rapid growth. Between 1995 and 2015, 475 projects of ≤ 5 MW were allotted with an aggregate capacity of nearly 1,209 MW. Therein, 244 implementation agreements were signed (as of 31st December 2014), of which 137 projects were at the clearance stage, 64 had been commissioned and 43 were under construction. In Kullu District alone, 137 projects had been allotted and 70 implementation agreements signed (45 projects were in clearance, 12 had been commissioned and 13 were under construction) (Himachal Pradesh Energy Development Agency 2015).

The case studies

The case study projects are (or in the case of Chorr and Pakhnoj, would have been) run-of-the-river developments with hydraulic structures to divert water to a small powerhouse. Such projects involve construction of a diversion, de-silting chamber, penstock (i.e. sluice/ gate/ pipeline/ intake structure controlling water supply to the turbine), powerhouse, and tailrace (i.e. a channel carrying utilized water away from the turbine). Table 1 summarizes the location and selected salient features of the projects.

Table 1: Location and selected salient geographical features of the case study projects

Project name (Generation capacity, MW)	Location	Coordinates	Diversion weir elevation (m AMSL)	Powerhouse elevation (m AMSL)	Basin catchment area at diversion site (km^2)
Chorr (1)	Chorr Nallah near Jogini Falls (2.5 km NE of Manali)	32°-11'-42" N; 77°-11'-40" E	~2,280	~2,078	7
Haripur (3)	Pakhnoj Nallah near Haripur Village	32°-08'-44", 32°-08'-32" N; 77°-10'-29", 77°-09'-33" E	~1,686	~1,531	35
Kathi (3.5)	Umang/ Joling/ Phojal Nallahs near Kasta Village	32°-08'-10" N; 77°-03'-55" E	~2,382	~2,003	18
Kukri (5)	Balsoti Nallah near Kasta Village	32°-05'-20" N; 77°-05'-33" E	~2,461	~2,220	52
Pakhnoj (2.5)	Pakhnoj Nallah near Haripur Village	32°-08' N; 77°-12' E	~1,994	~1,710	52

The qualitative analyses yielded five primary themes:

- adverse impacts (perceived, experienced, and expected);
- benefits (perceived, experienced, and expected);
- approval processes;
- public participation (or lack thereof) in approval processes; and
- conflict resulting from actual and proposed projects.

Each primary theme included secondary and, in some cases, tertiary themes. Table 2 identifies the themes and, to show their predominance, includes the number of sources (interviews) that expressed each theme and the number of references *(data segments)* coded to each theme.

Among the primary themes, adverse impacts (perceived, experienced, and expected) was the predominant one (40 sources, *152 references*) and it included seven secondary themes. The secondary themes encompassed concerns about the economy, landslides and soil erosion, sacred spaces, personal safety, trees and plants, and water. Water was the most common secondary theme (28, *89*), and it consisted of four tertiary themes spanning general concerns and specific concerns about agriculture (irrigation, rice production, and livestock), fish stocks (both wild and farmed), and availability of potable supplies. Notably, and counter to the foregoing concerns, eight research participants, encompassing project proponents, government officials, and local residents alike, thought there were minimal adverse impacts (8, *12*).

Table 2: Themes derived from the interviews along with the #s of sources and *references*

Primary themes	Secondary themes	Tertiary themes
Adverse impacts (perceived, experienced, and expected) (40,*152*) [40 sources, *152 references*]	Economy (5,*7*), landslides and soil erosion (9,*10*), minimal adverse impacts (8,*12*), sacred spaces (8,*15*), personal safety (1,*1*), trees and plants (7,*9*), water (28,*89*)	Subthemes of water: agriculture (19,*33*), fish (8,*17*), general (10,*19*) human use (15,*19*)
Benefits (perceived, experienced, and expected) (35,*92*)	Education (2,*2*), community funds (11,*15*), medical (2,*2*), electricity (4,*5*), general (4,*4*), infrastructure (8,*13*), job creation (12,*15*), minimal benefits (17,*22*), secondary economic (5,*6*), temples (7,*7*)	
Approval processes (33,*52*)	Aftermath and cancellation (6,*8*), community-based organizations (10,*12*), awareness (7,*7*), Panchayat (7,*7*), proposal (6,*9*), state government (14,*19*)	
Public participation (or lack thereof) in approval processes (28,*56*)	Ideal consultation (4,*5*), meetings (3,*3*), minimal involvement (15,*20*), NOC concerns (16,*25*), public hearings (3,*3*)	Subthemes of minimal involvement: lack of meaningful consultation (13,*17*), unaware (3,*3*) Subthemes of NOC concerns: deceitfully attained (7,*10*), NOC not given (10,*13*), NOC given (2,*2*)
Conflict resulting from actual and proposed projects (28,*108*)	Corruption (5,*7*), court challenges (14,*23*), deception (5,*10*), dissent (13,*21*), harassment (3,*3*), inter-community (3,*6*), religion (9,*25*), ways forward (6,*13*)	Subthemes of ways forward: alternative energy (3,*4*), limits to development (2,*2*), monitoring (4,*5*), oversight (1,*2*)

Benefits (perceived, experienced, and expected) was the second predominant primary theme (35 sources, *92 references*), and it included 10 secondary themes covering impacts such as improved education and medical services, more reliable electricity, and enhanced infrastructure including improvements to temples. In contrast to these positive views, the most common secondary theme reflected positions of people who saw only minimal benefits (17, *22*) associated with small hydro. After that, job creation, and in particular employment in project construction, was the second most predominant secondary theme (12, *15*).

The primary theme of approval processes (33 sources, *52 references*) included six secondary themes encompassing descriptive information on the roles played by village- and state-level institutions (Panchayat, government departments) in preparing, advancing, reviewing and approving project proposals. It included a secondary theme covering the roles of community-based organizations, including environmental and outdoor recreation groups and a coalition of villagers, in opposing three of the projects. In two cases – Chorr and Pakhnoj – opposition efforts, including public protests and court challenges were successful in stopping the projects.

The primary theme of public participation (or lack thereof) in approval processes (28 sources, *56 references*) contained five secondary themes. The two most predominant pertained to NOC concerns (16, *25*) and the belief that there was minimal public involvement (15, *20*). The NOC

concerns included three tertiary themes, one of which reflected views that the clearances were deceitfully attained (7, *10*) through document forgeries and bribes to village leaders. The belief that there was minimal public involvement included a tertiary theme regarding lack of meaningful consultation (13,*17)* by either the project proponents or the state government.

The fifth primary theme, conflict resulting from actual and proposed projects (28 sources, *108 references*), included eight secondary themes comprising corruption (5, *7*) of officials and politicians, deception (5, *10*) by contractors and village leaders, and harassment (3, *3*) of local residents. It also included secondary themes regarding local opposition: court challenges (14, *23*), dissent (13, *21*) through protest marches and letters, and ways forward (6, *1*3) for improving small hydro development. Ways forward consisted of four tertiary themes, including placing limits on development (2, *2*) and improved monitoring (4, *5*) and oversight (1, *2*).

Discussion and implications

The results indicate that, although small hydro development might enhance state and regional economies, concerns remain over local environmental, economic and social impacts, especially in regard to water and its related economic and livelihood activities. These concerns underscore a need in small hydro planning and approval processes to further investigate and attend to fundamental aspects of environmental justice, namely equity in the distribution of environmental risks, impacts on wellbeing and recognition of the diversity of values and experiences in affected communities (Trubek 1980, Schlosberg 2004, Williams and Mawdsley 2006, Schlosberg and Carruthers 2010).

The results regarding approval processes and public participation echo critiques of IA in India (e.g., Diduck et al. 2013, Rathi 2017), and reveal how small hydro planning and approvals fail to adequately safeguard the three pillars of environmental democracy (i.e. access to information, access to participation in decision making, and access to justice) (Pring and Pring 2009). That being said, the court challenge that blocked the Pakhnoj project suggests the efficacy of public interest litigation in India under the right conditions, such as having highly capable legal and technical support and the ability to take on the risks of litigation. Further, the public protests that stopped Chorr reveal that neoliberal public policies may have stifled but not totally silenced civil society (which expresses alternatives to state and market values) and poor citizens (the shock absorbers of society) who are forced to stay and suffer or flee from environmental degradation (Thompson 2008).

Ultimately, the potential for achieving higher degrees of environmental justice in small hydro planning and approvals would be improved if small hydro projects were subjected to strategic assessments and region- or catchment-based cumulative effects assessments. Such assessments would help bring to light the full range of environmental, social and economic impacts, along with effective ways to avoid or mitigate adverse impacts while optimizing benefits. In doing so, the assessments would enable actualization of the suggestions in the ‘ways forward’ theme (i.e. placing limits on development, and improving monitoring and oversight). Employing strategic and cumulative effects assessments would open the door to using the array of community engagement processes and methods that have proven effective in IA. With respect to small hydro, it is especially pressing to adopt early, more decentralized and active engagement.

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