Small hydro and environmental justice: Lessons from the Kullu District of Himachal Pradesh

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1 Introduction

Himachal Pradesh has significant hydropower potential, and the public sector (state) is rapidly developing this resource in conjunction with private developers (Kumar and Katoch, 2014), via state-based agencies (e.g. Himachal Pradesh Government Energy Development Agency [Himurja]). Because of the negative impacts associated with large-scale projects, Himachal Pradesh has promoted small hydro, which is thought to offer more potential for social and economic benefits for local residents and fewer adverse impacts (Sharma, Tiwari and Sood, 2013). Although the Government of India defines small hydro as projects with less than 25 MW of capacity, Himachal Pradesh defines small hydro as those less than 5 MW (Himurja, 2015b; Mishra, Khare and Agrawal, 2015).

India's national impact assessment legislation is enacted by a regulation passed under the Environment (Protection) Act 1986. Further, the Environment Impact Assessment (EIA) Notification 2006 (S.O. 1533, 14 September 2006) applies to hydropower projects but includes important exemptions. Assessment is compulsory for projects greater than 50 MW, while projects between 25 and 50 MW are screened to determine if an assessment is necessary, and a formal assessment is not required for projects smaller than 25 MW (Erlewein, 2013; EIA Notification 2006 Schedule 1).

The regulatory gap created by the exemption for small hydro has been filled in part by state approval processes. In Himachal Pradesh, 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 a No Objection Certificate (NOC) from village councils (Gram Panchayats) if local communities will be affected. Until 2014, NOCs also were required from relevant government ministries, such as Public Works, Irrigation and Public Health, and Fisheries and Wildlife (Himurja, 2015c).

Given the strategic importance of small hydro development in Himachal Pradesh 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, 2014c; Rai and Srivastava, 2014; Diduck and Sinclair, 2016) the objectives of this research were to (1) examine the impacts of small hydro development in Himachal Pradesh, and (2) consider the environmental justice implications for local communities.

2 Small hydro in Himachal Pradesh

Himachal Pradesh, located in the Western Himalaya, holds considerable hydropower potential, estimated to be 27,463 MW, of which 24,000 can be harnessed. In 2017, the state had installed capacity of 10,519 MW (Government of Himachal Pradesh, 2020). The state views hydropower as a key driver of economic growth, and in recent years it has accelerated the pace of hydropower development (Kumar and Katoch, 2014; Government of Himachal Pradesh, 2020). Because of the negative impacts associated with large-scale projects and in order to take advantage of smaller sources, Himachal Pradesh has actively promoted small hydro by adopting policy measures, such as wheeling and banking of power, streamlined clearance processes and waiver of royalties for designated periods (Baker, 2014a; Diduck and Sinclair, 2016; Chapter 2, this volume). Statewide, by 2020 there were 742 small hydro projects that had been allotted, with an aggregate capacity of nearly 1,779 MW. Therein, 281 implementation agreements had been signed, of which 161 projects were at the clearance stage, 88 had been commissioned and 32 were under construction (Government of Himachal Pradesh, 2020).

In Kullu District alone, 137 small hydro projects had been allotted and 70 implementation agreements signed by 2015 (45 projects were in clearance, 12 had been commissioned and 13

were under construction) (Himurja, 2015a). The Kullu District is a high mountain region, with altitudes ranging from c. 1,000 to 6,600 m above sea level (Johnson et al., 2018). Pertinent to hydropower generation, it has substantial stream/river flows derived primarily from glacier melt, snowmelt and rainfall in the June–September monsoon season (Sah and Mazari, 2007). The district had a resident population of 440,000 in 2011, of which 90 per cent lived in rural areas (Johnson et al., 2015), and a substantial transient and migratory population. Economic activity in the district includes agriculture, horticulture and aquaculture; tourism and pilgrimage; hydroelectric development; cottage and small industries; and local commerce (Directorate of Census Operations Himachal Pradesh, 2011).

As noted, it is thought that small hydro offers more potential for social and economic benefits for local residents and generally has fewer adverse impacts (Sharma, Tiwari and Sood, 2013; Mishra, Khare and Agrawal, 2015). However, the research literature reveals that predicted or promised local benefits such as employment, improved road networks, more reliable power and reduced combustion of wood often are not realized, and impacts are far from benign (Sinclair, 2003; McCandless, 2007; Kumar and Katoch, 2015; Sinclair, Diduck and McCandless, 2015). Studies from Himachal Pradesh, including the Kullu District, have demonstrated the range and severity of adverse impacts experienced during construction and subsequent scheme operation. These impacts include disruption of local irrigation systems, loss of traditional livelihood opportunities, loss of cultural assets, removal of trees and horticultural land, diverted channel flows and altered sediment transport regimes, slope instability, soil erosion and increased flood risks– many of which are manifest on site and downstream (Baker, 2014a; Rai and Srivastava, 2014; Diduck and Sinclair, 2016; Chapter 2, this volume).

Despite increased understanding of adverse impacts, small hydro projects are not subject to the EIA Notification 2006 and therefore do not fall under the purview of the National Green Tribunal (NGT) (NGT Act, Schedule 1). Further, small hydro is not subject to formal approval processes by relevant state government ministries and agencies, such as Public Works, Irrigation and Public Health, Fisheries and Wildlife and the Disaster Management Authority (Himurja, 2015c). Project proponents are required to prepare a Detailed Project Report (DPR) describing geological (but not dedicated geomorphological appraisal), hydrological, engineering and

financial aspects of their projects, along with economic, environmental and social impacts. However, the DPRs are site specific and do not fully assess connected and coupled impacts beyond and between sites. Proponents are also required to provide 1 per cent of the project cost as "local area development funds," which are meant to support local infrastructure and other development projects, as well as apply for NOCs from affected Gram Panchayats. Beyond this, there are no formal requirements to involve the public in preparation of the DPR or to otherwise engage in broad community consultations.

3 Theoretical orientation

This chapter adopts the framework of environmental justice found in Chapter 1. The framework is founded on basic attributes of good governance, such as broad-based citizen participation, respect for the rule of law, respect for cultural values, effectiveness and efficiency, accountability, transparency and responsiveness (United Nations Economic and Social Commission for Asia and the Pacific, 2008). The framework is also informed by the goals of sustainable development, such as inter- and intragenerational equity (World Commission on Environment and Development, 1987) and United Nations Sustainable Development Goal 16. This goal is to "promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels" (United Nations Department of Economic and Social Affairs, 2020).

Included in the framework are four basic components. Recognitional justice refers to recognition of the diversity of participants, experiences and interests (desires, wants, needs, goals, aspirations) in communities that are affected by environmental governance decisions (Schlosberg, 2004; Williams and Mawdsley, 2006). This component provides a basis for and enables the other three components. Procedural justice requires opportunities for meaningful participation in environmental governance and the political and legal processes to create and manage them (Pring and Pring, 2009; Gill, 2017). Meaningful participation in governance and political processes requires early and ongoing opportunities for involvement, access to information and, if necessary, access to resources to gain the capacity for effective participation, among other key features (Stewart and Sinclair, 2007; Diduck and Sinclair, in press). Meaningful

participation in legal processes requires access to information, knowledge and legal and technical support, along with legal standing; access to proceedings that are fair, efficient and affordable; and access to enforcement mechanisms (Pring and Pring, 2009).

Distributive justice, which is at the heart of the framework, seeks equity in the distribution of the risks and benefits that result from environmental governance decisions (Schlosberg, 2004; Williams and Mawdsley, 2006). Finally, restorative justice is concerned with the extent to which the adverse impacts of environmental governance decisions are avoided, mitigated and remedied (Motupalli, 2018; Raphael, 2019).

4 Research strategy and methods

Our research strategy involved a preliminary scoping phase followed by an intensive examination of five small hydro projects in Himachal Pradesh. Methods included document review, field observations and semi-structured interviews. Data sources for the document review 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 farmers, shop owners, village leaders, community activists, members of conservation and other community organizations, other local residents, state government officials and project proponents or owners and their employees.

The scoping phase included 20 interviews that canvassed small hydro growth in Himachal Pradesh, as well as 15 projects[1] that were considered but not selected for the intensive phase of the research. The intensive phase, which involved 32 interviews, centred on the Chorr, Haripur, Kathi, Kukri and Pakhnoj projects in the Beas River watershed in the Kullu District (Figure 7.1). These projects were chosen because of similar design (run-of-the-river) and initiation in the private sector, the availability of background documentation and a significant local interest in them.

[1] Baloot Fozal 4.6 MW; Baragran 3 MW; Brahim Ganga 5 MW; Fozal 6 MW; Galang 3.5 MW; Hamshu 0.5 MW; Kesta 4.5 MW; Pharari 0.5 MW; Pharari Nallah 0.25 MW; Sarbari-1 4.5 MW; Sarwari-III 2 MW; Sheel 1.5 MW; Shirir 1 MW; Solang 3 MW; Suman Sarwari 5 MW.

<INSERT FIGURE 7.1 HERE>

The 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 most required an interpreter. 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 small hydro growth, project approvals, local participation in project development and understandings of project impacts. Data analysis was inductive, began in the field and continued in the laboratory using QSR NVivo 11 qualitative data analysis software. The analysis took a grounded approach (Corbin and Strauss, 2014) and involved sorting and coding data segments and identifying themes (Creswell, 2014). Throughout, efforts were made to verify the data with field notes and/or documentary data.

5 Results

5.1 The five run-of-the-river projects

The projects were designed as 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 used water away from the turbine). Further technical details of run-of-the-river projects can be found in Chapter 2. Table 7.1 summarizes the location and selected salient features of the projects as presented in the DPRs.

<INSERT TABLE 7.1 HERE>

5.2 Grounded thematic analysis

The thematic analysis of the interviews yielded five primary themes: adverse impacts (perceived, experienced and expected); benefits (perceived, experienced and expected); governance and approval processes; public participation (or lack thereof) in governance and approval processes; and community opposition. Each primary theme included secondary and, in some cases, tertiary themes. Table 7.2 identifies the themes and, as a measure of their predominance, includes the number of sources (interviews) that expressed each theme and the number of references (data segments) coded to each theme. The themes are explained below, and selected interview quotations are provided to add depth and richness of detail. Code names are used in the quotations to protect the anonymity of the research participants.

<INSERT TABLE 7.2 HERE>

5.2.1 Adverse impacts

Adverse impacts (perceived, experienced and expected) formed the predominant primary theme (42 sources, *192 references*), which included four secondary themes. Water was the most common secondary theme (27, *90*), consisting of three tertiary subthemes spanning concerns about agriculture (irrigation, rice production, livestock) (19, *33*), human uses (availability of potable supplies) (16, *20*), and fish stocks (both wild and farmed) (8, *17),* as expressed by the following comments:

> "The main issue is the availability of water. We have horticulture such as apple orchards. We do not get enough water for irrigation." (Ravi, farmer and gharat owner, Pakhnoj project)
> "I am concerned about the pollution of water. I am afraid that people will have to drink polluted water." (Rubina, local resident, Kukri project)
> "It is going to affect the fish farm owners in this area. There are five fish farms and mostly those are private and all of them are using the water from the stream." (Manohar, shop owner, Haripur project)

The next most common secondary theme identified social and economic impacts (16, *48*), highlighting three tertiary subthemes: disruption of sacred spaces (10, *34*), economic harm from reduced tourism and closure of gharats (traditional watermills) (5, *7*), and threats to personal safety from construction crews (4, *4*). Disruption of sacred spaces was mainly a concern in the Chorr case, as the proposed project would have impacted two temples to the goddess Jogini and a waterfall named in her honour:

> "Stones near the base of falls were considered to be the footprints of Jogini, and many were broken during construction. At one time no one was allowed to go there, even pujaris [temple priests] could only enter on holy occasions, although some exceptions were made for pastoralists for grazing." (Ajay, teacher, Chorr project)

The secondary theme of terrestrial systems (15, *19*) included concerns about landslides and soil erosion (9, *10*) and loss of trees and plants (7, *9*). Notably, and counter to the foregoing concerns, nine research participants, including project proponents, government officials and local residents alike, thought there were minimal adverse impacts on terrestrial systems (9, *13*).

> "There are no negative effects of the project. Only a few trees will be cut if they are bringing the pipeline. But the rest there is no problem." (Anupam, local resident, Kathi project)
>
> "I think there is no impact of small hydro projects. There are issues related to big projects, such as construction of infrastructure, land issues, submergence of areas, cutting trees, etc. But in case of small hydro projects, these are really too small to have any impacts." (Vishal, state government official)

5.2.2 Benefits

Benefits (perceived, experienced, and expected) made up the second most common primary theme (35 sources, *91 references*) and comprised three secondary themes. Local area development funds, the most common of the secondary themes (19, *44*), encompassed suggestions and ideas about funding provided by the project proponent – equalling 1 per cent of project costs – to the Local Area Development Authority in support of development activities.

Two notable tertiary themes were infrastructure (11, *20*) such as streetlights, paved roads and paths, bridge repairs, sanitation facilities and temple upkeep, and public services (6, *9*) such as more reliable electricity and improved education and medical services.

Job creation and economic spinoffs (17, *21*) formed the third most common secondary theme. The latter included tax revenue, increased business for hotels and shops from migrant workers and potential donations for festivals. Job creation, and in particular employment in project construction, was commented upon by local residents and project opponents as well as by project employees, as for example:

> "There are many unemployed youths in these three panchayats. If through the project they are getting some kind of employment, then that will be helpful." (Prem, opposition leader, Haripur project)
> "People are making money because they are getting jobs, so they are getting Rs. 8,000–Rs. 10,000 per month. So, people would also like to have jobs in the other villages." (Anupam, local resident, Kathi project)
> "There are 10 or 15 people who have got employment right now, and when this project was being built at that time there were about 60 or 70." (Ankush, employee, Suman Sarwari project)

In contrast to these positive views, an important secondary theme (17, *22*) reflected positions of people who saw minimal or no benefits associated with small hydro:

> "We do not get any benefits out of these projects. It may be beneficial to the country but definitely not for the local people." (Ravi, farmer and gharat owner, Pakhnoj project)
> "No benefits. They are not giving the electricity to any of the villages. Maybe they will give the electricity to the government, so what kind of benefit are we going to get?" (Purva, village leader, Haripur project)
> "Yes, [there are jobs] during construction. After that there is no employment, no continuous employment. When you complete a hydro project then you need only very few people and they are all experts." (Vijay, conservation organization)

5.2.3 Governance and approvals

The third and fourth primary themes, governance and approvals (26 sources, *47 references*) and public participation (30, *67*), are closely linked and had similar prevalence in the NVivo database. The third theme is summarized here and the fourth in the next section. Governance and approvals included three secondary themes, encompassing descriptive information on the roles played by state government agencies and departments (17, *24*), panchayats (i.e. village councils) (7, *7*) and project proponents (6, *9*) in preparing, reviewing and approving project proposals, as the following comments show:

> "Clearances and NOCs are required from agencies with jurisdiction over affected areas, such as the Forest Department, the panchayat, the Revenue Department, Sub-Divisional Magistrate or the District Commissioner, Irrigation and Public Health, the Public Works Department, Fisheries Department, and Pollution Control Board." (Satyananda, state government official)[2]
>
> "In the panchayat there are different types of people. Some have got a personal interest, but the overall interest is for the betterment of the area. If the panchayat wanted, they can object right from the beginning that this project should not be established because it will cause more harm, it is more harmful than beneficial." (Virbhadra, opposition leader, Haripur project)
>
> "Our project was self-identified, but we still used the standard application process. All documents were looked at first by HIMURJA before implementation. The documents had to be collected and organized by us, all NOCs had to be obtained by us, and coordinated by us. We had to speak with all separate government ministries after receiving the requirements from HIMURJA." (Dev, project owner)

Finally, governance and approvals included a secondary theme pertaining to remediation (5, *7*), following the lack of restoration and clean-up in the Chorr case after the project was halted because of public opposition and cancellation of the allotment granted to the project proponent:

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[2] As noted above and in Chapter 2, many of these NOCs were eliminated from the approval process in 2014.

> "No one is sure who will clean up the partial construction and people are angry that the buildings are left half-finished and that they dug up sacred land to do this." (Lokeshwar, Panchayat Pradhan, Chorr project)

5.2.4 Public participation

Public participation (or lack thereof) (30 sources, *67 references*) contained two secondary themes: minimal involvement (26, *36*) and panchayat NOC concerns (17, *31*). The latter reflected that some local residents believed that projects had proceeded without panchayat NOCs being granted (10, *13*), and others believed that clearances had been deceitfully attained (9, *18*) through document forgeries and bribes to village leaders.

Minimal public involvement included the tertiary theme pertaining to lack of opportunities for involvement provided by the project proponent and the state government (15, *19*):

> "The State Pollution Control Board does not consult with local communities before making the decision to grant a NOC or not." (Mohit, state government official)
> "They don't consult the persons who are being affected by the small hydro projects. Rather it is a national interest that electricity is to be generated. It is a basic necessity but at the same time the people affected should be consulted." (Prem, opposition leader, Haripur project)

Minimal public involvement also included the tertiary theme of lack of adequate notice about the project (12, *12*); as one participant noted, "I first heard about the project ten years ago from the sign that was posted at the base of the hill in Bahang village" (Jai Ram, shop owner, Chorr project). At the same time, in some cases community activists were aware of formal notifications that were given:

> "There was press notification that the project was going to be established – is there any objection from the public? So, after that we immediately gave opposition – a letter to the local panchayat. About 300 people signed that letter. So that was given to the panchayat." (Virbhadra, opposition leader, Haripur project)

Finally, minimal public involvement included the tertiary theme of ways to improve involvement (4, *5*), which captured suggestions from participants for enhancing both early and ongoing community engagement:

> "The people of the affected area must be consulted *before* starting the process of the project." (Prem, opposition leader, Haripur project)
> "I'll just say that there should be a committee that should consist of some permanent people of the villages where the project is. There should be representatives from the government. There should be representatives from the company and there should be representatives from Fisheries, Forests, an organization like ours – NGOs which are concerned, really concerned for the public interest, not for their positions." (Anand, conservation organization)

5.2.5 Community opposition

The fifth primary theme, community opposition (19 sources, *54 references*), included three secondary themes, the most common of which was public protests (13, *23*). Protest actions included petitions, rallies, marches, lobbying and civil disobedience. In the Chorr case, they were especially widespread:

> "For the march into Manali, many store owners showed solidarity and closed their shops in protest. Manali mall closes in accordance with wishes of the president of the Manali market." (Suman, Panchayat Pradhan, Chorr project)
> "They organized a large demonstration in 2011, but the market was closed on three separate occasions for different rallies. At largest, 30–40 villages were represented, from Kotrang to Solang. Nagar also gathered here." (Ajay, teacher, Chorr project)

Another secondary theme under community opposition was court challenges (11, *19*), which captured issues, arguments and participant experiences in legal actions brought against three of the projects. Two projects, Chorr and Pakhnoj, ultimately were halted, while the third, Haripur, proceeded and was commissioned in 2017. Community opposition also included a secondary theme covering the roles of community-based organizations (10, *12*), including conservation

groups and coalitions of villagers, in opposing the three projects. The organizations' tactics included forming local committees, accessing government information, and maintaining good communication:

> [A local opposition committee formed and] "was successful in part because it recruited an impartial and unofficial leader, whose word was law. He was well educated and a hard worker. He helped to get all the documents." (Ajay, teacher, Chorr project)
> "There is a committee, called the Jan Jagran Avam Vikas Sanstha, which collects information about upcoming projects in this region from government departments or through the Right to Information Act. Once the committee has the information, we all know about the proposed projects." (Shanta, farmer, Pakhnoj project)

6 Discussion

The research participants' concerns about adverse impacts emphasized harm to stream flow regimes, ecological well-being, agriculture and livelihoods. Their views regarding benefits highlighted the potential of the local area development funds, hopes for job creation and economic spinoffs, and the belief that small hydro has the capacity to bring benefits to local residents. These results echo findings in similar studies of small hydro in the Kullu District (Sinclair, 2003; Kumar and Katoch, 2015), elsewhere in Himachal Pradesh (Baker, 2014a; Baker, 2014b; Rai and Srivastava, 2014), and in the neighbouring Himalayan state of Uttarakhand (McCandless, 2007; Sinclair, Diduck and McCandless, 2015; Diduck and Sinclair, 2016). A point of departure in this study was the heavy emphasis on concerns about impacts to sacred spaces, reflective of the particular facts of the Chorr case in which such impacts were a flashpoint and became a catalyst for local opposition.

These results suggest the importance of rejecting the rhetoric that small hydro projects have manifold local benefits and minimal adverse impacts. Such statements are prevalent, as seen in the views expressed by project proponents and government officials during this study and in the research cited above. While the negative impacts of small hydro may be less extensive and dramatic than those of large projects, they are no less real and harmful to people, communities

and terrestrial systems affected. Minimizing adverse impacts and exaggerating local benefits mask the fact that the projects, in the main, provide electricity to the regional grid in support of industrial activities while harming elements of local social-ecological systems, such as agriculture and traditional livelihoods. These outcomes undermine environmental justice through the inequitable distribution of environmental benefits and risks/harms (Schlosberg, 2004; Williams and Mawdsley, 2006) and impede the progress of sustainable development by entrenching intragenerational inequities (World Commission on Environment and Development, 1987). They also underscore a need for small hydro planning and approval processes in Himachal Pradesh to more fully attend to the issue of recognitional justice (Schlosberg, 2004; Williams and Mawdsley, 2006). Investigating, understanding and recognizing the diversity of communities, participants, experiences and interests that are affected by proposed projects would improve opportunities for advancing distributive justice when making decisions about small hydro projects.

The results on governance and approvals were descriptive of the roles played by the formally recognized actors (state government agencies and departments, panchayats and project proponents), while the results on public participation were more critical or evaluative. Noteworthy results on public participation were that other than seeking an NOC from affected panchayats, community engagement was non-existent, and provision of notice and public information about the projects was inconsistent. These results are in line with similar studies of small hydro in the Kullu District (Sinclair, 2003; Kumar and Katoch, 2015) and other parts of Himachal Pradesh (Baker, 2014a; Baker, 2014b; Rai and Srivastava, 2014). The results about lack of notice and public information also echo concerns raised in studies of large hydro in Himachal Pradesh and Uttarakhand (Sinclair and Diduck, 2000; Diduck et al., 2007; Diduck et al., 2013) and other industrial projects to which the EIA Notification 2006 was applicable (e.g. Dilay, Diduck and Patel, 2020; Chapters 8 and 9, this volume).

The results on public participation indicate the importance of making small hydro planning and approval processes in Himachal Pradesh more inclusive. The processes found in this study failed to provide opportunities for affected communities to participate in a meaningful fashion by, for example, being involved early and often and having access to complete project information

(Stewart and Sinclair, 2007; Diduck and Sinclair, in press). This shortcoming suggests that Himachal Pradesh is not taking full advantage of the opportunity to advance procedural justice (Pring and Pring, 2009) and good governance (United Nations Economic and Social Commission for Asia and the Pacific, 2008) and UN Sustainable Development Goal 16 in respect to promoting inclusive societies and building effective, accountable and inclusive institutions (United Nations Department of Economic and Social Affairs, 2020).

Nevertheless, the results on community opposition reveal successes with respect to access to justice and community-level institutions. The court challenge that blocked the Pakhnoj project reinforces the efficacy of public interest litigation in India under the right conditions (Rajamani, 2007; Chapters 5 and 6, this volume), such as having highly capable legal and technical support and the ability to take on the risks of litigation (Pring and Pring, 2009). Further, the public protests, which had widespread support, that stopped the Chorr project reveal that neoliberal public policies (see the analysis in Chapter 2) may have stifled but not totally eroded norms, customs and organizations in support of local values and aspirations.

7 Conclusion

The results and discussion lead us to conclude that the state of small hydro development in Himachal Pradesh is sorely wanting and does not support the achievement of, or opportunity for, basic environmental justice for local communities. Local residents revealed the adverse impacts of small hydro, lack of fulfilment of promised benefits and lack of access to local decision processes. These problems led to public protests and legal opposition that came at a cost to the residents and their communities, which could have been avoided with more inclusive and forward-looking small hydro planning and decision making.

The fundamental basis for environmental justice – recognition of the diversity of participants, experiences and interests is not being acted on – and the inability to easily access NOCs and like processes obstructs procedural justice. To address these shortcomings and thereby enhance the likelihood of distributive justice, small hydro proponents and regulators need to recognize the knowledge and acumen of local mountain people and establish meaningful ways for them to

participate in planning and decision making. Additionally, the findings reveal process concerns that likely cannot be solved through simply tweaking the current planning and decision-making frame. The results underscore the conclusions others have drawn (Erlewein, 2013; Diduck and Sinclair, 2016) that there is a need for strategic assessment of hydro policy, the outcomes of which could help inform DPRs and decision making for individual projects. We also see the need for regional cumulative effects assessments focused on river catchments in Himachal Pradesh. Such assessments, when done properly, would allow for more thoughtful consideration of impacts of any proposed project in combination with impacts already present (Erikstad et al., 2020). For example, such studies could ensure adequate water availability for irrigation and other purposes. As such, they would help bring to light the full range of environmental, social and economic impacts and their spatial and temporal complexities, along with effective ways to avoid, mitigate or remediate adverse impacts while optimizing benefits.

Inclusive strategic and regional cumulative effects assessments would also open the door to using the wide array of community engagement processes and methods that have proven effective in impact assessment, while shining a brighter light on the impacts of small hydro and especially those that are of great concern to locals and state and national governments, like water availability, climate change and economic development. A promising engagement method that should be considered is the establishment of ongoing community-based management committees, like those established for joint forest management. Such management bodies have proven effective for relationship building and mutual learning. Implementation of such actions would surely advance environmental justice, good governance and sustainable development in Himachal Pradesh. More opportunities to engage in a deliberative way in small hydro decision making would be possible, and better information on which to base decisions would be available. Inclusive strategic and cumulative effects assessments would also facilitate capacity for more effective integration of small hydro planning into Indian policy positions on such global challenges as climate change and disaster risk reduction. Such integration is consistent with the state's goal to mainstream disaster risk reduction across all government departments (Himachal Pradesh State Disaster Management Authority, 2017), and it would assist in national efforts to attain the broader portfolio of the UN Sustainable Development Goals.

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Table 7.1

Location and selected salient features of the projects, as presented in the Detailed Project Reports (DPRs)

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

Table 7.2

Themes derived from the interviews, along with the number of sources (interviews) and *references* (data segments) coded to each theme

Primary themes	Secondary themes	Tertiary themes
Adverse impacts (42, *192*)	Water (27, *90*), social and economic (16, *48*), terrestrial systems (15, *19*), minimal adverse impacts (9, *13*)	Water: agriculture (19, *33*), human uses (16, *20*), fish stocks (8, *17*) Social and economic: sacred spaces (10, *34*), economy (5, *7*), personal safety (4, *4*) Terrestrial systems: landslides and soil erosion (9, *10*), trees and plants (7, *9*)
Benefits (35, *91*)	Local area development funds (19, *44*), minimal benefits (17, *22*), job creation and economic spinoffs (17, *21*)	Local area development fund: infrastructure (11, 20), public services (6, *9*)
Governance and approvals (26, *47*)	State government (17, *24*), panchayat (7, *7*), project proponents (6, *9*), remediation (5, *7*)	
Public participation (or lack thereof) (30, *67*)	Minimal involvement (26, *36*), Panchayat NOC concerns (17, *31*)	Minimal involvement subthemes: lack of opportunities (15, *19*), lack of adequate notice (12, *12*), ways to improve involvement (4, *5*) Panchayat NOC concerns: Not granted (10, *13*), deceitfully attained (9, *18*)
Community opposition (19, *54*)	Public protests (13, *23*), court challenges (11, *19*), community-based organizations (10, *12*)	

Figure 7.1 Map of the Kullu District in the Beas River watershed. The Chorr project is near Vashist village, Haripur and Pakhnoj are near Haripur village, and Kathi and Kukri are approximately 30 kilometres north-northwest of Kullu town.