Diverting Waters: Examining the Potential for Community-Based Strategic Environmental Assessment of Small Hydropower Projects in the Upper Kullu Valley, India

by

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Abstract

This research explores the potential for implementing community-based strategic environmental assessment (CBSEA) using the development of micro and mini hydropower (MHP) in the Upper Kullu Valley of Himachal Pradesh, India as a case example. CBSEA provides an alternative to traditional assessment tools because the process is conducted by community members, ensuring their concerns and local knowledge are considered, while also engaging community members in strategic thinking. CBSEA has been studied little, so my work explored if and how a CBSEA could be implemented in a local context.

A case study approach involving projects in the Upper Kullu Valley was undertaken to consider the promise of CBSEA in this context. Data were collected through a document review, semi-structured interviews with stakeholders, and observation of community events and existing MHP projects over the course of three months. A thematic analysis revealed the various roles of community members and decision makers in MHP development, such as through the no objection certificate process for the Panchayat and Forest Rights Committee. Also identified were potential barriers and enablers to implementing a CBSEA, such as a lack of awareness surrounding MHP development, a desire for involvement in decisions, and evidence of strategic thinking. Participants further identified concerns about the potential cumulative effects of MHP projects on water availability and flooding.

Given the potential revealed in the data for CBSEA, a framework for its implementation was developed using five main themes to encompass the barriers and enablers identified. These include considering cumulative impacts, increasing participant engagement, ensuring adequate government support, providing educational support and training to community members, and improving the reliability of decision-making processes. Given the research findings, focusing on these five themes would allow for a CBSEA to be implemented in the Upper Kullu Valley.

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List of Acronyms

CBEA	Community-Based Environmental Assessment
CBSEA	Community-Based Strategic Environmental Assessment
DPR	Detailed Project Report
EIA	Environmental Impact Assessment
FRC	Forest Rights Committee
MHP	Micro and Mini Hydropower Project
NGO	Non-Government Organization
NOC	No Objection Certificate
SEA	Strategic Environmental Assessment

Glossary of Local Terms

Gram Panchayat	Community council
Gram Sabah	Community assembly
Pradhan	Leader/president
Nallah	Small river or stream

Chapter 1 Introduction

1.1 Background

Hydropower projects have become a characteristic of the Indian Himalayan Region because it holds 78 percent of total hydropower capacity in India (Lodhi et al., 2016). Currently, hydropower represents 11.2 percent of installed electricity in India (Central Electricity Authority, 2023) but the country is aiming to achieve 50 percent electricity generation through renewable sources by 2030 (Birol & Kant, 2022). As India's energy demand continues to grow at the fastest rate in the world (Birol & Kant, 2022), hydropower development is considered essential.

Mandatory environmental impact assessment (EIA) for all scales of hydropower projects has been called for because of the significant social, environmental, and economic impacts that are caused by micro, mini and small hydropower projects (MHP) (Diduck & Sinclair, 2016; Kumar & Katoch, 2016). Literature that examines EIA in the Indian Himalayan Region shows that there are limitations, weaknesses and even loopholes employed by regulators and project proponents that have led to EIA being ineffective in the assessment of these projects (Agrawal et al., 2010; Lodhi et al., 2016). Specific limitations with EIA for hydropower projects strongly relate to a lack of assessment of cumulative impacts (Agrawal et al., 2010; Erikstad et al., 2020; Kuniyal et al., 2017).

To improve assessments and overcome EIA limitations, strategic environmental assessment (SEA) of hydropower projects has been proposed (Kumar & Katoch, 2015; Kuniyal et al., 2017; Lodhi et al., 2016). SEA is characterized by the assessment of environmental impacts of policies, plans and programs at early stages (Partidario, 1996). SEA ensures that EIA occurs throughout the project - at policy, plan and program formation, project management and implementation (Chaker et al., 2006). SEA also includes consideration of cumulative impacts. However, the government of India currently has no

guidelines or legal requirements for SEA despite evidence showing that SEA is effective in helping achieve sound project decisions (Kuniyal et al., 2017).

While SEA is a proven tool used globally, it is generally used for larger scale contexts, such as for a country (e.g., pipelines), or a province (e.g., road development), which may impede its application at a local scale. Community-based environmental assessment (CBEA) provides an alternative to traditional assessment tools. CBEA is an environment assessment process conducted by community members – making community concerns and local knowledge the heart of the assessment. Drawing on the proactive, sustainability focused, and decision-making aspects of SEA and the participatory, empowering, and knowledge generating characteristics of CBEA, community-based strategic environmental assessment (CBSEA) has been examined as a potential tool to assess strategic level decisions (Sinclair et al., 2009). However, there is little practical implementation of it, making CBSEA a tool with unknown potential.

1.2 Purpose and Objectives

The purpose of the research was to explore the potential for implementing community-based strategic environmental assessment for micro and mini hydropower projects.

To achieve this, the objectives of the research were to:

1. Determine the roles of communities and decision makers in MHP development;
2. Identify potential barriers or enablers that could impede or support the implementation CBSEA;
3. Describe concerns about, and approaches to, incorporating cumulative effects in a CBSEA, and;
4. Develop a community-based framework for the SEA of MHPs.

1.3 Methods

To achieve these objectives, a case study approach was employed, using the Upper Kullu Valley as the location of the study. The subject of the study is MHP development in the Upper Kullu Valley and

the object of the study, which refines the subject, is CBSEA (Thomas, 2011). I used the Upper Kullu Valley, in Himachal Pradesh, as the location of the study because there is extensive MHP development in this area. In the Kullu District alone, there are 309 MHP documented projects in the pre-initial assessment stage, under construction or already commissioned (Himurja, n.d.b). The people residing in the Upper Kullu Valley are also highly reliant on natural resources as agriculture is the main source of livelihood in the Kullu District (Shabab, 2019). Additionally, my advisor has existing connections in various communities in the Kullu Valley, such as in Mohar and Goshal, due to longstanding research projects by students and faculty from the Natural Resources Institute.

I conducted a document review to help understand the policy context and status of projects in the Upper Kullu Valley. Semi-structured interviews with government officials, academics, non-government organizations (NGOs), and with local people who have been affected by MHP projects were also undertaken. This helped identify stakeholder roles, how to incorporate cumulative effects into a framework and other key considerations for a CBSEA of MHPs. I further explored how local people understood SEA and foresee the potential for SEA in the context of MHP in the Upper Kullu Valley.

Throughout the three months spent in the field, I used observation as a method to systematically collect data on activities. I observed community meetings that helped understand the context of the area, and guide interview questions. The detailed methods can be found in Chapter 3 of the thesis.

1.4 Significance of Research

This research contributes to the broader literature by providing information on the application of CBSEA, with a focus on considering the cumulative impacts of hydropower projects. It provides insight regarding the use of SEA in the hydropower sector in India as there has been limited work done on this

topic (Lodhi et al., 2016) and there are gaps in the literature, particularly in India because there are no SEA formal requirements (Fischer & González, 2021).

Furthermore, this project contributes to the wider SEA literature and specifically to literature on CBSEA – an under-researched subject. It helps identify ways that the Indian government can implement CBSEA. Although there is not a consensus on the exact meaning of SEA, it is widely understood to help decision makers incorporate sustainability into decision-making processes (see Chapter 2). This project therefore can help initiate an approach to EIA that is centred around people and contributes to the broader sustainability of the country.

1.5 Organization of the Thesis

The thesis is organized into six chapters, including this introductory chapter. Chapter Two provides a literature review to provide background on the energy context in India and introduce EIA approaches that are relevant to the research. In Chapter Three, I discuss the data collection methods used in the research, provide details of the study area, and of the data analysis methods used. Chapter Four considers the policy approach to MHP development in the Upper Kullu Valley, the status of MHP projects, and discusses the cumulative impacts identified by participants and through the literature. Chapter Five then goes on to discuss the roles and processes of decision making for MHP development. The barriers and enablers to a CBSEA are then discussed. In Chapter Six I discuss the results of the study, while drawing on the existing literature. The results are used to inform the CBSEA framework that is subsequently presented. Chapter Seven concludes the thesis by summarizing the research findings, drawing conclusions around the objectives of the thesis, discussing the limitations in the research and identifying the potential for future research on this topic.

Chapter 2 Assessing the Impact of Small Hydro

The topics of the literature review include EIA, SEA, CBEA and finally, CBSEA. These topics are discussed within the context of India and development of MHP. The first section will discuss how EIA was developed in India, the legislation around EIA and the specific implications that EIA has for MHP development in the Indian Himalayan Region. The following section discusses the characteristics of SEA, how SEA emerged globally, how SEA effectiveness is determined and how it has been applied to the Indian and hydropower sector. The final section of the literature review considers CBEA, the central role of participation in CBEA and the potential for CBSEA, especially for rural contexts in developing countries.

2.1 Environmental Impact Assessment in India

2.1.1. Indian Energy Context

Energy demand in India has increased significantly over the past few decades and is now increasing at the fastest rate in the world (Birol & Kant, 2022). This is largely due to economic development which has improved the quality of life for many people. However, it is estimated that 15 percent of people in India still do not have access to electricity (Gupta, 2020). To help meet this energy demand, energy generation has also expanded greatly. In 2022, energy generation growth in India was 8.87 percent. Yet this growth is primary attributed to coal which represents 49 percent of energy production. Meanwhile, renewable energy represents 43 percent of energy production, and hydropower 11 percent (Central Electricity Authority, 2023).

Hydropower has been established to help meet the increased demand for electricity and to promote economic development (Kuniyal et al., 2017). The government of India aims to harness 50,000 MW of electricity from hydropower (Kuniyal et al., 2017), but the pressures of economic development have impacted natural resource use in India. This is seen in the Indian Himalayan Region where energy

from water sources is being harnessed from dams and run-of-the-river projects (Kuniyal et al., 2017). Dams are structures created to hold water that can generate electricity as the water moves through the dam. A run-of-the-river is a structure that diverts water from rivers into penstocks which then transport water to a lower elevation (Rajvanshi et al., 2012). The change in elevation generates power that can be converted to electricity (Jha-Thakur & Rajvanshi, 2021). Construction of these projects and the diversion of water create pressures on ecological systems and socio-economic conditions, and cultural services are put at risk (Jha-Thakur & Rajvanshi, 2021). As a result of the risks of harnessing hydropower, EIA was applied to mitigate these risks.

2.1.2. Development of EIA in India

In the 1970s, India introduced EIA. Large hydropower projects underwent EIA by the Planning Commission, but EIA was not yet part of legislation (Jha-Thakur & Rajvanshi, 2021). In 1986, environmental assessment was formally legislated through the Environmental Protection Act (Diduck et al., 2021), but not until the EIA notification of 1994 was EIA mandated in an attempt to motivate sustainable industrialization. Over the years, the 1994 EIA notification was amended 11 times (Jha-Thakur & Rajvanshi, 2021) to reduce the level of detail required in EIAs and to give more decision-making power to states. It was replaced by the 2006 Notification (Ram & Apurva, 2022) which has since been amended 110 times (Yadav & Aggarwal, 2023). The amendments included changes that give exemptions to companies and provide for fast-tracking approvals which ultimately reduce the stringency of EIA leaving more room for environmental degradation. As these changes were made to existing legislation, public consultation was not required (Yadav & Aggarwal, 2023).

However, Jha-Thakur and Khosravi (2021) found that significant improvements related to the openness and public nature of EIA in India have been made over the years, although this aspect of the EIA process still has deficiencies. At the same time, there has been poor improvement related to

increasing the credibility of the EIA processes and the independence of individuals work on EIA. There has been little improvement in EIA for considering alternatives and mitigation measures and in taking EIA beyond the project level. The worst performing area of EIA identified by Jha-Thakur and Khosravi (2021) was in monitoring and follow-up.

In 2020, a new EIA notification draft was created by the Ministry of Environment, Forest and Climate Change, of the central government, to replace the 2006 EIA notification. A 60 day period was allocated for the public to comment on the draft notification, but the period was extended twice due the extent of engagement by the public – almost two million public comments were made on the notification despite the document only being available in Hindi and English (Jolly and Singh, 2021; Jha-Thakur, 2023).

Rather than updating the 2006 EIA notification to improve environmental and social sustainability, the 2020 draft EIA notification focuses on accelerating development. The 2020 draft includes various changes from the 2006 Notification, for example, the time for public participation would be decreased to 20 days; the list of projects exempted from EIA would be expanded; and an exemption would be created for modernization projects, like dams. Also indicated was a relaxation of compliance reports, normalization of post-facto compliance, and clearance for government projects designated 'strategic'. Overall, the 2020 draft EIA notification focuses on accelerating development (Ram & Apurva, 2022). Proposed changes also contradict decisions by the Supreme Court of India (Jolly & Singh, 2021; Ram & Apurva, 2022). While the 2020 draft notification was not implemented, other efforts to change EIA in India have been undertaken, as outlined in a report by the Vidhi Centre for Legal Policy. During the period from March 11, 2020, to March 22, 2022, 18 amendments were made to the Environment Protection Act which give greater relaxation and exemptions to existing laws (Jain et al., 2022).

State governments have also implemented their own policies to deal with development projects at various scales. For example, prior to 2014, projects in the state of Himachal Pradesh required No Objection Certificates (NOCs), which are formal declarations from individuals or organizations that they do not object to projects moving forward. However, in 2014, the policy changed so that project proponents were only required to obtain NOCs from Gram Panchayats (community councils) in circumstances where communities were affected by the projects. In Himachal Pradesh, all projects are also required to provide Detailed Project Reports (DPRs) that consider the environmental and social concerns of the project. DPRs are a compilation of information on the geological, hydrological, engineering, and financial implications of a project. However, impacts are not evaluated beyond individual projects and do not account for coupled impacts that surface between several projects. In Himachal Pradesh, projects are also required to allocate one percent of project costs to a Local Area Development Fund that supports local infrastructure (Diduck et al., 2021).

In 2021, a new Energy Policy was introduced in Himachal Pradesh which once again changed project development procedures.

2.1.3. Small Hydro

Hydropower in India is categorized as large, medium, small, mini and micro. Nationally, projects under 25MW of power capacity are considered small, with projects between 100kW and 5MW being classified as mini, and projects with less than 100kW of capacity being classed as micro. The categorization of hydro size differs in some states and among different sources (Asher, 2016). In Himachal Pradesh, for example, small hydro power is considered any project that generates less that 5MW of energy (Mishra et al., 2015). Under the 2006 EIA Notification, hydropower projects with less than 25MW of power capacity do not require an EIA, while projects between 25 and 50 MW are

screened to determine if an EIA is required, and projects with more than 50MW of power capacity are required to complete an EIA (Government of India Ministry of Environment and Forests, 2006).

As with other hydropower development, small hydropower has been promoted in India to generate economic development. Exemptions for small hydropower projects were further justified because they are less costly and were alleged to have little impact on the environment (Himurja, 2006; Lodhi et al., 2016). They are described as "having a minimal impact on natural biodiversity and human settlements" (Government of Uttarakhand, 2015, p. 2). MHPs have specifically gained traction because they are understood to provide more social and economic benefits to locals residing near the project (Diduck & Sinclair, 2016). But upon further study, the literature indicates that both environment and social impacts are associated with small hydropower development.

The impacts of large hydropower projects have been extensively studied and include deforestation, emissions of greenhouse gas emissions from reservoirs, habitat destruction, and changes in hydrologic systems. The impacts of micro and mini hydropower projects are less known, but still significant (Kumar & Katoch, 2016; Lodhi et al., 2016). These impacts include changes to environmental flow due to diversion of water which also results in increased landslide occurrences, reduced soil moisture which can lead to a greater need for irrigation, and harm to aquatic life (Kumar & Katoch, 2016). Soil destabilization can cause damage to houses and community buildings in the form of cracks and seepages (Buechler et al., 2016). Pollution to water results from dumping excavated material known as muck, and in certain cases this decreases the availability of water for domestic, irrigation, and traditional uses. Noise pollution occurs during the construction phase which can impact human and animal health, and loud noise and work camps can cause disruptions to community life (Kumar & Katoch, 2016). The impacts of smaller hydro projects can be as severe as those from larger hydro projects (Lillesund et al., 2017). This has proven to be the case for muck disposal, deforestation, and

water diversion in small run-of-the-river projects (Kumar & Katoch, 2016). Yet because of the widely known negative impacts associated with large hydropower projects, the government of India and Himachal Pradesh have pushed for rapid development of SHPs (Diduck & Sinclair, 2016). However, the research overwhelmingly shows that small hydropower projects should also be subjected to EIA because the impacts are significant (Diduck et al., 2021; Erlewein, 2013; Kumar & Katoch, 2016).

2.1.4. Limitations of EIA procedures

There are many limitations associated with EIA in India that are discussed in the literature. These include poor administration and baseline data, lack of consideration of cumulative impacts and strategic decision making, and lack of public participation. These limitations are discussed below.

Administrative Failures. There is evidence that the administrative processes for allocating NOCs and DPRs in Himachal Pradesh are flawed. There is concern from Gram Panchayats (community councils) that NOCs are sometimes acquired deceitfully or sometimes not at all (Diduck et al., 2021). Even when project proponents go through proper clearance processes from EIAs, the projects often do not follow their mitigation plans (Kuniyal et al., 2017). As such, it is recommended there be a greater focus on mitigating risks post EIA, and conducting better monitoring (Pandit et al., 2023). As well, more rigorous DPRs and using independent bodies for allocating NOCs and completing DPRs is recommended (Pandit et al., 2023). However, the 2020 draft EIA Notification does not address these issues and in fact creates further potential compliance gaps (Ram & Apurva, 2022).

Baseline Data. Baseline data are essential to assess potential impacts of a project but in India there is no standardized method to collect baseline data, making it difficult to use data to inform decisions (Lodhi et al., 2016). The baseline data for socio-economic information are also often based on census data, rather than from primary data collection (Lodhi et al., 2016). Furthermore, Kumar et al. (2018) found that data on extreme weather events in the Indian Himalayan Region are “scarce or rarely

available" (p. 5). As such, inventory on extreme weather events with attributes of location and elevation should be developed to better understand why and when these events will occur (Kumar et al., 2018).

Cumulative Impacts. Since EIA identifies impacts at the individual project level, it is an inadequate tool to measure cumulative impacts of multiple hydropower projects, which can be significantly greater than individual project impacts (Erlewein, 2013; Kuniyal et al., 2017; Lodhi et al., 2016; Rajvanshi, 2019). Almost no hydropower projects in the Indian Himalayan Region have been subjected to a cumulative impact assessment. Reported EIAs argue that when species are impacted by project developments, the species tend to move to surrounding areas, beyond the project impact zone. So, for one single project, the impact on species could be very small, but this does not consider how other projects are pushing species out of their impact zones (Lodhi et al., 2016). More details on cumulative impacts can be found in section 2.3.

Decision Making. EIA evaluates projects individually which means it has no impact at the policy, program or planning level. A focus on individual projects suggests that environmental considerations are not incorporated into broader decision making. Erlwein (2013) found that some government officials and project proponents believe that policies, programs and plans should not be concerned with the environment and should focus on increasing energy generation. However, a lack of strategic decision making can also create inefficiencies for project proponents. For instance, shared transmission lines and roads could reduce costs and environmental impacts if decision making was coordinated (Erlewein, 2013).

Participation. Historically, EIA has suffered from a lack of consultation with local people (Sinclair, 2003; Spaling et al., 2011). Spaling et al. (2011) summarizes and attributes poor participation to a lack of legislative requirements and training for facilitators, to financial limitations, and to prioritizing national economic development. The 2006 EIA Notification included changes to enhance public

participation in hydropower projects, however, meaningful participation is still lacking even in larger hydropower projects where EIA is mandatory (Diduck et al., 2013; 2021). Additionally, the expected benefits for local people residing near hydropower projects are often not realized (Diduck et al 2021; Diduck & Sinclair, 2016; Kumar & Katoch, 2015; 2016).

In addition to local people receiving fewer benefits than promised, they are also impacted by project activities, many of which are not described in EIAs as they are indirect impacts. In the Indian Himalayan Region this is particularly evident because communities reside at higher elevations and are reliant on agriculture for livelihoods, making water sources even more essential to the day to day lives of local people (Erlewein, 2013; Lodhi et al., 2016). Certain agricultural lands may not be considered a part of the designated impact areas that are outlined in EIAs or DPRs but can experience major changes. This occurs from air pollution such as dust on crops that reduces farmers' yields (Kandhari, 2010 from Lodhi et al., 2016). In cases where compensation is provided, it can be inadequate. For example, for farmers, a change of 50 percent in agricultural lands often leads them to completely change their livelihoods (Lodhi et al., 2016).

Differing perspectives on project success, and failure to identify environmental and social impacts highlight the disparity between local people and project proponents. Diduck et al. (2013) found that project proponents were able to speak to the economic benefits associated with new hydro development but failed to address negative impacts. Diduck et al. (2021) demonstrate that such failures inhibit environmental justice. When livelihoods are affected by privatization, marketization, and economic expansion, people tend to seek justice (Polanyi, 1957), especially when local communities do not have access to royalties earned by project developers (Kuniyal et al., 2017). Baker (2021) shows the retaliation of the community of Vashisht, in Himachal Pradesh to run-of-the-river hydropower projects that impact irrigation systems – essential for farming. The project proponents earned NOCs despite

having inadequate mitigation measures to address the environmental and social impacts from the project (Baker, 2021). Failure to properly consult and create space and time for public participation resulted in delays and even halting of projects. Locals in Vashisht found out about a hydropower project near the village only upon construction. Due to interference with religious and cultural assets, and potential economic impacts of the project, protests emerged which ultimately resulted in a withdrawal of government approvals and a case being brought against the proponent in the civil courts (Diduck & Sinclair, 2016). This is just one example of how a lack of public participation can lead to public push back, mobilization, and ultimately project disruptions.

The benefits associated with good public participation can help with planning, assessment, and mitigation of a project (Diduck & Sinclair, 2016). Public participation provides an opportunity to gain an understanding of a community's concerns that may only be known through local knowledge. Further, public participation can help ensure that the intended benefits of a project reach local people (Diduck & Sinclair, 2016) and that there is greater political support for decisions taken (Retief, 2007). Over the years there have been efforts to improve and increase public participation in India through EIA legislation (Diduck & Sinclair, 2016), however there has been no action at the state level to improve public participation for small hydropower projects (Diduck & Sinclair, 2016). Overall, EIA can be an effective tool if conducted properly, but has limitations, making it inadequate as the sole assessment tool in project development (Erlewein, 2013; Lodhi et al., 2016). SEA is recommended for the Indian hydropower sector to help with decision making (Diduck et al., 2021; Erlewein, 2013; Lodhi et al., 2016; Rajvanshi, 2015, 2019).

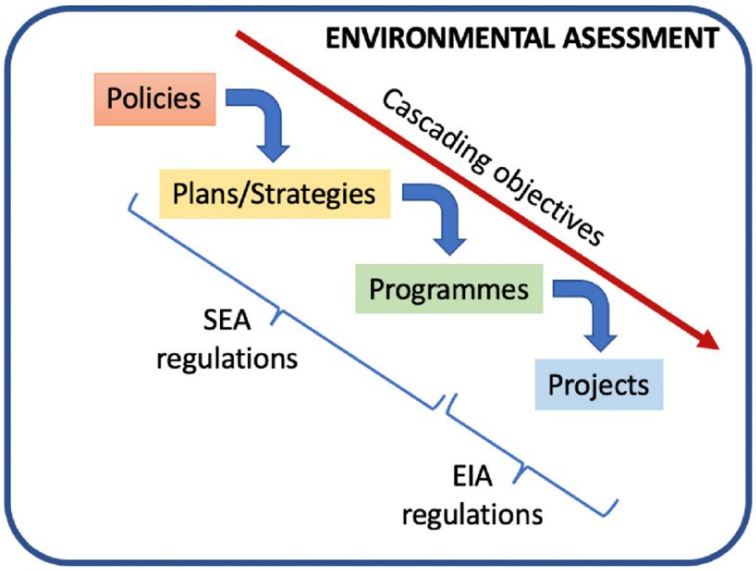
2.2 Introduction to Strategic Environmental Assessment

2.2.1. Definitions and Characteristics of SEA

SEA is an overarching assessment tool for "evaluating the environmental consequences of proposed policies, programs, and plans in order to ensure they are fully included and appropriately addressed at the earliest appropriate stage of decision making on par with economic and social considerations" (Sadler and Verheem, 1996, p. 27). It can incorporate many different forms of assessment such as regional environmental assessment, cumulative impact assessment, sectoral environment assessment, strategic basin assessment, and EIA (World Bank, 2012). It differs from regional environment assessment because SEA is often industry specific, whereas regional environment assessment, as implied in the name, is region specific. But when more than one industry is involved in an SEA, the assessment tends to present more like a regional environment assessment because it requires a more comprehensive scope within a designated area (Sinclair et al., 2017). EIA differs because it is project specific, whereas SEA does not look at individual projects. SEA is rather viewed as a more pro-active tool compared to EIA but should not be considered a tool to replace EIA (Chaker et al., 2006; Rajvanshi, 2001, 2015) (see Figure 1 below).

Figure 1

The Role of SEA and EIA Within Environmental Assessment



Note. This image was created to demonstrate the relationship between SEA and EIA. From From "Advances in Implementing Strategic Environmental Assessment (SEA) Techniques in Central America and the Caribbean," by J. Rodrigo-Ilarri, L. González-González, M.-E. Rodrigo-Clavero, & E. Cassiraga, *Sustainability, 12*(10), (https://doi.org/10.3390/su12104039). CC BY 4.0 License.

The value of SEA is its ability to influence decision making (Partidario, 2000). SEA helps decision-makers evaluate the potential impacts of their decisions by considering the trade-offs between alternatives and the interests of stakeholders. The aim of SEA is to reduce the reliance on impact assessment that occurs at the project level by choosing the alternative with the fewest impacts needing mitigation (Rajvanshi, 2015). Furthermore, SEA for policies, programs and plans is critical for achieving sustainability goals by incorporating environmental and social considerations into decision making processes (Partidario, 2000; Rajvanshi, 2015; Saxena et al., 2016).

In addition to informing decisions, there are many other benefits of using SEA. SEA can promote regional or transboundary collaboration (Rajvanshi, 2015). This occurs when a resource extends beyond one region or country and decisions are made regarding the use of the resource. SEA also makes for transparent decision making and accountability particularly when decisions are well documented and easy to understand so all stakeholders can be informed (Dalal-Clayton & Sadler, 2017; King & Smith, 2016; Rajvanshi, 2015). SEA can also reduce the costs of projects. Since SEA aims to prevent the need for the mitigation of impacts, this reduces the cost of mitigation for projects. Lastly, since public participation is central to SEA, it can reduce the risk of delays from stakeholder resistance (Chaker et al., 2006; Doso & Gao, 2020; Rajvanshi, 2015).

Cumulative Impact Assessment. A critical component to SEA is cumulative impact assessment. Cumulative impacts occur when the impacts of several developments are combined and present greater combined impacts or expose new impacts (Rajvanshi et al., 2012). The effects from cumulative impacts result when a system does not have adequate time or space to recover from several activities (Canter,

1999). For example, run-of-the-river projects can have a cascading effect that cause interruptions to the environmental flow, which can cause fragmentation because the river system does not have time to recover from the change in environmental flows (Erlewein, 2013). This in turn affects irrigation for farming and has required farmers to change the types of crops that are grown to ones that are more drought resistant (Erlewein, 2013). Other common cumulative impacts from run-of-the-river dam development include reducing the migratory movement of species, causing changes to sediment transport, decreasing the water quality due to sediment build-up, and effecting riparian areas (Rajvanshi et al., 2012). Lodhi et al. (2016) indicate that SEA could address impacts on fauna and flora by assessing diversity at a regional, or basin scale.

Kuniyal et al. (2017) examined the impacts of hydropower projects along the Satluj Basin from 1989-2014 and found that project placement did not align with the carrying capacity of the river basin. Over the 25-year period, forested land decreased 2.9 percent, and agricultural land by 1.7 percent. Decreased land use patterns like these are attributed to the overlapping project-affected areas. Large projects were found to be overlapped 11.2 percent of the time, and medium projects 2.1 percent of the time. To mitigate the impacts, Kuniyal et al. (2017) suggest a minimum distance between large hydro projects of seven kilometres, for medium hydro projects five kilometres, and for small hydro projects three kilometres (Kuniyal et al., 2017).

2.2.2. History of SEA

SEA has been an evolving concept since the 1980s when it was first discussed for use in policies, programs, and plans (Fischer, 1999). Interest in SEA expanded globally in the 1990s because of limitations observed in EIA (Lodhi et al., 2016). SEA was originally viewed as an addition to EIA processes for strategic projects (Fischer & González, 2021), but transformed into a standalone framework (Fischer, 1999). SEA processes have also shifted from a concept to procedural steps. However, there remains a

lack of consensus in terms of what SEA is and how flexible SEA should be. An overly flexible approach may lead to ambiguities and cause confusion, making legislation challenging (Partidario, 2000; Retief, 2007).

In 2004, the vocabulary of SEA was firmly established under the European Directive of 2001. Passing of this Directive meant that all 25 European Union members had to apply SEA to their plans and programs (Fischer & González, 2021). Now more than 90 countries use SEA, and more than 60 countries have formal SEA requirements, while many other countries use SEA through voluntary measures (Fischer & González, 2021; Saxena et al., 2016). In 2011 the literature on SEA expanded widely but most literature is representative of countries with formal SEA requirements (Fischer & González, 2021), thereby leaving a gap for countries in South Asia that do not have legislation for SEA.

2.2.3. SEA in South Asia

SEA in the South Asian context began in the 1990s by donor agencies like the World Bank (Saxena et al., 2016). Few developing countries have formal SEA requirements and without the capacity and supporting institutions to carry out SEA, the ability to influence decision making is limited (Rajvanshi, 2019; Therivel & González, 2021). However, it is extremely valuable that developing countries use SEA because much of their economic growth relies on activities that require land and bio-resources which can lead to environmental degradation (Rajvanshi, 2015; Retief, 2007).

In addition to lacking legal requirements for SEA, South Asian countries face barriers in implementing SEA because decisions are often made through top-down approaches. As well, the fear that SEA will slow economic growth creates little political commitment to its implementation (Saxena et al., 2016). In contrast to the fear of slowing economic development, SEA can help to alleviate poverty through disaster and risk reduction (Saxena et al., 2016; World Bank, 2012). Similarly, influencing decisions for development has an impact that may benefit communities (SAARC, 2008). Saxena et al.

(2016) also found that poverty reduction is linked to conservation, making SEA an important tool in addressing poverty.

2.2.4. SEA in India

The literature suggests that India should legislate SEA (Kumar & Katoch, 2015; Kuniyal et al., 2017; Lodhi et al., 2016; Rajvanshi, 2001). Whether SEA is carried out and done effectively is highly dependent on if SEA is legislated in a country (Fischer & Retief, 2021; Saxena et al., 2016). However, there are no legal requirements nor guidelines for applying SEA in India (Kuniyal et al., 2017; Lodhi et al., 2016) and there have only been a few SEAs completed in India. As of 2021, there have been nine SEAs done over the course of 24 years, and the most recent conducted in 2013, which considered the strategic planning of city development for the municipality of Pune (Jha-Thakur & Rajvanshi, 2021). The majority of the SEAs that have been undertaken were done with projects that were funded internationally (Saxena et al., 2016). As noted above, the 2020 draft EIA Notification has no mention of plans to include SEA in legislation (Jha-Thakur & Rajvanshi, 2021).

2.2.5. SEA of Hydropower in India

In 2012 an assessment similar in nature to a SEA was done in the hydropower sector for the Alaknanda and Bhagirathi Basins in Uttarakhand, India. The assessment focused on cumulative impacts to assess the change in environmental flows of the two basins since many of the projects included in the assessment were already under construction or commissioned (Rajvanshi, 2019). The assessment led to the recommendation to cut 24 of the 70 hydropower projects because of significant impacts on aquatic and terrestrial biodiversity. The study showed that the potential cumulative impacts from keeping the 24 projects would be a 37 percent reduction in the river length and a 21 percent reduction of forested land. But the power generation would be reduced by 27 percent. In addition to cutting 24 projects, the Ministry of Water Resources, River Development and Ganga implemented new legislation for minimum

environmental flows that must be maintained during seasonal variations (Rajvanshi et al., 2012). The release of environmental flows at specific times is to mimic natural flows (Rajvanshi, 2019).

Through the Alaknanda and Bhagirtathi Basins cumulative assessment, it became evident that there are few examples of SEA being used in India (Jha-Thakur & Rajvanshi, 2021). A lack of commitment by the federal government to enact legislation for SEA shows that leadership from ministries is warranted. Additionally, involvement of scientific institutions, local governments, local people, and environmental advocates is important in the implementation of SEA (Kuniyal et al., 2017). Lastly, the study indicated that training, capacity building, and institutional support are essential to properly implement SEA in India (Jha-Thakur & Rajvanshi, 2021; Rajvanshi, 2019).

2.2.6. Effectiveness

Evaluating SEA can be challenging because the effectiveness of SEA lies in the ability to influence decision making for policies, programs, and plans (World Bank, 2012). As distance between projects and decision making increases, the ability to connect the outcome of projects to the influence of SEA becomes more difficult (Fischer & Retief, 2021). Evidence for effective SEA is therefore sparse (Fischer & Retief, 2021; World Bank, 2012). However, there is increasing evidence to suggest that the processes undergone in an SEA constitute the value of an SEA, rather than the report itself (IAIA, 2011). To better understand the implications of SEA effectiveness, Therivel & González (2021) propose seven dimensions to evaluate SEA effectiveness which are discussed below.

Context. Firstly, the context of where an SEA takes place is reflective of SEA effectiveness but is rarely assessed (Dalal-Clayton & Sadler, 2017). Although there are arguments for the development of more specific procedures to follow for SEA, flexibility is required to adhere to the different contexts in which SEAs are done in. One prerequisite outlined by the Development Assistance Committee of the Organisation for Economic Cooperation and Development is for SEA to be highly sensitive to the context

of the areas where it is being applied (Dalal-Clayton & Sadler, 2017). For example, whether SEA is done during a natural disaster or in a mundane scenario changes the understanding of an SEA outcome (Dalal-Clayton & Sadler, 2017). The political context in a country also highly influences strategic interventions, much more than project interventions (Rajvanshi, 2015).

Procedures. The procedures used for SEA are further indicative of effectiveness. This includes the quality of data and the scoping process used during the SEA procedures. Without adequate baseline data, it is difficult to assess the effectiveness of SEA because it is difficult to compare the results to the initial data. Likewise, an overly broad or narrow scope will prevent a proper analysis of impacts (Therivel & González, 2021).

Substantive. Substantive effectiveness is the degree to which the SEA leads to change. A substantively effective SEA results in decisions and an awareness that are strongly influenced by the sustainability of policies, programs, and plans (Fischer & Retief, 2021; Therivel & González, 2021). Examples of resulting change include influencing future decisions that improve environmental or socio-economic conditions of a community. The consideration of alternatives and the identified mitigation measures highly influence the substantive effectiveness. How those ideas are reported can influence the uptake by decision makers of suggestions from the SEA (Therivel & González, 2021). But measuring the degree to which SEA influences those decisions is very difficult because the causal link of strategic plans to improving environmental or social conditions is unclear (Partidario & Fischer, 2004).

Pluralist. Effectiveness of an SEA in a pluralist context is when the SEA process comprises many different perspectives that ultimately influence the outcomes. Involvement of many different stakeholders and their satisfaction with participation processes will determine this. Participation is an influential element of SEA and is a determinate of success in policies, programs and plans (World Bank, 2012). Through SEA, there is potential for more inclusive and unbiased public participation. SEA

encourages public participation throughout the process resulting in greater transparency (Lodhi et al., 2016). A minimum requirement of pluralist effectiveness is two-way communication between stakeholders and those facilitating the SEA. Whereas a high level of pluralist effectiveness addresses power imbalances (Therivel & González, 2021). It should be noted however, that a high level of pluralist effectiveness is not required in all SEA processes (van Dorren, 2011).

Normative. Normative effectiveness is established when an SEA influences the correct form of change. For example, whether change leads to more sustainable development outcomes or to greater equity. However, what is considered the 'right' change can be controversial. Therefore, power dynamics are relevant to normative effectiveness because the people who define what is 'good' and 'bad' change will determine what kinds of changes will occur and whether they are effective (Therivel & González, 2021).

Knowledge and learning. Knowledge and learning are other features of SEA that influence effectiveness. When learning occurs by individuals undertaking a SEA, this can help improve and speed up future SEAs. Having well established post-implementation processes like monitoring is important for gaining takeaways from SEAs (Therivel & González, 2021).

Transactive. Transactive effectiveness refers to the efficiency of conducting SEAs. Cost effectiveness is particularly concerning for SEAs because the cost of SEAs can range significantly. The estimated costs of conducting a SEA are between 5000 and one million Euros (equivalent to 7400 to 1.5 million CAD) (European Union, 2019), which makes the need for cost efficiency very important. However, many costs associated with SEAs are not quantified in initial plans. For example, the costs of holding stakeholder consultation, or the cost of changing development plans might increase the cost of conducting a SEA (Therivel & González, 2021).

2.3 Community-Based Environmental Assessment

2.3.1. Characteristics of CBEA

CBEA is similar to traditional environment assessment except the process is done by the community who "conducts scoping, considers alternatives, identifies impacts, assesses significance, selects mitigation measures and decides on the environmental management plan" (Spaling, 2003 as cited in Spaling et al., 2011, pp. 344-345). CBEA is normally used for projects that require natural resources to ensure livelihoods, such as projects on boreholes, water systems, agro-forestry, latrines, and bridges (Sinclair et al., 2009). Since solutions for mitigating impacts of projects are generated by local people who will be responsible for implementation, the decisions resulting from CBEA are generally more socially acceptable (Sims & Deb, 2009). CBEA also helps develop capacity for future decision making (Biswal et al., 2023).

CBEA in some countries occurs because donor countries are required to conduct CBEA for development projects both inside and outside of the country. This can be problematic because CBEA is then based on a western application, leaving uncertainty in the processes involved for developing countries (Spaling, 2003). Although, Oino et al. (2015) found that there is a desire for community-based approaches for development in developing countries. For NGOs, the connection between environmental conservation and community conservation has led to CBEA as well as the association of CBEA with good management of natural resources. It is NGOs who often initiate CBEA, but ideally the process itself should be led by the community. Eventually, NGOs remove themselves from the community, so the community is fully facilitating CBEA and moving towards self-determination (Spaling, 2003).

Learning Through Participation in CBEA. Public participation is often neglected in traditional EIA processes. EIA normally does not use local knowledge systems, whereas CBEA relies on those systems to inform decisions (Kilemo et al., 2014). In many cases, economic growth is valued higher than the well-

being of local people and without rules to ensure meaningful public participation occurs in EIA processes, it is often overlooked. Inadequate training for facilitating public participation and financial constraints can also act as barriers to public participation (Spaling et al., 2011). Yet the complexity of the natural environment is cause for local participation in managing natural resources (Berkes, 2008) because the people using the resources have user knowledge unique to where they live (Sims & Deb, 2009).

There are several benefits that can occur when local people are involved in resource management decisions. In CBEA, participation not only helps to inform decisions, but also creates a channel for knowledge generation in the community which in the long-term can help build capacity for future decision making and learning (Biswal et al., 2023; Spaling et al., 2011). Sims & Deb (2009) observed empowerment of local people through sharing knowledge in a CBEA. This can lead to community members learning traditional knowledge that otherwise would not have been shared. Additionally, knowledge about sustainable decision making can be gained through the CBEA process (Sims & Deb, 2009).

Spaling et al. (2011) found in CBEAs conducted in Kenya and Tanzania that participative learning was present, and there were some reports of communicative learning. Communicative learning is when new ideas are learned that cause one to question their own beliefs. It is interpersonal and can lead to a change in how someone acts (Mezirow, 1997). Communicative learning was shown through changes in understanding sustainability, project impacts, and sociocultural impacts related to water accessibility (Spaling et al., 2011). Instrumental learning was also observed. Instrumental learning is task oriented and involves developing new skills that can be applied to that specific environment (Mezirow, 1994). Through instrumental learning, Spaling et al. (2011) found that community members learned about water contamination and gained a new desire to mitigate contamination.

2.3.2. CBEA Best Practices

Spaling et al. (2011) have identified best practices associated with CBEA. These practices help address some of the barriers to participation, to ensure more equitable outcomes and learning from the CBEA process.

Access. Access to people is essential for CBEA, but timing of the CBEA or the place of gathering can hinder accessibility. For example, a community reliant on fishing for their livelihoods is likely more difficult to access and get people to participate during the fishing season. Likewise, where participative activities are held can create barriers to participation if there is a cost associated with getting there, if transportation is difficult to obtain or if the time taken to get there is substantial. People may feel they could spend that time doing other things such as water procurement or producing food (Spaling et al., 2011).

Notice. Adequate notice to participants for meetings is suggested to increase participation. For example, Spaling et al. (2011) suggest one week of notice prior to any activity to increase attendance. However, for some activities and in different contexts, more time is needed. To ensure activities are communicated to participants, different modes of communication is encouraged such as telephone and email (Spaling et al., 2011).

Representation. Within a community, the local elite often are part of community decision making but may not accurately represent the beliefs or concerns of a community in its entirety. Within a community, subgroups need to be represented as well. To accurately represent marginalized groups, there should be greater attention to recruitment, facilitating activities, and creating comfortable spaces for sharing so that a variety of voices are heard (Biswal et al., 2023; Spaling et al., 2011). Gender dynamics within a community can pose a challenge for collecting information, for example when men speak over women, women are not able to express their opinions or thoughts (Kilemo et al., 2014). The

Kullu Valley is a patriarchal society, where women's roles are to manage the household and do agrarian chores (Shabab, 2019), such as collecting forest products. Through the daily use of forests, women have practical knowledge of the forests (Bingeman, 2001). However, Bingeman (2001) found that women in the Upper Kullu Valley participated much less in decisions about natural resource management, compared to men. Bingeman (2001) also suggests that the low numbers of women at meetings might be the reason women in attendance do not speak up at meetings. In the same study, men admitted that the opinions of women were less valued than those of men. Spaling & Vroom (2007) suggest having private consultation sessions with women so there is more freedom to converse. They found that when women are well represented, they were very good participants – something that would have been missed without special attention to recruiting women for participation (Spaling et al., 2011).

Effective Facilitation. Communicating the reason for a facilitator's presence has proven to be important for community members and for generating trust in the CBEA process. Emphasizing their role in introductions and repeating it through the process helps community members remember the purpose of the facilitator. Disassociating the facilitator from donor agencies, NGOs or government helps create more openness with the community. In addition, facilitators should gain a strong understanding of the cultural context of a community they will be working in which can also lead to better participation (Biswal et al., 2023; Spaling et al., 2011). Lastly, Kilemo et al. (2014) suggest that a good facilitator can reduce the effects of gender dynamics and deliver greater representation.

Cost-Sharing. CBEAs can be very costly, specifically the cost of employing an outside facilitator and implementing the suggested mitigation strategies (Kilemo et al., 2014; Spaling et al., 2011). Even if CBEA is successful in getting community members to identify foreseen positive and negative impacts of a project, actually implementing the mitigation measures identified are necessary to make the assessment effective (Kilemo et al., 2014). Training, monitoring, and follow-up also require funding -

ongoing resources are therefore needed (Spaling, 2003). To reduce the cost to the community, Spaling et al. (2011) suggest fairer cost-sharing between the community and government or project proponents. Additionally, compensation should be made for sharing valuable local knowledge, as well as for some types of labour done by community members that normally goes unpaid (Spaling et al., 2011).

Appraisal Tools. Participatory rural appraisal tools are the recommended method for collecting information about a community while also establishing decision-making power of the community (Biswal et al., 2023; Kilemo et al., 2014; Spaling et al., 2011). Participatory rural appraisal is considered the "voluntary involvement of people in self-determined change" (Narayanasamy, 2009, p. 28) because the community decides how they want to discuss their own situation (Narayanasamy, 2009). Because of its participatory nature, participatory rural appraisal is well suited in CBEA processes (Spaling, 2003). Additionally, participation has been found to increase the transparency of plans, increase traceability of decision making and mitigate environmental impacts (Stoeglehner, 2004).

Participatory rural appraisal is an established tool that is very flexible, cost efficient and time efficient (Narayanasamy, 2009; Spaling, 2003). Participatory rural appraisal can lead to participants and facilitators developing new skills and gaining new information, in a mutual manner. Both community members and outsiders can learn through the process of sharing information (Narayanasamy, 2009; Spaling et al., 2011). Spaling et al. (2011) also found some participatory rural appraisal methods to be enjoyable for participants which could lead to a greater willingness to participate in future CBEAs.

Communicating Findings. Lastly, communicating the findings revealed through an CBEA is important for people to have enduring takeaways from CBEAs. Timely reports sustain support and involvement of the project. When findings are not communicated to the community within a few months, people tend to lose interest and the value of CBEA can decrease (Spaling et al., 2011). Additionally, findings should be communicated in a manner so that everyone involved can be informed

(Dalal-Clayton & Sadler, 2017). Visual representations of the findings are shown to be useful, especially for individuals who are illiterate. Strong visual representations of the findings can create a sense of pride in the community by demonstrating the community's knowledge. It can enhance peoples' understanding and is more engaging (Spaling et al., 2011).

2.3.3. Community-Based Strategic Environmental Assessment

There is significant literature on CBEA, its processes as well as its practical implementation. However, there is little evidence on the use of CBSEA – an extension of CBEA that uses community-based approaches for strategic level decision making. CBSEA brings together two types of EAs to have communities design more sustainably oriented policies, programs and plans.

Application of CBSEA. Through combining aspects of CBEA and SEA, Sinclair et al. (2009) (see also Sims, 2012) designed a CBSEA to evaluate a watershed management program in Costa Rica. The Costa Rican program, called the Watershed Management Agricultural Program, employed a CBSEA approach and involved communities from two watersheds. The study looked to examine how a CBSEA could impact decisions on the second phase of the program. The program was created to address issues of erosion and contamination from farming.

The opportunity to use CBSEA arose from a willingness of community members who were involved in the first phase of the program and wanted to be involved in decision-making processes of the second phase. Additionally, the timing of the program was significant because the directing organization, Instituto Costarricense de Electricidad, was open to trying new approaches to development planning (Sims, 2012; Sinclair et al., 2009). The design developed by Sinclair et al. (2009) was comprised of CBEA approaches from Spaling (2003), Neefjes (2000), and CIDA (2005) and through SEA approaches from Noble (2005) and Partidario (1999). Further insights were gathered

from the workshops conducted by Sims and Sinclair and reported in Sims (2012) and Sinclair et al. (2009).

Like in CBEA, participatory rural appraisal tools are a key aspect identified for CBSEA. As discussed above, participatory rural appraisal tools are useful because they encourage community-led participation. Participatory rural appraisal empowers communities to present their own situation in the manner they prefer (Narayanasamy, 2009). However, Sinclair et al. (2009) found challenges in reallocating power to communities as has been the case with CBEA. Furthermore, Sinclair et al. (2009) and Walker and Sanz (2024) found that it is unclear if CBEA approaches considerably influence decision-making processes.

Another characteristic identified by Sinclair et al. (2009) in CBSEA is creating conditions for good discourse. Since CBSEA largely consists of participation and knowledge sharing between community members, establishing conditions that enhance this communication is important. In CBSEA this can prove to be more challenging because with strategic level discussions, community members do not know how their participation will influence any outcome (Sinclair et al., 2009). This can lead to limited interest in decision making processes of policies, programs and plans.

In a similar way, learning is an important feature of CBSEA identified by Sims (2012). The learning outcomes included transformative learning. Both instrumental learning and communicative learning was experienced by participants. The learning involved critical reflection which caused the participants to question their assumptions. Reflections related to the environment and how individuals could contribute to better conservation. In this way, participants were concerned with aspects beyond their own interests. This showed that collaboration and sharing with fellow community members can increase concern for others (Sims, 2012). Sinclair et al. (2008) also found that learning in EIA can be

increased by addressing power imbalances. Less power imbalance allows individuals to have experiences that are not influenced or distorted by outside influences (Sims, 2012).

As with CBEA, Sinclair et al. (2009) determined that learning in CBSEA is dependent on creating inclusive environments where all community members can participate – whether this means selecting more accessible spaces, selecting better times, or covering costs associated with attending meetings. Sinclair et al. (2009) found strong engagement of participants because there was a desire to learn and help farmers who would be impacted by the resulting decisions. Capacity for such an approach was also increased for future CBSEA (Sinclair et al., 2009).

In justifying the choice to examine CBSEA, Sinclair et al. (2009) explain that the challenges of SEA relate to participation, and the lack of consensus on how SEA should be implemented. As such this provided an opportunity to determine if CBSEA could be used to support a more bottom-up approach to strategic level decision making, and potentially influence greater political acceptability towards SEA (Sinclair et al., 2009). By the same argument, there is potential to examine CBSEA in other developing countries and in particular, contexts where development decisions impact rural life.

2.4 Chapter Summary

India is a country largely reliant on hydropower to meet its increasing electricity needs. As a result of such pressures, MHP has been established in mountainous regions in northern India – such is the case in the Upper Kullu Valley in the state of Himachal Pradesh where development of existing and proposed MHPs is extensive. MHP is widely held as the favoured form of hydropower because it is believed to cause fewer environmental and social harms, which has led to exemptions for such projects from EIA in India. However, the literature reveals that MHPs have produced significant adverse impacts on local environments and communities near these projects. As well, cumulative impacts of projects are further proving to be a concern for communities as the impacts of several projects are compounded. For

these reasons, SEA has been proposed in the literature to overcome barriers in current EIA legislation and processes in the context of MHP in the Indian Himalaya.

The literature also establishes that, due to the rural nature of MHPs in the Indian Himalayan Region, CBSEA could be an appropriate approach to use. Yet there is limited research on this topic, making it an important subject to study to gather further evidence of its utility and how it might be implemented in different contexts. I have built on the literature related to SEA and CBEA, which establishes some basic characteristics that were considered in developing a CBSEA frame that could be used in the Upper Kullu Valley. These characteristics include: forward-looking and strategic in orientation; highly participatory, including opportunities for discourse among participants; accessible and inclusive; learning oriented; and, respectful of the key SEA steps, such as alternatives selection and consideration of cumulative effects.

Chapter 3 Methods

This chapter discusses the methods and approaches that I used in the research. Through a qualitative research approach, a case study research design was used. Data collection methods included a document analysis, observation, and interviews. For case study selection, a purposive approach was applied. I also took steps to ensure validity as outlined in the latter part of the Chapter.

3.1 Research Design: Case Study

The research design that I used was a case study approach. Yin (2014) defines case studies as a means to study a "contemporary phenomenon in depth and within its real-world context" (p. 58). A case study approach involves spending an extended amount of time on a site or several different sites, with the researcher having personal interaction with the environment to understand the lifestyle or operations of each site but having little control over the behaviour of participants and events (Stake, 2009; Yin, 2014). The types of research questions that are suitable for a case study design are "how" and "why" questions (Yin, 2014). For example, how can a CBSEA be applied in the Indian Himalayan Region hydropower context?

Although case studies can be used to inform a proposed theoretical framework, one drawback is that they often do not lead to trustworthy generalizations about a population (Yin, 2014). Case studies focus on contemporary issues, however, and have the advantage of flexibility and using various forms of data such as documents, interviews, and observations (Baxter & Jack, 2008; Yin, 2014). Another advantage of a case study approach is that it considers both phenomenon and context and the overlap between the two. This is different from other approaches where a phenomenon is independently studied, separate from its context. Some approaches study phenomena within their context but do not obtain the level of detail that case studies do, according to Yin (2014). Additionally, a case study approach provides a unique set of data that is testable and holds empirical validity (Eisenhardt, 2002).

The literature around case studies highlights the structural uncertainty of the method (Thomas, 2011). In an effort to provide more direction, Thomas (2011) outlines the distinction between the subject and object of a case study. For this research, the subject of the case study is MHP development in the Upper Kullu Valley and is the "instance of some phenomenon" (Thomas, 2011, p. 512). Given just the subject, the scope is unrestricted. The object, or analytical frame, refines the subject and provides the "theoretical, scientific basis" (Wieviorka, 1992 in Thomas, 2011, p. 512). The object of this research is CBSEA. Together the subject and object provide the basis for the research that was undertaken.

3.2 Worldview

Examining my own worldview was important to recognizing how my perception of the world may shape the approach used for research (Creswell & Creswell, 2018) so I may lessen the bias I have as a researcher. In examining the literature to better understand my worldview, I found myself identifying with Creswell and Creswell's (2018) transformative and constructivist worldview. A transformative worldview is associated with being action oriented, specifically to address oppression (Creswell & Creswell, 2018). When I was younger, I was the kid who ran around the playground chanting for everyone to recycle. I had this romantic idea that if we all just did our part, our environmental concerns would be a thing of the past. This perspective changed with time, to how I now understand the implications of environmental impacts on marginalized people and the role of government policy in sustainably managing natural resources. I have an interest in understanding the impact of policy on remote communities, particularly northern Indigenous communities, through my work with Indigenous-led organizations. I also feel connected to this topic because I grew up in a city that experiences extreme temperatures, and I have seen how family members in northern Manitoba experience even more extreme weather, but with fewer resources. It is from this perspective that I hope to do research that will inform government policy on natural resource management. From a transformative lens, I wanted

to understand how the political aspects (e.g., decision-making) of my research topic are connected to social oppression and how different approaches to making decisions can influence this (Creswell & Creswell, 2018).

I also associate with a constructivist worldview because I believed my research should be used to understand individuals and their perspectives that have been developed through their unique histories and lived experiences (Creswell & Creswell, 2018). My motivations to undertake this research were to understand how local people experience development and how they might be supported to make decisions about future development. The involvement of participants through a case study research design follows with a constructivist worldview because understanding participants is at the heart of constructivism. I believe to understand an issue, it is central to understand how people are experiencing changes from that issue. In engaging with participants, I sought to understand their perspectives, and how their own experiences have shaped their beliefs. My worldview is consistent with a case study approach because of the participative nature of a case study approach.

3.3 Study Area

I selected the Upper Kullu Valley in the state of Himachal Pradesh as the location of my case study. Himachal Pradesh is in the northern region of India and is part of the Indian Himalayan Region (see Figure 2).

Figure 2

Map of the Kullu District in Himachal Pradesh, India

Note. This image shows where the Kullu District lies within Himachal Pradesh, India. From "Small Hydro and Environmental Justice: Lessons from the Kullu District of Himachal Pradesh," by A.P. Diduck, R. Johnson, E. Edwards, A.J. Sinclair, J. Gardner, & K. Patel, in A. P. Diduck, K. Patel, & A. Kumar Malik (Eds.), *Advancing Environmental Justice for Marginalized Communities in India,* (p. 105). Routledge, (https://doi.org/10.4324/9781003141228-7). Copyright 2022 by A.P. Diduck, R. Johnson, E. Edwards, A.J. Sinclair, J. Gardner, & K. Patel.

The Upper Kullu Valley is in the Kullu District which consists of four Tehsils (Kullu, Banjar, Nirmand, and Manali) and five development blocks (Ani, Banjar, Kullu, Nimand and Naggar). The area of focus for my study was from Solang village to Katrain village which fall in the Manali Tehsil and the Naggar Block (see Figure 3).

Figure 3

Map of the Kullu District

Note. This image shows a map of the Kullu District. From *Map of District Kullu,* by National Informatics Centre, n.d. (https://hpkullu.nic.in/map-of-district/). Copyright 2025 by District Administration Kullu.

The word Kullu is derived from Kulata which is one of two tribes that occupied the North-West region of the Himalayas (Shabab, 2019). The Kullu District emerged as an important area since it is part

of the Indo-Tibetan trade route (Mehra, 2017), and today it is considered prosperous because of the economic well-being of locals. For example, Mehra (2017) describes being frequently told that "everyone has a house, food, and warm clothes in the winter" (p. 290). While land ownership varies by caste, caste discrimination is less prominent than it was previously. However, the state of Himachal Pradesh continues to be ruled by upper-caste members from the Brahmin and Rajput castes (Mehra, 2017).

In the Kullu District, agriculture is the main source of livelihood, making up 70 percent of employment for the working population (Shabab, 2019). In Himachal Pradesh, 40 percent of the state's gross domestic product is earned through agriculture production (Kumar, 2022). Previously, agriculture production in the Kullu District consisted of growing wheat, barley, and millets. Later, corn and potatoes were introduced. In low lying areas, rice was grown in paddy fields as a prime crop (Shabab, 2019). But during colonial times, apple cultivation was introduced in Himachal Pradesh (Mehra, 2017; Shabab, 2019), which has resulted in a drastic change in land use. In the 1970s there was an "apple revolution" which is attributed to state subsidies of horticulture production (Vedwan, 2008). From 1975 to 2002, the horticulture land use area increased by 61 percent, 50 percent of this expansion from apple orchards (San & Mazari, 2007).

The Kullu Valley is also well known for its tourism, particularly in the town of Manali, where tourists come to stay all year round, but particularly during high season between May and June, when the weather is nice and before monsoon season. Tourism in the Kullu Valley grew by 241 percent from the 1990s to early 2000s due to increased conflict in Kashmir (San & Mazari, 2007; Mehra, 2017). Tourists, mostly from India, come to see the mountains, hike, see snow in the winter, and see the way of life of the Kullu people, which differs vastly from other parts of India. The Kullu region is known for its local deities and the esteem that locals have for their deities (Luchesi, 2006; Shabab, 2019). Villagers can

often be found worshipping their local deities and when deities are moved or displayed, a large group will follow the deity to the temporary place the deity will rest (Luchesi, 2006).

While tourism is important, the economy in the Kullu Valley is still largely a subsistence economy, reliant on agriculture to support the way of life (Kumar, 2022). Road networks were established to help connect people for tourism and to enhance trade (Mehra, 2017; Shabab, 2019). Due to the rapid development of the area, from the expansion of tourism and commercial apple production, there is little planning and a randomness in development which has led to severe impacts on the geoenvironmental conditions of the area (Sah & Mazari, 2007).

The monsoon season occurs between early June and late September and is a time when many natural hazards occur. These natural hazards include cloudbursts and are associated with destruction of important infrastructure such the national highway, and even loss of life. Cloudburst is an event when a concentrated amount of precipitation is discharged over a small area (Kumar et al., 2018) which can cause flash floods and landslides (Singh et al., 2023b). From 1990 to 2001, 42 percent of cloudburst occurrences in Himachal Pradesh occurred in the Kullu Valley because of its “high relief, closed basin morphology and high temperature gradient” (Sah & Mazari, 2007, p. 17). Landslide occurrences are also frequent during monsoon season when the slopes are wetter (San & Mazari, 2007). Natural climate variability influences extreme weather events, but climate change also contributes to the frequency and intensity of extreme weather events in India (Kumar et al., 2018; Mukherjee et al., 2018; Gupta et al., 2024). At the same time, altering river channels can reduce flood hazard prevention (Kasprzak & Migo, 2015). It is estimated that each degree of climate change increases the number of extreme weather events by double (Myhre et al., 2019). Furthermore, the India Meteorological Department has reported an increase in cloudburst incidents in recent years (Singh et al., 2023a). Owing to the impacts from cloudburst events, increased occurrences will have consequences both economically and on human

fatalities (Singh et al., 2023b). Due to the prevalence of natural hazards in the Kullu Valley, Sah & Mazari (2007) argue that there is a need for strategic development.

The Kullu District has extensive river systems, which includes the Beas River. The Beas River originates at the Rhotang Pass and runs south until meeting the Sutlej River in the Punjab plains. Since the Valley is situated at a high elevation, this creates the type of elevation differential sought after for generating hydropower electricity. In the state of Himachal Pradesh alone, it is estimated that there is 25,000MW of hydropower potential (Himurja, n.d.a), which is 25 percent of the national hydropower potential.

Due to the significant MHP activity and potential in the Upper Kullu Valley and the reliance of local people on the Beas River for their livelihoods (Erlewein, 2013), I felt it was an interesting case to examine MHP development and CBSEA (Please see Chapter 4 for more details on MHP in the region.). As well, there has been research conducted on MHP in this region, including by my advisor, Dr. John Sinclair (see Baker, 2021; Diduck & Sinclair, 2016; Diduck et al., 2021; Kumar & Katoch, 2016; McCandless, 2006; Sinclair, 2003; Sinclair & Diduck, 2000). Additionally, I worked with Mehru Thakur (Photo 1), an interpreter and guide, who has worked with numerous University of Manitoba Natural Resource Institute students, which was very helpful for initiating connections and in navigating the language and culture in the Kullu Valley.

Photo 1

Mehru Thakur, Interpreter and Guide, Standing in Front of his 4x4

3.4 Participants and Sampling

For my research, purposive sampling was used for participant selection as this is based on identifying participants who have specific characteristics that can help a researcher understand their research topic (Ritchie et al., 2003). In developing an overview of the MHP in the Kullu Valley as well as identifying potential people to speak with, the following criteria for selecting individuals were used:

1. The person was physically accessible;
2. The person had knowledge of hydropower in the region; and
3. The person was willing to participate in the study (i.e., be interviewed).

Data collection was completed once saturation was reached, that is when no new information was acquired through more data collection (Eisenhardt, 2002).

3.5 Data Collection Methods

The data collection methods that were used are outlined in this section. Both naturally occurring (e.g., participant observation, document analysis) and generated data (e.g., interviews) were used (Ritchie, 2003).

3.5.1. Document Analysis

I conducted a document review and analysis because this approach is compatible with a case study design and is often used as a secondary method to supplement other methods (Bowen, 2009). In my research, document analysis provided historical context of the topic studied by tracking changes over time (Bowen, 2009). Document analysis also helped indicate what places, situations or people could potentially be observed to help inform the study (Bowen, 2009). This information helped determine what the historical roles of decision makers and stakeholders have been regarding hydropower development in the state.

Advantages of the document analysis for me were that it had little cost (once I was in India), and it was an efficient way to collect information since no primary data were required (Bowen, 2009). Additionally, the document analysis was useful because the data are stable since the presence of the researcher does not change the data, as is the case with other methods like interviews (Bowen, 2009). However, the document analysis lacked details since the documents were not created for the specific purpose of the research or topic being studied (Bowen, 2009), which is why I used observation and interviews as well.

Documents that I used included policies and legislation regarding MHP, and information on the size, location, and status of MHP projects in the Upper Kullu Valley. For example, an updated number of MHP projects in the region was acquired. Documents that I attempted to obtain in the field were community meeting notes related to hydropower development, details of hydropower projects not accessible online, and DPRs from HIMURJA — the state government body responsible for managing MHP development. Throughout the data collection process, I continued a document review to contextualize new information found through the other data collection methods. For documents collected both prior to fieldwork and while in the field, I used judgement sampling to select documents

based my appraisal of the relevancy of the documents to the research topic. For each type of document, I determined if the document would help achieve at least one of the research objectives.

3.5.2. Observation

Field observations were used to collect data on MHPs and their effects on individuals during their activities as observed in the field (Narayanasamy, 2009). Data resulting from observation are my descriptions and reflections of situations to show how people experience the world (Watson & Till, 2010). Observation involves creating a level of comfort for individuals being observed that enables the researcher to observe information about the day to day lives of people (Bernard, 2011). Increasing the level of comfort reduces the reactivity of individuals so behaviours change very little when a researcher is observing them (Bernard, 2011).

The information collected helped me to understand the functionality of the community and MHPs, as well as the roles individuals play in the community, especially regarding hydropower and decision making. I looked at eleven MHPs in the region to gain a sense of their scale, when they were developed, how they are operated, who is involved in their ongoing operation, and the current state of projects. In cases where projects were not operational or not completed, I observed if and how the projects impacted surrounding communities as well as why they did not proceed. Observations also helped confirm some of the cumulative effects talked about in interviews. I observed two community meetings to understand how decisions were made, who was present at meetings, and who primarily participated and spoke during those meetings. Field observations also helped guide the types of questions asked to people during the interviews that followed (Bernard, 2011; Narayanasamy, 2009). The template used to help guide my observations of MHP projects is found in Appendix A.

3.5.3. Semi-structured interviews

The main empirical data collection method employed in the research was semi-structured interviews (Narayanasamy, 2009), for which ethics approval was obtained through the University of Manitoba (protocol number: HE2024-0218). The purpose of the interviews was to "explore the views, experiences, beliefs and/or motivations of individuals on specific matters" (Gill et al., 2008, p. 292), offering undiluted information (Ritchie, 2003). Semi-structured interviews were conducted because they encourage depth in responses where new information can emerge not previously considered in the study. Responses can deviate from the interview schedule, but the interview also follows a structure and focuses on a particular topic (Gill et al., 2008). Exploratory questions were primarily used to gather information about the research topic (Cassell, 2015).

As outlined in Appendix B, interviews provided insight that helped me to achieve my objectives, such as data on what people perceive the barriers and enablers to implementing CBSEA in communities might be, the roles of stakeholders and decision makers in MHP development, the need for, and consideration of, implementing a cumulative impact assessment in CBSEA and how a participatory approach, such as CBSEA, might fit into current community decision processes. This information was key to establishing a framework for CBSEA that can be applied to the Upper Kullu Valley. In developing the questions, I used the knowledge gained through my literature and document review, and through interview schedules of previous research in the area, as well as the input of my advisor. Since cumulative impacts and SEA were concepts likely new to participants, I started with simple questions and moved to more complex questions. In explaining what cumulative impacts are, I emphasized the combined nature of the impacts and highlighted the whole area to consider. In asking questions about SEA, I emphasized strategic and long-term thinking, and I inquired about decision making from a broader perspective, rather than for individual projects.

A total of 55 interviews, four as group interviews, were conducted which ranged from ten minutes to one hour and forty minutes. 58 interview participants consisted of a mix of 10 government officials, 18 community members, 11 community leaders, three members of NGOs, six people working in the private MHP sector, and 10 academics. However, the perspectives of community members, community leaders, members of NGOs, and academics were generally aligned, while the perspectives of government officials and participants from the private sector were more closely aligned, as is revealed in the data presented in the thesis. Through internet sources and with my guide and interpreter, I identified community leaders, known as Pradhans, members of the Forest Rights Committee (FRC), community members, and elected officials. I contacted them through phone calls, or to reach Gram Panchayat members, I went to the Gram Panchayat offices which are found in each community. I identified academics who have expertise in the field of small-scale hydropower, or community governance through academic institutional internet sources. I contacted a few academics through email but found it more effective to go to intuitions to make contact. For all interviews, written consent was given at the time and place where initial contact was made. Of the 59 interviews participants, five participants indicated they would not like their name associated with the information provided in the interviews and are therefore referred to as Anonymous Participant 1, Anonymous Participant 2, etc. All other participants indicated consent to use their real names which is done when interview data are presented in the following chapters.

Although interviews were aimed at individual participation, four group interviews were conducted in groups of two or three people. The work of previous students indicates that local people are more comfortable with group interviews, and, in fact, it often happens organically. During my field work, I found group interviews occurred when participants were already together before my presence and because of a previously established relationship. When the occasion to do a group interview arose, I

took care to direct questions at all participants. I found that all participants in group interviews were enthusiastic to answer questions. Further, Ritchie (2003) indicates that group interviews can be beneficial because they allow more time for participants to reflect on their answers and compare their answers to other participants (Ritchie, 2003), which I found to be true. During group interviews, participants would engage with the answers of another participant when they agreed, or when those answers spurred more thoughts. Since the information shared in interviews cannot be guaranteed as confidential given there is more than one participant present, I emphasized the importance of keeping the identities of one another confidential and explained the importance of not sharing information that they would not like other people to know.

Interviews were primarily conducted in the local language Pahari, which is a dialect of Hindi. For these interviews, an interpreter translated what the participants said while I recorded their answers by hand. I found that there was enough time during the translation process to record their answers in writing. In instances where participants were comfortable and able to speak English, I would ask permission to audio record the interview because the interview progressed at a quicker pace and did not allow sufficient time to record their answers in writing. I audio recorded nine interviews, with consent from participants. Following the interviews, I transcribed the audio recordings using a software tool called Otter.ai. Participants did not have the opportunity to review their interview responses.

In conducting interviews, it was important to understand the range of roles that rural community members play, and the inherent pragmatism of rural communities (Halseth, 2016). Additionally, other researchers who have conducted interviews in villages in the Indian Himalayan Region have faced difficulties interviewing women, even when the interviewer was female (Dilay et al., 2024; McCandless, 2006). Another potential difficulty was the third-party effect which occurs when a third person in the room affects the interview and responses are altered because of their presence

(Bernard, 2011). To address these potential limitations, I paid special attention to establishing a comfortable environment for female participants through actions such as providing extensive explanations of the research and what the information they provide might be used for, holding the interviews in their homes, and emphasizing not having to answer a question if they did not want to.

3.6 Data Analysis

I did a thematic analysis using NVIVO, a qualitative data analysis software program. Using an inductive approach, I developed nodes as I analysed the data and then developed themes from those nodes. I also used an iterative process to gain an awareness of emerging themes in the data (Creswell & Creswell, 2018; Eisenhardt, 2002) which can indicate whether data saturation has been reached (Elo et al., 2014). Data analysis was completed once saturation was reached, that is when no new patterns were emerging.

In communicating the research findings, if ideas were discussed by one to three participants, the exact number of participants is specified. When ideas were mentioned by between three participants and up to 25 percent of participants, the term “few” is used. When 25 to 50 percent of participants mentioned an idea, the term “some” is used. When 50 to 75 percent of participants mentioned an idea, the term “many” is used. Lastly, when 75 to 100 percent of participants talked about the same idea, the term “most” is used. It is useful to understand the number of participants that discuss the same idea. However, qualitative research dictates that any number of mentions of an idea can be used in the research.

3.7 Validity

Validity is an important aspect of research because it helps ensure that findings are true and reported in a manner consistent with the data. Validity is also important so that research can be used to support further research within the field. There are various strategies identified by Creswell & Creswell

(2018) to increase the validity of research findings, one of them being triangulation. Triangulation involves using multiple data sources to ensure credibility and rigour in the research findings (Baxter & Jack, 2008; Creswell & Creswell, 2018; Ritchie, 2003). I used triangulation throughout my data collection and analysis by comparing the findings from documents, observations, and interviews. For instance, when interview participants indicated something, observational data and documentation could sometimes confirm what the participant is discussing. This helped ensure the validity of my results.

There are several other strategies that can be taken to increase the validity of a qualitative study. For instance, proper and detailed documentation. This can involve taking notes or memos during data collection on observations made that are not verbally expressed (Creswell & Creswell, 2018). They also help jog your memory about details that you may otherwise forget (Bernard, 2011). Taking field notes is a way to create overlap between data collection and data analysis (Eisenhardt, 2002). I attempted to effectively document my observations through field notes and memos which were then reflected on during data analysis. I used the three types of field notes outlined by Bernard (2011), which include methodological, description and analytic notes. Methodological field notes are notes related to the technique of collecting data. It helps increase learning on which methods work and which do not. Descriptive notes are notes on what is happening around you through watching and listening attentively. Analytic notes normally transpire less frequently because they are reflections when new understandings emerge on how a culture is organized. I used these three field notes to obtain details necessary for a valid study.

Member checking is another useful strategy to ensure the reliability and validity of data. This can be done by checking if the findings from data analysis match with what participants said (Creswell & Creswell, 2018). Another way to use member checking is by getting interview participants to check if the information shared in the interview matches with how they feel about the topics discussed.

Rich descriptions can increase the validity of data and mitigate bias in the research by providing compelling details (Bowen, 2009; Creswell & Creswell, 2018). Providing thick descriptions involves presenting substantial details on an individual's context. This may include information on their feelings, actions, experiences and how they interact with you (Creswell & Miller, 2000). As such, I included descriptions to contextualize the individuals I interviewed by noting their tone of voice, body language, gestures, and other descriptors that help to represent the distinctive features of each person.

Chapter 4 Micro and Mini Hydropower Development Activities in the Upper Kullu Valley

This chapter examines the MHP development activities in the Upper Kullu Valley to better understand the local context in relation to these developments. This is accomplished in what follows, first by presenting the MHP projects that were observed during the fieldwork. Following this, policy changes are discussed. Then, future development is discussed based on the current projects documented by HIMURJA (the state government institution for managing MHP development), and through participant responses. Following this, cumulative impacts identified through observation and interviews are presented to better understand how people are experiencing cumulative impacts from MHP development and aspects of such effects that should be considered in decision making.

4.1 Current Status of Projects

As part of the research, field observations were conducted to examine the status of MHP projects, and how decisions are made within communities. Projects that were observed ranged from 300kW to 4.9MW, with some projects having more than one generator. One project observed was in the beginning stages of construction, one project was closed for repairs, one project had been shut down due to local resistance, and the others were functioning. Projects were located in a diverse range of places, for example, off the side of the highway, close to residences, along hiking trails, or even partially in the riverbed. While only one project was permanently closed and another was closed for repair, all projects must close on a regular basis for a short period for cleaning. Figure 4 shows the location of the projects observed, and Note. This map was created to show the locations of the MHP projects that were visited. The map was generated to show Google Maps Locations of MHP Project Visited in the Upper Kullu Valley, by Google My Maps, n.d. (https://www.google.com/maps/d/edit?mid=1xJ-aPNE37ASwNeGogHvbvngoZd5ZN3c&ll=32.24747567711273%2C77.16202285555555&z=11). Copyright 2025 by Map data.

Table *1* provides details of each project that was observed.

Figure 4

Map of Projects Visited

Note. This map was created to show the locations of the MHP projects that were visited. The map was generated to show *Google Maps Locations of MHP Project Visited in the Upper Kullu Valley,* by Google My Maps, n.d. (https://www.google.com/maps/d/edit?mid=1xJ-aPNE37ASwNeGogHvbvngoZd5ZN3c&ll=32.24747567711273%2C77.16202285555555&z=11). Copyright 2025 by Map data.

Table 1

Details of Projects Observed

Name	Capacity (MW)	Year Allotted	Status & Year Commissioned
Aleo I	2 x 1.5	2000	Commissioned, Unknown
Aleo II	2 x 2.4	2006	Commissioned, Unknown
Baragargh	2 x 2.5	2006	Commissioned, 2017
Haripur Nallah	2 x 1.5	2002	Commissioned, 2017
Mahri	2 x 2.5	2000	Commissioned, 2007
Palchan Bhang	3 x 300kW	2011	Under Construction
Phindri	1.5	2014	Commissioned, 2022
Serai	2	2009	Commissioned, 2018
Solang	1.5	1997	Commissioned, 2002
Chorr	1	unknown	Construction Paused in 2012
Beaskund Top	4.9	2009	Commissioned, Unknown

Observational data provided evidence of certain activities and events at the site of MHP projects. For instance, there was evidence of repairs from flooding, dumping, broken material, impacts on aesthetic values, and implications for connectivity of the area. These observations are discussed in the following sections as they support the themes on cumulative impacts identified in interviews.

4.2 Future Development

One source used to identify MHP projects in the Kullu Valley was a public list provided by HIMURJA, through their website. The hyperlink to the list was changed to two different document over the course of a few months, but the most recent list available indicates a total of 309 MHP documented in the Kullu District, and a total of 781 MHP in Himachal Pradesh, in various stages of implementation. Most projects fell into the pre-initial assessment stage, indicating that many more projects are set to

begin construction, if approved. Of the 781 projects, 142 were in the under construction or commissioned stage (Himurja, n.d.b).

During interviews, participants were asked whether they think more development will occur in the Kullu District. An equal number of participants indicated that MHP development would continue as opposed to stopping. Participants who indicated that development would continue said there was a lot more hydro potential in the area or that many projects were in the approval process or currently under construction. Participants who indicated there would be no more MHP development mostly reasoned it was because there is no more room on the Nallahs (streams) for more projects. For example:

> I think there won't be more MHP development because the area is saturated. (Budhishwar Gaur, Project Owner)
>
> There are no streams left, they've all been allotted. (Chura Mani, Panchayat Pradhan)
>
> All the Nallahs are already allotted and sanctioned, there is no space left. (Harsh Krisham, Panchayat Secretary)

Additionally, one participant revealed that investors were moving away from investing in MHP, suggesting that there is less interest in MHP development as opposed to other development projects.

4.2.1. Swaran Jayanti Energy Policy

To understand the current approach to MHP development by the state government of Himachal Pradesh, the Swaran Jayanti Energy Policy was examined. A 2014 amendment to the 2006 Hydro Power Policy for Himachal Pradesh had significant implications for how project decisions were made. For instance, the policy says that NOCs are no longer required from the Irrigation and Public Health Department, Public Works Department, Revenue, and Fisheries and Wildlife. Instead, one joint inspection committee oversees providing all clearances. Similarly, the 2014 amendment changed the procedures for the Gram Panchayat approval. Previously requiring two NOCs from the Gram Panchayat, following 2014, only one consultation with the Gram Panchayat was required, and no NOC needed. Overall, the committee which formed the amendments contained in the policy were looking to fast-

track the approval process (Diduck & Sinclair, 2016). Since 2006, various other amendments were made to the policy but in 2021, a new energy policy was introduced and implemented in 2022, called the Swaran Jayanti Energy Policy (Government of Himachal Pradesh, 2022).

The intention of the new policy is to diversify and amplify the renewable energy mix in Himachal Pradesh, but the policy also works to fast-track approval processes. The approval process involves obtaining various government clearances, consents and plans, including, Environmental Clearance, Forest Clearance, Consent to Establish, Mining Clearance, Catchment Area Treatment Plan, Land for Compensatory Afforestation, Rehabilitation and Resettlement Plan. However, these clearances, consents and plans are now done through a single-window approach, to speed up the time needed for approval (Government of Himachal Pradesh, 2022).

NOCs are also required from Public Works, Jal Shakti, Wildlife, Fisheries and Revenue departments, as well as from Gram Panchayats. Gram Panchayat NOCs need to be issued within one month from when the project is brought to the community, otherwise reasons against issuing an NOC need to be provided. If sufficient reasoning is not provided, the Deputy Commissioner may make the final decision to move forward with the project. When NOCs are issued with conditions by either Gram Panchayats, or government departments, the conditions need to be given in writing to HIMURJA (Government of Himachal Pradesh, 2022).

Following adoption of the Swaran Jayanti Energy Policy in Himachal Pradesh, projects need to be 250 metres horizontally, and 50 metres vertically apart. But relaxation of this requirement can be given based on “technical, design, socio-economic, and topographical aspects” (Government of Himachal Pradesh, 2022, p. 181). This added criterion is the first in the policy scheme for Himachal Pradesh that considers the distance between projects. While this stipulation is premised on making projects more “environmentally friendly” (Government of Himachal Pradesh, 2022, p. 32) there is no environmental

reasoning given for establishing the set distances. Furthermore, previous research by Kuniyal et al. (2017) suggests a separation of three kilometres between small projects to properly account for cumulative impacts – which is 60 times the vertical distance recommended in the policy. It is unclear whether this policy change has been made to address cumulative impacts, or to address concerns of project proponent conflict.

4.2.2. Considering Micro and Mini Hydropower Detailed Project Reports

As part of hydro policy in Himachal Pradesh, DPRs are required to be completed by project proponents outlining information on the geological, hydrological, engineering, and financial implications of a project. The initial intention of using DPRs to inform my research was to examine the reports for evidence of how social, environmental and cumulative impacts are considered. However, it proved difficult to collect the DPRs for the projects visited. Project proponents and a company that manages projects were unwilling to provide DPRs despite them supposedly being public documents. I was able to collect five DPRs, four of which were in pre-construction phases. Ownership of the project for one of these DPRs matched that of the Serai project, a project that was visited. However, it is unclear whether the DPR was for this project since there were two generators indicated on the DPR, versus one observed during the site visit. Since project capacities can be altered over the course of assessment, the DPR and project visited might be the same.

Despite being able to access the five DPRs, little useful information was gleaned from them except the inadequate consideration of social, environmental and cumulative project impacts. Some examples are provided in what follows.

The DPRs highlighted benefits of projects, such as using less kerosene and wood for cooking, which could reduce greenhouse gas emissions, deforestation, increase hygienic cooking conditions, and reduce the workload on women who are primarily responsible for collecting wood in the forests.

Employment was outlined as a positive aspect of projects. One DPR indicated that 37 of the 50 people employed as labourers for the project would be from the affected population. However, who constituted the affected population was not specified (Virender Dogra Power Projects Private Limited, 2024).

The DPRs also proposed that exploitation of hydro potential will help reduce power shortages and specifically that "power shall be made available to the adjoining habitation of the project" (Umi Infrastructure Company Private Limited, 2021, p. 40). Two DPRs stated word for word the same sentence, "By constructing this project this problem of low voltage and shortage of power in the adjoining area will be overcome forever" (Umi Infrastructure Company Private Limited, 2021, p. 40; Bholenath Power Construction Company Private Limited, 2023, p. 18). It is argued that through increasing power production, the standard of living for poor people residing near the projects will be improved through activities like setting up new small-scale industry. However, the reports also indicate that power generated from the projects will feed into the state grid, HPSEB GRID, and is by no means guaranteed to the surrounding communities.

The DPRs specified that no populations would be adversely affected by the projects because the projects do not use reservoirs, there is no submergence involved, and people are not displaced. The water use of local people and the irrigation supply of the catchment area would also not be affected. The DPRs indicated that there would be no adverse impacts on forests, wild, or aquatic life, or on the geology of the area since landslides and erosion are negligible factors of the project. Yet, the reports indicated that there is no baseline data for flash floods so predictions on the implications of flash floods cannot be done. Additionally, the DPRs indicated that no other projects would be affected in the basin or upstream or downstream of the Nallah, yet there was no justification for this conclusion.

Furthermore, the aesthetics of the area would not be negatively affected, but rather enhanced as a "feature of tourist interest" (Bholenath Power Construction Company Private Limited, 2023, p. 33).

Overall, the format and level of detail pertaining to environmental and social impacts was limited. In one case, environmental considerations were in a table where project proponents indicated whether the project would implicate certain environmental factors. However, most of the factors were irrelevant to MHP development, and when they were relevant, no detail was provided on how those factors would be assessed. The same DPR provided no estimation for the cost of mitigating environmental effects, and instead, indicated that the cost would be assessed during execution of the project (Bagipul DPR, 2024).

4.3 Negative Cumulative Impacts

Previous studies on small-scale hydropower development in India address issues of cumulative environmental and social impacts. For example, Erlewein et al. (2013) looked at larger scale hydropower development in Himachal Pradesh and determined a lack of consideration for cumulative effects. Diduck et al. (2021) looked more specifically at impacts in the Kullu District of small-scale hydropower. While these studies outline a need for cumulative impact assessment, they do not examine the extent to which cumulative impacts are observed from small-scale hydropower development in the Kullu District or the Kullu Valley. The following two sections discuss the negative and positive cumulative impacts that were identified in interviews and observations and are summarized in Table 2.

Table 2

Cumulative Impacts Identified During Interviews by Study Participants

Type of Cumulative Impact	Major Theme	Subtheme

Negative	Water scarcity	Farming Drinking water Reduce electricity production Fisheries Flourmills
	Increased flooding	Altering the flow of water Damage from flooding
	Geological changes	Landslides Erosion
	Ecological changes	
	Cutting of Trees	
	Poor distribution of benefits	
	Reducing Aesthetics	
Positive	Minimal impacts	
	Increased electricity production	
	Development of the area	

Negative cumulative impacts from hydropower development were discussed by many participants. A few participants further discussed the sensitive and dynamic nature of the Himalaya. For example, Rahul Sharma and Dr. P.D. Lal, both environmental activists, said:

> The Himalaya is changing fast, and we continue to disturb the nature through projects, roads, concrete. (Rahul Sharma)

> Like your Canada, these are glacial areas, very rich in biodiversity and very, very sensitive ecosystem. (Dr. P.D. Lal)

Such comments emphasize the greater urgency for negative impacts to be reduced and addressed. The following negative cumulative impacts were identified by study participants during interviews.

4.3.1. Water Scarcity

Water scarcity was the most common cumulative impact discussed my many participants, during interviews. Participants from different backgrounds talked about water scarcity, framing it as an

impact caused by small hydropower development, or as something affecting the ability of MHP projects to run properly. Water scarcity was discussed as a negative cumulative impact and was associated with impacts on farming, drinking water, electricity capacity, fisheries, flourmills and the aesthetics of the area. Many participants discussed their concerns for existing water scarcity, or their fear of potential water scarcity associated with small-scale hydropower production.

Farming. Since agriculture is a primary livelihood for people living in the Kullu Valley, there is distress about water scarcity. This was evident in interviews as some participants referenced the potential effects of water scarcity on farming activities associated with several MHP projects along the same stream.

Participants who spoke about the effects of water scarcity on farming sometimes referred to general water scarcity affecting farming. For instance, Amar Nath, a Panchayat Pradhan said, "several projects along one stream will affect irrigation and people". Other participants spoke more directly about issues with diverting water away from irrigation lines, thereby leaving lower flow and a water shortage for farmers. For example, two academics said:

> There are social impacts such as causing a shortage of water. This creates problems for agriculture, and horticulture. Before development of a project here, water was used from the Nallahs for irrigation. After development, the water is being diverted and the community is not able to irrigate which is causing a crop crisis and so a failure to earn money. (Chet Ram)

> Due to the long pipelines, the stream water was diverted another way. The agricultural land between is what dried up. They don't have any irrigation water there, so the agriculture land was turned to the barren land. This is a large impact we have seen. (Dr. Kesar Chand)

A few participants also discussed an increasing water shortage for farming, for example:

> We are dependent on apples, but the projects collect the water, and we are suffering. The projects will spoil our agriculture. Day by day the water level is reducing, and the projects are using this water. (Amar Rana, Panchayat Pradhan)

> Where projects are being established, these rivers and streams are snow fed, but the glaciers are receding. There are many orchards, so demand of water is increasing day by day. (Man Chand Thakur, Retired Forest Officer)

This implies that in addition to the water being diverted for running the projects, overall water levels are further reducing. Rahual Sharma (environmental activist) highlighted the increase in demand for water saying, “because of irrigation, we need more water for the orchards than rice. We need water for spraying, and for growing exotic vegetables like broccoli”. Another reason for increased demand of water is for pesticide sprays for apple orchards, as expressed by a few participants. For example:

> We also need water for the spray for the apple trees. (Harsh Krisham, Panchayat Secretary)

> There is a big focus on water since it is so important for sprays for apple orchards. (Hemraj Thakur, FRC Member)

Two participants specifically faulted project proponents for causing such water shortages for farmers, for example:

> The valley is very rich in water sources, because they are all glacial fed. Water is coming. So, all that water, instead of coming to farmers and stakeholders, that goes into investors.” (Dr. P.D. Lal, Environmental Activist)

> Micro hydro projects use local water sources. They are all on small streams, the same ones used by irrigation systems. There is conflict with farmers and investors. They are looting water from local use. (Guman Singh, NGO Coordinator)

Drinking Water. The second most discussed concern regarding water scarcity from MHP development was associated with having a lack of drinking water for villagers. A few participants talked about how drying of streams was presently affecting, or they fear would affect, their access to drinking water. For example:

> There is a failure from local issues like a lack of drinking water. (Anonymous Participant 5)

> The water is also the drinking source for the village. They are now dried out because of changes to the environment. (Rahul Sharma)

Another participant who is the secretary for his Forest Rights Committee (FRC) for his Panchayat indicated his concern for access to water for animals. The FRC is a community group formed to protect forests and provide information to people on the rights of locals regarding the surrounding forests. This FRC secretary said, “the impacts are affecting the villagers because in the winters the rivers are drying

up so animals can't drink water" (Gokol Chand). A lack of drinking water was also connected to polluting water during construction of MHP projects. Amita, who is the Pradhan of the women's group, Mahila Mandals, for her Panchayat said:

> We were opposed because the water goes to the villagers for drinking. When workers come or whoever stays in the village, they pollute the water. The water is used for irrigation, but MHP will reduce the water flow for irrigation and drinking.

Overall, there was concern for access to drinking water currently, or in the near future.

Reduction in Electricity Production. Water scarcity was also discussed in terms of decreasing electricity generation. This was discussed by a diverse group of people, including by government officials. They were concerned with project capacities decreasing because of low water flow for MHP projects. A few participants said that the water flow in winter is a big concern since capacities decrease significantly from the summer months. For example, two employees of HIMURJA, the authority for MHP in Himachal Pradesh, said:

> In the lean season, a 2MW project becomes a 500kW project. (Pseum Dass)
>
> Some project capacities are decreasing because there is less discharge. (R.K. Shukla)

Another participant who wanted to remain anonymous said, "in the winter there is less water, and electricity production is less" (Anonymous Participant 5).

A few participants talked about using the decrease in capacity of projects as a way to persuade investors away from building new projects. Rahul Sharma said, "we told the investors there wasn't enough water for a hydro project and they've had a lot of problems because of a lack of water – they close sometimes for one month at a time".

Romi Chandra, who is a geography professor and researcher called into question the long-term effectiveness of projects saying:

> How long will this serve the purpose? Some say that these kinds of projects have a very short lifespan… because even the supply of the water is questionable. Where is the water coming

from? Is there is a glacier or a lake? But the glaciers are all shrinking and melting. That question is there.

Fisheries. A few participants talked about fisheries being impacted from MHP development. Water scarcity was the reason cited for fish farms being impacted. Upon describing changes to the environment, and due to MHP development, Rahul Sharma said, "there are fish farms, but now sometimes they are not successful because there is no water". Tot Ram, a trout farmer, also described water scarcity during periods when the hydro power projects are being cleaned. During the winter, when there is less water, the projects get cleaned by releasing built up silt. But during these winter months, this is also the time for hatchery season. The trout farmer said:

> When the projects are being cleaned, the silt that is released affects the hatchery. The silt sticks to the eggs, thereby reducing mortality. We also cannot shake the crates that the fish are in so they cannot be cleaned. This is a big problem. (Tot Ram)

Flourmills. A few participants made reference to gharats, meaning flourmills, to describe one of the impacts of water scarcity from MHP development. Two researchers said:

> We have observed that in small project, the gharats, the flourmills, are affected. Most of the flourmills were destroyed, I think, deformed by the divergent of water. (Dr. Kesar Chand)

> Local people should be involved in planning. For example, flourmills are affected by a shortage of water. This affects employment. Some water from hydropower development should go to flourmills. (Chet Ram)

One Panchayat Pradhan also talked about watermills, which were likely used as flourmills. He described the long-term issues of diverting water, saying:

> Individual projects on one stream are okay, but multiple projects will slowly impact the environment. We used to do agriculture, but we don't anymore. In other places they've been affected by a lack of water. Some places that use watermills are also impacted so they are no longer using these. There are long-term water issues. (Roshan Lal)

4.3.2. Increased Flooding

Since the Upper Kullu Valley is highly impacted during monsoon season, flooding is a major concern for people living in the area. During interviews, some participants talked about flooding and the

implications that MHP development has had on increasing the amount and intensity of flooding during monsoon season. Although almost all participants who talked about flooding associated MHP with amplified flooding, one participant expressed a different opinion. An employee of the fisheries department indicated that, “flooding is not related to MHP” (Chanchal Thakur).

However, many of the participants who talked about flooding indicated that there was a correlation between MHP development and increased flooding, for example:

> There are generally negative impressions of local people regarding hydro power projects because the periodicity of floods has been increasing after the installation of projects. (Shubham Deep, Geology Doctorate Student)

> Where projects are, flooding comes 10 years later. (Amar Rana, Panchayat Pradhan)

> In the past, we didn’t know about the negative impacts of the projects, but now we can see floods that are destroying the village land. (Gokol Chand, FRC Secretary)

Altering the Flow of Water. A few participants attributed increases in the periodicity of flooding, or the intensity of the effects of flooding to project construction and moving boulders. During construction of projects, tunnelling is sometimes done so pipes can run through the mountains to divert water towards the powerhouse. Roads are also sometimes constructed for projects. The material, or muck, collected from both building roads and drilling tunnels is dumped nearby and is then either managed so as to prevent the muck from moving into the water or the dumping area is converted into a tree plantation area, using funds from the Local Area Development Fund, which is funded by project proponents as a requirement for MHP development. The funds are intended to be used to support local development, such as schools. A few participants indicated that when the muck from tunnelling is dumped, it is done very close to, or in, the riverbed which can cause changes to the water flow or increases the silt concentration of the river. For example:

> Last year, there was flash flooding. People claimed it was because of the projects. The projects are dumping muck into the nearby river. This causes flooding. There are no dumping areas, so the muck goes to the river side, and it shrinks the river. (Sheetal Thakur, Sociology Professor)

> Muck from tunnelling and digging the projects go into the river which has changed the movement of the river. (Kaushalya Devi, Panchayat Pradhan)

Vijar Kumar, who previously worked as an engineer on hydropower projects and is now a Panchayat Pradhan, confirmed the same thing, saying, “there are many projects, and they are going to construct many tunnels, and their muck is directly disposed to the rivers”. In shrinking the riverbed, there is concern that the concentrated amount of water that runs through the river system during monsoon season will cause the streams and rivers to overflow.

The Palchan Bhang project that was visited was under construction involved tunnelling into the side of a mountain. There was also a buildup of muck to secure the makeshift bridge, used for accessing the construction site. Upon observation, dumping from construction was done near or even in the stream. As shown in Photo 2, the muck appears to shrink the size of the stream bed where the bridge is.

Photo 2

Palchan Bhang Project Under Construction

The pollution control board oversees monitoring the flow and pollution of water, which includes muck disposal from projects. One government official working with the Pollution Control Board said that

although there is little muck from MHP projects, “dumping site are close to rivers and must be protected the riverbed. They can be washed away in floods. We monitor these sites” (Sumit Sharma). This signals a positive feedback cycle since this official indicates that when there is flooding, there is potential to increase the muck into riverbeds. At the same time, a few participants indicated this to be the cause of flooding. Additionally, while there is supposed to be monitoring of muck disposal, there seems to be a disconnect between theory and practice as many people are observing muck disposal directly into the water. Hukam Ram, a Panchayat Pradhan, made this link about a specific project, saying:

> The project is an underground project. They have constructed a road, and all the soil and stone was thrown on this mountain. Since the Himalaya is not flat ground, there should have been plantations and enough work done to keep that soil there. In rainy season most of the soil was washed away. The plantation and wherever else they put the mud was not preserved as it was indicated on paper. It should have been executed more seriously, more properly. So, if there is cloudburst, or anything, then all the muck will come to the village, and it will destroy everything.

Other manufactured causes of flooding resulting from MHP development that were identified in interviews included moving boulders in the riverbed, and from building protective walls. One participant indicated that project proponents were moving rocks and boulders to protect the projects from flooding, but in turn, changing the flow of the water. In speaking about a specific MHP project, Gokol Chand (FRC Secretary) said, “I’m concerned with the Solang project – They are using machines to protect the project but at the same time moving the water towards the village”. During a visit to the Phindri Hydropower project, I observed workers on site moving rocks in the river to move the water away from the project. Project proponents wanted to protect the project since flooding the previous year caused damage at the intake site and caused the project to close for a day.

Similarly, Kaushalyan Devi, a Panchayat Pradhan, said that when project proponents build protecting walls, the rocks get stuck along the walls, changing the flow of water and sometimes harming the villages. She said:

> The flooding has washed away a lot. The concrete calls constructed by the companies for the MHP projects cause the rocks to get stuck which moves the current in a different direction

which often harms the villages. Without the projects, the floods wouldn't have happened. We are asking the government for compensation so that we can make our own walls to protect the village and prevent damage.

Damage from Flooding. One of the concerns associated with altering the flow of the river is that the water flows towards villages, causing flooding in villages and damage to infrastructure and agriculture. Three Panchayat Pradhans indicated this in saying:

> It diverts water to the village and destroys agriculture and the village. (Chura Mani)
>
> This Nallah flooded last year and damaged public property. (Amar Rana)
>
> There is one project that is very dangerous in Buruwa. It is built in the middle of the stream. It diverts water to the village and destroys agriculture and the village. (Chura Mani)

Two other participants indicated damage to infrastructure because of the placement of projects along streams. For example:

> Government is proposing, or authority is proposing, the site in between the stream. But cloudburst in this area is very common. Flash floods and landslides are very common. So how we can protect that infrastructure? (Dr. Kesar Chand, Geography Researcher)
>
> Most structures are on the riverbed, so cloudbursts cause infrastructure damage. (Psem Dass, HIMURJA Employee)

Evidence of flooding was also evident through observation. The Serai project was under construction and had been closed for two months since the penstock, the pipe that transports water to the generator, was washed away during flooding. As shown in **Photo *3***, a cement mixer was visible to repair the penstock.

Photo 3

Serai Project Under Construction

Three other projects visited had been closed due to flooding at least once in the last two years. Additionally, many participants discussed failed or damaged projects that they were aware of in the Kullu District. The most common reason attributed to damage or project failure was from flooding, for example:

> There are two projects affected by flooding – one of them is the Serai Pinnacle project… A 5MW project in Tosh had another project that was affected by flooding. (Anonymous Participant 1)
>
> And I think in this year, one small hydroelectric project washed away. I remember, Palchan, that hydroelectric project, I think the penstock was washed out. (Dr. Kesar Chand, Geography Researcher)
>
> There are some projects that have stopped due to floods, but I don't know any specifically. (Monika Bharti, Panchayat Pradhan)

4.3.3. Geological Implications

Concerns over landslides, and land erosion were discussed by a few participants in interviews. Participants associated these geological changes with MHP development. For example, two academics said:

> There are also sinkholes and landslides from SHP projects. No matter the scale, there are large impacts. (Dr. Nirmla Singh, Public Administration Professor)
>
> Some landslide incidents are continuously happening related to hydropower development. (Shubham Deep, Geology Doctorate Student).

These comments point to the general connection between MHP development and geological changes.

Geological changes were a particular concern during the construction phase of projects, and where tunnelling is done. Disturbances during the construction phase were correlated to landslides and erosion, for example*:*

> All the landslides that are happening are from tunnelling which creates soil erosion. We should not have MHP because they are harming locals and not providing any benefits to them. (Kaushalyan Devi, Panchayat Pradhan)
>
> During the construction phase, this is all fragile. There are landslide areas (Dr. P.D. Lal, Environmental Activist)

This concern was further related to decisions to issue NOCs. For instance, Vijar Kumar, a Panchayat Pradhan said, “people realize that we should not give the NOCs, because technically, construction work damages the sideline of the rivers and the Nallah of that area”, indicating that construction was causing erosion to the riverbanks. This points to previously discussed concerns of flooding, where participants talked about how increasing the sediment load in streams is altering the flow of water and potentially redirecting it towards villages.

4.3.4. Changing Ecology

When participants discussed the negative impacts associated with MHP development, a few participants discussed how the disturbances created by development are causing harm to the ecology of the area. According to Swaran Jayanti Energy Policy (2022), 15 percent of the total flow of water in streams must be maintained, even when water is diverted to MHP projects. The minimum 15 percent flow, determined by the government, is based off the low season, in wintertime, when there is less

water flowing in streams. The District Officer from the Pollution Control Board indicated that their role is to “ensure ecological flow that is essential for agriculture, for drinking and for animals. This ensures ecological balance” (Sumit Sharma). However, Dr. Kesar Chand, a geography researcher, said that even when 15 percent of flow is maintained, it is an insufficient amount since the streams are very small to begin with. In connection with water scarcity, a few participants indicated an impact on ecology, for example:

> The flora and fauna are affected in the stream. (Man Chand Thakur, Retired Forest Officer)
>
> There’s been less water, the species are affected. (Chura Mani, Panchayat Pradhan)

Another example of biodiversity loss was given by Hukam Ram, a Panchayat Pradhan, who discussed birds living and nesting close to the rivers which were being impacted by MHP development. More generally, he spoke about a loss of bird and insect populations, saying:

> I'm not able to see many birds which were here 20 years back. The birds used to come to my garden, but not many now, and there are no more butterflies. These things [project development] have impacts. I also used to have honeybees but now there are not many honeybees in the village. A few people had honeybees last year at their home, but 50 percent of the have honeybees died. (Hukam Ram, Panchayat Pradhan)

While it is unclear if the birds described here are impacted directly from MHP development, there is acknowledgement that certain birds living and nesting close to rivers are impacted.

There was also specific reference to an increased impact on ecology when there are more projects along a stream. Two geography professors said:

> There are more impacts to aquatic life and to biodiversity with more projects. (Sneh Lata)
>
> The river acts as an ecosystem, so many projects along a river will destroy the ecosystem. The food chain will be destroyed, which also harms humans…. I don’t think the effects of surrounding projects is considered. But the distance between projects should be considered because the entire ecology of the area is affected. (Dr. Renuka Thapliyal)

4.3.5. Cutting of Trees

While less common, cutting trees for MHP development was discussed by a few participants during interviews. A few participants either employed in the private MHP sector or as government officials described it in a positive manner, in that smaller scale projects require less tree cutting. For example, three government officials said:

> Damage from SHP project includes cutting trees and road construction. Smaller projects have smaller impacts versus large projects. (Khekh Ram Thakur, Block Development Office)
>
> There is not much tree cutting done (R.K. Shukla, HIMURJA Employee)
>
> MHP is very good because there is less environmental damage to nature and to trees. (Psem Dass, HIMURJA Employee)

Although the comparison acts as a positive association of MHP development over larger scale hydropower development, tree cutting was still described by participants as an impact. Tree cutting for MHP development was also described as a more discernible negative impact and more damaging when there are more projects close together. For example:

> When you are building two or three projects, there will be more cutting and more roads which creates more environmental disturbance. (Bir Singh Thakur, Elected District Level Official)
>
> We resisted the projects because of concerns for tourism, impoundment, deforestation, and the climate. (Guman Singh, NGO Coordinator)
>
> The environment is degrading from projects. They are moving into forests now. (Kaushalya Devi)

Daya Ram, the Pradhan for his Panchayat FRC, also went on to discuss how MHP development in forests has impacts beyond trees, but also prevents natural ecosystem services from working, saying:

> The forest should be left alone from hydropower – it affects everything and, in every way, and it will create more movement and development into the forest. The forest is a natural process, and it doesn't need human interference – it will take care of itself even if humans are not involved. The grasses and the roots prevent flooding.

Overall, however, a diverse group of people discussed tree cutting as associated with MHP development.

4.3.6. Reducing Aesthetics

Aesthetics was another theme noted during interviews, which was also evident through my observations of various MHP projects and in interviews. Impacts on the aesthetic beauty of the area was talked about by a few participants, for example:

> It destroys the natural beauty because of drying streams and from the infrastructure. (Bir Singh Thakur, Elected District Level Official)

> You know, just that they're building pipes, fitting those pipes from top of the mountain to the bottom. In some ways, it might affect the scenic field because this is also a tourist area. It's like an odd structure, you know, ugly thing. We call it visual position. That sort of thing is there because there's a huge pipe coming down from the entire mountain to the bottom. (Romi Chandra, Geography Researcher)

> The aesthetic beauty is also spoiled. (Man Chand Thakur, Retired Forest Office)

One participant reasoned that there was a fear of changing the aesthetics of the area if MHP projects were established there, saying "tourism would've been impacted by the projects from water scarcity, changing ecology and aesthetically" (Bhagwan Singh Rana, Environmental Activist).

The impact on the aesthetics of the surrounding area was very apparent while visiting MHP projects. As shown in **Photo *4***, **Photo *5***, and **Photo *6***, penstocks are located in areas that are visible to anyone on the main highway. The penstocks obscure the view and reduce the natural aesthetic of the area. This is particularly evident in **Photo *6***, where tourists can be frequently seen being driven up towards the Anjani Mhadev temple – a well-known temple and tourist attraction of the area.

Photo 4

Aleo I Penstock Visible from the Highway

Photo 5

Marhi Penstock Visible from the Highway

Photo 6

Serai Penstock

Other aesthetic downfalls were very evident across all the projects, and particularly for the Beaskund project. Photo 7 consists of six pictures which show various pieces of infrastructure, or equipment. As shown in the upper left quadrant, there is an arrow pointing upwards, indicating the path of Beaskund and showing that the hiking path locals and tourists use is directly beside this infrastructure. The upper centre picture shows tents pitched close to transmission line poles, obstructing the view of the mountain.

Photo 7

Beaskund Infrastructure Along the Beaskund Hiking Trail

Similarly, the Chorr project, is close to the popular tourist destination Jogni Falls. The project construction has been stopped for numerous years but pipes and partially built structures can be seen along the trail to the falls, as seen in Photo 8. The project stopped construction due to resistance from the surrounding villages. The project was being constructed very close to a temple, used by locals as a ceremonial space to give babies their first haircuts.

Photo 8

Chorr Project Remaining Infrastructure

Since Jogni falls is a popular tourist destination, some Dhabas and shops have popped up. As shown in Photo 9, the shops are using the remaining pipes and infrastructure to shelter their spaces, or provide additional seating, as shown in the centre picture.

Photo 9

Makeshift Shops Along the Hiking Trail to Jogni Falls

The Haripur Nallah project is located next to a boy's boarding school and a forested area. **Photo *10*** shows the contrast between the surrounding forested area and the infrastructure of the powerhouse.

Photo 10

Haripur Nallah Project Amongst a Forested Area

4.3.7. Poor Distribution of Benefits

MHP development was also discussed in terms of providing benefits to only a few people, including to private companies or to the government. Although Local Area Development Funds exist to help ensure locals receive benefits from MHP development, participants indicated that the funds are often poorly allocated.

During interviews, participants discussed a lack of benefits received by the people who experience the impacts from MHP development. A few participants referred to private companies receiving benefits, for example:

> Projects are only constructed for the benefit of a few, or for companies that are self-interested. They don't see the impacts to the local people. These projects should not be considered for implementation on the hillside. (Anoop Thakur, Activist)

> Private people take benefits over locals. Locals want jobs but it doesn't happen. (Sneh Lata, Geography Professor)

> The people who are building the projects are interested in money, whereas the locals are affected by water resources and landslides. (Sukhbis Metha, FRC Pradhan)

The same position was reflected in decisions about new MHP development. Gokol Chand said, "we refused to give the NOC because the villagers had demands that they wouldn't fulfil. Only the project people get the benefits so why should we give permission if we will only lose water?"

While a few participants discussed private companies receiving benefits from MHP development, a few also discussed the government receiving benefits from MHP development, rather than locals. An aspect of the Swaran Jayanti Energy Policy, which has created change for MHP projects, is an adjustment in royalties. Previously, the royalty for project developers in the first 12 years of a project was 3 percent, followed by 13 percent to the 30th year, and 19 percent from years 31 to 40. Now, the royalty is 15 percent in the first 12 years, 20 percent for years 12-30, and 30 percent up to year 40 (Hindustan Times, 2023). One HIMURJA employee attributed the royalty changes to increasing income for the government, saying "royalties have changed to increase the shares and income for the government" (R.K. Shukla). Another participant, Man Chand Thakur, a retired forest officer, referenced MHP projects as a source of funding for the government, citing their main interest as money, saying "it is believed that hydropower projects are the only way to generate income, through royalties and revenue from the projects. The major interest is money, and this is the reason for ignoring the objections of communities." Additionally, Kaushalya Devi, a Panchayat Pradhan, said, "we used to live without electricity, so for locals MHP projects don't give any benefits – they are for the government," indicating that the intention of MHP projects is not to improve the lives of those living nearby, but rather to obtain funds for the government.

The Local Area Development Funds are collected so that local communities, who are impacted by MHP development, receive compensation for the impacts they experience. The fund was established to provide benefits to communities impacted by MHP development. As such, 1 percent of the project cost should be issued by the project proponent, and following construction, revenue generated from 1 percent of the power generated should be issued to the Local Area Development Fund. The funds are allocated to the affected area and the Panchayat, and for micro projects, they are also given to the affected block and district (Government of Himachal Pradesh, 2022). However, a few participants discussed how funds are poorly allocated, and the communities affected by projects are not receiving any of the funds. For instance, one project owner indicated that they put money into the fund, saying:

> The government is not putting the money back into our area as it should be done. The government should at least help the local area. I give so much money for the Local Area Development Fund, the community should take it over. (Budhishwar Gaur)

Gokol Chand also said, “there is an amount in the budget for the project that is supposed to be given to the village, but it is not given. The district commissioner has the money, but it should be given to the village.” So, while there is intention in the policy to support the places that are affected by projects, participants indicated that the funds are not being dispersed appropriately.

4.4 Positive Cumulative Impacts

Although negative cumulative impacts were discussed more frequently during interviews, positive cumulative impacts were discussed by some participants. These impacts included electricity production, providing a source of energy with few or no impacts, and contributing to development of the area.

4.4.1. Minimal Impacts

When talking about the positive cumulative effects of MHP projects, the most frequently mentioned reason noted by participants was from the minimal impacts caused by MHP development. Some participants indicated that there are few to no cumulative impacts from MHP, citing MHP as a

form of green energy, ecofriendly, or less harmful to the environment. In general, participants who spoke of MHP in this way, had a positive perception of MHP and supported the development, stressing their necessity. There were various types of participants who indicated positive perceptions of projects, however, many of the participants who were employed in the private MHP sector or who were government employees contributed to this perspective. For example, three participants from those two sectors said:

> SHP should be promoted because there are not many environmental issues. (Sumit Sharma, Pollution Control Board)
>
> There are not really any environmental impacts because only a small amount of water is taken. Few projects involve tunnelling, and there is less tree cutting. (Sitesh Thakur, Project Engineer)
>
> Run-of-the-river projects are ecofriendly. There is not much tree cutting done and only small streams are diverted. (R.K. Shukla, HIMURJA Employee)

In a similar manner to describing deforestation, in a few instances, participants from different backgrounds compared MHP development to larger-scale development, signalling that the positive outcome of MHP is from fewer impacts. For example:

> MHP projects are better than large scale projects because they are less harmful to the environment. (Dr. Renuka Thapliyal, Geography Professor)
>
> The small ones are not disturbing that much. They actually use a new construction style. They are not building big dams like earlier. They are diverting the river to the channel of where they are building where they are producing the electricity. They are just diverting it and later it is coming to the river. (Hukam Ram, Panchayat Pradhan)

4.4.2. Electricity Production

Electricity production was discussed as a positive cumulative impact from MHP development. Due to frequent power shortages in the Kullu Valley, there was a desire for more reliable electricity, however, power produced from MHP projects go to the state grid and are not guaranteed to increase the reliability of electricity in the Kullu Valley. Yet, a few participants, who are educated individuals, discussed the necessity of electricity and how MHP projects helped supply this electricity. For example:

> MHP is green energy and can be positive because it provides electricity to locals. (Sneh Lata, Geography Professor)
>
> MHP development also helps to provide electricity for small communities. (Chet Ram, Geography Professor)
>
> See, we need to construct for development. We are a developing country. We need more electricity, more power. (Hukam Ram, Panchayat Pradhan)

A few participants also expressed that because MHP projects generates much needed electricity, this overpowers some of the negative impacts from MHP development. For example:

> MHP is good because we need energy. There are also environmental problems associated with, but energy needs are greater, so MHP are necessary, and electricity generation is more important. (Sukhbis Metha, FRC Pradahn)
>
> I'm not totally against the projects because everyone needs energy. (Vedram Thakur, Past Panchayat Pradhan)

4.4.3. Development

Lastly, a positive cumulative impact of MHP development discussed by participants was the promotion of development in the area. A few participants indicated that MHP development in the area was providing employment, social welfare, and connectivity through road construction, for example:

> When the [MHP development] start, the area becomes developed. They create connectivity for rural villages through building roads, employment for locals, through society of welfare – we gave 500,000 rupees to the school from the company. (Anonymous Participant 1)
>
> We need to build the projects because we need the development to be done in the future, in the long-term or short term. We cannot say no to development. They [MHP projects] should be done, but they should be executed properly. (Hukam Ram, Panchayat Pradhan)

This last participant demonstrates that for them, the positive cumulative impacts outweigh the negative cumulative impacts because they contribute to the overall development of India.

Local employment through MHP development was identified as a positive cumulative impact by a few participants. Participants indicated that employment contributed to development and economic benefits for the local area, for example:

> With hydropower, lots of people will get jobs. (Khekh Ram Thakur, Block Development Office)

> There are social impacts in terms of economic benefits through employment, female development, and scholarship to affected people. (Anonymous Participant 4)

One environmental activist, Bhagwan Singh Rana, also cited it as a reason people did not support their resistance to MHP projects, saying "some locals were also against [our resistance] because of the temporary employment that would come from the projects." However, a few other participants indicated that while a certain amount of employment was supposed to be given to locals, this frequently did not occur, or it was temporary work that did not lead to sustained benefits. For example:

> We were told that there would be local jobs – jobs like supplying vehicles would be done by the villagers. We fought the case in court. There have been no local jobs and they have refused to give us any benefits. (Hotam Beas, FRC Secretary)

> They say the projects will generate employment, but it's not true. Higher posts in the company are already filled. It is the lower and temporary positions that they hire for. (Sheetal Thakur, Sociology Professor)

During cite visits, it was apparent that hiring local people meant hiring from Himachal Pradesh or the Kullu District, and only in a few cases from the villages impacted by the projects.

As referenced earlier, the Local Area Development Fund is supported through directing 1 percent sales of the energy produced from running the MHP projects to the fund. These funds are issued to contribute to development of the area where the projects are constructed. While there is criticism around whether those funds are correctly distributed, a few participants found them to contribute positively to the social welfare of the area. For example*:*

> They should have MHP. There are benefits like light for the community. (Madhu Devi, Panchayat Secretary)

> They will also be building a playground for a school. Funds are allocated for social activities to the affected villages. The company does this personally and the whole cost of it is done by them such as labour, materials, etcetera. (Anonymous Participant 1)

Another aspect of development that was positively conveyed by a few participants was through increasing the connectivity of villages. A few participants indicated that when building roads for the

MHP projects, that road provided some villagers with increased accessibility, for example three community members said:

> In Soil, the road through the village is positive for the village and it didn't involve cutting any trees. Some houses before didn't have road access and now they do. (Hotam Beas, FRC Secretary)

> Yes, people are normally supportive of new projects. People want to benefit the village. For example, new roads and water supplies. (Asha Rani, Village Organizer)

One participant described the importance of increasing connectivity through roads by saying, "roads are important because if someone gets sick, we have to carry them. For agricultural use we need labour for carrying. It costs money to transport the apples" (Amita, Mahila Mandals Pradhan).

Connectivity was also observed during visits to projects; however, they did not always present as a social benefit. Many projects that were observed had roads leading exclusively to the projects and were evidently constructed for the purpose of accessing the projects, as shown in **Photo *11***.

Photo 11

Aleo I Project Road

A few project roads were in poor condition, sometimes questionable to drive on, even in a 4x4 vehicle. This was the case for the Phindri project, as shown in **Photo *12***. We opted to walk down the 1.5 kilometre road rather than drive. The road to the Beaskund project and to the Serai project were built haphazardly and would not be accessible in a normal vehicle.

Photo 12

Phindri Project Road

It appeared that most roads were built solely for accessing the projects. But for the Solang Powerhouse, the road also led to a residential area, as shown in **Photo *13***. The road was built initially for the project and appears to be essential for the people now living there.

Photo 13

Solang Project Road

One participant further mentioned a boost in tourism because of the increased connectivity that MHP provide. However, it was difficult to understand why this was the case because roads created for MHP generally seemed to be exclusively used for the projects.

Lastly, a positive cumulative impact from MHP development presented by a few participants was a boost to the economy. Participants indicated that there was a boost to the economy from MHP development, for example:

> Small hydro power is good, it boosts the economy, and it boosts private companies. (Anonymous Participant 4)
>
> SHP projects are good for the local economy. (Dr. Renuka Thapliyal, Geography Professor)
>
> It is good for entrepreneurs because it is a smaller industry. (Raymish Sharma, Activist)

However, it was unclear why the projects boosted the economy. While the DPRs indicated projects should contribute positively to the local economy, as noted above, a few participants indicated a lack of benefits to locals. Likewise, two project owners, who are locals, described the difficult process of establishing projects, inhibiting many from pursuing this type of entrepreneurial activity. They said:

> Getting a project is a cumbersome process. There is blackmailing my locals, and it is expensive. (Bhuvneshwar Gaur)
>
> For small projects, it is not worth it to build more projects because of the high cost and effects on the environment. (Dile Ram)

4.5 Chapter Summary

Through a document review, observation and semi-structured interviews, the current activities of MHP development in the Upper Kullu Valley were studied. Eleven projects were observed, information from HIMURJA outlines the hundreds of projects commissioned, under construction or in pre-assessment phases in Himachal Pradesh and the Kullu District. However, other information on projects, like DPRs, was difficult to obtain, and in cases when DPRs were reviewed, little information was found on how social, environmental, economic, and cumulative impacts were considered. DPRs frequently provided justification for the projects without evidence to support these claims. They also tended to indicate there would be no adverse environmental or social impacts on the area. The cumulative effects established in participant interviews were either not addressed or did not seem to be a concern in DPRs. Furthermore, new policies did not indicate improvements for addressing such effects. Rather, it was revealed that two key changes were made to the new energy policy that have affected MHP development, including reintroducing Panchayat NOCs with discretion to the District Commissioner, and adding a criterion for minimum distance between projects.

The interviews revealed that there is uncertainty among participants as to whether project development will continue. They did identify a number of potentially positive and negative cumulative impacts of existing and proposed development. The most discussed cumulative impact pertained to water scarcity caused by MHP development. Water scarcity was described as affecting farming, drinking water access, reducing electricity production, affecting fisheries and flourmills, and impacting the aesthetics of the area. Flooding was also discussed frequently by participants, resulting from altering the flow of water primarily through dumping muck and moving boulders. Geological changes were described through events such as landslides and soil erosion. From a negative standpoint, ecological changes, deforestation and poorly distributing benefits of MHP development were also discussed,

although less commonly. The positive cumulative impacts from MHP development identified were electricity production with fewer cumulative effects than other forms of electricity generation, and increased social, economic and infrastructure development in the area. The information discussed in this chapter highlights the need for cumulative impact assessments to be done for MHPs, yet new policies lack adequate consideration for such impacts.

Chapter 5 Decision Making for the Development of Micro and Mini Hydropower

This chapter presents data on how people understand decisions are made regarding MHP development. Firstly, the role of community members is outlined as it relates to NOCs. The roles of the Forest Rights Committee (FRC), state and central government, and outside influences are then examined.

5.1 Perceived Roles and Processes of Decision Making

Amongst participants, the understanding of the process for making decisions varied significantly. Variation in how current policies are interpreted by individuals can be attributed, in part, to changing policies, such as the Himachal Pradesh Hydro Power Policy, which changed from 2006, to 2014, with many amendments throughout this time, leading eventually to the new Swaran Jayanti Energy Policy in 2021. Additionally, some Panchayats may not have been asked about new hydro power development for many years, before the time of current leaders, and when policies were different. Other reasons may be attributed to policy and procedures not being followed, information not being dispersed, or a lack of involvement in decisions. The following section establishes the perceived roles in decision making for MHP by Gram Panchayats (community councils), community groups, state government departments, and the central government according to the policies and individual interviews. Furthermore, there is discussion on some of the influences on MHP decisions.

5.1.1. No Objection Certificates

NOCs are a key part of the decision-making process for moving projects forward. As the name suggests, they indicate that the group issuing the NOC has no objections to the project. As stated in the 2006 Hydro Policy for Himachal Pradesh, project proponents needed to obtain NOCs from various state government departments, and from any affected Panchayat. Now, NOCs still need to be issued by the

Panchayat, through the Gram Sabah, which is the assembly of community members to discuss community plans, issues or any new developments.

NOCs were discussed by most participants in conveying their understanding of decision making for new MHP development. Participants agreed that various government departments needed to provide NOCs for MHP projects to move forward. These were identified as including Public Works, JaI Shakti, Wildlife, Fisheries and Revenue departments and Gram Panchayats. However, there was a range of perspectives on how the Gram Panchayat NOC is obtained.

Panchayat NOC. While a few participants indicated that the Panchayat NOC was required for projects to move forward, more participants indicated that NOCs from the Panchayat are no longer needed. For example, Dile Ram, a project owner, said:

> Before it was difficult to begin the projects because you get the NOC and normally the Panchayat refuses. But the state changed the policy. Now if the Panchayat refuses three times, they need a major reason for their refusal. If there is no reason given, then there is automatic sanction by the government.

This participant had a good understanding of the changes made to the Hydro Policy in 2021 which changed the requirements for Panchayat NOCs as outlined in the quote.

Some participants indicated that the government ignores the decisions made in the Gram Sabah (community assembly) regarding issuing NOCs. For example, two community members said:

> The interest of the state government is money, so often, compromises are made. Despite objections of local people, permission is given. There is one project in the Nallah (stream) here, but the government is ignoring all the objections. (Man Chand Thakur, Retired Forest Officer)

> We have been asked for NOCs and we have refused, but still, they are building them. (Om Perkash, FRC Pradhan)

Other participants discussed a lack of permission sought from Panchayats. Two participants discussed the construction of two different series of projects that were being built in-between two Panchayats. In these cases, one Panchayat was asked, but the other Panchayat was not. One Panchayat Pradhan indicated that “the other Panchayat gave the NOC, but not us, not Shirar” (Chitsalekha

Bhargava). In another Panchayat, the Pradhan indicated that "the project people have taken the NOC from Soil, but they did not ask us for an NOC. We would have asked the Gram Sabah (community assembly) for the NOC" (Sarla Devi). In both cases, the Pradhans believed they should have been consulted prior to project construction commencing. For both Pradhans, it seemed unclear as to why their Panchayat was being overlooked and believed there to be potential impacts on the villages from the projects.

One project owner called into question the effectiveness of NOCs since they are asked for after government has already allotted the projects. They suggest that NOCs should be asked for before allotment, and said:

> The Gram Sabah is not effective because the decisions made are not good. What's the point of going for a NOC if the government has already allotted it? The NOC process should have happened before the government allotted the projects. (Budhishwar Gaur)

While other participants were critical of the NOC process since the opinions of local people were overlooked, this participant highlighted a flaw in the NOC system. Their critique of a disingenuous approach to local consultation calls into question the effectiveness and intention of NOCs for Panchayats. The Swaran Jayanti Hydro Policy further pulls away from requiring consent from local Panchayats since the District Commission may override the opposition of NOCs from Panchayats.

5.1.2. Forest Rights Committee

The Forest Rights Committee (FRC) is a community group formed to protect forests and provide information to people on the rights of locals regarding the surrounding forests. One Pradhan of a FRC described their role saying:

> The government has ordered to form a committee to inform people about forests and encroachment. Also informing people about their rights for fuel wood when government officials don't let them. Everyone should be aware of their rights, but this hasn't happened. (Om Perkash)

It was understood by participants that the FRC was required to issue an NOC for MHP development to move forward. However, as with the Panchayat NOC, a few members of their Panchayat FRC discussed NOCs being ignored. For example:

> The project people come for NOCs, but no power is given to the FRC. If power was given to the FRC, then we would be able to check the state of the project. For example, a private company is building a road behind the village. We had refused but they continued building. The FRC needs power to stop them. (Gokol Chand, FRC Secretary)

> Along the Alia River, there was a project sanctioned even though the FRC refused. (Daya Ram, FRC Pradhan)

> Yes, we have been asked for NOCs and we have refused, but still, they are building them. (Om Perkash, FRC Pradhan)

Two participants further questioned the utility of the FRC, saying:

> The FRC is just a name, but they don't involve us in any decision making. We are supposed to stop environmental problems from happening. I've been the president and for 15 years. The only benefit of the FRC is that we can stop people from illegally cutting trees. (Daya Ram, FRC Pradhan)

> The Forest Rights Act is important, but the NOC is not being taken from them. Instead, it is being taken from the FRC which is a committee made up of around three people." (Guman Singh, NGO Coordinator)

The latter participant is referring to the 1980 Forest Conservation Act which requires the central government to issue permission for the use of forested land (Government of India, 2013).

5.1.3. Role of Central & State Governments

As is evident from the change to the Himachal Hydro Policy in 2021, government's role in deciding about MHP is significant. Both the state government and the central government have a role. During interviews, some participants talked about the role that either the central government or the state government have. Sometimes, it was unclear whether participants were referring to the central or state government, since they would say "the government".

Through discussion of the Panchayat NOC, and given the Swaran Jayanti Energy Policy, it is apparent from the data collected that state government, through the District Commissioner has

overriding power to allocate projects, over community members. Furthermore, government departments such as the Public Works, Jal Shakti, Wildlife, Fisheries and Revenue departments have an integral role since NOCs must be received from these departments for projects to move forward.

A few participants discussed the role of government departments in MHP development. For example, one employee from the fisheries department said, “we have a NOC committee where meetings are held, and projects approved” (Chanchal Thakur). It was clear, however, that NOCs from government departments are an integral part of decision making for MHP projects and the limits set by those departments need to be met. For example, one employee of HIMURJA said:

> There are many reasons why people object to giving NOCs such as irrigation lines, and encroachment of land. In these cases, we made an agreement to ensure a percentage of water will be given in writing by the company. Otherwise, the irrigation department won’t give the NOC, regarding irrigation issues… The main deciding factor for projects is through NOCs. The fishery NOC is important because you can’t have a hatchery in the project area. The company must get all the NOCs to proceed. (Psem Dass)

Another participant indicated the same thing, saying, “we cannot go over the limits set by the departments [who allocate NOCs]. For example, we cannot cut the trees unless they say. Their role is to protect the environment” (Anonymous Participant 2).

The central government was also spoken about in terms of needing permission for projects to move forward. A few participants discussed the role of the central government in decisions for MHP development, for example:

> The private companies don’t bother with permission from the communities now – they get permission from the central government. (Kaushalya Devi, Panchayat Pradhan)

> Based on the Forest Conservation Act of 1980, they must get permission from the central government. (Man Chand Thakur, Retired Forest Officer)

> For NOCs, there needs to be permission from the forest department and the Panchayat. 95 percent of the forests are reserved for the central government. Five percent is for local people. So mostly they need permission from the central government. (Ses Ram, FRC Secretary)

5.1.4. Influences on Decision Making

When speaking about decision making for hydro power development, some participants discussed the presence of bribery, pressures, and corruption. These participants indicated that bribes and pressures influenced decisions by creating pressure for community members and community leaders to issue NOCs or to prevent local push-back to project development. It was suggested that bribes and threats were from project proponents and government to move forward with projects. Corruption was attributed to community leaders and elected representatives seeking money through hydropower development.

Bribery. A few instances of bribery were discussed relating to issuing NOCs, for example:

> NOCs are gained by money and political pressure. (Guman Singh, NGO Coordinator)

> There might have been money given [to the previous Panchayat Pradhan] for issuing the NOC. (Chura Mani, Panchayat Pradhan)

> Although a few participants talked about Panchayat Pradhans specifically accepting bribes, two participants indicated that the participative nature of NOCs, through the Gram Sabah, meant there was less chance for pressure to be put on Panchayat Pradhans to issue NOCs. For example, one participant said, "I think it's better for the public to make the decisions because the members of the Panchayat can be bribed. Now NOCs are normally not given. (Kaushalya Devi, Panchayat Pradhan)

Other instances of bribery were discussed about stopping people from mobilizing against projects. For instance, when a series of projects were allotted in Jibhi, in the Banjar Valley, locals mobilized against the projects. Bgagwan Singh Rana, who was involved in this movement said, "I was threatened to be sued and offered a bribe in a suitcase of money by the state government" to stop opposing the projects. There was another instance of mobilization discussed on the Paknoj Hydro Project in Haripur, in the Soil Panchayat. Rup Chand Katoch, who was involved in this resistance said, "people were against the Soil project but the person in the village who filed the case was bought out with money… This country's judiciary can be bribed so it's difficult to fight cases. The companies that build projects bribe everyone" indicating that the project proponents often instigate bribes. This also

suggests that beyond influencing hydropower decisions, there are difficulties seeking legal justice because of bribery.

Pressure. A few participants also talked about threats, blackmailing, and political pressure being used to prevent people from resisting projects, to influence issuing NOCs, to agree to land acquisition deals, or to get community members to oppose projects. For example, one community member said about the Paknoj project that "some NGOs are raising issues. But the members of the NGO for Paknoj were given legal allocations to threaten them to stop resisting" (Man Chand Thakur, Retired Forest Officer). While pressures from outside the Panchayat may occur, one Panchayat Pradhan talked about the pressures that exist within the Panchayat because of opposing political affiliations, saying "since there is a change in the governing body, the opposition is making people scared that the projects will create changes in the water" (Chitsalekha Bhargava).

Corruption. Similarly, instances of corruption were discussed by a few participants. Corruption was associated with decision making for NOCs and new projects, and with village work. When talking about a new development project allotted, one Panchayat Pradhan said, "when my friends were discussing why the Minister didn't want to listen, they said, 'see, 4.3 billion rupees, 10 percent commission will go to minister'" (Hukam Ram) indicating that it was not beneficial for the minister to make an economically sound decision because the more expensive the project, the more money would go to the minister. In terms of village work, that is arranged through the Panchayat and funded through a central government social program, one participant said, "people in the Panchayat work for money. The Pradhan will say people do work, which they actually don't, and then they put the money into their personal accounts" (Ses Ram, FRC Secretary). Another participant, who previously worked as Pradhan for their Panchayat said, "I got out of the Panchayat because my Panchayat members asked to fill up the papers for work, and then take the money without having done the work. From the ministry level,

everyone wants their part" (Tot Ram). Not only does this indicate corruption on a local Panchayat level, but they suggest that corruption is commonplace at the ministry level as well.

5.2 Barriers to CBSEA

In examining how a CBSEA may be applied to the Upper Kullu Valley, one objective was to determine the barriers to implementing a CBSEA. This next section discusses the various themes identified in the data as barriers to a CBSEA. These include dissonance in the community, government implications, process deficits and a lack of education and awareness. The following section establishes the relevant common themes that emerged during interviews and confirmed during observation. These are outlined in Table 3

Table 3

Barriers to a CBSEA Identified in Interviews by Study Participants

Theme	Subtheme
Dissonance in community	Self-interest
	Disinterest
	Polarization of opinion
	Short-term thinking
Government failure	Lack of government care
	Funding for Panchayat Pradhans
Operational gaps	Inadequate maintenance and monitoring
	Insufficient preliminary studies
	Quality shortcomings
Information deficits	Lack of education
	Lack of transparency

5.2.1. Dissonance in Community

During interviews, a common theme brought forward by participants was concerning a lack of cohesion within communities. Participants indicated that people have different priorities, are not necessarily interested in community activities or are influenced by relative connections.

Self-Interest. A few participants discussed community members being self-interested. Given various scenarios, participants brought examples of how community members tend to put their own well-being first, over the well-being of the community. For example, three different Panchayat Pradhans said:

> People are not taking an interest in the development of the area. Rather, they want individual benefits. (Amar Rana)

> Sometimes villagers are interested in projects for other villagers, but they are especially interested in themselves – this is their priority. (Chitsalekha Bhargava)

> They want personal benefits, and if the meeting is for the public good, people are not interested in coming. (Kaushalya Devi)

Disinterest. While a few participants described community members to act in the own interests, other participants described community members as disinterested in community activities. A few participants said that community members were not interested in attending activities related to decision making in the community or to MHP development. For example:

> There is disinterest from the community because the Panchayat is not doing things and they don't have knowledge. (Bhagwan Singh Rana, Environmental Activist)

> Not many people have an interest in attending the meetings. So instead, the Panchayat goes to peoples' homes. (Ses Ram, FRC Secretary)

> It is very difficult to get people to attend the Gram Sabahs. During my time, people didn't take much interest. We would tell the Wards (a subdivision of the Gram Panchayat) to bring people so that resolutions could be passed. On the 3rd attempt to pass resolutions, you need less people. Getting people to come is like moving a stone in the throat. (Tot Ram, Trout Farmer and Past Panchayat Pradhan)

Similarly, a few participants discussed how participants are only likely to attend community meetings when there are important agendas. For example:

> People come if there is a big issue but otherwise less people come. (Amar Nath, Panchayat Pradhan)
>
> There are few people at the Gram Sabahs, only for important things. (Bhuvneshwar Gaur, Member of Legislative Assembly)

Polarization of Opinions. Differing opinions within a community is inevitable. However, polarization of opinions can deter decision making processes and create conflict, both barriers to a CBSEA. A few participants indicated that community members had vastly different opinions, making community-led decision making difficult. For example:

> Some people will be supportive of the project, and some will not. This will lead to disputes within the community. It is better for the government to do it. (Anonymous Participant 1)
>
> When the community makes decisions, it is difficult because people have very different opinions. (Monika Bharti, Panchayat Pradhan)

Short-Term Thinking. Similarly, there is polarization that exists because of the difference between people who think short-term and long-term. For example:

> People have long-term thinking, but some people are only short-term focused. (Roshan Lal, Panchayat Pradhan)
>
> They [community members] are generally short sighted. In a general sense, the majority of the people are short sighted. They do not care about the long-term effects of the project. (Shubham Deep, Geology Doctorate Student)
>
> Economic interests might change people's desire to think long-term. This is a global issue. (Guman Singh, NGO Coordinator)
>
> In one case, for the transmission towers, people wanted the money from compensation, so they offered their own land, so they'd receive money. They didn't consider the long-term impacts, it's just easy money. (Sheetal Thakur, Sociology Professor)

Another participant brought in an example of how community members are inclined to think short-term, saying:

> Community members forget about issuing NOCs. They only remember when there are problems. They are thinking short-term. For example, there is a water conservation project. The operations are poorly maintained, and no water is flowing into the tanks. This project was supposed to be for the long-term benefit of the community. Instead, people took short term

money to provide construction and materials, but it wasn't done properly. (Budhishwar Gaur, Project Owner)

Implications of Relatives. Lastly, the implication of relationships between relatives for decision making was mentioned by three participants. These participants talked about how community members tend to make decisions based on their relatives or follow suite with what their relatives are doing. For example:

> There are political reasons around MHP development. The state leaders are involved with planning and only involve their relatives. (Chet Ram, Geography Professor)

> Once a Pradhan gives the NOC, their relatives join them and support the decision. (Daya Ram, FRC Pradhan)

A Panchayat Pradhan discussed how they have to clarify their relationship with their relatives, saying:

> One big, big problem is that most of the people are my relative. Okay, I told them, you are relative in my home, you come to my home, you are relative, but in office, no relation. I have to be stern sometimes, strong sometimes. (Hukam Ram)

5.2.2. Government Shortcomings

There were two aspects concerning the government that act as a barrier to CBSEA for MHP development. Firstly, participants indicated that the government is lacking care for the community members living close to MHP projects. A few participants also said that the funding in communities prevented activities through committees and through the community from proceeding.

Lack of Care. A sentiment expressed by a few participants was that the government does not care about its residents. For example:

> There have been many attempts to change things. We've called the ministers, but they don't care, even though the awareness is there. They don't see nature or care about it. (Rahul Sharma, Environmental Activist)

> Government, I think somehow, they're lacking in this area. They are not very sincere or serious. They're busy collecting the tax, state government, and we don't have people who are actual

> visionaries, or leaders or who are committed. The bureaucrats who come here, they're here for two years and then they shift to some agriculture department or some health department. (Romi Chandra, Geography Researcher)
>
> We are not consulted. The government is concerned with money, and they don't bother with the people. (Rup Chand Katoch, Activist)

Similar findings were revealed in discussions about NOCs. A few participants discussed governments not listening to the objections of Panchayats and moving forward with projects without permission.

Funding for Panchayat Pradhans. A few participants indicated that funding constraints compromised certain activities within the community. Three participants talked about how Panchayat Pradhans are poorly paid. This bounds the role to people who are financially well-off and can fund their activities independently, or it means the activities of the Pradhan are constrained. For example:

> A good salary for the Pradhan would also help so they can do good social work (Dile Ram, Project Owner)
>
> There are demands and things, and it's very difficult. We have very low budgets. Then how can we complete their demands? (Vijay Kumar, Panchayat Pradhan)
>
> Every Pradhan is not a rich person. Every Pradhan does not have enough resources to go to the Manali office, to Kullu, to the Commissioner. We have to go to all the offices on our own money. If a Pradhan is paid well, then that will be helpful for a Pradhan who is not financially doing well. If a Pradhan has his own funds, then it is no problem. But lots of Pradhans, especially the ladies, they do face this problem. They cannot go to the offices because they do not have enough funds. And most of the lady Pradhans, they do not drive, so they have to take public transport, ask for a lift, or hire a taxi. It is problematic. (Hukam Ram, Panchayat Pradhan)

5.2.3. Operational Gaps

Some participants discussed how theory and practice do not align with MHP development in India, and in the Kullu Valley. Significant implementation gaps have large repercussions for CBSEA because this indicates that even if a successful CBSEA was accomplished, the implementation may not be done effectively, or in line with the outcomes of the CBSEA. Likewise, the high potential for poor

preliminary research prevents CBSEA from delivering accurate planning decisions. The following operational gaps were identified by participants.

Inadequate Maintenance & Monitoring. A few participants indicated issues pertaining to maintenance and monitoring. They discussed how little is being done to monitor MHP projects after they are implemented. For example:

> I think the policy is there; 15 percent of the water should be released to the farmers, but it is not followed in many cases. So again, maintenance, and it's obviously monitoring. (Dr. Kesar Chand, Geography Researcher)

> In reality, once the project begins, there are no permits required. The companies at first will agree to the people's demands but then they will do whatever they want. (Gokol Chand, FRC Secretary)

In reference to the social work that is supposed to be done by project proponents, Dr. Kesar Chand, a geography researcher said, "I have seen in many cases, you know, hydroelectric project authority builds the hospitals and maintain the schools, but they never come back for the monitoring." This diminishes the effect that the social work has on communities.

Similarly, two participants referenced different situations where maintenance was not done, for example:

> The hydro projects in the hill areas are not beneficial to local people. They are not maintained by the companies or by government departments. (Anoop Thakur, Activist)

> Previously, there was a valve the project people could push when cleaning which would push the water to the same stream. That valve has failed, and they aren't replacing it. A foreigner must come to fix this, but they are not doing it. (Tot Ram, Trout Farmer and Past Panchayat Pradhan)

Lack of maintenance was also evident upon observation of MHP projects. The Aleo II project is part of a cascading system and receives water discharge from the 192MW Allain Duhangan project. The discharge from Aleo II is then used by the Baragarh project, which was also visited. Nearby the penstock of Aleo II, **Photo *14*** shows old penstock pipes on the riverbank and was metal visible in the riverbed.

Photo 14

Aleo II Retired Penstock Pipes

Similarly, the Beaskund Top project, as shown in **Photo *15***, has broken metal sheets along the main path of the popular trail, Beaskund. **Photo *16*** also shows a broken transmission line pole which leans over the hiking path, with wires overhead.

Photo 15

Beaskund Top Broken Metal Sheets

Photo 16

Beaskund Top Broken Transmission Line Poles

When speaking about who should be involved in monitoring, two participants indicated that there is a role of the government, but locals should also be given authority to monitor. For example:

> It should be the role of the government to make checks on the project because the villagers can't do everything to check the water levels. But if power was given to the FRC then we could go check. Projects are installed and then never again are they discussed with the villagers. The FRC should check. The project people should give money. What goes to the government should first go to the FRC. The FRC can use the money to fix walls, or for other development. (Gokol Chand, FRC Secretary)

> Local should mean all the execution and monitoring is done by the bureaucracy. But they should include local society, local Panchayat, or local Member of the Legislative Assembly, Member of Parliament, all the representatives. Local representation should be there in monitoring and execution of any work. (Hukam Ram, Panchayat Pradhan)

Insufficient Preliminary Research. Three participants spoke about how background studies for MHP project development are done inadequately, or not at all. Furthermore, there is a call for studies on the specific areas where projects are being implemented. For example:

> The government should develop a fool proof system so as not to cause massive losses. There needs to be background studies and consideration for the climatic condition of the area. (Anoop Thakur, Activist)
>
> There are many government short cuts. There is no study of how much water is flowing each year, and no data collection. There is no consideration of global warming. The government doesn't want to know the facts. (Man Chand Thakur, Retired Forest Officer)
>
> There's not much planning. Preliminary surveys are not being conducted. They are not conducting full surveys, and they are creating, according to me, fake reports. (Shubham Deep, Geology Doctorate Student)

One participant, an employee for a hydropower management engineering company also indicated that the current studies are inadequate because of the fast-changing hydrology of the area. They said:

> After 10 years, from when the projects are allotted to when they are constructed, the hydrology has changed. When projects are studied, they should be built in the same year otherwise there will be less discharge than anticipated. In general, there is less discharge because the glaciers are melting and are getting less deposits in the winter. The big projects with storage facilities are getting all the water. The hydrology of small streams is disturbed very quickly. (Sitesh Thakur)

So, in addition to insufficient preliminary research, when studies are prepared, they are ineffective due to the duration between project allotment and implementation.

Quality Shortcomings. A few participants directly spoke to the poor quality of projects, citing poor construction as a primary reason. For example:

> I'm not against the projects, but they should be done properly so they don't cause harm…All the projects around here are constructed haphazardly. They are simply allotted for people's own vested interests. (Anoop Thakur, Activist)
>
> If they [the projects] are not done properly, then yes, there can be cumulative impacts…We only divert a little bit of water from the main river. If it is not done properly and with care then there are impacts, otherwise it is okay. For example, the walls should be five meters thick but often they are only one to two meters thick. (Budhishwar Gaur, Project Owner)
>
> The quality of the construction was also not very good, not as good as it should have been done. So, the retaining walls on the road and the breast walls, they were not of good quality. (Hukam Ram, Panchayat Pradhan)

5.2.4. Information Deficits

During interviews, it was apparent that limited awareness was a common talking point for many participants due to a lack of education and transparency. Having information gaps for MHP development acts as a barrier to CBSEA because it is difficult for community members to make informed decisions when they do not have the proper information or knowledge about potential impacts or how decision making processes are done.

Lack of Education. Some participants discussed a lack of education among members of communities, for example:

> The community is not aware of the negative effects, so we have to make them aware. (Rup Chand Katoch, Activist)

> The people only know what they can see, for example a pipeline. They know about bursting pipes now and see this as a negative effect. But other affects are not known to the people. (Sukhbis Metha, FRC Pradhan)

> The decisions in the Gram Sabah are not good because people are not well educated, and they don't know. (Budhishwar Gaur, Project Owner)

Participants also spoke about how community leaders might be uninformed, but also have a role in education and increasing the awareness of community members, for example:

> A lack of education is a problem. Educated people should be in the Panchayat so they know how to talk. Otherwise, people get sold out for money. (Amar Rana, Panchayat Pradhan)

> The Panchayat isn't asking the villagers or informing them, so nobody is concerned about the projects. (Om Perkash, FRC Pradhan)

Lack of Transparency. Transparency was another topic discussed regarding education and awareness in communities. A few participants described how the processes of MHP development and in decision making are unclear, for example:

> Most project people hide the impacts and don't explain them. (Bir Singh Thakur, Elected District Level Official)

> There is not any transparency. So that's why people, most of the communities, are confused what's going on in the nearby area. They don't have any idea about that because water is theirs. Water belongs to the community. Land belongs to the communities, but they don't have any idea about what the government is doing. (Dr. Kesar Chand, Geography Reseacher)

Lastly, participants mentioned that the timing differential between when NOCs are allocated and when project construction begins are not very transparent. When speaking about the Haripur project, Rahul Sharma, an environmental activist said, “the project was sanctioned in 2003 and for 10 years no one knew about it. When they started construction, people asked ‘what’s going on’. It is on a small stream. Nine local administrations were impacted.” Another participant described in detail the process, saying:

> In Panchayat you have to get the NOC from maybe one hundred people. When they apply, at that time, nobody knows what will happen in the next 15 years. When the construction work starts in that area, only then do they think it will directly cause damage. But the NOCs of the projects are from different times. Maybe one is applied for in 2005, the second is applied for in 2010 and the third is applied for in 2014. Suddenly they started work at the same time - Three projects working at the same time in 2024, and then people realize that we should not have given those NOCs because technically, construction work also damages the sideline of the rivers and the Nallah of that area. (Vijay Kumar, Panchayat Pradhan)

This was also evident in reviewing the current projects allotted, according to HIMURJA documents. Projects currently under construction have allotment dates that go back as far as 1996, as is the case for a 3MW project owned by Sasi Power Pvt. Ltd. in the Kullu District. Many other projects have allotment dates that go beyond 25 years. Or, for the projects called Aleo I, Aleo II, and Baragargh, despite being a series of cascading projects, one project was allotted in 2000, and two projects were allotted in 2006. Overall, a lack of transparency in terms of discussing project impacts or because of lengthy timelines creates a general sense of distrust between project proponents and community members.

5.3 Enablers for CBSEA

During interviews, various themes emerged as enablers to CBSEA, as shown in Table 4. These included motivations to get people to participate in community activities, strategic thinking by community members, and an increased level of education and awareness about MHP development. The

important role of leaders in participation and strategic thinking was also identified by participants. The following section discusses these themes in detail.

Table 4

Enablers to CBSEA Identified in Interviews by Study Participants

Theme	Subtheme
Motivations to participate	Food & drink offered
	Free items
Strategic & long-term thinking	Evidence of strategic thinking & planning
	Desire for sustained benefits
	Consideration for the environment & harms
Strong leadership	Leaders' role in participation
	Leaders' role in strategic thinking
	Role of Ward members
	Standard of education for leaders
Education & awareness for community members	Increased education & awareness
	Communicating information
	Formation of committees
Support for community involvement	Desire for community involvement
	Local knowledge
	Community-minded
	Mobilization
	Inclusivity & accessibility

5.3.1. Motivations to Participate

During interviews, some participants talked about a few aids that increase the attendance of community meetings or community activities. These include offering food and drinks in meetings and providing free items like trees for plantations.

Food & Drink Offered. Upon asking participants if there were motivations to get people to participate, a few indicated that tea and refreshments are provided at meetings. For Panchayat meetings, there is funding of 50 rupees per person to provide food and refreshments. Two Panchayat Pradhans indicated that food and drinks was not a successful way to get people to come to meetings, saying:

> I don't think food is an effective way to get people to come. (Chitsalekha Bhargava)
>
> At the meetings, they give tea and biscuits that are paid by the government, but it doesn't help attendance. They will not come for food. (Kaushalya Devi)

There were a few participants, however, who indicated that it was an effective way to motivate people to attend. For example, "it is difficult to get people to attend meetings. For bigger projects, people will come because they think they will get the benefits from the project. For other projects, we give people food to get them to come" (Hemraj Thakur, FRC Member). Two participants indicated that they pool together the funding to pay women community groups to make food for the meetings. For example:

> One time the Panchayat asked women to bring momos and sidhus. They did and were paid by the Panchayat. This helps get more people. Women were already there at the meeting because the food. The youth come too. (Asha Rani, Community Organizer)
>
> Before I was Pradhan, the Panchayat used to issue a notice about 15 days before any Gram Sabah. People read the notice, but they didn't come on that day. When I became the Pradhan president, I decided that the people who come to the Gram Sabah, they should be given at least tea, coffee and some snacks. Every Panchayat has a budget of 50 rupees per person for the Gram Sabah. So, if we have 90 people, time 50 rupees person, that will be 4,500 rupees that we can spend on the lunch. On most of the Gram Sabahs I asked a few ladies group and self-help groups. Every Gram Sabah I ask a particular group to bring tea like sweet and salty tea, butter tea, and with our local dish which are sidhus or momos. Lunch is provided that day and that has helped me a lot. Most of the Gram Sabahs have enough people because they know lunch is provided, so they come for the lunch snacks. Most of the Gram Sabahs in the last four years are passed in group numbers. This was due to the addition done by me. Other Panchayats are not doing all that they should being doing. If they are given lunch snacks then they will be happy to come. (Hukam Ram, Panchayat Pradhan)

Free Items. A few participants also mentioned how offering free things like seeds, and trees are motivators for people to come to meetings or participate in community activities. For example:

> We ask people to volunteer. We tell them that they will get trees on a certain date and then they voluntarily come. (Hotam Beas, FRC Secretary)

> When we are distributing trees or seeds people will come because they get them for free. If not, people won't come. Everyone is busy with agriculture. But if there is a direct benefit to people they will come. (Amita, Mahila Mandals Pradhan)

> When there are free schemes, like free fertilizer or agriculture equipment, then people will come to meetings. (Chitsalekha Bhargava, Panchayat Pradhan)

Another motivator mentioned was providing appreciation events, for example, "the Mahila Mandals and youth groups are not paid but we throw them parties or take them on tours or trips – this is supported by the Panchayat. It is common to do this in all Panchayats" (Amar Rana, Panchayat Pradhan).

5.3.2. Strategic & Long-Term Thinking

Strategic and long-term thinking are fundamental attributes of CBSEA. To conduct a CBSEA, individuals need to be able to conceptualize how decisions made at the present time will impact future events. During interviews, there was evidence that community members do think strategically and plan for the long-term. They also have a desire for benefits that will be sustained in the long-term. Participants indicate that community members also consider how decisions might impact the environment or cause other harms later on.

Evidence of Strategic Thinking & Planning. In interviews, a few participants said that locals think strategically. For example:

> I think people do long-term thinking. (Bhagwan Singh Rana, Environmental Activist)

> Communities can make strategic decisions. (Bhuvneshwar Gaur, Member of the Legislative Assembly)

> Local people can make strategic decisions. (Chet Ram, Geography Professor)

Additionally, a few participants talked about instances where locals were thinking critically about planning. For example:

> We changed from agriculture to horticulture. We must plan for these changes and for shifts if changes to the environmental system will affect horticulture. (Amar Rana, Panchayat Pradhan)

> There is flooding now, so before putting up projects, there needs to be fortification and channelization of the area first. Many projects are on the riverside. No area of the country should be damaged by these projects. (Anoop Thakur, Activist)

Through the Gram Panchayat Development Plan, planning is also done by the Panchayat. The Gram Panchayat Development Plan is a process whereby Panchayat members and elected officials create social and development plans for the incoming year (Sreyoshi, 2025). One participant describes this process saying:

> We have the Gram Panchayat Development Plan. Next year we plan to do everything that we put in the framework, with the budget that we have. Then we bring it forward in front of the entire Panchayat in the Gram Sabah, and we tell them about it. If someone says 'I want to construct a road out here', or they say 'no, this road can be constructed next year. Please construct this other road.' Then we would change that. (Rohit Vats, Panchayat Pradhan for Manali Constituency)

In some cases, Panchayats were concerned with new projects affecting the water supply to villages, so they issued NOCs on the condition for assurance from project proponents that the water supply will not be affected. For example two Panchayat Pradhans said:

> Two years ago, villagers and village committees came to the Panchayat asking use to oppose the projects. We made a resolution that the projects could only be built below a certain point. This was because the project would have taken water and affected vegetable and horticulture farming. (Chitsalekha Bhargava)

> We have cleared all the doubts and they have given us written assurance that our irrigation and drinking water will not be disturbed. If it will be disturbed, then we have a right to cancel our NOC, and this project. (Hukam Ram)

A project owner indicated the same, saying "there are problems for ensuring irrigation isn't affected. I had to give in writing to the village that the intake for the project will be below the village. After discussing this with them, I got the NOC" (Dile Ram). Although this might provide some assurance

to the Panchayats, this suggests that perhaps other Panchayats are experiencing issues associated with water supply, or there is distrust in impact assessment.

Desire for Sustained Benefits. In a similar way to long-term planning, a few participants suggested that villages should receive free electricity, for compensation and as a benefit, rather than Local Area Development Fund. The participants saw free electricity as more effective, and more sustainable in the long-term, for example:

> If they had only gotten a percentage of free electricity, instead of the Local Area Development Fund, this would have been better and more effective. (Bir Singh Thakur, Elected District Level Official)

> There should be stakes for the locals, or free electricity for the people because it is their water, from their area, so locals should get the benefits, but they are not. (Sukhbis Metha, FRC Pradhan)

> In my Panchayat, if we were asked for permission, we would ask for electricity and shares in the revenue. (Monika Bharti, Panchayat Pradhan)

Consideration for the Environment & Harms. Upon asking questions about how decisions are made, a few participants indicated that there was consideration for environmental impacts in decision making. For example:

> All the Panchayat decisions are long-term. We discuss about the long-term impacts of the environment. Mostly we are thinking about cleanliness and plantations. (Roshan Lal, Panchayat Pradhan)

> We will give NOCs for development that is beneficial for the village and doesn't impact the environment. There should only be community-based projects, not personal projects. The villagers should get together and do these projects, then they will be supported. This is our duty to the villagers. For example, plantation projects are welcomed…. We first need policies to maintain the environment of the valley (Amar Rana, Panchayat Pradhan)

> People do think long-term term because whenever NOCs are discussed with the project proponents, it involves employment, and environmental damages. The villagers talk about water resources which is an important part of the projects – the water should not be reduced for the future of agriculture. (Hemraj Thakur, FRC Member)

Other concerns considered by three participants included about safety and protection of villages. For example:

> We told them that we don't want any wires or poles from the project. Rather, we want closed wires for safety reason. When harvesting apples and when it's raining, the wires can kill people. The same goes for pruning in the winter. (Hotam Beas, FRC Secretary)

> The FRC could restrict them and tell them to put boulders on both sides to protect the village. I'm not against the projects, I just think the villages should not get harmed. (Gokol Chand, FRC Secretary)

5.3.3. Strong Leadership

Having strong leadership in communities presented as an important feature for establishing participation and strategic planning. Furthermore, the role of Ward members (a subdivision of the Gram Panchayat) was spoken about by a few participants, indicating a need for better communication with individual Wards. To establish better leadership and more strategic planning, participants suggested implementing a standard of education for community members. These four aspects of leadership could contribute to CBSEA by increasing participation, strategic thinking, and communication.

Leaders Role in Participation. Some participants discussed the role of leaders in increasing participation of community members in community activities. For example:

> Interest depends on the initiative of the Panchayat (Anoop Thakur, Activist)

> The Pradhan is very active and helpful, so everyone is supporting him. The women groups were asked to clean the village and they will do it. The youth groups were asked to help with the plantation, and they will. (Asha Rani, Community Organizer)

> There is disinterest from the community because the Panchayat is not doing things and they don't have knowledge. (Bhagwan Singh Rana, Environmental Activist)

> When the Pradhan is active, people are interested in participating. Otherwise, people won't be interested. All Pradhans should know their power. (Ses Ram, FRC Secretary)

Three participants also mentioned the role that pressure plays in getting people to attend. They indicated that leaders have to put pressure on community members, however, this pressure is vague. For example:

> It's not always easy to get people to participate in these projects. They need pressure to come since they will not come on their own free will. They only come when there is pressure. (Madhu Devi, Panchayat Secretary)

> There is only one way to get people to care – we have to push people and ask them many times to join us. People should instead have to come. (Om Perkash, FRC Pradhan)

Leaders Role in Strategic Planning. Two Panchayat Pradhans who I spoke with talked about various projects they have been working on, such as waste collection systems, a sewage system, and a library. Other participants described them as "active" Pradhans, meaning that they were doing a lot to benefit the community. Being "active" was seen as a positive characteristic of a Pradhan. When speaking to one community from one of these "active" Panchayats, they talked about how their Pradhan approaches informing community members. This participant, a community organizer, said, "the Pradhan informs three months before what's happening, what's planned, and the future" (Asha Rani). The other "active" Panchayat Pradhan describes clearly how they approached their role as Pradhan, and how they contribute to strategic thinking, saying:

> My point of view is that to become a Pradhan is not that big of a problem. But what is his intention to do as a Pradhan? That is more important. Every person who wants to be Pradhan should have a proper plan for what he wants to do in the society. Here, the Pradhan does not plan was he wants to do, it is the public who force him into the position. They say, 'You are good person, you should become Pradhan.' The Pradhan doesn't know how to work for the society, and they do not plan properly. When I decided to become Pradhan, my vision was very clear what I wanted to do. I issued the plan of what I wanted to do, my promise note. I had about seven promises. (Hukam Ram)

In both cases, there is emphasis on planning for the future, and deliberately informing individuals what you plan to do so community members understand what is taking place.

Role of Ward Members. A few participants talked about the role that Ward members can play in informing and gathering the concerns of villagers and increasing attendance. For example:

> Before the Gram Sabah, we ask the Ward member to organize a Ward Sabah. The Ward member will ask the people in the Ward what will be done in the next financial year. All the works, their demands, everything is recorded by Ward members. (Hukam Ram, Panchayat Pradhan)

> We would tell the Wards to bring people so that resolutions can be passed. (Tot Ram, Trout Farmer and Past Panchayat Pradhan)

> Ward members can inform their villages. (Chet Ram, Geography Professor)

One Panchayat Pradhan further recommended Ward wise Gram Sabahs, saying:

> We are a large Panchayat with four or five villages, so there should be Ward Wise Gram Sabahs so people can discuss their issues. There are seven Wards and there should be a day for each Ward to discuss their issues and talk specially about that Ward. This way, all the issues will come to the Panchayat. All the Pradhans complain about attendance, and I think this is a common reason for it. (Amar Rana)

Standard of Education for Leaders. Lastly, a few participants discussed having a standard level of education for community leaders so that better decisions could be made on behalf of the community. For example:

> There should be a minimum education standard in the elections – graduation at the least for Pradhans. Often, non-educated people are making decisions. There are lots of court cases sent to the Panchayat and they must make decisions about these court cases. (Amar Rana, Panchayat Pradhan)

> The Pradhans have lots of power. The government should set an education requirement for Panchayat members. This way they will know their power because less educated people can't talk to officials. (Ses Ram, FRC Secretary)

> If anyone wants to become a clerk, he has to face a written test, a bar - He needs to qualify a few standards. So why shouldn't the politicians face a minimum criterion of education? Or at least, if any fellow who wants to become a Member of the Legislative Assembly, or a Member of Parliament, he should a graduate. At least for a Pradhan, he should complete secondary or high school so that he can understand what is written on the papers. Aleader should be able to understand what is written on paper and what will be its impact on society, on a family, or on a person. (Hukam Ram, Panchayat Pradhan)

5.3.4. Education & Awareness for Community Members

Participants established how the education and awareness of community members regarding MHP development has increased since MHP development began in the area. They indicated that people are now more aware of the potential impacts and benefits of MHP development. A few participants also indicated that increasing the level of education of community members would further increase strategic thinking. Participants believed that the state government has a role to play in providing this education. To increase education, various modes of communication were discussed as noted below. Overall, these aspects of education and awareness act as an enabler for CBSEA because it shows that community

members are informed and can continue to be more educated so that they can made strategic decisions within their communities.

Increased Education & Awareness. Participants indicated that over time, there has been an increase in education and awareness around MHP development. For example:

> There is interest in attending the Gram Sabahs because there is more awareness about MHP because people know their rights now. They don't want to lose resources. (Bir Singh Thakur, Elected District Level Official)

> The villagers are thinking about the environment. Before, people didn't know about the effects of MHP, but now they can see the damage done from constructing these projects. (Daya Ram, FRC Pradhan)

> In the past we didn't realize the difference between one project and several projects because we didn't know about the negative impacts. Now the locals come and ask the Pradhan why they allowed the projects, and they are upset. (Kaushalya Devi, Panchayat Pradhan)

A few participants also tied strategic thinking to level of formal education. They discussed that increasing the education of people is the main way to increase peoples' ability to think strategically. For example:

> Whether people think strategically depends. Their level of education is important because it takes effort to explain things to the community. It requires convincing people to think long-term. About 50 percent of community members think strategically. (Anonymous Participant 3)

> I think committee members, if they have some basic knowledge about the policy guidelines, after that, they can involve strategically in a decision. So that's bare minimum. They need the knowledge. (Dr. Kesar Chand, Geography Researcher)

> If we can educate them [community members] thoroughly, then I think they might think longer term. (Shubham Deep, Geology Doctorate Student)

Participants also noted that the state government plays a major role in increasing the education and awareness of community members for MHP development. Chet Ram, a geography professor, discussed a preventable gap that exists, saying*:*

> There is no education institution to provide hydropower electricity education. They need to provide education to local people – this is essential. The State government should provide this but it's not happening. There is no specific education for hydropower in Kullu, Mandi, etc. What is the reason?

Another participant indicated the need to increase education on the Forests Rights Act of 2006 saying:

> The government should do workshops to increase awareness of the laws and give information on the Forest Rights Act. No one knows anything about sanctioning. But this would give the people information to know what is happening. (Sukhbis Metha, FRC Pradhan)

Information on the Forest Rights Act could empower communities to protect their forests and surrounding environment which are relied on for subsistence. Two participants indicated that the education of community leaders should also be done by the government. For example:

> Pradhan and Panchayat members should have training because they are not expert in everything, just representatives of the communities. They need trainings. The responsibility should be taken by the authority, like small hydro project authorities. They have to give some capacity building programs to the Pradhan as well as the Panchayat members so they have basic knowledge. (Dr. Kesar Chand, Geography Reseacher)

> The government needs training for the elected Panchayat. There should be a condensed training course arranged by the government. Educated people should be invited who have knowledge in the field. This isn't being done here. (Anoop Thakur, Activist)

Communication of Information. In relation to increased education and awareness, specific channels to inform people were discussed. Various education channels were mentioned that helped inform people about MHP development. The most mentioned ways to inform people was by door-to-door outreach, through the Gram Panchayat, lectures, or presentations, physical signage like notice boards, and social media. For example*:*

> They should go physically to people, because it is a small area to visit if visiting each household. (Chet Ram, Geography Professor)

> WhatsApp and social media is the best thing for dispersing information. (Vedram Thakur)

> It is through the Gram Sabah and through Panchayat meetings. These are the two ways. Then you have in the Panchayat Kar (village informant), you have this basic notice board where all the information is always displayed. So people can, if they did not end up coming to the Gram Sabah, they can go the next day. They can read about what happened. (Rohit Vats, Panchayat Pradhan for Manali Constituency).

Formation of Committees. In addition to communicating information through specific mediums, a few participants also recommended forming committees to improve locals' understanding of MHP development and the potential impacts associated with development. For example, two academics said:

> I think there should be a committee, small hydroelectric committee, or large hydroelectric committees within the communities. (Dr. Kesar Chand)

> Informed people, elected leaders, planers, and policy makers should be directly contacting people. Focus groups should be made to create dialogue about the potential impacts of MHP. (Dr. Renuka Thapliyal)

One participant also said the community could benefit from a Local Area Development Fund committee saying, "it is effective, but there should be a Local Area Development Fund committee in the Gram Sabah in each village. This would increase the effectiveness" (Bir Singh Thakur, Elected District Level Official).

5.3.5. Support for Community Involvement

An enabler for CBSEA that interview participants identified was strong support for community involvement. Participants directly spoke to a desire for community involvement in decision making because of the knowledge community members have of the area, and because they want to ensure welfare for their community. Participants also spoke of community members previously mobilizing to protect their communities, showing examples of community-based efforts. Lastly, inclusivity and accessibility are discussed, based on differing information from data collection methods.

Desire for Community Involvement. Some participants spoke of the desire and ability of locals to be involved in decision-making processes. A few participants directly indicated that locals should be involved in decision making, for example:

> Community involvement in decisions is the most important. For me, I'm trying to touch lives through my work. Serving people is very good work. (Anonymous Participant 3)

> Local people should be involved in planning. For example, flourmills are affected by a shortage of water. This affects employment. Some water from hydropower development should go to flourmills. (Chet Ram, Geography Professor)

> Yes, the community should be involved in decisions because if there are projects in the forests, the forest department will do whatever development they want. (Daya Ram, FRC Pradhan)

Local Knowledge. A motive for community involvement in decision making was revealed by participants due to their knowledge of the area. For example:

> During a DPR, they should be involved in that, in the primary report. They should be provide local knowledge, that type of thing. They definitely have traditional knowledge. (Dr. Kesar Chand, Researcher)

> I can tell you we grow apples, and we grow fruits. A scientist from Chennai does not know the local ecosystem. He knows the things better in Tamil Nadu, but in Chennai, in the local ecosystem, he doesn't know. (Hukam Ram, Panchayat Pradhan)

> Locals should make decisions in the Gram Sabah because they should know about how their decisions will impact their kids. (Vedram Thakur, Past Panchayat Pradhan)

Some participants further emphasized the importance of local knowledge when comparing the decisions made my policy makers who do not live there. For example:

> All policy makers in Delhi don't know what it's like here. The locals have lived here for 1000 years, and I've seen so many changes in my life and I'm only 66 years old. There should be a say from locals, we are practical experts. Locals need to be involved, especially educated people, to make decisions. (Rahul Sharma, Environmental Activist)

> Local involvement is very important because it is their land, because it will ultimately affect them in the long-term. People are coming here to do business, and they'll go away. They make their profits and move out. The people who are actually living here, they're the ones who will be benefiting or losing in the long-term. (Romi Chandra, Geography Researcher)

Community-Minded. Another factor mentioned by participants that supports community member involvement in decision making is a sense of community orientation. There are various groups in the community, like self-help groups, and the Mahila Mandals, a women's clubs, whose role is to support community activities. Their desire for a better community was revealed in interviews. For example:

> The Panchayat committee asked the groups to come and help out. There were no incentives to do it, it was just to keep the community clean. (Madhu Devi, Panchayat Secretary)

> I wanted to create awareness in the village. Nobody cleans public areas, foot paths, or temple areas. (Amita, Mahila Mandals Pradhan)

Amongst other community members who may not be in those groups, community concern was also shown. For example:

> If projects only provide personal benefits, the community will object to them. If it is something that will benefit the whole community, then people will accept the projects. (Monika Bharti, Panchayat Pradhan)

> Private landowners are allowing pipes to run through their land because it is good for the village. Without this land they could not do the project. (Asha Rani, Community Organizer)

Mobilization. A few participants talked about occurrences when community members came together to reject the project development of MHP projects, or other development projects. These participants spoke about their mobilization efforts. For example:

> At first the protests were small. People came to me because the protests needed to be organized on a larger scale. We needed a unified approach. I consulted many people about their opinions in order to safeguard the area and their religious sentiments. Then people started contacting me to show their support for the case. 10,000 people rallied, and many of them from outside of Kullu. (Anoop Thakur, Activist)

> We resisted the projects because of concerns for tourism, impoundment, deforestation, and the climate. People gathered and went to court to protest. (Guman Singh, NGO Coordinator)

> We arranged a rally in Kullu – about 1,000 people came. It was the 1st rally in all of the Kullu District against a hydro power project with both men and women. (Rup Chand Katoch, Activist)

Inclusivity & Accessibility. Lastly, during interviews, the topics of inclusivity and accessibility in community meetings and activities were discussed. Inclusivity in community meetings meant that different types of people, in varying demographic groups, attended, while an accessible meeting meant that there were no significant barriers to attend meetings. In general, inclusivity in community meetings was described as not being an issue. A few participants indicated that a diverse range of people attended and participated in meetings, for example:

> People are invited irrespective of class, gender, etc… All types of people attend the meetings. (Anonymous Participant 4)

> There is a women's group, youth clubs, and self-help groups that are present at the larger meetings. (Madhu Devi, Panchayat Secretary)

Two participants mentioned a lack of participation from younger people, for example:

> I think male, female, some youth, Mahila Mandals, and youth clubs should be there. Otherwise, teenagers, I don't think they have any idea about these things. (Dr. Kesar Chand, Researcher)

> Most of the time, it is all types of people. We are old and women. But young people, they do not come in good numbers, especially when they are in college. Young people are not taking that much interest here. I have noticed it. They are busy with their own things. (Hukam Ram, Panchayat Pradhan)

Additionally, the day that Gram Sabah meetings are held, normally on Sunday, seem to work best for most people. The government oversees assigning the day of the meetings. Two Panchayat Pradhans said:

> Most of the Gram Sabahs are done on Sunday so that all the employees can come because it is a holiday. (Hukam Ram)

> The government decides on a day to hold the meetings – normally on a Sunday so more people can attend. It's normally a good day for everyone. (Kaushalya Devi)

While Sunday may be the best day for people to come, a few participants discussed business as preventing them from attending community meetings. One of the meetings attended during the fieldwork was held on October 2nd, which is a particularly important day because it is the meeting day where works for the following year are discussed. For example, which roads may be repaired or constructed, which fences constructed, and which footpaths. When participants discussed being busy, they indicated agriculture, such as doing grass cuttings, and tourism work as the main reasons for being busy. For example:

> Everyone is busy with agriculture. (Amita, Mahila Mandals Pradhan)

> It's hard to get people to come because they are busy with grass cuttings. (Chura Mani, Panchayat Pradhan)

> Sometimes people won't come because they are doing grass cuttings, busy with tourism activities or because of apple season. (Monika Bharti, Panchayat Pradhan)

The meeting attended was held during grass cutting season, perhaps deterring people from attending. It might therefore be beneficial to have community meetings when it is not grass cutting season or apple harvesting season.

In regard to accessibility, one Panchayat Pradhan indicated difficulty for more rural people to participate in meetings, saying, “people must walk up steep hills to get to the Gram Sabah because there are no roads for everyone” (Amar Rana).

Another observation made during a community meeting was regarding the number of women and men present. There were 26 people who attended a meeting I participated in, but only three women were present, and none spoke during the meeting, despite significant discussion by the men in attendance. Another meeting was observed, consisting of only females. This was not a Panchayat meeting but a national scheme which was being proposed to help women generate income through their traditional skills like knitting and food processing. As part of the meeting, the attendees were being taught how to maintain financial books. The 20, or so, attendees seemed engaged, attentive, and participated in learning how to utilize the note keeping books distributed to them. The disparity in the number and involvement of women during meetings when men were present, and the general consensus among participants that there is good inclusivity in community meetings suggests that an understanding of inclusivity may not involve equal involvement between men and women. Furthermore, one participant indicated that when decisions are made, men are the primary decision makers, saying “the men of the village decided where to take the line. Women don’t have as much interest. Men are the head of the families so the decision should be made by men on behalf of everyone” (Asha Rani, Community Organizer). While only one participant discussed this, observations point to an inequality between men and women in meetings where decisions are made for the community.

One participant had a different take on accessibility. This participant talked about how accessibility to community leaders in rural places is greater than in urban places. They said:

> There is good participation, especially in rural areas. The structure of rural development is still intact. In urban areas, they do an incremental approach which doesn't work. In rural areas, the Pradhan is very accessible. The Pradhan is more into the people. The Pradhan office is a more desirable office to approach. (Anonymous Participant 3)

5.4 Chapter Summary

Data revealed that the main role that community members have in MHP development is through the NOC process. When community members gather to discuss new projects, they do so through the Gram Sabah, and vote to decide whether the project should move forward. However, participants indicated that they are not asked for NOCs, or if they are asked, project proponents did not listen. Instances of bribery, corruption and general pressure on Pradhans, or community members, points to NOCs being acquired deceitfully, as was found by Diduck et al. (2021). Despite the NOC being a mandatory process for project proponents, trust in the system was not apparent. Additionally, changing policy and procedures seemed to cause confusion among participants as to what was required of community members.

In analysing the data collected, various themes were characterized as enablers and barriers to CBSEA. The barriers identified were those themes that might inhibit a CBSEA from working in the Upper Kullu Valley. The barriers identified included dissonance in the community, government shortcomings, operational gaps, and information deficits. The themes identified, which would support a CBSEA in the Upper Kullu Valley include having specific motivators to encourage participation, evidence of strategic and long-term thinking, strong leadership, education and awareness around MHP, and support for more community involvement in decisions about MHP development. Overall, it was found that the barriers identified in the research are significant but can be overcome by focusing on certain elements, with

support of the enablers. As such, a framework was developed and will be outlined in the following chapter.

Chapter 6 Developing a framework for CBSEA

The sections below discuss key themes revealed in the data related to decision making for micro hydro, potential barriers and enablers and perceptions of cumulative effects. The themes related to these, and the data presented in the preceding chapters are then used to inform the development of a CBSEA framework. The major components of the framework are then discussed at the end of the chapter.

6.1 Participation of Community Members in Decisions

My research found that MHP projects are often located on, or nearby, Panchayat land, and regardless of location, have broader implications for Panchayats. As such, participants in my research suggest that community involvement in decisions about MHP development is needed to ensure that the concerns of surrounding communities are understood and considered in decisions. My results, which are also supported by the literature (see Sims & Deb, 2009), indicate that community members can help inform decisions because of locational knowledge acquired through working with and depending on the natural resources of the area. For example, Diduck & Sinclair (2016) found that public participation helps recognise the concerns of a community which are informed by local knowledge and oftentimes exclusively identifiable by community members (Diduck & Sinclair, 2016; Kandhari, 2010; Sims & Deb, 2009), providing justification for involvement in natural resource management (Berkes, 2008). Participants in interviews likewise demonstrated knowledge of the area unique to people living in the area and emphasized the importance of this knowledge in decision making about hydro projects.

The research also revealed how policy changes by the state government from 2006 and onwards, have led to changes which limit the level of involvement of community members in MHP development decisions. The Panchayat NOC requirement and the mechanism used to obtain community consent for MHP project development were initially introduced in 2006. Then in 2014 policy shifted so

NOCs were non-compulsory for MHP development, instead, only consultation was required. In 2021, a new policy was introduced, again requiring NOCs from the Panchayat, but through a community-wide vote. The Panchayat can oppose the NOC only with specific reasons given in writing. These reasons need to be deemed justifiable by the District Commissioner, or the project can still move forward at their discretion.

My results reveal that these policy changes have created confusion in communities around the involvement of government departments, Panchayats and community members in MHP decisions. For example, there was no consensus among participants as to whether an NOC was required for MHP development, because community members sometimes indicated they were not asked for NOCs. Additionally, there was uncertainty if government or project proponents honoured the NOC decision of the community. As with Diduck et al. (2021), the research indicated evidence of NOCs being deceitfully acquired, such as through bribery, pressure and corruption, or not acquired at all.

Participants indicated that the decision-making system in communities was generally inclusive. But upon attending a Gram Sabah, few women were in attendance, and those women did not play an active role in the discourse, pointing to a societal norm where women are not involved in decision making. Perhaps childcare could have prevented women from participating. However, it appeared that village homes were multigenerational, which would provide options for childcare. As outlined by Kilemo et al. (2014), gender dynamics in communities, such as men talking over women, can be difficult to alleviate and prevent information collection, and even inhibit learning (Sinclair et al., 2009). Bingeman (2001) also found women participate significantly less than males in meetings on forest management, despite working in forests on a daily basis.

While the results reveal there are avenues for community involvement in decisions about MHP development, such involvement is still inadequate and the processes often confusing. Governments and

project proponents are keen to move projects along often at the expense of meaningful involvement, according to participants. Additionally, it is important to consider how decision-making systems contribute to or challenge existing oppressive structures.

6.2 Influences on a CBSEA

As outlined in Table 3 and Table 4, four barriers and five enablers to implementing CBSEA were identified in the data. Getting community members engaged in CBSEA was a barrier, perhaps caused by lack of interest in MHP development because in the past, the expected benefits for locals from MHP were not realized (Diduck et al 2021; Diduck & Sinclair, 2016; Kumar & Katoch, 2015; 2016). This research also found that participants were not receiving the benefits that are promised in DPRs. Nonetheless, this acts as a barrier to CBSEA due to the participatory nature of a community-based assessment. When community members are primarily concerned with self-improvement, and lack concern for the well-being of their community, processes that involve working with fellow members to engage in planning for the community may be very difficult. It was found that engaging participants may be particularly difficult in a CBSEA because getting participants to understand the purpose of strategic assessment and encouraging strategic thinking is challenging. This was also found in the workshops done with community members by Sinclair et al. (2009), since participants did not know how strategic level discussions would influence any development outcomes. Consequently, if CBSEA is to be initiated then it needs to be clear how the information collected could be used in project level decisions.

While a few participants indicated difficulties engaging the public, other participants discussed a strong desire and need for greater community involvement in decision making. This was also observed by Oino et al (2015), who found a desire for community-based assessment for development in developing countries, such as India. Furthermore, participants indicated specific ways to influence community participation, suggesting that with certain motivators, people will make themselves available

for community meetings. Beyond wanting community-based assessment, my data shows evidence of strategic thinking and planning by communities, a key element of SEA. For example, Panchayats were found to make conditions for issuing NOCs for MHP to ensure no impacts would ensue, such as water shortages. Such a tactic considers the long-term outcome of projects, but also suggests that other Panchayats are experiencing issues associated with water supply, or distrust in the effectiveness of assessments.

To increase participation, it was suggested that greater communication is needed using various channels to inform community members of meetings and to disperse information. Spaling et al. (2011) also found communication to be more effective when using several modes such as telephone as well as email. Panchayat Pradhans have an important role in dispersing information and due to their influence within communities, it was mentioned that putting "pressure" on community members helped in increase participation. However, it was unclear what exactly "pressure" signified and whether it contributed to power imbalances within the community. Participants also indicated being busy with agriculture was a reason they did not attend community meetings. Sinclair et al. (2009) and Spaling et al. (2011) found that selecting better times, and when livelihoods are not impacted, results in increased participation and more inclusive environments.

Another barrier identified in the data was a lack of care for community members residing close to MHP projects, who experience the effects of MHP development. Similarly, Erlwein (2013) found some government officials and project proponents to lack concern for the environment since their main concern was with increasing energy generation. The lack of attention to community concerns can result in communities mobilizing in opposition to a project as was described by community members, and the site of one blocked project observed. This supports Diduck et al.'s (2021) contention that when

governments fail to address the impacts of projects, people tend to seek justice (see also, Polanyi, 1957).

Together, inadequate maintenance and monitoring, preliminary research, and construction quality act as barriers to a CBSEA. These shortcomings inhibit a CBSEA because exceptional planning cannot overcome these barriers. For example, Kuniyal et al., (2017) found that even when proper planning is done on paper, the outcome may be very different. So, project development may not live up to the level of assessment undergone during construction and operation. Lodhi et al. (2016) also observed shortcomings in baseline data collection since there are no standardized methods for this being used in India. This was evident in the DPRs where no baseline data for flash floods were available. Kumar et al. (2018) also found there was extreme data deficiencies on extreme weather events in the Indian Himalayan region. Therival & González (2021) highlight the importance of post-implementation processes in SEA, like monitoring. Pandit et al. (2023) further recommends better monitoring through scientific investigations, data and analysis. SEA requires that sound approaches to monitoring be developed to ensure reliability, which may be a challenge in the context of my research.

My results suggest, however, both the opportunity and desire to overcome these barriers through a variety of activities, such as properly engaging participants, increasing government support, increasing education and awareness, and focusing on process reliability. Of these, I feel that the most important and perhaps most practical to implement is increasing government support because without it, a CBSEA might not be supported, or the outcomes of a CBSEA might not be transferred to governance decisions. Furthermore, each of the thematic activities identified are tied to increasing government support. For example, increasing government support can also lead to better education and awareness through developing institutional capacity.

6.3 Perceptions of Cumulative Impacts

Through interviews and observations, cumulative impacts resulting from MHP development were identified. Participants discussed, and impacts were observed, regarding water scarcity which particularly impacts irrigation for farming, and availability of water for drinking. Also identified were the impacts of increased flooding, geological changes, geological concerns, deforestation, changing aesthetics and poor distribution of benefits.

In analysing the responses of participants related to extreme weather events such as cloudbursts, flooding, and landslides, it was indicated that these events were increasing in frequency and intensity, which was also found in the literature (see Gupta et al., 2024; Kumar et al., 2018; and Mukherjee et al., 2018). However, there is a lack of data and literature surrounding the cause of extreme weather events in the Kullu Valley or even the Indian Himalayan region. The literature also does not point to evidence of MHP development as a cause for extreme weather events. As such, the perceived increase in flooding events may be confirmed in the literature, however, the association to MHP development is uncertain.

The most recent energy policy in Himachal Pradesh added a criterion of minimum distance between projects, likely to dampen the synergistic effects of many projects, though this is not a stated reason for the policy. However, the criterion is not being implemented for the purpose of addressing cumulative effects of projects, but rather to avoid conflict between project proponents for cascading projects. Upon examining DPRs of projects, little to no consideration was given to cumulative impacts. Furthermore, even the effectiveness of the established minimum distance is called into question as to whether it was enough distance between projects to address cumulative impact concerns, since much larger distances between projects is recommended in the literature.

Potentially positive cumulative impacts of MHP development were also discussed relating to MHP projects having fewer impacts than larger scale, or fossil fuel dependent projects, MHP projects generating needed electricity, and MHP projects contributing to development of the area. However, many of the perceived positive cumulative impacts countered opinions of other participants, or upon observation, were found not to be true. For example, road connectivity was described as a positive outcome from MHP development, but when visiting projects, the roads almost exclusively led to projects and were not multi use. Employment was described as a positive effect, yet it was found that either there was little to no permanent employment from local from projects, or when there was, they were for unskilled positions. In DPRs, local employment did not translate to employment for the communities where projects are based, but more widely to the Kullu District, or Himachal Pradesh. The same was found in the work done by Kumar and Katoch (2015). A few participants noted the benefit of projects for increasing electricity production in villages, however the electricity generated from the MHP projects goes to the state grid and is by no means guaranteed to go to the local communities. Lastly, the smaller amount of tree cutting for MHP projects versus larger-scale projects was seen as a positive effect, however, this was only discussed by government officials and not by community members, perhaps because community members are reliant on those forests and do not want any tree cutting.

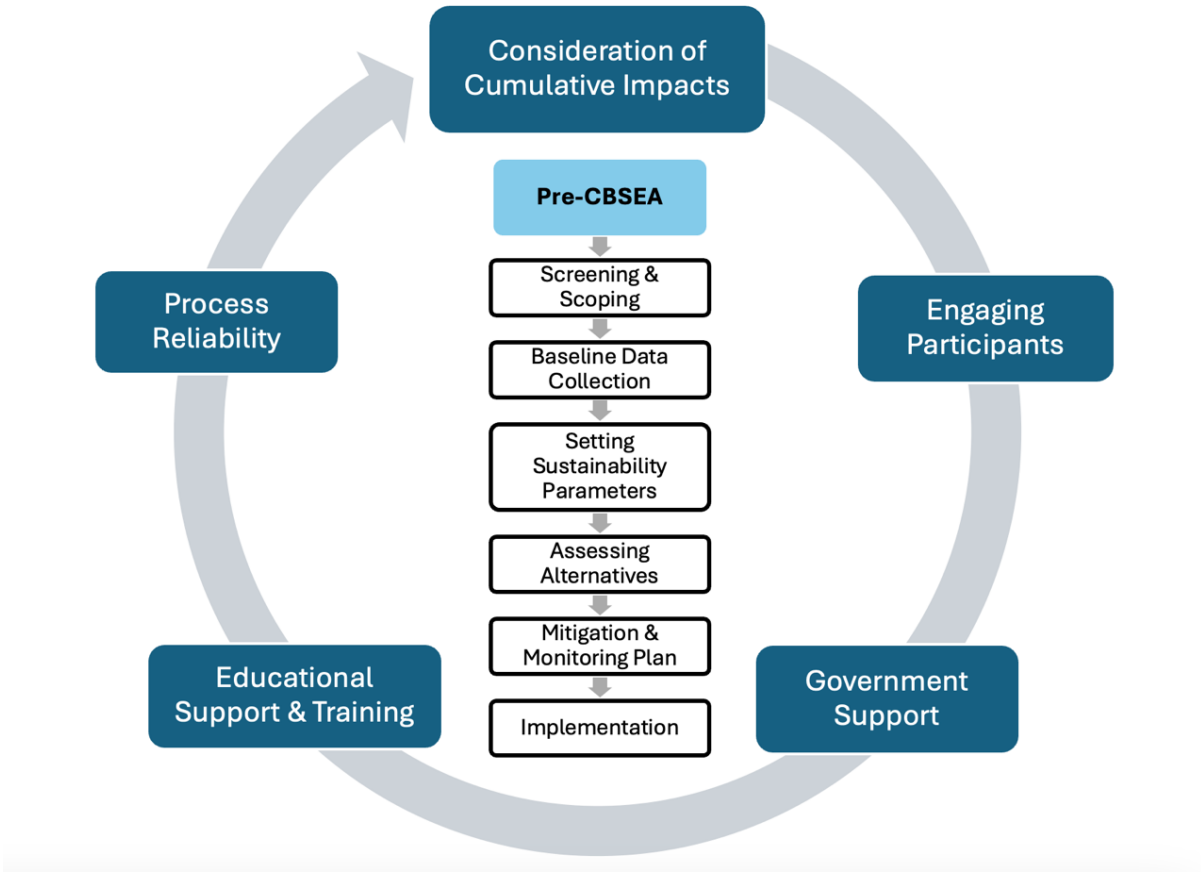
The extent of cumulative impacts identified in the research warrants increased consideration of current MHP projects, and that this should be a key consideration for new MHP development. Given the scope of assessing cumulative impacts of MHP in the area, assessments such as regional assessment, or strategic assessment would be better suited for understanding and mitigating cumulative impacts. Additionally, locals should be involved in these assessments given their understanding and vast knowledge of the area, particularly as people reliant on natural resources of the area for subsistence.

6.4 A Framework for CBSEA

In the Upper Kullu Valley, locals have a close relationship to the environment since most people are reliant on agriculture for their livelihood, making locals inherently aware of environmental changes. This was evident through semi-structured interviews, whereby community members identified cumulative impacts that they have observed from MHP development. The structure of rural society means that locals live near their neighbours and interact with community members regularly through community events like weddings and festival celebrations. Structures of decision making already exist through the Gram Sabah, making community meetings and discussions normal processes for community members. Each household is expected to contribute their opinion on important community decisions. CBSEA has the potential to improve those decision-making processes while not completely disrupting current processes. The results reveal that participants indicated support for community involvement in decision making, there was evidence of strategic thinking and mobilization around MHP development, and of consideration for the environment. These themes indicate an ability and desire for assessment processes that involve locals beyond traditional public participation. As such, a framework for a CBSEA is presented below, in Figure 5. The framework draws on existing SEA procedures (e.g., Chaker et al., 2006, Lodhi et al 2015, Rajvanshi, 2015, and DEAT, 2000), a next-generation CBSEA framework (e.g., Biswal et al., 2023), the work of Sinclair et al. (2009), and the themes revealed through data analysis.

Figure 5

A Framework for CBSEA



In examining the literature on SEA, there is widespread dissonance concerning how SEA is practically applied, making its implementation difficult. It is argued that this allows for flexibility in implementation and for the variation that exists for implementation in different contexts. For example, countries have variable legislative systems and procedures around impact assessment (Partidario, 2000). Yet, within these differences, common steps involved in an SEA were identified (see Chaker et al., 2006; DEAT, 2000; Lodhi et al 2015; and Rajvanshi, 2015). While steps varied slightly, they generally consisted of screening and scoping, baseline data collection, setting sustainability parameters, assessing alternatives, mitigation and monitoring plan, and implementation. These steps are shown in the centre of Figure 5, as the basic procedures for implementing a CBSEA. Surrounding these common steps are five elements that emerged from the research as being foundational throughout a CBSEA and conducted

on an ongoing basis from pre-CBSEA to implementation. One new step, pre-CBSEA is also presented. These elements and this step emerged from the data as being essential to any attempts to implement CBSEA. Each of these is described below.

6.4.1. Pre-CBSEA

Drawing on the framework developed by Biswal et al. (2023) for next generation CBEA, a pre-CBSEA phase is included. A pre-CBSEA phase is critical because it includes undertaking introductions between community members and facilitators, deciding on a public participation plan, and building local capacity for doing the CBSEA. In other words, building relationships and planning the processes together. Spaling et al. (2011) found that clearly communicating the processes of a community-based assessment is important to ensuring participants have lasting learning outcomes. Similarly, Spaling et al. (2011) suggest that discussing the role of the facilitator is important to a community-based approach. Since participation is essential for the entirety of a CBSEA it is crucial to properly engage community members since their role is for the duration of the assessment, which can take considerable time and energy (Spaling, 2003). During interviews, participants indicated that community members are not keen to participate in activities that contribute to the general community. For instance, themes of self-interest, disinterest and short-term thinking were identified. Similarly, participants indicated that community members have very differing opinions, and that the interconnectedness of relative relationships drives people to think a certain way. These attributes highlight the need for proper engagement of participants early to get people thinking strategically and thinking about their neighbours. Sims (2012) discussed how the process of a CBSEA led to participants thinking beyond their own interests, having more concern for community members, and having more consideration for environmental conservation. Furthermore, in this research, activities like offering free trees, seeds, or meals to individuals attending community meetings were said to encourage participation. For example,

two Panchayat Pradhans talked about successful attendance numbers for community meetings by pooling together meeting funds to hire local women to make a meal for attendees. This meant attendance from the women providing the food, as well as guaranteed a free meal to others, while keeping the same budget for meetings.

A Pre-CBSEA involves introducing the people involved in the CBSEA to each other and to the objectives of the project so as to build relationships. Since CBSEA is not well known, and SEA can be difficult to understand, breaking down the concepts of the assessment would be helpful for locals to gain an understanding of what will be done, and what their role is in the process. Additionally, as with a next generation CBEA, building capacity for a CBSEA is considered important prior to screening and scoping. As identified in interviews with participants, changes to state policies regarding hydropower development have led to unclear understandings of the requirements of community involvement and the power that community members have in decision making. Interview participants indicated education and awareness of community members is needed, which would help those participating in the CBSEA to understand the procedures and engage more in the process. Sinclair et al (2009) indicate that through the process of a CBSEA, capacity for additional CBSEAs is increased, thereby situating communities to conduct future CBSEAs.

Facilitators, or any stakeholders from outside the community, should be familiarised to the local context (Biswal et al., 2023). This includes engaging with community to understand the subsistence context, economic position, cultural norms, power dynamics, accessibility, and how sustainability is understood by community members. Since participants suggested there was distrust in government processes for MHP development, it is important to establish trust and show genuine care for communities participating in a CBSEA. This was also echoed by Sims (2017) who found that spending

adequate time building trust contributed to the success of community-based projects. Furthermore, obtaining community permission should be done (Biswal et al., 2023) in this stage.

6.4.2. Consideration of Cumulative Impacts

Consideration of cumulative impacts was identified as a main element for a CBSEA in the Upper Kullu Valley. This means that in implementing a CBSEA, cumulative impacts need to be considered throughout the process. During interviews, participants outlined numerous cumulative impacts they have observed because of extensive MHP development in the area. For example, water scarcity, geological, ecological, and aesthetic changes, deforestation, and a poor distribution of benefits. The literature revealed similar findings, such that of river fragmentation, which affects the environmental flow, irrigation for farmers, and changes to sediment load (Erlewin, 2013; Rajvanshi et al., 2012).

Despite participants and the literature highlighting cumulative impacts of MHP development, upon reviewing policies and reports for MHP development, it was revealed that cumulative impacts are not genuinely considered in decisions about MHP development. For example, DPRs indicated there would be no cumulative effects from projects, but no details were provided about how this was determined. There were other poorly justified claims relating to the social benefits of projects. The DPRs also appeared inauthentic because there was word for word copying from other DPRs. The most recent energy policy in Himachal Pradesh also fails to properly address cumulative impacts. While a new stipulation for minimum distances between projects was implemented, Kuniyal et al. (2017) indicate this is not enough distance. Additionally, the policy discusses minimum distances in terms of avoiding conflict between other project proponents, rather than for reducing the cumulative impacts on local people, and the geology and ecology of the area.

The literature (see Lodhi et al., 2016) also indicates that cumulative impact assessment is a key component of a SEA and important in assessing the impacts of small-scale hydropower development,

such as from run-of-the-river projects. However, even when cumulative impact assessment is legislated as a legal obligation, the assessments are often lacking (Duinker, 2013). As such, greater attention needs to be on assessing cumulative impacts. Sinclair et al. (2017) argue that a cumulative assessment mindset is required to "understand how to adjust human activities for a sustainable future" (p. 184). A cumulative assessment mindset assumes that all human activities which might impact the ecosystem should be assessed as a cumulative impact, and then factored into decisions about activities like new development project (Sinclair et al., 2017). Also of note was the need to include naturally occurring processes in cumulative impacts, such as hurricanes causing major flooding (Sinclair et al., 2017). This is relevant to the Upper Kullu Valley because of frequent occurrences of landslides, and cloudbursts. Questions such as "what is the carrying capacity of the ecosystem" and "how will human activities affect this?" need to be asked (Sinclair et al., 2017).

A cumulative impact assessment follows similar procedures to the proposed CBSEA since it requires scoping, analysis, mitigation, and follow-up, but is seen as difficult and overwhelming to assess (Sinclair et al., 2017). Ideally when a cumulative impact assessment is conducted, information would be collected and shared from a combination of Regional Environmental Assessments, SEAs, and other management plans, making a cumulative impact assessment more feasible, and with only small information gaps to fill. But when a cumulative impact assessment is unfeasible and to be completed by project proponents, the role of government should be clearly identified (Sinclair et al., 2017).

6.4.3. Engaging Participants

Engaging participants was identified as a critical element for a CBSEA in the given context. As previously discussed, a challenge of SEA is in how participation is executed since there are few guidelines for the implementation of SEA (Sinclair et al., 2009). However, with a community-based approach, participation is not just an element of the process, but rather drives the entire process

(Spaling, 2003). Each step involves community members. For example, community members need to help determine what constitutes scoping and screening by deciding why a CBSEA is being done, the goals of the CBSEA, and what the alternatives are.

Participants indicated that community members are incentivized to participate in community decisions when they receive sustained benefits from projects. This might be a good policy for project assessment, but it also points to an overall desire for longer-term benefits from development. To secure participant engagement, it seems relevant to establish, early on, why a CBSEA would benefit community members in the long-term. Sinclair et al (2009) found in the CBSEA conducted that there was a desire to learn and mitigate the potential impacts on farmers and Sims (2012) found that participants in the CBSEA learned how they could personally contribute to environmental conservation. This supports the need to connect potential impacts to the livelihoods of individuals to establish an understanding of long-term benefits of a CBSEA and drive engagement.

Leadership was discussed as a means to achieve good participation and to encourage strategic thinking by introducing schemes that derive long-term benefits. Leaders such as Panchayat Pradhans and Panchayat members have influence in communities and sway to effect engagement of participants in something like a CBSEA. Ward leaders, who represent smaller jurisdictions than Panchayat Pradhans, were also talked about as potentially having a greater role in decision making by ensuring concerns of each Ward are heard. As such, Ward-wise meetings, led by Ward leaders, were suggested.

Such engagement strategies were identified as ways to improve participant engagement. Sinclair et al. (2009) also found that through a CBSEA, and associated critical reflection, participants were found to think beyond their own interests. Additionally, Sims (2012) found that through collaboration and sharing, participants increased concern for their community members. Both outcomes are pathways for overcoming self-interest, disinterest and short-term thinking.

6.4.4. Government Support

A concern identified was a lack of government care for the area. Interview participants found that government officials did not care about the concerns of community members, nor had knowledge of the area. Participants indicated that MHP projects are being used to generate revenue for the government, while failing to uphold promised benefits to locals, as was found by Diduck et al. (2021), Diduck & Sinclair (2016), and Kumar & Katoch (2015; 2016). Participants further described a disconnect from where decisions are made to where those decisions are enacted. In other words, they lacked local knowledge because decisions are being made from urban centres like Shimla and Delhi. Yet, these same participants indicated that community members have a strong sense of understanding and knowledge of the natural resources in and around their communities, especially as it related to changes from MHP development. Participants also described governments not listening to the objections to projects from locals which was talked about in the context of NOCs. Various cases taken to court by communities who are against projects also indicate a lack of consideration for the concerns of participants. As highlighted by Sinclair et al. (2021), having an option to not move projects forward is an essential element to next-generation impact assessment. As such, it is important for government to respect the outcomes of a CBSEA, even if it an undesired one.

Interview participants indicated that Panchayat Pradhans are paid inadequately. The result of inadequate pay is that only leaders who can afford to have a net negative income can hold such a position of power in communities. Participants said that low budgets for Pradhans means forgoing activities that would benefit their Panchayats, like travelling to larger towns for meetings. It was also said that women are more greatly impacted by lower wages because women often do not drive, meaning that to get places they must hire taxis, or rely on getting rides from community members. This further exacerbates issues of inequality that exist in the Upper Kullu Valley and more widely in India.

In the previous CBSEA conducted in the study by Sinclair et al. (2009), a facilitator from outside the community was used. The authors highlighted the importance of facilitation. While a facilitator from outside the community was used for that CBSEA, due to the preestablished system of decision making in the Upper Kullu Valley, and through the Gram Sabah, it is conceivable that Panchayat Pradhans would help facilitate a CBSEA. Even without directly leading facilitation, Panchayat Pradhans have significant influence on participation and getting community-members to think strategically. As well, the transition to a fully community-led assessment may be easier given the established role of the Panchayat Pradhan. It is therefore important that Panchayat Pradhans are supported sufficiently so they can effectively do their job, and effectively facilitate a CBSEA.

6.4.5. Educational Support and Training

It became clear from the data that an essential element for the successful implementation of CBSEA was ongoing educational support and training throughout the process. Lack of knowledge and awareness around MHP development was identified by participants as a barrier to CBSEA, but it was also indicated that these problems could be addressed through government support. Participants also indicated an increased level of education and awareness could be achieved through communication channels such as social media. Additionally, participants indicated that improved strategic thinking of community members is tied to better education and awareness.

To continue increasing the education and awareness in the Valley, it was recommended by participants to increase opportunities for learning, with support from government. One recommendation was to increase the education capacity of the Kullu District through new educational offerings which provide training to locals about hydro development. This would provide educational facilities, opportunities to share expertise on impacts of hydro development, and training for locals so when employment opportunities arise from new project development, they have the necessary skills to

work in long-term positions. Holding workshops to help people understand the potential impacts of MHP development was identified as an important activity to be undertaken as part of a CBSEA to enable more informed decisions. Similarly, providing training to Panchayat Pradhans was identified as a way to increase capacity for a CBSEA. Alternatively, setting a standard of education was recommended since Panchayat Pradhans need to be able to decipher the meaning of government documents and explain information to the community.

Sinclair et al. (2009) found that learning through a CBSEA addressed power imbalances so that individuals were less persuaded by outside influences (Sims, 2012). In this research, it was identified in interviews that community members sometimes prioritize short-term benefits for MHP development. For example, during land acquisition, community members might be inclined to sell off land for MHP development because of the short-term financial benefits. Through a CBSEA, and through addressing power imbalances, community members may be more inclined to think long-term, and to have greater knowledge of the outcomes of MHP development, leading to different decisions. Overall, increasing the understanding of locals around MHP development, through education and training, with the support of government, would contribute to a more effective CBSEA.

6.4.6. Process Reliability

Process reliability is the final theme identified through the data analysis of potential enablers and barriers of a CBSEA in the context of the Upper Kullu Valley. A focus on process reliability was identified based on concerns by participants that within MHP development, there are operational gaps which were discussed in terms of maintenance and monitoring, in preliminary research, and in the overall quality of projects. In evaluating EIA in India, Jha-Thakur and Khosravi (2021) also found that monitoring and follow-up were the worst performing aspects of EIA. Participants also spoke of a lack of transparency and of occurrences of bribery, pressures and corruption, which undermine the reliability

and legitimacy of current decision making around MHP development. Together, the research and literature justify greater attention to improving process reliability in impact assessment.

Aspects of increasing process reliability for CBSEA were identified to include improving baseline data, and maintenance and monitoring. Improving baseline data can be accomplished through CBSEA by doing adequate preliminary research that includes collecting assessment specific data and considering climate change impacts. DPRs indicated that there was no baseline data for flash floods in the Upper Kullu Valley suggesting that baseline data collection has not been prioritized in previous development projects in the area. Kumar et al. (2018) suggest creating an inventory on extreme weather events to understand why these events are occurring which could determine if there is a correlation to MHP development. It was suggested by participants that baseline studies be conducted regularly due to the dynamics of the hydrologic system in the area and receding glaciers, thus creating a time series of data that can be used into the future that project level assessments can draw on. Improving maintenance and monitoring involves ensuring that what is planned is completed, even after implementation. As identified by participants, maintenance and monitoring would ensure promises to community members are guaranteed, including infrastructure built as part of Local Area Development Fund. As such, a CBSEA with proper maintenance and monitoring would identify what needs to be monitored and who is responsible. To deal with quality shortcomings, attributed to construction, maintenance and monitoring should be done to ensure planning aligns with implementation. It was suggested that both government and locals are involved in maintenance and monitoring.

Through a CBSEA, it is understood that transparency would be improved since a clear process for how decisions are made is established and completed by community members for steps such as follow-up and monitoring. Given the energy policy changes in Himachal Pradesh, and the diminished power of the Gram Sabah in MHP decision making, there should be clarity, as well as a commitment

from state and central government to respect the decisions of Gram Sabahs as they pertain to MHP development.

Chapter 7 Conclusions

As established in Chapters One and Two, India's energy demand is continuing to increase. To meet this demand, and renewable energy goals, India has largely focused on increasing the capacity of energy generated from hydroelectricity. As a result, there has been an escalation in development over the past two decades for both large- and small-scale hydro projects in the state of Himachal Pradesh. As per previous research outlined by Diduck et al. (2021), Erlewein (2013), Kumar & Katoch (2016), Lodhi et al. (2016), and Lillesund et al. (2017), there are significant impacts resulting from hydro projects of all scales. As such, EIA processes must be improved to include strategic thinking to avoid and mitigate the potential impacts of hydropower projects.

SEA has been recommended in the literature as an important precursor to project EIA because of its potential to guide decisions towards the most sustainable path (Partidario, 2000; Rajvanshi, 2015; Saxena et al., 2016). This involves thinking long term, starting at the beginning stages of considering ways to address a problem or opportunity – at the policy, planning and program level. CBEA has also been proposed when local people are impacted by development and natural resources are relied on by those same communities. Combining these two concepts, Sinclair et al. (2009) used a CBSEA approach to assess a watershed management program in Costa Rica. This research examined how such an approach might work in the context of the Upper Kullu Valley, where numerous small-scale hydropower projects have been constructed and are planned.

The objectives of the research were to: 1) determine the roles of communities and decision makers in MHP development; 2) identify potential barriers or enablers that could impede or support the implementation of CBSEA; 3) describe concerns about, and approaches to, incorporating cumulative effects in a CBSEA; and 4) develop a community-based framework for the SEA of MHPs. Over the course of three months, I collected data in the field using semi-structured interviews with key stakeholders,

participant observation of MHP projects in the Upper Kullu Valley and of community events, and through a document review of various government documents and DPRs of project proponents. In this chapter I draw conclusions in relation to the first three objectives, data from which enabled me to achieve my final objective. In the end, I also establish the potential for future research.

7.1 The Roles of Communities in Decision Making for MHP Development

Through interviews, it was found that the involvement of community members was already an important aspect of local decision making due to their local knowledge of the area surrounding projects and because they are the ones who endure the impacts of these projects. At the same time, the current policy framework does not contribute to greater community involvement, and instead reduces the role of community members. It was found that the policy framework further contributed to confusion regarding what the current role of both community members and local decisions makers are in MHP development.

The pre-established system, through the Gram Sabah (community assembly), allows people to discuss community wide concerns and development projects. However, concerns were expressed about the inclusivity of these meetings, which aligns with the findings of Bingeman (2001). Additionally, many instances of bribery, pressure and corruption were discussed as they related to obtaining permission from communities to build MHP projects. Overall, it was found that there is the opportunity for, and should be, more inclusion at the community level in decisions, that more clarity and transparency regarding the current processes for micro hydro decision making are needed, as well as greater attention to inclusivity at the community level.

7.2 Enablers and Barriers to a CBSEA

Four barriers to and five enablers of CBSEA were identified through the research (see Table 3 and Table 4). The types of barriers identified are not that uncommon, such as trying to get people to

move beyond acting in their own interest by becoming more active participants in community life and decision making. Likewise, decision makers need to at least try to reflect the input they have received in the decisions that they make; otherwise, why would people want to get involved? Many authors have commented on these issues in relation to public involvement in EIA (see Sinclair et al., 2009; Spaling et al., 2011; Walker & Sanz, 2024). Aswell, similar to findings by Sims (2012) and Biswall et al. (2025), it was identified that it is challenging to get people to think strategically about projects, sustainability and the future of their communities.

These barriers were countered in the Upper Kullu Valley though, through people establishing a strong desire for greater involvement in MHP and other development, as well as offering strong evidence of strategic thinking, especially by community leaders who are influential in these rural communities. It was also revealed that participants felt community members were continuously becoming more aware and educated about MHP development, making them appropriate participants to help inform decisions.

Given the enablers and barriers identified, the framework that I developed was meant to help to magnify the enablers of CBSEA and reduce the effects of the barriers. An example of this is in examining the barrier of information deficits, and the enabler of increased education and awareness for community members. Increasing educational support and training is a key component of the framework. It was found that community members have developed a better understanding of MHP, and the associated effects from this development. In building on this, increasing educational support and training can further enhance learning and awareness. At the same time, increasing educational support and training can reduce the information deficits that exist by clarifying or informing about aspects of MHP development decisions that are confusing, or are not apparent to community members.

7.3 Concerns About and Approaches to Cumulative Impacts

Through interviews and observations, it was apparent that numerous environmental changes were occurring, many of which were attributed to MHP development. The most prominently discussed concern, which could be the result in part of cumulative effects, was water scarcity. Community members are extremely reliant on surrounding nallahs (streams) for farming and drinking. Participants discussed how water is being drawn away from communities thereby leaving community members with less local water. Other effects that could be cumulative in nature were identified by participants such as increased flooding which contributes to erosion, and the increasing occurrences of landslides. It was also very apparent that people perceived MHP projects positively due to the perception of fewer negative impacts associated with them, as compared to, for example, fossil fuel dependent energy sources.

Despite the extensive discussion of cumulative effects discussed by participants, current policies fail to address cumulative effects from MHP development. Yet, addressing cumulative effects, as highlighted in the literature, is necessary to adequately assess the impacts of MHP development (Lodhi et al., 2016). This is particularly true for implementing SEA, which looks beyond the project scale. As such, if a CBSEA is to be used, there should be robust consideration of cumulative effects. CBSEA may in fact be the best chance for the consideration of cumulative effects, since this is rarely happening at the project level in the region.

7.4 A Framework for a CBSEA

Following an analysis of the data collected through interviews and participant observation, it became clear that there is potential for a CBSEA in the Upper Kullu Valley. There are existing mechanisms within communities to make decisions, such as through the Gram Sabah, that are devised to include all community members. While there are issues with the system, it is an established way for community discussion to occur and can accommodate CBSEA considerations. Participants in the

research also indicated wanting more community involvement in hydro development decisions, in part because of the local knowledge they have about the natural resources of the area, and existing decision processes provide that opportunity. Taking this into consideration, as well as other CBSEA enablers and concerns about cumulative environmental effects, a framework was developed for a CBSEA in the Upper Kullu Valley.

As Figure 5 establishes, the framework is built on the foundation of existing approaches to SEA as established in the literature. These components are captured in the centre of the figure. A step is added to these traditional components, the 'pre-CBSEA' stage, meant to help kick-start the process. Surrounding these central components are the major themes identified through the research that need to be addressed to apply SEA at the community level. These include consideration of cumulative effects, increasing public engagement, government support, educational support and training, and process reliability. Each of these is discussed in some detail in Chapter Six of the thesis. As Figure 5 depicts, the vision is that these are overriding issues that must be considered as the central components or steps of the CBSEA are undertaken. So, for example, I would envision cumulative effects being considered throughout, always being front of mind, as suggested by Sinclair et al. (2017) and not just being a stand-alone consideration. In the same way, increasing government support would be considered throughout the CBSEA. For example, government might provide support by building capacity for a CBSEA and supporting Pradhans in facilitation. Government support would extend throughout the process, after findings are revealed from the CBSEA, and would include genuine consideration of the CBSEA to help inform policy decisions.

7.5 Future Research

This study examined the potential for a CBSEA in the Upper Kullu Valley, however, actual implementation was not done. Future research may involve implementing a CBSEA, guided by the

framework developed, to determine the effectiveness of such an approach. However, as indicated by Sinclair et al. (2009) and Sims (2012), initiative by community members and the facilitating body, and openness by the project proponent to try an alternative approach to EIA is needed. Additionally, there is concern in conducting strategic planning due to the abundance of projects already commissioned in the area. While this research contributes to decision making for MHP development, it may already be past the point of useful application of CBSEA. As a few participants indicated, the saturation of projects in the Kullu Valley has already been reached, meaning there is no more room for additional projects. Yet, other participants said they believed more MHP development to be coming, and this also makes sense since it seems that people have thought there would be no more MHPs for some time.

The implementation of CBSEA for MHPs may seem futile for many locals at this point though, which is likely to complicate the rolling out of any process. There are, however, new subsidies being introduced by the state government to reduce the cost of implementing solar panels, and increasing royalties for MHP might decrease investor interest. Given this, a CBSEA may be more practically examined and applied to other types of development, such as solar power.

Further research should also be conducted on maintenance and monitoring of MHP development to better understand what these processes are, how these processes are being followed, and their effectiveness. Maintenance and monitoring were found to be important aspects of the research, but further examination should be done to understand how to overcome associated challenges of maintenance and monitoring.

In future research, it is crucial to highlight the importance of explaining concepts such as strategic planning. It was challenging for participants to conceptualize a process whereby policies, programs, or plans are evaluated, rather than a single project. In the same way, Sinclair et al. (2009) found that it was difficult to establish engaging discourse because participants of a CBSEA did not know

if their input would influence any projects directly. This was especially true when participants felt strongly about a single project and wanted to express concerns about that particular project, rather than concerns surrounding MHP development of the area. Similarly, it was challenging in interviews to convey what strategic meant, and how community members might be able to think more strategically about MHP development. This involved getting people to think about the future, and potential scenarios which was difficult to do. People seemed more interested in discussing the impacts they were currently experiencing from MHP development, rather than conceptualizing something new.

7.6 Concluding Comments

The research focused on MHP, which are abundant in the Kullu Valley and with which participants were familiar. However, participants often turned discussions to large-scale projects since there have been cases in the last few years involving large hydro projects failing, such as in Malana in the Kullu District. For two consecutive years, two projects have experienced infrastructure damage from cloudbursts causing the projects to fail. Consequently, damage to the area has been significant leaving the community of Malana cut off from road access for many months. The intense damage and implications for the community meant that interview participants frequently brought up Malana, making it difficult for participants to focus on smaller-scale projects. For participants, there was often no clear distinction between MHP and larger-scale hydro development. As such, the impacts of all scales of hydro projects are often grouped together suggesting that to increase community support for MHP, support for larger-scale projects must also be achieved.

Key results from this thesis reveal that CBSEA could be used if the five components identified through the research and contained in the framework are actioned. The learnings about these components are associated with the CBSEA framework but they also point to shortcomings in more general decision-making systems in the region. For example, engaging participants was identified as a

critical component in conducting a CBSEA, but participants also noted that this should be emphasized during other forms of public participation. Likewise, improving decision process reliability was identified in the research but has also been found in the literature to be lacking in other areas of India, pointing to a wider concern for process reliability beyond the local systems in the Upper Kullu Valley. As such, the activities established in the framework could also be applied in other circumstances involving decision making about development projects in the Kullu Valley and potentially more widespread.

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Appendix A: Observation Guide Template

Name & Location of Observation:	Date:	Start Time:	End Time:
Type of Infrastructure:			
Purpose/Use of Infrastructure:			
Year Built & State of Infrastructure:			
Repairs, Maintenance, Closures, etc:			
Other Observations:			

Appendix B: Interview Schedule

Introduction:

Thank you for agreeing to an interview with me. My name is Julia Tays and I am a Master's student at the University of Manitoba in Canada. My research looks to examine how community based strategic environmental assessment could be implemented for micro/mini hydropower development. I am interviewing you and others to better understand the current situation regarding micro/mini hydro development and any potential role for strategic and cumulative effects considerations in assessments carried out.

As we move through the questions, please feel free to ask for clarification on a question. You may take as much time as you need to think about your response. If you prefer not to answer a question, this is completely acceptable, and we can skip to the next question. Before we begin, do you have any questions that you would like to ask me?

Background:

1. Which community in the Kullu District do you currently call home?
2. Can you describe your general impressions of MHP development in your community/the Kullu District?
3. What role do/have you (or your organization) play(ed) in decision making about MHP development in the Kullu District, if any?

Cumulative impacts:

I am interested in what are called cumulative impacts as they have shown to be a concern in hydropower development. This is when the impacts of several different projects are considered together. For example, in the case of micro/mini hydropower, this could evaluate how the proximity of projects to one another has led to changes in the amount of water that flows through the river.

4. Have you or your community experienced any impacts resulting from surrounding hydropower projects that you think are cumulative impacts?
5. In deciding about new micro/mini hydro projects, do you think it will be important to consider the effects of other micro/mini hydro projects and other projects occurring in the District such as, other hydro, new roads, water projects, etc. If yes, how might such considerations be made in the current decision-making processes?

   Strategic Environmental Assessment:

One way to assess the long-term sustainability of implementing hydropower projects in an area is through community based strategic environmental assessment (SEA). SEA looks at a sector, such as hydropower, and helps determine the impact of policies, plans, and programs before decisions are implemented. Understanding how decisions impact the environment, or people such as yourselves, can result in better decisions.

For example, in 2006, the state of Himachal Pradesh implemented a policy to incentivize the development of small hydro power in the state. An SEA in this case would have evaluated how the decision to implement this policy would impact the environment and people. The SEA would look at how this policy compares to another potential policy, program, or plan, to determine which one should be implemented.

6. It is my understanding that more MHP development is likely to occur in the Kullu District. Are there any mechanisms for your community leaders to work together to consider the impacts of a type of project like MHP in a more strategic planning way – allowing thinking about the future?
    - If yes: Please describe.
    - If no: Do you think it might be possible to develop a way for more strategic decision making among communities about the future of micro/mini hydro development? How might this happen?
7. What might be some incentives or barriers to getting community members and leaders to participate in this type of strategic planning? (i.e., what might the process need to look like to encourage involvement; e.g., facilitated community meeting, provide food, in the evening, etc.)
8. Do you know about any micro/mini hydro projects that have failed – either never completed or shut down? If so, do you know why they failed?
9. Do you have any other comments about micro/mini hydro development in the Kullu District, or questions about this interview?

Appendix C: Participant Consent Form

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PARTICIPANT INFORMED CONSENT FORM
Individual or Group Interview

Study Title: Diverting Waters: Examining the Potential for Community-Based Strategic Environmental Assessment of Small Hydropower Projects in the Kullu District

Student Principal Investigator: Julia Tays, Candidate Master of Natural Resources Management

WhatsApp Number: +1 204 396 3708

Email: taysj@myumanitoba.ca

Student Supervisor: Dr. John Sinclair, Professor and Director of the Natural Resources Institute, Faculty of Earth, Environment and Resources

Email: john.sinclair@umanitoba.ca

None of the researchers have any conflict of interest in this study.

This consent form, a copy of which has been given to you, is only part of the process of informed consent. If you want more details about something mentioned here, or information not included here, feel free to ask any of the people named above. Please take the time to read this document and any accompanying information carefully. It is very important that you understand:

- what is being asked of you,
- what the risks and benefits of participation are, and
- how the information you provide will be used and stored.

Purpose of the research: The purpose of the study is to examine how an alternative approach to environmental assessment might be used to evaluate micro/mini hydropower (MHP) development. The type of environmental assessment that I am examining is called community-based strategic environmental assessment (CBSEA). It combines a community-based approach which focuses on community participation, using local knowledge systems and empowering communities. This approach is combined with strategic environmental assessment which focuses on decision making and evaluating the alternatives for different policies, plans and programs for the most sustainable option. An important aspect of strategic environmental assessment is that it considers cumulative impacts which can occur

from hydropower development when several projects are constructed along the same stream creating cascading impacts. The research will be conducted in the Kullu District in the state of Himachal Pradesh. The objectives of the research are: to understand the current status of MHP development in the Kullu District; to identify potential barriers or enablers that could impede or support the implementation CBSEA; to describe concerns about, and approaches to, incorporating cumulative effects in a CBSEA, and; to develop a community-based framework for the SEA of MHP projects.

Participant Involvement: As participants for this study, you are being asked to participate in an in person interview due to your knowledge of micro/mini hydropower development and decisionmaking in the Kullu District. It is expected that a total of 80 participants will participate in the study through individual or small group interviews. Interviews are expected to take between 20 minutes and one hour in length.

Interview Procedures: The interview will consist of questions relating to your thoughts on the status of hydropower development in the Kullu District, if you are aware of any cumulative impacts from such development, the role of environmental assessment in project decision making and approaches to implementing CBSEA.

If you are comfortable and agree to being audio recorded, I will record the interview using an app on my phone. If not, I will record your answers in a notebook. Please indicate below if you would like to be recorded or not.

If at any point you no longer wish to participate in the study, you may stop the interview. You may also withdraw from the study by contacting myself or my supervisor prior to May 2025. Our contact information can be found on the first page. In any instance where you choose to withdraw from the study, no negative consequences will occur and all interview transcripts and recordings of yourself from your interview will be deleted. However, if withdrawing from a small group interview, information shared with other participants cannot be withdrawn from the study since other participants have heard the responses.

Confidentiality: During individual interviews, the information you provide as part of this study will be kept confidential unless you choose to identify yourself and the information you share. For safety, your information will still be kept on a UM-approved secure platform. For small group interviews, the information shared cannot be guaranteed to remain confidential since other participants will hear the information that is shared by the speaker. It is therefore highly recommended that information shared within group interviews is only information that you are comfortable with other people knowing.

I will be asking questions with the help of an interpreter who will operate under an Oath of Confidentiality, meaning that the information you provide will remain confidential. In instances where we quote any of your answers, your name will not be associated with the quote, but you may be referred to using a general descriptor identifying your community, the type of participant that you are (ie. community member, community leader, sector expert, academic, government official), or your field of study, if applicable. However, if you chose to associate your name with the information you provide as you would like to receive credit for your responses, please indicate below.

Only myself and my supervisor will have access to the interview audio recordings, handwritten notes and transcripts following the interview. Audio recordings and handwritten notes will be destroyed once

the information is transcribed to a Word document. Transcripts will be kept in a password protected cloud on my University of Manitoba SharePoint OneDrive. Within two years after the study has been completed (June 2027), the transcripts will be destroyed.

We will do our best to keep your personal information safe. However, it is not possible to guarantee confidentiality. We will only share your personal information if the law requires us to.

Risks and Benefits: The information that you provide in the interviews will not be used in a manner that will put you at risk. You may also choose not to answer any questions that you do not wish to. There are no direct benefits to participating in this study other than possibly gaining an understanding of CBSEA. However, the information that you provide has the potential to inform future environmental assessment and hydropower development that could benefit you.

Dissemination of Data and Research Results: The results of the study will be shared in the form of a master's thesis through the University of Manitoba. Results may also be shared in journal articles and at conference presentations. The purposes of sharing the results will be solely for academic purposes.

Participants may choose to receive a 2-page summary of the research results by November 2025. They may also choose to receive a copy of the completed thesis within a month of its completion. The preferred method to send these documents should be indicated below.

Questions or Concerns: A designated University of Manitoba auditor may check that this study is being done safely and properly. To do this, they may visit the study site or review the research records. We will tell you if someone outside the research team will be there while you are participating. If this makes you uncomfortable, please tell the Principal Investigator, who will ask the auditor to return at another time.

This study has been reviewed and approved by the Research Ethics Board 2 at the Fort Gary Campus of the University of Manitoba. However, this does not mean that participation is risk-free. If you have any questions, concerns, or complaints about this study, you may contact any members of the research team listed on the first page or the Office of Human Research Ethics at humanethics@umanitoba.ca or (204) 474-7122.

By signing this document, I have read the above information and have had the opportunity to ask and have answered any questions I may have.

I understand that:

- I will be taking part in a research study.
- I may freely leave the research study activities at any time.
- I do not waive my legal rights by participating in the study.

Please review the following statements. For each statement, please indicate yes or no.

I agree to participate in this study: Yes ___ No ___

I consent to the use of audio recording for this interview: Yes ___ No ___

I would like for my full name to be associated to the information I provide in this interview; I would like to waive my confidentiality: Yes ___ No ___

I agree that the information I provide for this study can be used and presented in a thesis paper, conference presentations and journal articles: Yes ___ No ___

I would like to receive a summary of research findings: Yes___ No ___

Participant's preferred method of contact for sharing research findings:

☐ Email: _____

☐ Text message (phone number): _____

☐ Mail (address): _____

_____

_____ _____ _____

Participant's Name Participant's Signature Date

To be completed by the student principal investigator:

The participant has given verbal consent to participate in the study: Yes ___ No ___

_____ _____ _____

Principal Investigator's Name Principal Investigator's Signature Date

Notice Regarding Collection, Use, and Disclosure of Personal Information
Your personal information is being collected under the authority of *The University of Manitoba Act*. The University of Manitoba is committed to preserving your right to privacy. The information you provide will be used by the University to support our research. Your personal information will not be used or disclosed for other purposes, unless permitted by *The Freedom of Information and Protection of Privacy Act* or *The Personal Health Information Act*. If you have any questions about the collection of personal information: Ph: 204-474-9462 or Email: fippa@umanitoba.ca

Appendix D: Photo Consent Form

University of Manitoba | Clayton H. Riddell Faculty of Environment, Earth, and Resources

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PHOTO CONSENT FORM

I, _____ (participant's printed name), consent to have my photo and/or video taken and to grant rights to use this content for the purposes of the study conducted by Julia Tays from the Natural Resources Institute at the University of Manitoba and under the supervision of Dr. John Sinclair.

I understand that the content may be used in research publications, in a thesis paper, or presented at academic conferences.

Research Participant's Signature: _____ Date: _____