

Migration Dynamics and Just Transition Pathways in Assam's Hydropower Landscape

Case Study Area: Dhemaji and Lakhimpur District, Assam

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List of Acronyms

AASU	All Assam Students' Union
APGCL	Assam Power Generation Corporation Limited
ASAPCC	State Action Plan for Climate Change of Assam
CUF	Capacity Utilisation Factor
EIA	Environment impact assessment
FGD	Focus group discussion
KMSS	Krishak Mukti Sangram Samiti
NEEPCO	Northeastern Electric Power Corporation Limited
NER	Northeastern region of India
NGT	National Green Tribunal
NHPC	National Hydroelectric Power Corporation
NTPC	National Thermal Power Corporation
RE	Renewable energy
SLHEP	Subansiri Lower Hydroelectric Project
TMPK	Takam Mising Porin Kebang

Executive Summary



Executive Summary

This report examines the socio-economic and environmental dimensions of the Subansiri Lower Hydroelectric Project (SLHEP) and its interactions with downstream communities in Assam, India, through a just transition framework. As India's largest planned hydropower project, with an installed capacity of 2,000 MW, SLHEP represents a significant pillar of the country's renewable energy strategy and its commitment to low-carbon development. At the same time, the project operates within a complex riverine and social landscape, where ecological processes and livelihoods are closely interconnected. Recognising these dynamics underscores the importance of complementing energy development objectives with sustained attention to equity, sustainability, and community well-being.

The SLHEP is designed to strengthen India's renewable energy capacity and contribute to national climate mitigation goals. While hydropower plays a critical role in the transition toward a low-carbon economy, its long-term effectiveness also depends on how well project outcomes align with the needs and expectations of communities living in project-influenced areas. In this context, the study focuses on understanding downstream interactions and identifying pathways through which project processes and outcomes can further support local resilience, confidence, and acceptance.

Specifically, the study seeks to:

- To analyse existing migration dynamics in downstream communities and assess how the SLHEP has reshaped these dynamics through its impacts on livelihoods and socio-economic conditions.
- Assess the project through a just transition lens, with particular attention to transparency, community participation, and recognition of local voices and knowledge systems.
- Propose actionable recommendations that support a balanced approach to renewable energy development, social equity, and environmental sustainability.

The research adopts a mixed-methods approach, combining qualitative and quantitative techniques across Dhemaji and Lakhimpur districts of Assam. Primary data were collected through in-depth interviews, focus group discussions,

and field observations with key stakeholders, including farmers, fisherfolk, and tribal communities. These insights were complemented by secondary sources such as government reports, environmental assessments, and peer-reviewed literature, providing a robust evidence base for the analysis.

Key Findings

The Subansiri Lower Hydroelectric Project (SLHEP) represents one of India's most ambitious hydropower initiatives, designed to harness the renewable potential of the Subansiri River and support the country's clean energy transition. The project makes a substantial contribution to low-carbon power generation, thereby reducing dependence on fossil fuels and strengthening national energy security. In addition to energy production, SLHEP has supported regional development through improved road connectivity, enhanced communication networks, and the creation of employment opportunities during construction phases. These developments have facilitated greater mobility, market access, and economic activity, positioning the project as an important driver of regional growth.

At the same time, the findings indicate that there is considerable scope to further strengthen how project-related benefits, responsibilities, and information are shared with downstream communities, particularly when viewed through the lenses of distributive, procedural, and recognition justice. Addressing these dimensions is essential not only for equity and resilience, but also for building sustained confidence and acceptance of the project among affected populations.

From a distributive justice perspective, communities whose livelihoods are closely tied to agriculture and fisheries have experienced changes associated with altered river flows, sediment dynamics, and flooding patterns. These changes have affected productivity and income stability, underscoring the importance of strengthening livelihood support, benefit-sharing mechanisms, and restoration measures. Processes related to land acquisition and displacement further highlight the need for continued attention to compensation frameworks and livelihood alternatives, so that economic benefits linked to infrastructure development, market access, and employment are perceived as inclusive and locally meaningful.

From a procedural justice perspective, the findings point to opportunities to deepen transparency and community engagement across different stages of project planning and operation. Many downstream households expressed a need for clearer, advance information on river discharge patterns, seasonal flow variability, and dam gate operations, as such information directly influences agricultural decisions, fishing practices, and household preparedness. Improving access to timely, locally relevant information particularly through village-level platforms and local languages can significantly enhance predictability, trust, and adaptive capacity. Similarly, clearer communication on compensation processes, rehabilitation timelines, and grievance redress mechanisms would strengthen accountability and enable households to plan more effectively.

With respect to recognition justice, the study highlights the importance of more explicitly acknowledging the social, cultural, and gendered dimensions of river-based livelihoods. Tribal communities and women, in particular, experience project impacts in ways that extend beyond material loss, affecting cultural practices, social cohesion, and everyday responsibilities. Changes in river access and flow regimes have disrupted traditional livelihoods and rituals, while increased male migration for alternative work has intensified women's unpaid care and household burdens. These findings underscore the value of culturally sensitive, gender-responsive, and participatory approaches that recognise local knowledge, lived experiences, and diverse forms of vulnerability.

Broader Implications

The findings underscore that while SLHEP contributes to renewable energy goals, it also intensifies the vulnerabilities of downstream communities. These challenges highlight the need to integrate distributive, procedural, and recognition justice principles into hydropower project planning and execution.

Recommendations

1. Enhancing Community Participation

- Establish inclusive and sustained platforms for engagement with affected communities across all project phases.
- Strengthen transparent and accessible communication through public consultations, multilingual disclosures, open-access platforms, and community support centres that provide regular updates and respond to local concerns.

2. Strengthening Socio-Economic Resilience

- Expand targeted livelihood support programmes, including skill development and employment opportunities, for displaced and affected households.
- Ensure fair, timely, and transparent compensation processes, coupled with livelihood restoration measures that enhance long-term socio-economic resilience.

3. Supporting Adaptive Environmental Management

- Invest in ecosystem restoration initiatives in downstream stretches of the Subansiri River, particularly in flood-prone areas of Dhemaji and Lakhimpur.
- Strengthen adaptive water management by linking reservoir operations with real-time rainfall and flow data, maintaining minimum ecological flows, and adopting forecast-based release planning. Involving local communities and scientists in monitoring efforts can further improve transparency and balance energy production with ecosystem and livelihood needs.

4. Promoting Equity through a Just Transition Lens

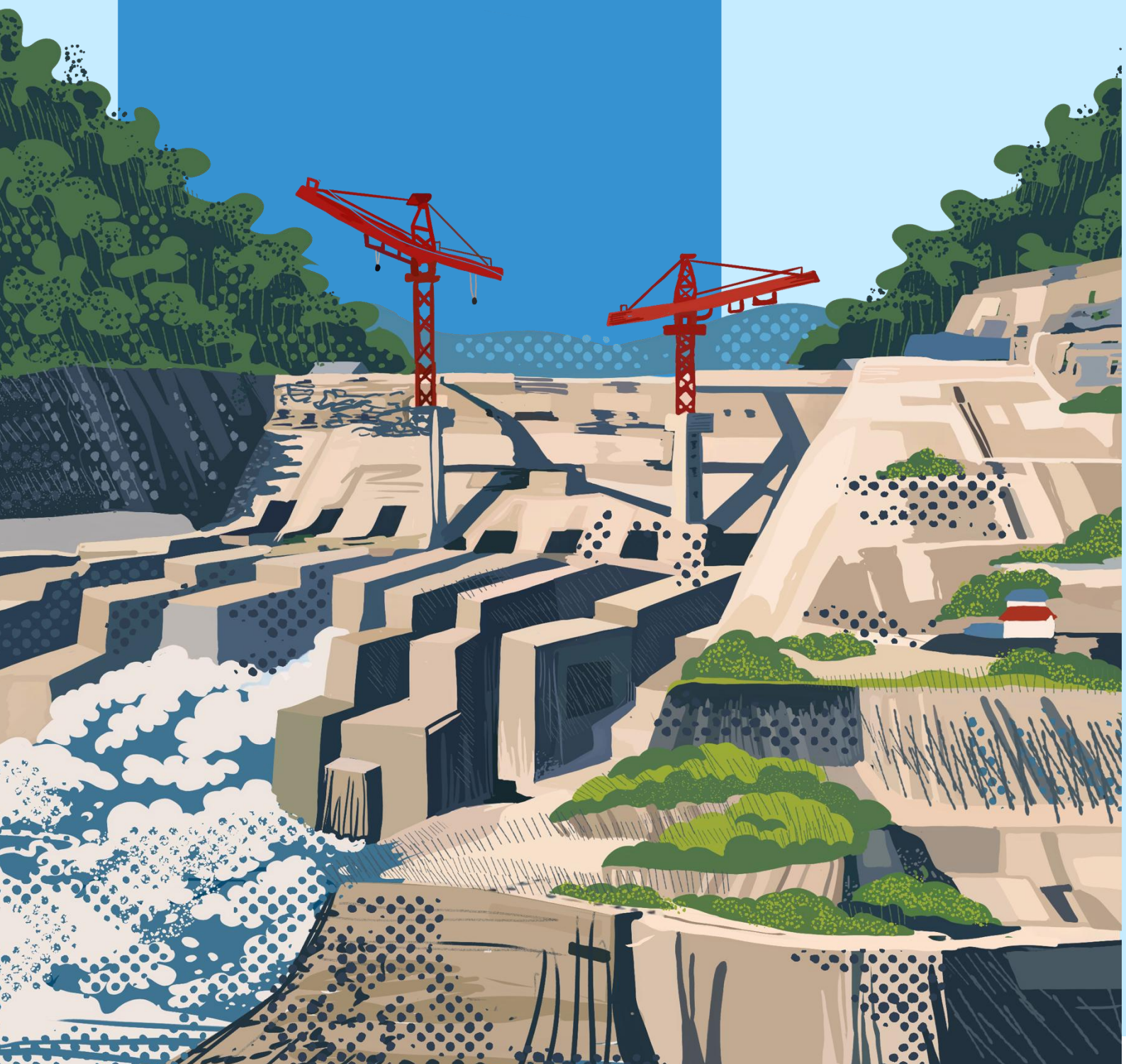
- Prioritise the meaningful inclusion of marginalised groups especially tribal communities and women in decision-making processes.
- Align renewable energy policies with broader goals of socio-economic equity, cultural recognition, and environmental sustainability.

Conclusion

The Subansiri Lower Hydroelectric Project presents significant opportunities to advance India's renewable energy transition while contributing to regional development in Assam. At the same time, its downstream interactions highlight the importance of sustained engagement, adaptive governance, and inclusive benefit-sharing. By adopting a just transition framework, stakeholders can strengthen trust, acceptance, and resilience among downstream communities, ensuring that energy development objectives are advanced alongside social well-being and ecological sustainability. Targeted, forward-looking interventions grounded in equity, transparency, and participation are key to securing a more just and resilient future for the downstream regions of Assam.



01
Introduction



1 Introduction

1.1 Contextual Background

Globally, climate change is one of the most pressing challenges facing humanity, with profound impacts on ecosystems, economies, and societies. The urgency to reduce greenhouse gas emissions has never been greater, as countries worldwide struggle with the escalating consequences of a changing climate. In response, nations across the globe have committed to the Paris Agreement, aiming to limit global warming to well below 2°C, with an ideal target of 1.5°C, and to achieve net-zero emissions by 2050. This collective effort is vital to reducing the worst impacts of climate change, such as extreme weather events, rising sea levels, and disruptions in biodiversity, water resources, and agricultural productivity (Ebi et al., 2021; Ferreira, 2024; Green, 2024). However, the impacts of climate change are not distributed equally.

Vulnerable populations, particularly in low-income countries, small island states, and rural communities, bear the brunt of these effects. Indigenous peoples, small-scale farmers, and low-income households already facing systemic inequalities, are disproportionately affected by environmental changes such as water scarcity, desertification, reduced agricultural yields, and increasing food insecurity (IPCC, 2023). These populations are also the most vulnerable to the economic and social impacts of the energy transition, which is essential for mitigating climate change.

At the country level, nations are working to meet their climate targets by shifting away from fossil fuels towards renewable energy sources. This transition is critical for achieving global climate goals and reducing reliance on carbon-intensive energy sources. However, the path to achieving net-zero emissions is not without challenges. As countries move towards decarbonisation, the shift often involves significant economic, social, and political changes, including the phasing out of fossil fuel industries and the creation of new energy sectors. This process can lead to job displacement, economic disruptions, and increased inequalities if not managed inclusively. A "just transition" framework, one that ensures fairness and equity become essential in these contexts, aiming to provide social and economic support to those most affected by the transition. In India, this approach is reflected in national climate strategies such as the Long-Term Low Emissions Development Strategy (LT-LEDS) and the Updated Nationally Determined Contribution (NDC) (MoEFCC, 2022). The LT-LEDS outlines a pathway to net-zero

by 2070, targeting 50 per cent of cumulative power capacity from non-fossil sources and a 45 per cent reduction in emission intensity by 2030. As of 2022, non-fossil energy already accounted for over 41 per cent of India's installed capacity, underscoring steady progress toward low-carbon development while maintaining energy security and social equity.

India, as one of the growing economies of the world, plays a pivotal role in the global effort to combat climate change. With its rapidly growing population, expanding economy, and increasing energy demands, the country faces a complex challenge. India's energy transition is critical not just for its own development but also for global climate mitigation. The country is increasingly turning to renewable energy sources, with hydropower and solar energy playing key roles in its strategy to reduce emissions and shift towards cleaner energy alternatives (Mohan, 2017). In line with its commitment to the Paris Agreement, India set ambitious climate targets, including achieving net-zero emissions by 2070. This goal reflects the country's recognition of the need for a low-carbon future and its responsibility in the global fight against climate change. However, India's energy transition faces a series of challenges.

These include the need to balance its growing energy demand with environmental sustainability, as well as the economic and social implications of transitioning away from fossil fuels. As of June 2025, India's total installed power capacity has reached 476 GW, comprising 240 GW from fossil fuel sources, while 235.7 GW (49 per cent) from non-fossil fuel sources (PIB, 2025). While the share of fossil and non-fossil capacity is gradually approaching parity, coal remains the backbone of electricity generation in India. Presently, it accounts for nearly 55 per cent of the total energy mix in the country, produces 74 per cent of the country's electricity and provides direct employment to over 239,000 workers in Coal India Limited and thousands more in contractual and transport roles, (PIB, 2025). At the same time, a very large share of India's workforce is in informal or unorganised employment; estimates put adult informal employment ranging from 87.8 per cent in males to 91.7 per cent in females which complicates social protection and reskilling efforts during the transition (World Bank, 2021). This combination of a power system still dependent on coal and a labour market that is heavily informal, creates significant hurdles to ensuring that the energy transition delivers equitable benefits across India's rural and marginalised populations. Moreover, as the effects of climate change intensify, India is already experiencing disruptions

in its hydrological cycle, including changes in rainfall patterns, water scarcity, and altered evaporation rates (Krishnan, et al., 2020). These disruptions have severe implications for agriculture, water resources, and food security, particularly for vulnerable populations in rural and marginalised communities (Rehman et al., 2024). In this context, the need for a just transition in India becomes particularly pressing.

1.1.1 Just Transition: Principles and importance in achieving a low carbon economy

The labour movement of the United States of America (USA) during the 1970s paved the way for just transition as a response to protect the health and livelihood of the workers who lost their jobs due to the shift toward cleaner industries (Bhusan et al., 2020). Tony Mazzocchi, a key figure in the labour-environmental movement, led the 'first environmental strike' and worked closely with Les Leopold and Brian Kohler, who later officially introduced the term 'just transition' during a 1995 presentation on the water quality of the Great Lakes (Moren et al., 2018; Tavares, 2022). Though the concept emerged way back, its applications gained popularity in the last few decades after its inclusion in policies relating to combating climate change with emphasis on the social dimensions (Lee & Baumgartner, 2022). It was incorporated in Rio+20 Earth Summit in 2012 which marks its major recognition in climate policy. International Labour Organization (ILO) defines just transition as 'greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind' (ILO, 2024). The global recognition of just transition was its inclusion in the Paris Agreement in 2015 for 'creation of decent work and quality jobs in accordance with nationally defined development priorities' (UNFCCC, 2016). Increasingly just transition was emphasised in policy frameworks and policy briefs prioritising environmental and social transformations through adoption of low carbon technologies, sustainable employment opportunities, and creating resilient communities (CSIS & CIF, 2020; OECD, 2023; Bhushan & Banerjee, 2023). Functionally, the framework broadly includes two dimensions: outcome, which refers to the new employment opportunities in the zero-carbon economy, and process, by means of which outcomes will be achieved so that no one is left behind (Galgóczi, 2018). Initially being centred around protection of socio-economic conditions of the workers (García-García, Carpintero, & Buendía, 2020), the concept experienced shifts in its scope over the years.

Unlike the narrower approach emphasising labour rights, more recent frameworks view just transition as a holistic and broader approach to ensure equity, fairness and justice while achieving low carbon transitions (Abram et al., 2022). Thus, its core focus is not only reduction of carbon emissions for climate action but also promoting justice by maximising social and economic benefits while supporting the mostly affected communities (ILO, 2024; Hasan et al., 2024). Heffron and McCauley (2018) stressed on inclusivity and advocated that just transition can be achieved by unifying environmental, climate, and energy justices to address the wider societal issues that are the end results of energy transitions. In contrast to relying on reactive measures after the damage is done, this approach helps reduce the inequalities and related injustices if proactive measures are adopted (KCI, 2022). However, these three justice frameworks being independent, have separate sets of values and thus a proper unified method is a debatable issue (Heffron & McCauley, 2018; Hasan, et al., 2024).

To understand how these frameworks converge, it is essential to revisit their shared conceptual roots. The theoretical basis for unifying environmental, climate, and energy justice can be traced to the early works of Schlosberg (2004), who conceptualised environmental justice through three interrelated dimensions: distribution, recognition, and participation. In his words, 'justice demands a focus on recognition, distribution, and participation. They are three interlinking, overlapping circles of concern' (Schlosberg, 2004). Justice in environmental governance, therefore, extends beyond equitable outcomes to include the acknowledgment of affected identities and inclusive decision-making. These interlinked dimensions form the normative foundation for contemporary frameworks of climate, energy, and just transition discourses, providing the theoretical bridge between environmental justice and emerging transition frameworks. Building upon these theoretical insights, achieving a just transition in practice requires translating these broad principles of justice into an operational framework that can address inequalities across socio-economic and environmental contexts.

Addressing the inequalities require more comprehensive frameworks which can be ensured by combining three fundamental principles of justice: distributive (fair distribution of burdens and benefits of an environmental change), procedural (the involvement of the most affected communities in decision making), and restorative (addressing the past harms created in the environment) (McCauley &

Heffron, 2018). Wang and Lo (2021) speak of the fourth dimension: recognition justice (acknowledging the diverse identities, rights, knowledge, values, and interests of the marginalised).

The conceptual roots of just transition lie in the environmental justice movement, which emerged earlier than the related frameworks of climate and energy justice. The environmental justice movement, which arose in the United States in the 1980s, provided the conceptual and organisational foundation upon which later discourses of climate and energy justice were built (Schlosberg & Collins, 2014). It emphasised fairness in the distribution of environmental benefits and burdens, and the inclusion of marginalised voices in decision-making, principles that have since been extended to the governance of low-carbon transitions (Hasan et al., 2024). Environmental justice aims at balancing the benefits and burdens proportionately within the most and least advantaged communities while prioritising inclusive social dialogue to reduce discrimination (Méndez-Barrientos et al., 2024). Initially originated to address the negative impacts of hazardous waste on human health around the 1980s in the United States, the concept of environmental justice underwent radical changes in its scope over time (Browne et al., 2022). While early advocates of environmental justice stressed too much on environmental degradation, recent scholars incorporate the socio-economic issues and broader sustainability concerns within the environmental justice framework (Wang & Lo, 2021). This shift is indicative of just transition which addresses the issues of the most affected communities while paying attention to the environmental harm. Thus, linking environmental justice with just transition presents a more holistic approach towards ensuring socio-economic equity while protecting the environment. Behind every transition will be increased innovation, increased prosperity, and social equity, which is what just transition aims for: 'No one should be left behind' (KCI, 2022).

Questions remain about how justice can be maintained and in what ways, i.e., while we strive towards the outcome, how the process can proportionately benefit the least advantaged, the worst affected, and the least prioritised. While the phasing out of fossil fuel is a positive step towards reduction of greenhouse gas emissions, this transition sometimes involves injustices and exposes the vulnerable community to the worst (Sovacool et al., 2019). Various studies across the globe have pointed out the wider societal challenges and invariable rise of injustices due to reduction of fossil fuel production (Zhao et al., 2020; Barragan-

Contreras, 2021; Stock, 2022; Elmallah & Rand, 2022; Sovacool & Stock, 2024). In India, environmental justice has evolved through distinct waves that link ecology with equity and survival (Rajan, 2014; Sidique & Zaidi, 2024). From Gandhian ideals of environmental ethics to the grassroots 'environmentalism of the poor' (Sidique & Zaidi, 2024), movements such as Chipko and Narmada Bachao Andolan foregrounded the distributive dimensions of justice in resource use. Subsequent industrial disasters like Bhopal (1984) highlighted the procedural and restorative dimensions of justice, spurring judicial activism that expanded Article 21 of the Constitution to include the right to a clean and healthy environment. The establishment of the National Green Tribunal (2010) institutionalised access to environmental justice, yet challenges persist due to limited inclusivity and uneven enforcement (Dilay et al., 2020). Recent scholarship highlights India's shift towards a "Just Sustainability" paradigm, merging social equity with ecological protection as the country grapples with rapid industrialisation and energy transitions (Sidique & Zaidi, 2024).

As India's development trajectory increasingly intersects with climate mitigation and energy transitions, the principles of environmental justice acquire renewed urgency. They serve as a moral and procedural compass for ensuring that decarbonisation efforts do not reproduce the same inequalities that earlier development pathways created. Environmental justice doesn't oppose development, nor does it support shifting of harmful industries to other places; it ensures proper justice in terms of distribution, procedural, and recognition (Evans & Phelan, 2016). These are the three key dimensions of justice interlinked strongly with just transition. They allow us to ask critically what justice is needed to realise a just transition through which environmental justice finds its way (Heffron & McCauley, 2018; Figueroa & Ulibarri, 2024).

Distributive justice is related to the fair and equal distribution of risks and benefits across all sections of society. It ensures that the most affected and marginalised people are not disproportionately burdened during the process of transition to a renewable source of energy (Castro-Diaz et al., 2023). When transition to renewable energy sources is involved, Devlin (2005) says that distributive fairness is a question of 'fair sharing of the financial benefits and perceived burdens deriving from the project between developers and local citizens and communities' (Jørgensen, Anker, & Lassen, 2020). Literature has reflected on distributive injustices related to development of renewables (Yenneti & Day, 2016; Cranmer

et al., 2023; Azkarraga & Gurrutxaga, 2024). These injustices limit the scope of just transition (Mueller & Brooks, 2020) by overburdening the nearest communities with challenges of displacement, loss of land, and other ecological impacts. Therefore, ensuring distributive justice takes into consideration the proper flow of economic benefits, allocation of compensation, and rehabilitation, all while preserving access to basic resources and services.

Procedural justice emphasises effective community participation and provides platforms where the marginalised and most affected people can raise their voices to shape environmental and energy policies (Chetty et al., 2023). Community participation in large infrastructure projects throughout all the stages right from the beginning ensure a 'just process' and 'just outcomes' as it becomes fair and safeguards inclusivity (Klepp & Fünfgeld, 2022). However, according to Schmidt (2014), procedural justice prioritises the processes more than the outcomes (Carrick et al., 2023) as justice can be viewed also from the pathways that it followed to reach the result. Though embedded in environment justice literature, procedural justice has gained prominence under the energy justice framework in recent years, especially in the context of energy transitions and reflected exclusion of affected communities from key decision-making processes, limited participation of communities, partial information disclosure, and epistemic injustice (Barragan-Contreras, 2021; Kelly et al., 2024; Yadav, 2024). In many cases, top-down approaches to hydropower development exclude local voices, especially those of marginalised communities, undermining democratic participation and fostering mistrust in governance institutions (Zhao et al., 2020; Mayer et al., 2022; Castro-Diaz et al., 2023). Procedural justice being a prerequisite to attaining distributive and recognition justice (Carrick et al., 2023) works in involving the affected communities and promoting sustainable project outcomes.

Recognition justice emphasises the importance of recognising and respecting the diverse identities, values, experiences, legal rights, dignity, fair representation, social status, and knowledge systems of marginalised groups, freedom from threats, and political rights. It challenges the social and cultural invisibility that many affected communities face in environmental governance. There has been consensus in defining recognition justice as it doesn't entail a good that can be distributed. It is created through relationships within socio-cultural settings and can show up in different forms (Schweiger, 2019). The systematic literature review by van Uffelen (2022) has reflected on the various interpretations and changing

notions of recognition justice which demands that communities lying at the forefront and the worst affected, not only be seen and heard but also be treated with dignity and respect, ensuring their concerns are meaningfully integrated into policy and planning. The social sufferings associated with energy transitions is primarily the denial of recognition (Renault, 2019). He stressed that the daily experiences of injustices be incorporated in recognition and inclusion. In hydropower development, distributive injustice mainly stems from the lack of participation and failure of governments to recognise prioritised communities (Clark, 2020).

Thus, achieving a just transition requires the integration of distributive, procedural, and recognition justice, as these dimensions are deeply interconnected and mutually reinforcing. Distributive justice cannot be realised without procedural justice which guarantees meaningful participation, transparency, and inclusive decision-making processes. When communities are excluded from decision-making (procedural injustice), their experiences and identities are overlooked (recognition injustice) which in turn also exacerbate distributive injustice (Figure 1: Interconnected network of achieving just transition Figure 1).

The Indian government has aimed to build an equitable society by focussing on an outcome-based approach expected to enhance the quality of lives of Indian citizens are (Government of India, 2025). The foundation of the outcome-based approach lies in the empowerment of every individual through skill acquisition and skill and capacity development (GOI, 2024). In the context of a low-carbon economy, aligning skill development initiatives with emerging green sectors is essential to ensure that the transition remains socially inclusive. Recent assessments emphasise that India's just transition must be accompanied by extensive reskilling and job creation efforts. The Assessment of India's Green Jobs and Just Transition Policy Readiness identify significant skill gaps in renewable energy sectors and highlights the need for inter-ministerial coordination to strengthen workforce readiness (PAGE, 2023).

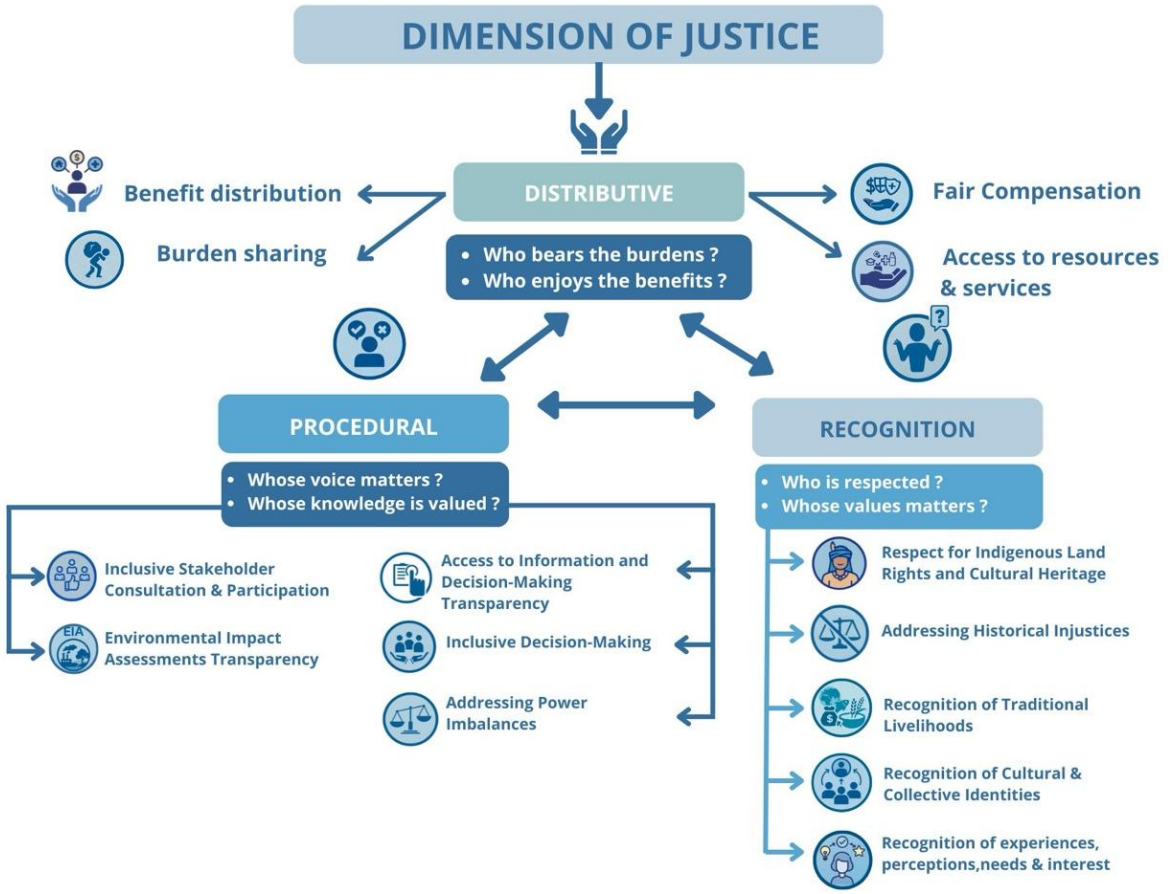


Figure 1: Interconnected network of achieving just transition

Source: Prepared by authors

Similarly, the Skills Council for Green Jobs Report projects that India could create nearly 35 million green jobs by 2047 if skill training is integrated across the clean energy and manufacturing value chains (Sattva Consulting & Skill Council for Green Jobs (SCGJ, 2023). Case studies such as Ayana Renewable Power demonstrate how community-based skilling and women's workforce participation can be embedded into renewable energy expansion (Just Transition Finance Lab, 2024). Moreover, sustainable transition financing must extend beyond infrastructure to include social investments such as retraining, income support, and social protection (Selvaraju et al., 2024). Skill development, therefore, is the root of the transition to zero or low carbon emission economies (UNFCCC, 2020). During the phasing out of renewable energy sources, skill development in the workforce could serve the transition toward green, pollution-free industries.

1.1.2 Just Transition in Northeast India: Hydropower potential, dams, and green budget initiatives

The renewable energy potential of the seven north eastern states of India is estimated at 119505.85 MW from large hydro, small hydro, solar, wind, and bio energy. However, only a meagre 2495.82 MW (2.09 per cent) has been tapped, with large and small hydro contributing the maximum share followed by solar and bio energy (PIB Delhi, 2022). This region, being located amidst the mountains, has offered ample scope to produce hydel power (Figure 2) due to the steep inclination and the uninterrupted availability of water from the large rivers mainly the Brahmaputra, Barak, and Gumti, and is often referred to as India's future powerhouse (Saikia, 2024). Presently, 14 major hydel power projects (as on 31 March 2023) are operational (except Sikkim), with Meghalaya having the highest number within the northeast (CEA, 2023).

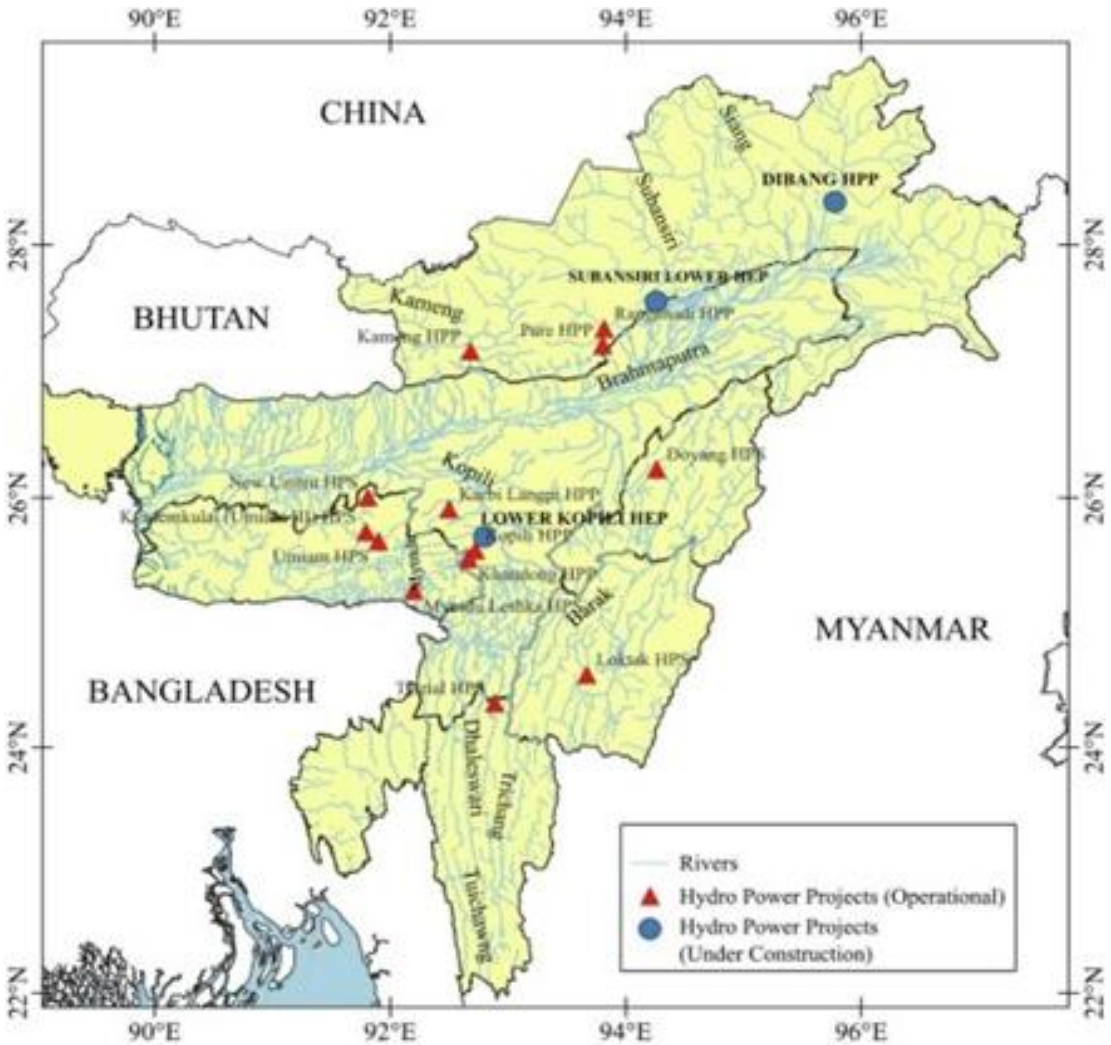


Figure 2: Location of large hydroelectric projects in NER

Source: Prepared by authors

Three hydro power projects are under construction: the SLHEP (2000 MW), Dibang Multipurpose Project (2880 MW); and Lower Kopili (120 MW) in Assam. Apart from these, 16 hydro power projects have received clearance from the Central Electricity Authority (CEA), out of which 12 will be in Arunachal Pradesh totalling 14478 MW (Bawa et al., 2022). Until March 2023, renewable energy potential from large hydro power in NER was 58956 MW, with Arunachal Pradesh (85.37 per cent) holding the maximum (Figure 3A). However, the installed capacity has remained significantly lower due to the remoteness, lack of accessibility and connectivity, community tensions among indigenous people, environmental destruction, and most importantly lack of private sector initiatives, reflecting the larger share of the untapped potential (Deshamukhya & Choubey, 2023). A state wise analysis can provide further insight to better understanding the disparity between estimated potential and actual distribution. As on March 2023, this entire region has generated 2027 MW of energy from large hydropower, which accounts for only 4.33 per cent of the total hydro power installed capacity in the country (CEA, 2023). Mizoram and Meghalaya have the highest proportion of installed capacity as per their own potential (Figure 3B).

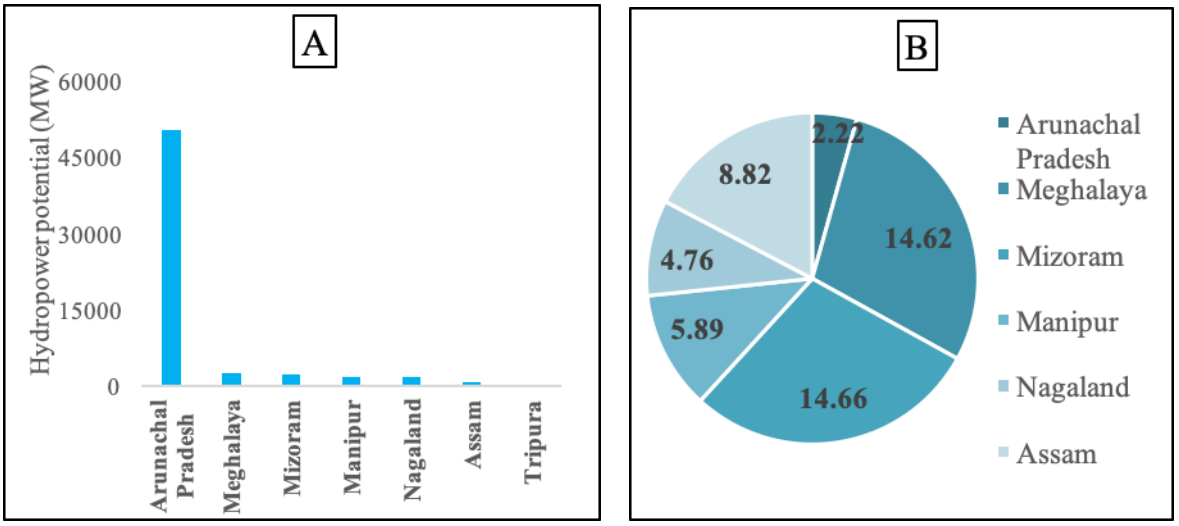


Figure 3: (A) Large Hydro power potential in NER; (B) Proportion of installed capacity of large hydro as percentage of total potential.
(Source: PIB Delhi, 2022)

Tripura has been identified as having zero potential for large hydro and wind. However, it has the potential for 46.86 MW of power from small hydro of which 16.01 MW (34.17 per cent) has been utilised (PIB Delhi, 2022). Although Arunachal Pradesh tops the list in hydropower potential, the relative installed capacity is the lowest (2.22 per cent), highlighting a significant gap between potential and actual

development. However, if the total operational capacity of 2027 MW is taken into consideration in the total NER, the state has the highest installed capacity (Figure 4) of 1115 MW (55.01 per cent). Assam on the other hand has 650 MW of identified potential capacity for large hydro power of which around 53.8 per cent is operative, reflecting the state's initiatives towards achieving zero carbon emissions (CEA, 2023).

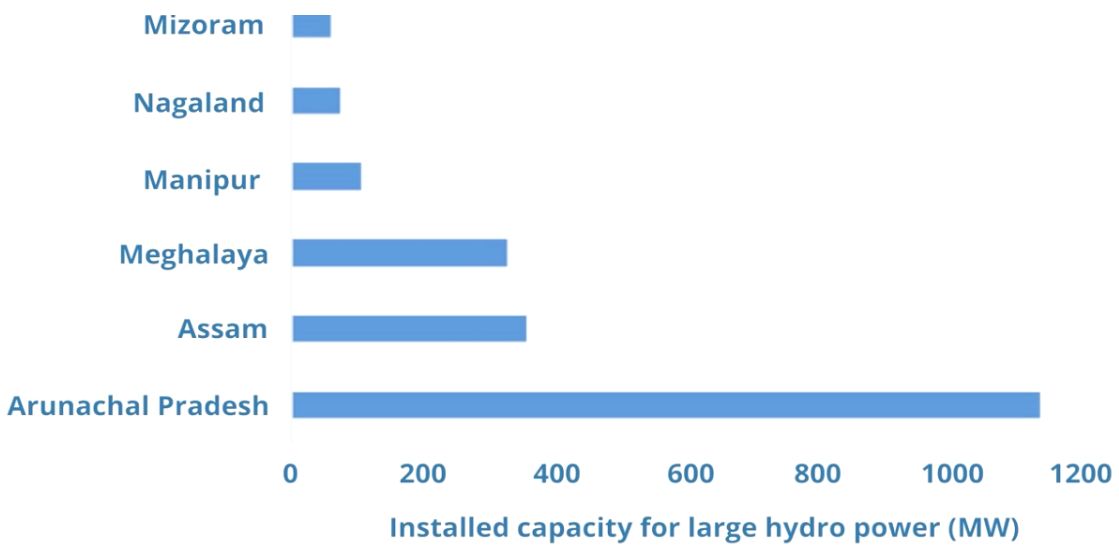


Figure 4: State wise variation of installed capacity of large hydro power in NER
(Source: CEA, 2023)

Presently, the state of Assam follows a PPP model to cater to the electricity needs of all sectors. In 2023, the energy mix of the state (Figure 5) showed a major share of fossil fuel (55.8 per cent), while non-fossil fuel based contracted capacity was 44.2 per cent (GOI, n.d.).

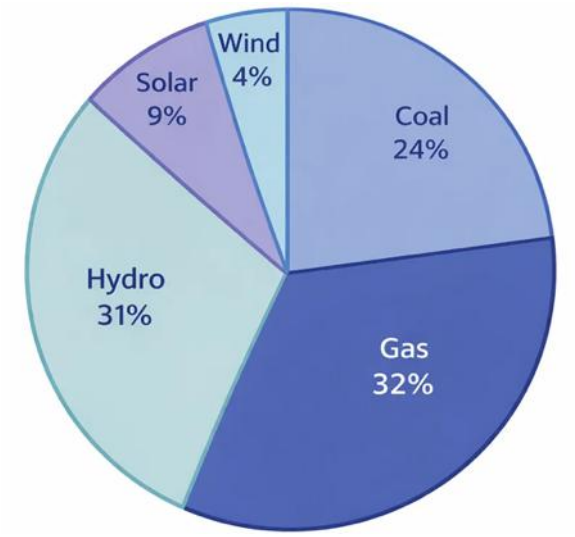


Figure 5: Share of contracted capacity of fuel in Assam, 2023
(Source: GOI, n.d.)

The following diagram (Figure 6) shows the projections of energy capacity including fossil and non-fossil fuels, and peak demand for energy. With increase in population pressure, consumption is also expected to increase.

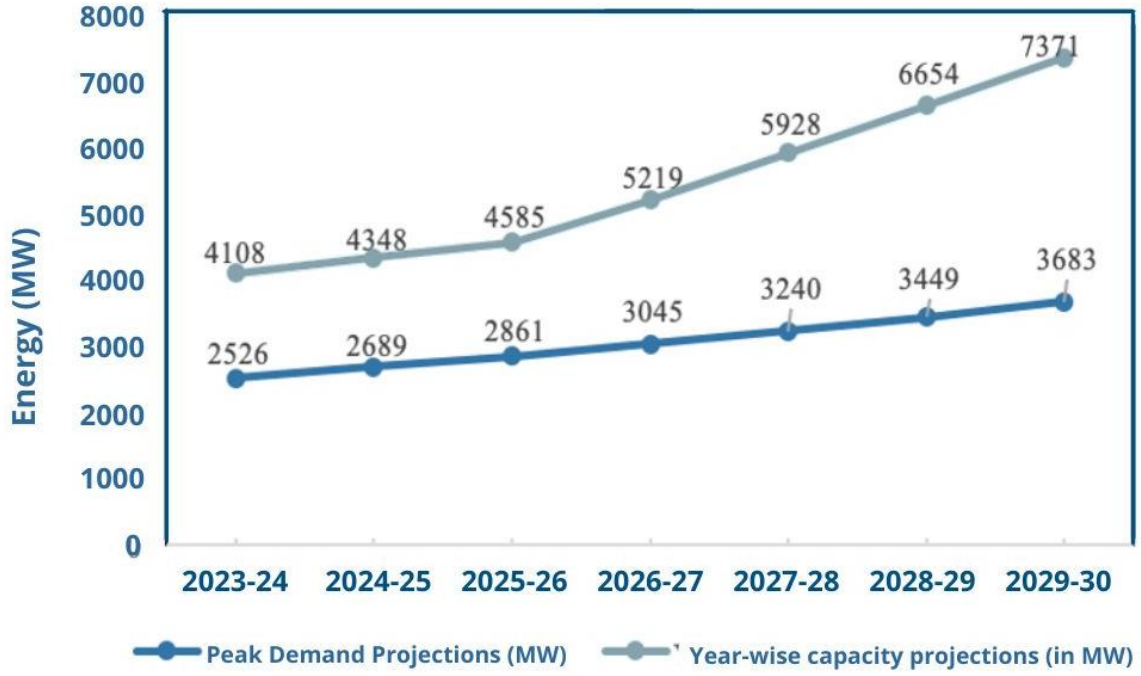


Figure 6: Year wise projected capacity and peak demand, 2023-24 to 2029-30
Source: GOI, n.d.

Though the projected statistics reflected a positive status and was seen to meet the demand during peak hours, the reality is different. The state is running on a power deficit and is totally dependent on outside sources to meet the demand for power (Choudhury, 2023). As of October 2025, The Assam Power Generation Corporation Limited (APGCL) has a total installed capacity of 379.7 MW, comprising both thermal and hydel power plants, with a peak generation of around 250 MW (Government of Assam, 2025). However, given the high electricity demand, the state remains dependent on Central power authorities like NTPC, NHPC, and NEEPCO (Abhishek & Sharma, 2022). The Chief Minister of the state himself admitted the inability to meet the rising demand of 2500 MW in 2023 during peak hours due to exhaustion of the state's own reserve of electricity. Earlier, in 2021-22, the peak demand was 2138 MW (GOI, 2022). He also laid emphasis on the construction of a coal-based thermal plant in Margherita (Choudhury, 2023) where coal mines have closed due to environmental deterioration (Chatterjee et al., 2022). On the other hand, the state's plans towards net zero emissions projected that the energy mix would show an increasing trend of utilisation of renewable sources to meet peak demand (Figure 7). The projected

share of renewables (hydro, wind, and solar) is expected to rise from 43.57 per cent in FY 2023-24 to 58.19 per cent by 2029-30 based on the Renewable Purchase Obligation (RPO). It is indicative of the state's action to net zero emissions. There is an increasing reliance on the establishment of solar power plants. The proposed solar power plant at Namrup in Dibrugarh district of Assam is expected to produce 3000 MW of solar power by 2030. Other solar power projects are also coming up in Sonitpur, Tinsukia, Karbi Anglong, Golaghat, Karimganj, and Kamrup (ORNATE Solar, 2023; PIB Delhi, 2024). At present, seven solar power plants are producing 175 MW power daily (PTI, 2024).

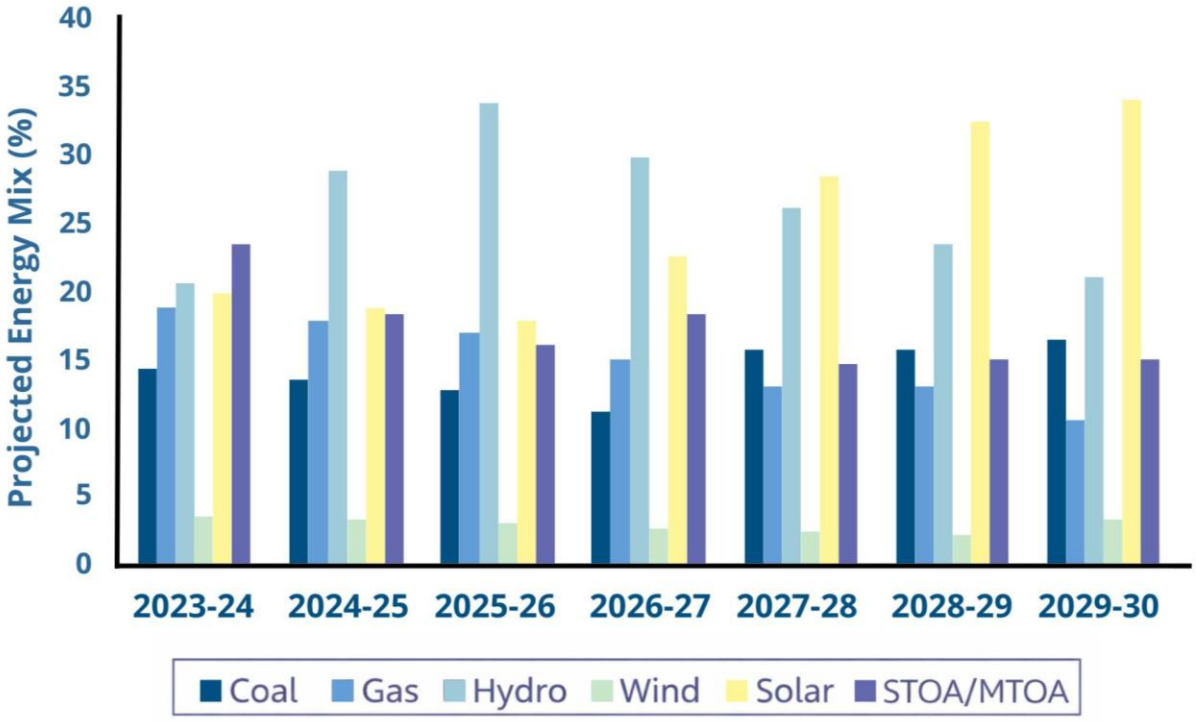


Figure 7: Share of projected energy capacity mix (non-renewables and renewables), 2023-24 to 2029-30

Source: GOI, n.d.

The expected efficiency of RE sources (both existing and planned) are shown in the following diagram (Figure 8). Existing hydro power is expected to generate 37 per cent of the maximum possible energy output annually.

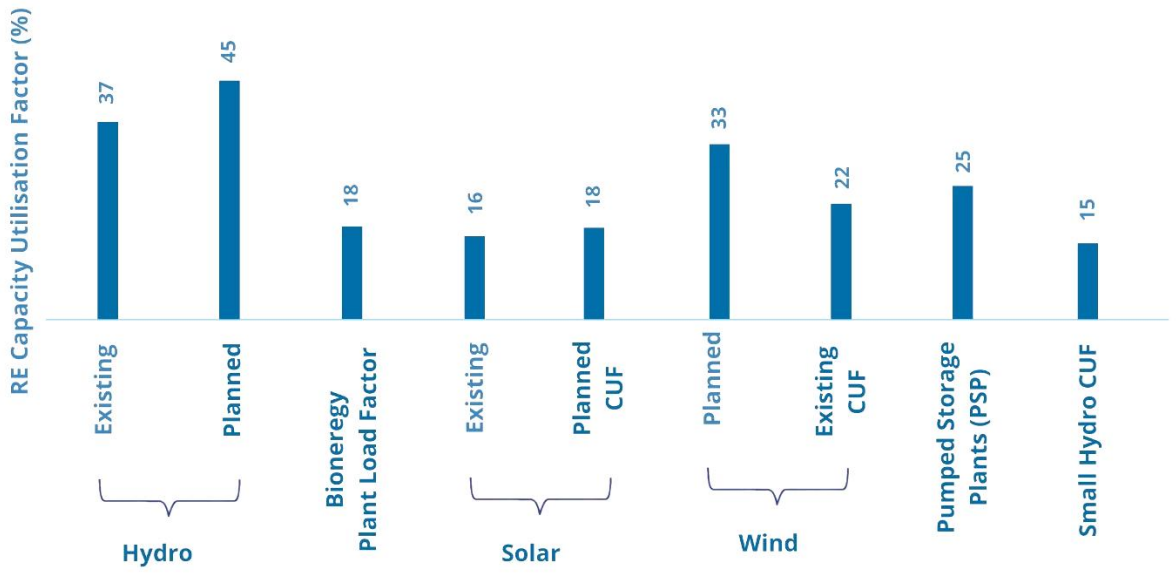


Figure 8: Proportion of RE Capacity Utilisation Factor (CUF)
(Source: GOI, n.d.)

The Ministry of Power has a plan to increase the efficiency to 45 per cent. The existing solar CUF at 16 per cent is indicative of a moderate energy generation efficiency. However, there are plans to it to 18 per cent making it efficient and viable, showing that the sites are conducive to solar power generation. The present efficiency for wind, bioenergy, pumped storage plants, and small hydro is relatively low which often raises concerns regarding the effectiveness of the RE. Transitioning away from non-renewables thus remain a major challenge owing to establish infrastructure, operational inefficiency, slow rates of investment in innovation, cost inefficiency, financing, and technology.

The state has introduced the Green Budget in 2023-24 to incorporate environmental concerns into budget decisions to achieve sustainable development goals and reduce the impacts of climate change (GoA, 2023). Assam is the 3rd state in India to have initiated the framework of green budget after Odisha and Bihar (Goel & Rath, 2024). The Green Budget is a pathway to achieving sustainable development goals which align with climate commitments combating climate change (GoA, 2024). The State Action Plan for Climate Change of Assam (ASAPCC), version 2.0 for the year 2021-2030 has stressed on the need for allocating funds for climate adaptation measures. Through this budget, the state aims to reduce unsustainable expenditure and increase investments towards achieving a green economy (GoA, 2023). As per the 1st Green Budget report for Assam 2023-24, the state has identified 9 vulnerable sectors and 14 relevant

departments (Table 1) under which schemes or programmes were further identified that directly or indirectly impacted climate change or environment.

Table 1: List of vulnerable sectors and relevant departments to be considered for the first Green Budget of Assam.

(Source: GoA, 2023)

Sl.No.	Vulnerable Sectors (based on SAPCC)	Departments (Identified for Inception Phase)
1.	Agriculture and Allied Sector	1. Agriculture
2.	Forestry and Biodiversity	2. Environment and Forest
3.	Water Resources	3. Water Resources 4. Soil Conservation 5. Irrigation
4.	Energy	6. Electricity (Power)
5.	Strategic Knowledge	7. Science, Technology and Climate Change
6.	Disaster Management	8. Revenue and Disaster Management 9. Public Works (Roads) 10. PWD (B&NH)
7.	Urban and Rural (Human Settlement)	11. Panchayat and Rural Development 12. Housing and Urban Affairs
8.	Human Health	13. Public Health Engineering
9.	Transport	14. Transport

Within these departments the schemes were categorised as highly favourable, moderately favourable, neutral, and less favourable depending on their related impacts. Each of the schemes were also classified under one of three broad domains: climate change mitigation, climate change adaptation, and environment sustainability.[1] The state government has taken initiatives to promote commercial

[1] For more details, visit: https://finance.assam.gov.in/sites/default/files/swf_utility_folder/departments/agriculture_com_oid_2/portlet/level_1/files/goa_green_budget_2023-24.pdf

tree plantation, exempt electricity duty on green energy for one year, set up the green innovation fund, a tax relaxation of 2 per cent on electric vehicles, the safe and continuous supply of water, and to rank the districts on the basis of cleanliness to achieve climate change mitigation, climate change adaptation, and environment sustainability (GoA, 2023). FY 2024-2025 witnessed an increase in the number of departments from 14 to 18 and the green budget share at 10.2 per cent of the total budget. Fishery and the Environment & Forest Department have the maximum share of the Green Budget at 23.52 per cent and 22.02 per cent of the total budget respectively (GoA, 2024). In FY 2025-2026 the number of departments rose to 32 with around 11.35 per cent of the total budget allocation.

The Assam Integrated Clean Energy Policy (ICEP), 2025 marks a major milestone in the state's evolving approach toward achieving a just transition by embedding social, economic, and environmental objectives within its renewable energy expansion strategy. The policy envisions Assam as a preferred investment destination in the renewable energy sector and as a key participant in India's emerging green hydrogen and ammonia economy. Anchored in the guiding principles of sustainability, inclusivity, and innovation, ICEP 2025 aims to establish an integrated clean energy ecosystem that promotes low carbon industrialisation while ensuring livelihood opportunities, equitable growth, and environmental protection (Government of Assam, 2025). By targeting the development of 11.7 GW of additional renewable energy by 2030 including solar, wind, small hydro, biomass, and pumped storage, the policy seeks to diversify Assam's energy mix and reduce dependence on conventional fossil sources. The emphasis on energy storage, decentralised solar generation, and distributed green infrastructure underscores an effort to ensure energy access and affordability, particularly in remote and rural regions of the state.

Furthermore, the policy's commitment to developing Renewable Economic Zones (REZs), Green Hydrogen Valleys, and Clean Energy Skill Development Centres reflects a transformative vision that couples decarbonisation with employment generation and technological advancement. In doing so, Assam's clean energy framework embodies the principles of distributive and procedural justice central to a just transition seeking to balance the imperatives of economic growth, social inclusion, and ecological stewardship. The state's approach recognises that the transition from conventional to renewable energy cannot be merely technological; it must be socially embedded and regionally adaptive, accounting for the needs

of local communities, particularly those dependent on natural resources. By fostering policy coherence between its Green Budget, State Action Plan on Climate Change (ASAPCC 2.0), and ICEP 2025, Assam demonstrates a progressive understanding of just transition as a pathway toward climate-resilient development, green industrialisation, and long-term sustainability within the broader context of India's net-zero commitments.

1.2 Research Questions and Aims

The SLHEP represents an important contribution to India's efforts to harness its renewable energy potential. At the same time, as with large-scale infrastructure initiatives, the project has brought to some important considerations related to socio-economic and environmental dynamics, particularly for downstream communities in the North-East region. Recognizing both the opportunities and the challenges associated with SLHEP, this study seeks to engage constructively with these emerging issues. In this context, the following research questions guide the analysis.

- What are the existing migration dynamics in downstream communities, and how has the SLHEP reshaped these dynamics through its impacts on livelihoods and socio-economic conditions?
- To what extent does the implementation of the SLHEP align with the principles of a just transition, particularly in terms of transparency, community participation, and recognition of local voices and knowledge systems?
- What actionable policy and governance recommendations can support a balanced approach to renewable energy development while promoting social equity and environmental sustainability in the context of large hydropower projects?

These questions delve into how the project can support the socio-economic development of vulnerable communities while adhering to the principles of just transition. So, the primary aim of this research is to explore whether the SLHEP is effectively improving the livelihoods of marginalised communities, fostering local economic growth, and addressing existing social vulnerabilities through the just transition lens.

1.3 Layout of the report

The report is structured as follows: Section 1 introduces the just transition framework as the conceptual base for assessing projects like SLHEP. Section 2 outlines the project background, data collection, and methodology. Section 3 presents and analyses the findings on socio-economic conditions and migration dynamics in Dhemaji and Lakhimpur. Section 4 applies the three justice lenses: distributive, procedural, and recognition to evaluate the project's equity dimensions. Section 5 concludes with key insights and actionable recommendations for integrating just transition principles into future hydropower and regional development planning.



02

Methods And Data



2 Methods and data

2.1 Description of the study region

2.1.1 Setting of the background—The Subansiri lower hydroelectric project: an overview

The SLHEP is a 116-metre-high concrete gravity dam constructed as a run of river dam across the river Subansiri, a tributary of the Brahmaputra with a small pondage (www.nhpcindia.com, n.d.). It consists of 8 units with each unit operative at 250 MW. The project is in Gerukamukh along the Arunachal Pradesh-Assam border spanning the Kamle district of Arunachal Pradesh and Dhemaji of Assam. The project was planned as early as 1955 after the massive flood of 1954 in upper Assam with the intention of controlling damage in the case of another event (Singh, 2016). Thereafter, the Central Water Commission (CWC) and the Geological Survey of India (GSI) conducted an extensive investigation in 1976. After the submission of the feasibility report by the Brahmaputra Board, the previously proposed 257-metre high rockfill dam was scaled down to 116 metres. In addition to a single dam, the Brahmaputra Board also suggested a cascading development of the basin by constructing three separate dams: 2000 MW upper, 1600 MW middle and 2000 MW lower Subansiri projects (Hazarika, 2016; Power Technology, 2020).

On the union government's direction, the Brahmaputra Board handed over the project to the National Hydroelectric Power Corporation (NHPC) in 2000 (Saikia, 2019). After the Techno- Economic Clearance by the Central Electricity Authority (CEA) of India in 2003, construction of the dam started in 2004 with commissioning due in then 2010 (Figure 9).

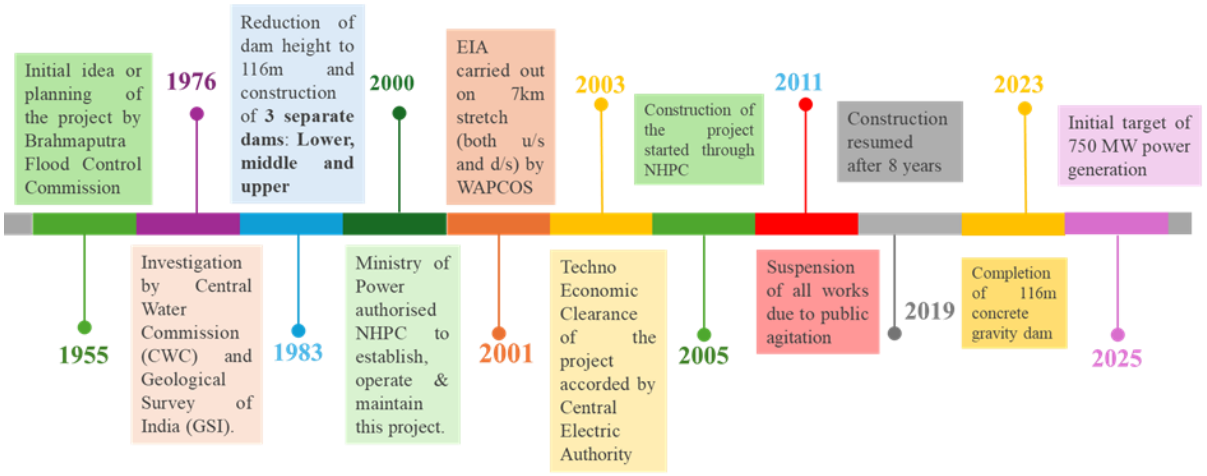


Figure 9: Timeline of SLHEP's Progress and Milestones

Source: Prepared by authors

However, delayed transfer of forest land, protests by downstream settlers against possible negative impacts of the dam, and interventions by the National Green Tribunal (NGT) put a halt to the construction between 2011 and 2019 (GOI, 2021). During this long period, the project witnessed several anti-dam protests organised by Project Affected Families (PAF), Mising communities, Idu Mishmi and Adi communities, Asom Jatiyatabadi Yuva Chatra Parishad, All Assam Students' Union (AASU), Krishak Mukti Sangram Samiti (KMSS), and Takam Mising Porin Kebang (TMPK) on the grounds that it would lead to environmental degradation and violation of several fundamental rights. They also demanded access to common resources (Singh, 2016). Moreover, their concern was that the environment impact assessment (EIA) considered only 10 km both upstream and downstream of the project. This stretch was a sparsely populated area, and the assessment did not adequately consider the significant aspects of the environment (Saikia, 2019). People worried that the project being situated in seismic zone V would trigger earthquakes and frequent landslides which could cause irreparable damage to ecology, economy, and livelihood in the downstream areas. Several expert groups and committees were formed from time to time beginning in 2008 to assess the impacts of the project and develop precautionary measures to combat them. Among these was the Thatte and Reddy Committee, which not only examined the environmental and social risks but also acknowledged the significant downstream benefits of the project. The committee emphasised the need for a safe dam incorporating engineering and environmental safeguards, and concluded that with proper implementation of its recommendations, the dam could be both

beneficial and secure (Mohammed & Basu, 2022). However, such reports neither satisfied local demands to stop the project, nor could they explain to what extent it would affect downstream areas. While the protests were underway, NHPC sought to regain public trust by pledging substantial financial commitments of ₹500 crore for local security and ₹470 crore for the development of the Lower Subansiri region (Saikia et al., 2023). However, despite NHPC's optimistic public statements, including claims that the first power generation unit would be operational by the end of 2018, local administration in Dhemaji of Assam and media reports indicated that only maintenance work was ongoing (Saikia et al., 2023).

This contradiction highlighted the underlying tensions between institutional interests and ground realities. In 2015, as per NGT's orders, NHPC was allowed to do repair and maintenance to ensure the safety of the local people, but this permission was used to resume construction instead (Saikia, 2019). Soon the protests started losing momentum as the leaders were absorbed into political parties and offered positions as MLAs and MPs. Finally, in October 2019, the construction works resumed after receiving suitable clearances from the NGT despite mounting protests and criticisms in both the states (Power Technology, 2020). Initially planned to control floods, it is feared that the project will instead amplify floods due to the cascading development of three separate dams on the river. It was reported to have displaced 38 families (Power Technology, 2020), but this figure is likely much higher than initially anticipated. Heavy rainfall in 2021 and 2022 in Arunachal Pradesh led to the dam overflowing causing the collapse of the guard wall and an under-construction tunnel, death of one worker, and devastation to many villages as far as 50 km downstream areas in Lakhimpur bringing into question the very purpose behind the construction of the dam (Unsheen, 2023). There were further protests to stop the project considering its devastating impact, but it lost its strength and work continued. In 2023, due to a landslide in the area, the last diversion tunnel was blocked during construction, thus disrupting the flow of the river that it was meant to maintain (Petley, 2023). People residing downstream are now sure of these disasters and the only purpose of construction of this dam was power generation. The project cost was ₹ 6285.33 crores in December 2002, which rose to the equivalent of Rs. 19,992.43 crores in January 2020. However, at completion, it is expected to cost a total of Rs. 21247.54 crores (GOI, 2021; NHPC India, n.d.). Once completed, it will supply power to 17 states in India. In 2023, the construction of all the blocks of the dam till the top

elevation level of 210 m had been completed. After the commissioning of the project, it will provide approximately 7500 million kilowatt hours of power in a year where it runs at 90 per cent (PIB Delhi, 2023). As of March 2025, three out eight turbines (750 MW) were to have become operational and would run at full capacity from 2026 (ETV Bharat, 2024).

2.1.1.1 Significance of the research in the context of Subansiri dam and just transition

While hydropower is globally recognised as a critical component of low-carbon energy transitions, the construction of large dams often entails substantial ecological and social disruptions. Studies highlight adverse impacts such as altered streamflow and riverine ecosystems (Hecht et al., 2019; Sofi et al., 2022), deteriorated water quality and habitats (Kuriqi et al., 2021), downstream water scarcity (Singh et al., 2024; Hou et al., 2024), and displacement of local communities (Ahmad, Shi, & Zaman, 2022). These challenges are particularly pronounced in the case of SLHEP. This project has sparked significant concerns among civil society organizations in NE India, particularly over the EIA process. Critics argue that the project undermines the potential for irreparable damage to downstream ecology, economy, and livelihoods. Such apprehensions are amplified in this flood-prone region, where marginalised communities face heightened vulnerabilities (Dekaraja & Mahanta, 2021; Dekaraja & Mahanta, 2022). Addressing these challenges call for evaluating SLHEP through the lens of a just transition. A just transition ensures that renewable energy development not only meets environmental goals but also delivers economic opportunities and social protections for marginalised groups. This involves achieving distributive justice through fair allocation of benefits and burdens, procedural justice by engaging communities in decision-making, and recognition justice by valuing the identities, rights, and knowledge of affected groups (McCauley & Heffron, 2018; Wang & Lo, 2021). Integrating these principles can ensure that such water infrastructure projects remain inclusive, equitable and resilient, balancing developmental imperatives with ecological and social sustainability (Cameron et al., 2023).

2.1.1.2 Why Dhemaji and Lakhimpur as study region in this context

The study was conducted in the downstream area extending up to 65 km from SLHEP (Figure 10). Dhemaji and Lakhimpur districts were selected as focal points for examining justice outcomes of transitioning to hydropower due to the location

of the Subansiri Dam in the Gogamukh revenue circle of Dhemaji. The environmental and socio-economic impacts of the dam are not confined to Dhemaji alone; they extend to the downstream areas of Lakhimpur, both of which are uniquely vulnerable to the compounded challenges of ecological disruption and socio-economic instability. This interconnected vulnerability makes these districts ideal for exploring how large-scale infrastructure projects, such as the Subansiri Dam, can influence the potential for a just transition, balancing environmental sustainability with the well-being of marginalised communities. The mighty Brahmaputra River is common to both the districts and flows to the south and its tributaries namely Jiadhal, Moridhal, Gainadi, Na-nadi, Simen, Subansiri, Ranganadi, and Dikrong replenish Dhemaji and Lakhimpur respectively. This intricate river system has been a boon to the districts' economy by supporting biodiversity and livelihood.

Moreover, since the construction of the dam, immediate consequences of the project are being noticed in these two districts of Assam. During the first EIA, only 7 km of Dhemaji was considered. However, Lakhimpur, which was further downstream and equally vulnerable was overlooked. The focus of the study on these two districts arises mainly because of their exposure to flood hazards thrice a year (Figure 10).

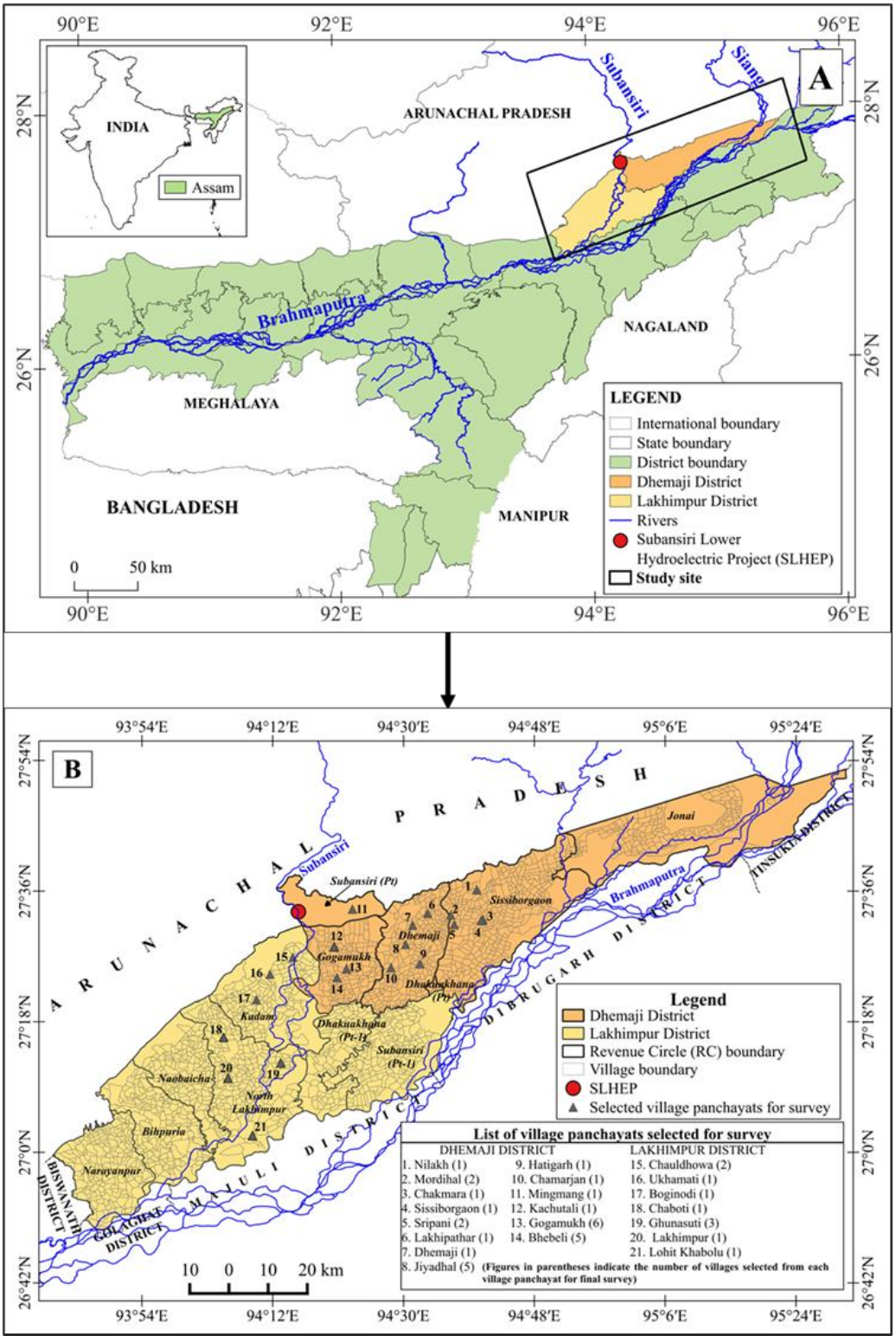


Figure 10: (A) Location of the study area in Assam, India, showing the Subansiri River basin and the site of the SLHEP; (B) Detailed map of the study site depicting district and revenue circle boundaries, and selected village panchayats in Dhemaji and Lakhimpur districts.
Source: Prepared by authors

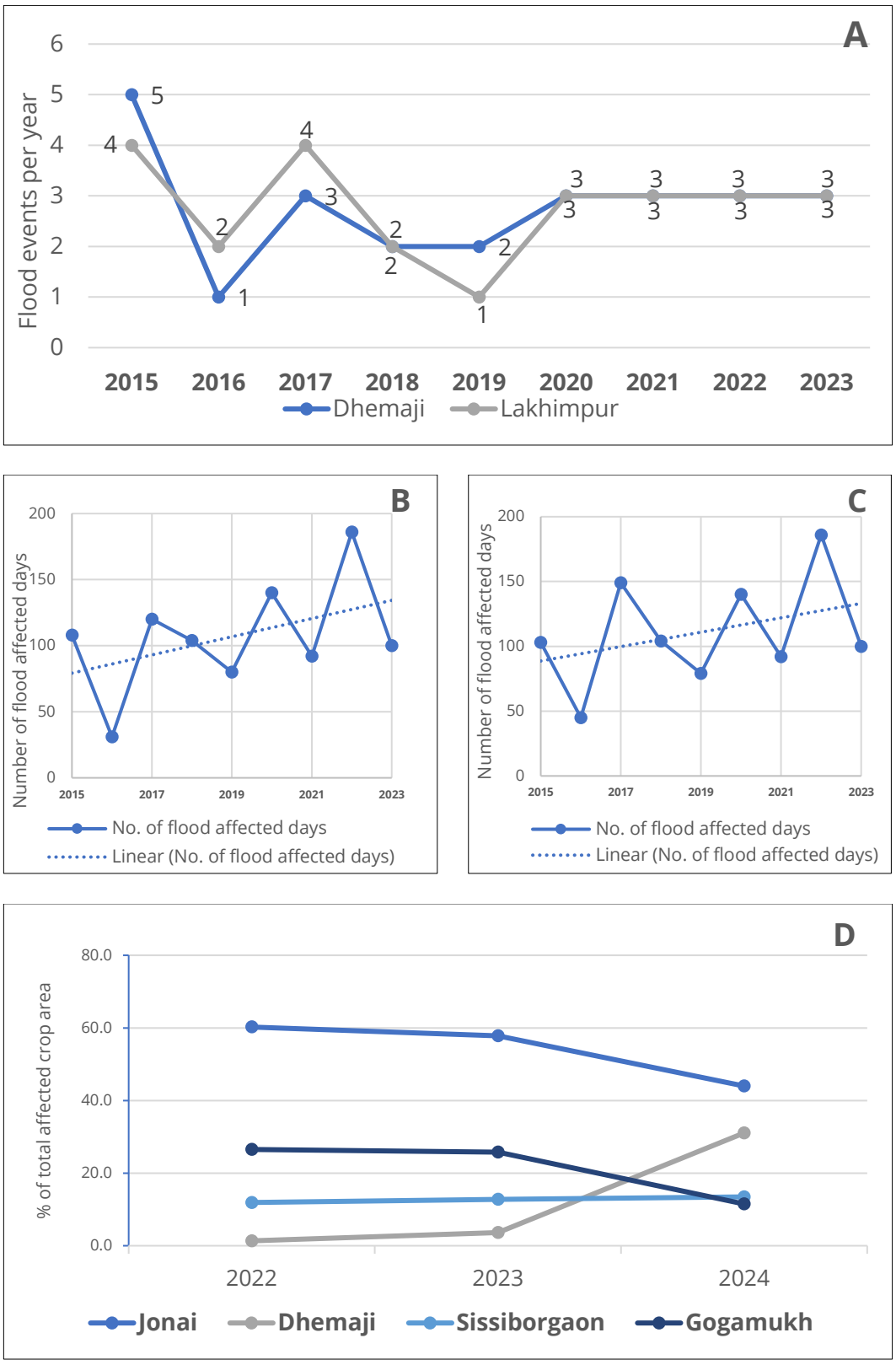


Figure 11: (A) Frequency of yearly flood events in Dhemaji and Lakhimpur districts; (B) Frequency of annual flood affected days in Dhemaji; (C) Frequency of annual flood affected days in Lakhimpur; (D) Proportion of flood affected areas across most affected revenue circles in Dhemaji District.
(Source: https://asdma.assam.gov.in/)

Approximately 25 floods have occurred here between 2015 and 2023, and floods have hit the villages thrice annually since 2020. The number of floods-affected days has been increasing in both districts as depicted by the two-year trend line (Figure 11 A, B, C). This risk is exacerbated by the construction of the dam which put the livelihoods of the vulnerable at stake.

Being predominantly rural, around 66 per cent and 83 per cent of the population of Lakhimpur and Dhemaji are agriculture dependent (Census of India, 2011). However, uncontrolled flood episodes have severely affected farming. Vast areas in Dhemaji now remain unproductive due to the erratic nature of rainfall, prolonged water logging, and control on dam gate closure. Data from 2022 to 2024 shows that the share of total crop area affected by floods has remained consistently high across major agricultural zones, with Jonai recording around 60 per cent of affected cropland in 2022-23, while Dhemaji block shows a sharp rise from less than 5 per cent in 2022 to nearly 30 per cent in 2024 (Figure 11 D).

This has aggravated food security concerns and increasing poverty. Moreover, 13.73 per cent of the population in Dhemaji and 14.06 per cent in Lakhimpur is multidimensionally poor, being deprived of access to housing, cooking fuel, sanitation, nutrition, and maternal health (NITI Aayog, 2023). Climate change has fuelled these challenges in areas where socio-economic conditions are so dire that they pose great threats to life, property, and economic stability (Dekaraja & Mahanta, 2018; Islam & Wang, 2024). Inadequate flood management and reactive and delayed response to disasters coupled with low adaptive capacity and lack of post disaster measures intensify the situation driving vulnerable communities into greater risk (Bhuyan et al., 2024).

In this context, Dhemaji and Lakhimpur represent critical areas of study for evaluating the potential of a just transition, as these districts are at a pivotal crossroads. They are confronted with the dual challenges of addressing long-standing socio-economic deprivation while simultaneously adapting to the profound transformations induced by large-scale infrastructure projects such as SLHEP.

2.1.2 Socio-Economic Profile of the Study Area

Dhemaji and Lakhimpur are two north-eastern districts of Assam located between Tinsukia, Dibrugarh, Majuli, and Golghat districts in the south, Biswanath district to the southwest and the state of Arunachal Pradesh to the north and northeast. These two districts comprise a total area of 3237 sq.km. and 2277 sq.km. respectively where over 99 per cent of the geographical area is rural (GOA, 2024). Table 2 highlights the demographic, literacy, and workforce characteristics of Dhemaji and Lakhimpur districts based on Census of India (2011) data. It provides a comparative overview of population distribution, growth trends, literacy levels, and employment patterns, revealing notable rural predominance, gender disparities, and the overwhelming dependence on agriculture across both districts.

Other than agriculture, animal husbandry, dairy farming, aquaculture, fisheries, and organic farming are the rising sectors that have huge potential to grow in near future shaping the socio-economic status of the people. National Bank for Agriculture and Rural Development (NABARD) supports fish farming in Dhemaji, Bordoloni, and CD Blocks of Dhemaji district, pig farming in all the blocks of Dhemaji and Lakhimpur, and dairy farming in all CD Blocks of Lakhimpur with a view to doubling real income of the farmers (NABARD, n.d.). These schemes will benefit the districts in building infrastructure, providing financial support to the marginalised and vulnerable, and improving skills and knowledge in agriculture thereby supporting integrated rural development.

2.1.3 Push Migration: A key concern in the study region

In our study, we focused on the migration scenario specifically in Dhemaji. For Lakhimpur, our assessment was limited to examining the downstream impacts of dam construction conducted on a rapid assessment basis. As already discussed, floods have not only disrupted lives and livelihoods but have also contributed to a cycle of chronic vulnerability hindering long-term recovery and sustainable development in the region.

Table 2: Demographic, literacy and workforce profile of Dhemaji and Lakhimpur districts

(Census of India, 2011)

Indicators	Dhemaji District	Lakhimpur District
Total Area (sq. km)	3,237 sq.km. (Rural: 3,221.45 sq.km.; Urban: 15.55 sq.km.)	2277 sq.km. (Rural: 2240.85 sq.km and Urban: 36.15 sq.km)
Total Villages	1,319 villages; 55 (4.17%) uninhabited	1,184 villages; 38 (3.21%) uninhabited
Towns	2 statutory towns and 2 census towns	4 statutory towns
Total Population	686,133	1,042,137
Rural Population	637,848	950,804
Urban Population	48,285	91,333
Population Growth (2001-2011)	19.97%	17.22%
Sex Ratio (females per 1,000 males)	954	968
Revenue Circles with Highest Population Growth (2001-11)	Sissiborgaon (highest), followed by Subansiri (Pt); Dhakuakhana (Pt) recorded lowest growth	Subansiri (Pt-1) showed the highest growth, followed by Bihpuria; Naobaicha recorded lowest (4.13%)
Overall Literacy Rate	72.7%	77.2%
Gender Gap in Literacy	Male literacy consistently higher than female literacy	
Workforce Participation Rate (Total)	47.15% (Main workers: 29.42%; Marginal: 17.73%)	41.26% (Main workers: 27.21%)
Share of non-workers	>50% of total population	
Agricultural Employment (Share of total workers)	82.88%; all CD Blocks employ >75% in agriculture; Murkongselek highest (87.04%)	65.88% of total workers engaged in agriculture
Gendered Nature of Employment	Higher male dominance across all CD Blocks	73.46% of females are marginal agricultural workers; higher informal employment among women

Floods affect nearly all of Assam's 35 districts[2], but Dhemaji located in the north-eastern part of the state, stands out as one of the worst affected (GOA, 2024). Figure 12 illustrates the extensive distribution of flood-affected villages across the district in 2024, with 343 villages in Jonai, Dhemaji, Sissiborgaon, and Gogamukh experiencing significant impacts. That same year, 5,202.39 hectares of agricultural land were reported as damaged, with Jonai bearing the highest proportion of affected cultivable areas. These statistics underscore the devastating effects of floods on both the local community and agricultural output (DRIMS, 2024).

Between 2022 and 2024, four of Dhemaji's six revenue circles[3] Jonai, Dhemaji, Sissiborgaon, and Gogamukh experienced the most severe flood impacts (Figure 13). Sissiborgaon recorded the highest number of affected villages, except in 2023, when Jonai reported 38.89 per cent of the total flood-affected villages (DRIMS, 2022, 2023, 2024).

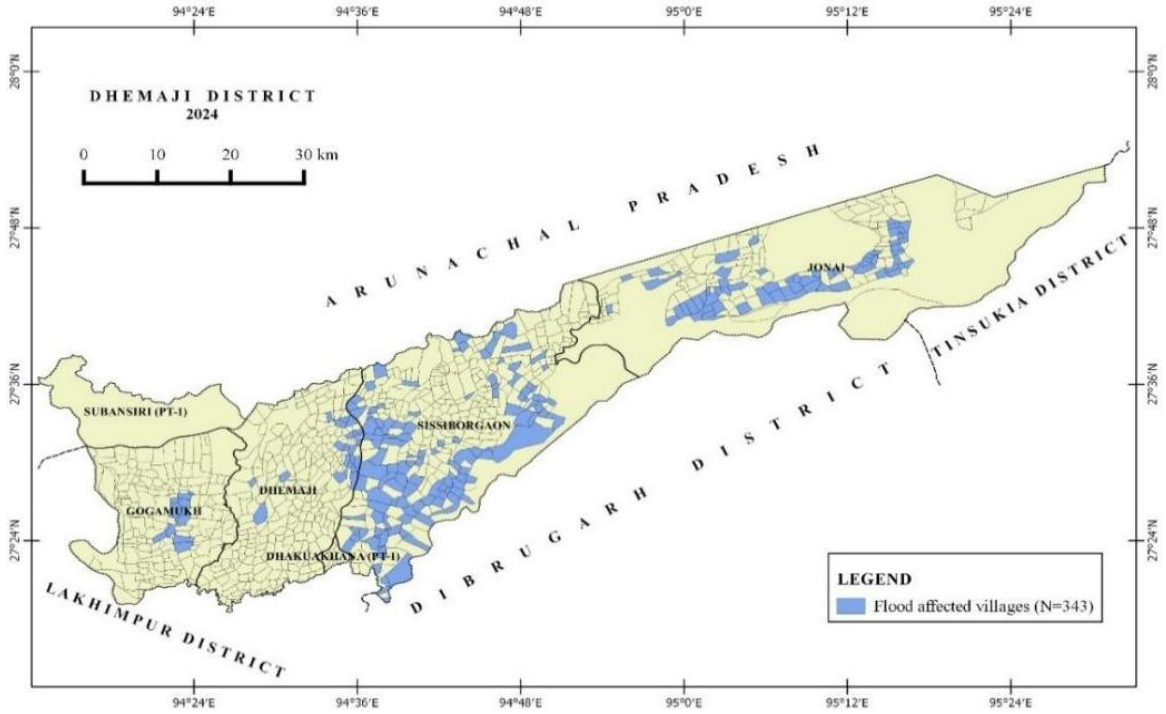


Figure 12: Flood affected villages of Dhemaji District,2024
Source: Prepared by authors

[2] A district is an administrative division within a country or state, designed to facilitate governance, administration, and the delivery of public services

[3] A revenue circle is the small local revenue subdivision of a district which further consists of several revenue villages governed by a revenue circle officer.

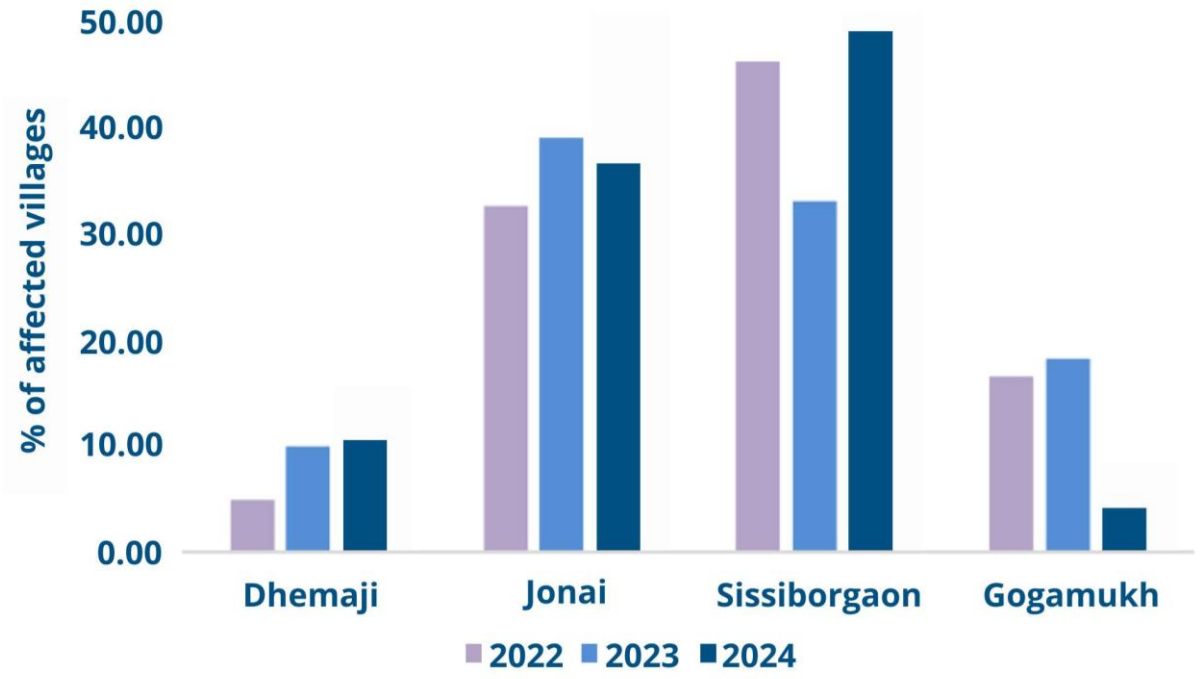


Figure 13: Proportion of flood-affected villages within Dhemaji Revenue Circles
Source: DRIMS

Beyond immediate displacement and shelter loss, floods cause severe land erosion and prolonged waterlogging, rendering vast areas of arable land unproductive (Chetia, 2014). Over time, these cumulative damages destabilise incomes and food security, creating cycles of economic precarities that leave many residents with little choice but to migrate.

Climate change intensifies these challenges by increasing the frequency, intensity, and unpredictability of floods, thereby heightening risks to life, property, and economic stability (Islam et al., 2024). Socio-economic constraints compound this vulnerability. Limited access to healthcare, inadequate education, and poor infrastructure weaken the district's capacity to adapt or recover from climatic events (Dekaraja et al., 2018). Institutional shortcomings in flood management, disaster response, and post-disaster rehabilitation further marginalise the population, leaving them increasingly exposed to risks (Bhuyan et al., 2024; Dekaraja & Mahanta, 2021).

As a result, Dhemaji has become a hotspot for migration, driven by the dual pressures of environmental degradation and socio-economic fragility (Chetia, 2014; Dekaraja & Mahanta, 2022). Seasonal and permanent migrations are common coping strategies for many residents, offering critical insights into the

interplay between climate vulnerability and socio-economic adaptation (Dekaraja et al., 2021).

Dhemaji's acute exposure to environmental and socio-economic challenges makes it an ideal case for studying climate-induced migration. Understanding migration patterns in Dhemaji offers valuable lessons on how climate vulnerability intersects with adaptive capacity and the pursuit of climate justice, providing a globally relevant framework for addressing climate-induced displacement in similarly vulnerable regions.

2.2 Mixed method approach

A mixed method approach was adopted to understand the impacts of the Subansiri Dam on livelihood changes and broader socio-economic dynamics in Dhemaji and Lakhimpur. This combined quantitative data such as employment patterns, demographic shifts, and qualitative insights drawn from field interactions.

2.2.1 Primary data collection methods

In-depth interviews were conducted in two phases with a local resident serving as the field investigator, which improved transcription efficiency and accuracy. The first phase, from 11 to 20 September 2024, involved 82 household surveys in Dhemaji to understand the impact of the dam construction on the local population. During this phase, we discovered that areas of Lakhimpur located 50 km downstream from the SLHEP were more significantly affected due to alterations in water flow and increased flood risks. As a result, a second field visit was conducted between 8 and 15 November 2024 in Lakhimpur. A total of 100 households were surveyed to explore issues related to hydropower development. In Dhemaji, the survey was carried out across 14 village panchayats[4] encompassing 30 villages within four revenue circles—Subansiri, Gogamukh, Dhemaji, and Sissirborgaon (Figure 10.B). In Lakhimpur, the survey was carried across 6 village panchayats encompassing a total of 10 villages situated within two revenue circles: North Lakhimpur and Kadam revenue circle.

[4] A village panchayat, also known as the Gram Panchayat, is a political institution that governs a village or group of villages in India.

These areas represent a diverse range of communities, each with distinct socio-economic and environmental challenges.

Apart from households, key personnel from the Mishing Autonomous Council, Dhemaji DC office, Dhemaji circle office, Dhemaji Disaster management office, Dhemaji Labour office, as well as academicians from universities of Lakhimpur and river activists were interviewed.

Interpretative research techniques were employed to capture the perceptions and experiences of communities in Dhemaji and Lakhimpur district, including small and marginalised farmers, sharecroppers and low-income workers engaged in livestock farming, small shop owners, and indigenous groups. These communities, already facing heightened risks from climate-related disasters and environmental changes, were engaged to ensure their voices were central to understanding the potential impacts of the SLHEP.

Focus group discussions (FGDs) are an important tool to capture group insights, perceptions, and experiences on certain issues (Nyumba et al., 2018). We used FGDs to understand whether and how project design allowed local communities to exercise their agency in project implementation and outcomes. A total of 7 groups consisting of 5 to 10 members were included for effective discussion (Figure 14). The groups were categorised as (i) Mishing people, (ii) Nepali people in Gogamukh CD Block, (iii) Rajanipur men's group, (iv) Womens' group in Dhemaji, (v) Sissiborgaon women's group, (vi) Namoni Kekuri aged people's group, and (vii) Naharani Ghunasuti villagers' group in Lakhimpur. The themes arising out of the discussions were documented for further analysis.

A multistakeholder consultation workshop was held on April 3, 2025, at IIT Guwahati to gather insights from experts on the impacts of the Subansiri Dam, exploring whether it represents a pathway to development or results in displacement. The workshop facilitated collaborative discussions on dam-induced transitions in the region and critically assessed whether these processes align with the principles of a just transition.



Figure 14: (A) Focus Group Discussion, Rajanipur village, Dhemaji; (B) Focus Group Discussion with women's group, Dhemaji.
Source: Field Photos,2024

2.2.2 Secondary data collection methods

Secondary data sources were used to provide a comprehensive understanding of the socio-environmental landscape surrounding the Subansiri Dam. Demographic trends, socio-economic status, and patterns of migration were analysed using data from the Census of India (2011). To assess environmental vulnerabilities, particularly flood hazards, insights were derived from Dasgupta et al. (2024) and the Assam State Disaster Management Authority. Policy analysis was conducted using multiple official documents, including the *Final Draft Report on the Resource Adequacy Plan for Assam* (Government of India, n.d.), the *Assam Green Budget for FY 2023–2024*, the *Report on the Twentieth Electric Power Survey of India (Volume I)* by the Central Electricity Authority (2022), and the *State Action Plan on Climate Change and Human Health, Assam (Version 2.0)*.

2.3 Data analysis

Data analysis was conducted using both quantitative and qualitative methods. **Quantitative data** were analysed using descriptive statistical methods to examine demographic patterns, socio-economic status, migration trends, and employment structures, with a particular focus on gender-disaggregated data. Data from the Census of India were used to understand literacy status and workforce distribution, including the proportion of agricultural and marginal workers across different revenue circles. Environmental vulnerability, particularly flood hazard exposure, was assessed through spatial and temporal analysis. Additionally, energy demand, infrastructure capacity, and policy targets were evaluated using numerical data.

Qualitative analysis focused on understanding the lived experiences, perceptions, and adaptive strategies of local communities impacted by the

Subansiri Dam and their adaptations in form of migration. Field narratives and observations were thematically coded to identify key patterns related to livelihood disruption, gendered labour dynamics, and socio-cultural shifts. Policy documents were analysed to assess the extent to which policy frameworks address issues of equity, sustainability, and just transition. This approach provided deeper insight into how local realities align or conflict with official development and climate narratives

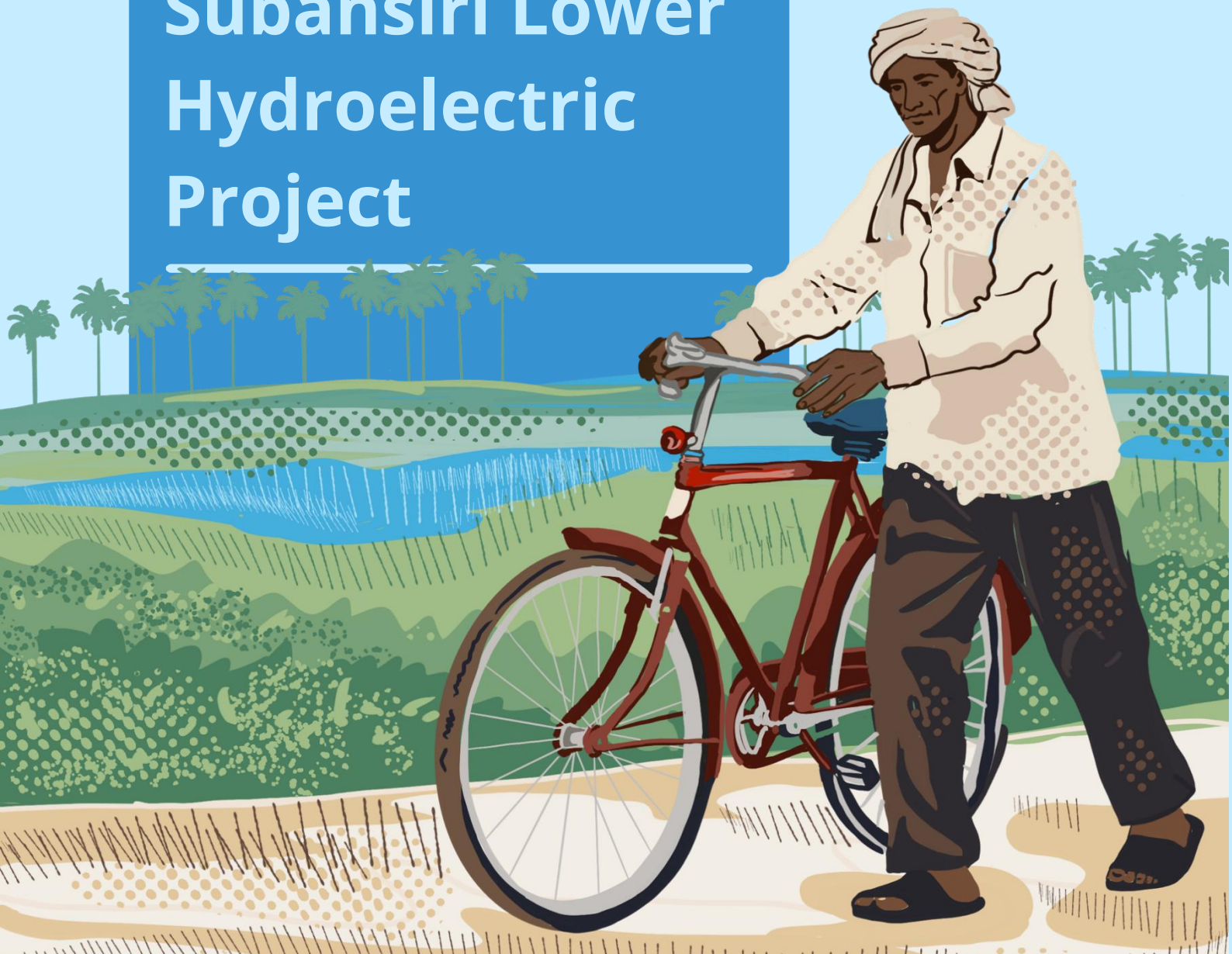
2.4 Ethical consideration and limitations of the study

The study was conducted with strict adherence to ethical research principles ensuring respect, confidentiality, and informed consent of all participants. Before each interview, participants were informed about the purpose of the study, the voluntary nature of their involvement, and their right to withdraw at any time without consequence. Anonymity was maintained throughout the documentation process to protect the identities of individuals, particularly when addressing sensitive issues such as displacement, livelihood loss, and institutional accountability (Barrow et al., 2025). Special care was taken to avoid any form of coercion or misrepresentation during interviews or field interactions. Additionally, the study prioritised the respectful representation of community narratives and was sensitive to the socio-cultural context of the respondents.

The inability to meet with NHPC officials posed a significant limitation in terms of direct communication, which hindered the study's ability to obtain first-hand insights and official perspectives regarding the Subansiri dam project. Without direct dialogue with the authorities responsible for the project, it was difficult to cross-check the claims with official records or responses, leaving certain community assertions unverified. The social, cultural, and economic dynamics of the community prior to the dam's implementation were difficult to document comprehensively, as much of the community's pre-dam identity and practices may have evolved or have been altered in response to ongoing changes.

03

Downstream Migration Dynamics and the Role of the Subansiri Lower Hydroelectric Project



3 Downstream Migration Dynamics and the Role of the Subansiri Lower Hydroelectric Project

3.1 Migration context in Dhemaji

'Many of us own agricultural land, but declining yields force us to migrate to other parts of India to survive. The money earned helps us buy essentials like tractors and fertilizers, which are too expensive otherwise. With no local work opportunities and delayed payments or harassment in daily-wage jobs, we have no choice but to leave, even though we don't want to... amar kunu upai nai, bahirt jabo mon nai jodiu jabo laga hoise'—Male migrant, age 38, Jiadhal village, Dhemaji (Field Interview, 2024).

In Dhemaji, migration has become a necessity rather than a choice, with most people using migration as a strategy to diversify and sustain livelihoods. Figure 15 provides an overview of migration insights in Dhemaji district.



Figure 15: Migration Insights of Dhemaji District
Source: Prepared by authors

Across the surveyed villages, 92.6 per cent of households reported at least one member, predominantly male, migrating to other parts of the country in search of better work opportunities. Most of the migrants are middle-aged and younger adults who had migrated to other parts of the country. The duration of migration

varies, often extending beyond five years, depending on individual circumstances. The primary drivers of migration in Dhemaji district stem from limited job opportunities that hinder stable livelihoods. High unemployment rates are largely attributed to a lack of diverse industries and business enterprises capable of generating sufficient employment. In this predominantly agriculture-based economy, seasonal work combined with climate variability such as frequent floods further exacerbate income instability (Figure 16).

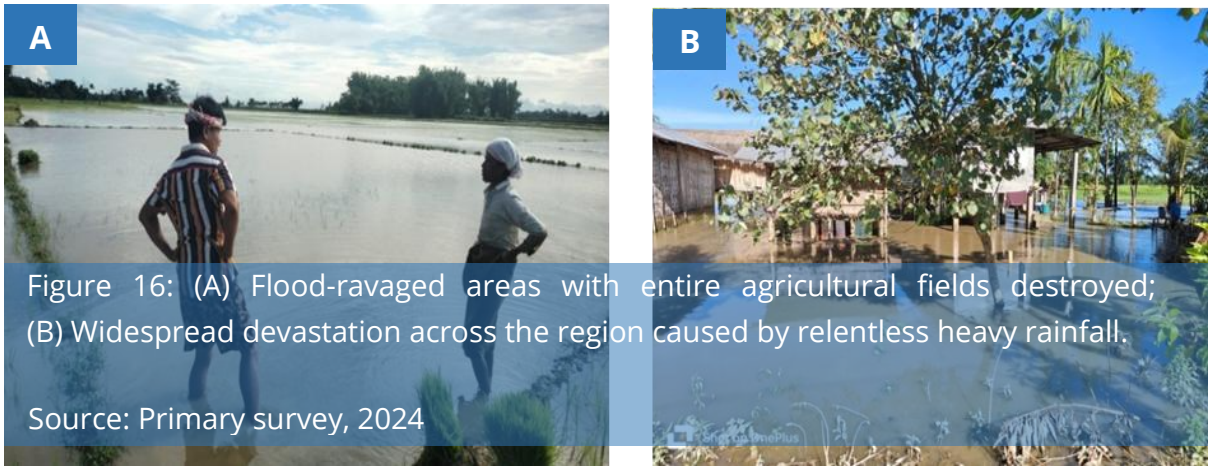


Figure 16: (A) Flood-ravaged areas with entire agricultural fields destroyed; (B) Widespread devastation across the region caused by relentless heavy rainfall.

Source: Primary survey, 2024

The few available local jobs are often low-paying, temporary, and devoid of security, leaving families struggling to meet basic needs like food, healthcare, and education. This persistent economic stagnation traps communities in a cycle of poverty, making migration less of a choice and more of a necessity for survival. Urban centres and economically prosperous regions offer greater reliability and higher income potential, acting as powerful pull factors for migration. Workers are compelled to seek better economic stability and improved living conditions which are often unattainable in their home region.

Migrants predominantly seek employment in industrial sectors, highlighting the district's reliance on out-migration to sustain household incomes and improve living standards. Major urban hubs such as Bangalore, Hyderabad, Chennai, Kerala, and Rajasthan were primary destinations. Migration patterns often followed a seasonal cycle, with migrants returning home during key agricultural periods like sowing and harvesting, allowing people to balance urban employment with agricultural activities creating a dual economic support system for households.

Migrants were primarily employed in sectors such as construction, carpentry, plumbing, security services, and small-scale industries like rubber processing and

fabrication. While these occupations require basic technical know-how and hands-on experience, most migrants worked in the unskilled or semi-skilled segments of these sectors, often without formal training or job security. Overall, respondents demonstrated resourcefulness by taking up labour-intensive jobs to ensure stable livelihoods, and adaptability where they often endured high costs and challenges of relocation, including social dislocation and financial burden of travel. For many, migration was perceived as the only viable path to break out of poverty and provide a better future for their families. This reflects both the limited local opportunities in Dhemaji and the appeal of more secure employment in larger cities, which offer better prospects for improving household income and living conditions at the source.

3.1.1 Perceived lack of opportunities driving labour migration

'We don't want to go outside but we have to...mon nai bahirat jabole tothapiu jabo laga hoise' —Male migrant, age 42, farmer from Rajanipur village, Dhemaji (Field Interview, 2024).

Many villagers expressed this concern with respect to Dhemaji district which is economically disadvantaged and has limited job opportunities creating a significant barrier to achieving stable and sustainable livelihoods. These areas often experience high unemployment rates due to a lack of diverse industries and business enterprises capable of generating employment. In agriculture-based economies, seasonal work and the effects of climate variability such as floods further contribute to the scarcity of reliable income. Jobs that are available in these rural regions tend to be low-paying, temporary, and provide little to no job security, leaving individuals and families without a dependable source of income. This economic stagnation leads to a cycle of poverty, as people struggle to afford necessities like food, healthcare, and education for their children. In such situations, migrating to urban centres or other regions with better economic opportunities becomes not just a choice but a necessity.

Most people of Dhemaji rely on agriculture or informal sectors for livelihoods, both of which are increasingly unstable due to environmental challenges like flooding and declining productivity. Even for those who find work locally, the wage disparity between Assam and other states is stark. For the same type of labour, workers in Assam are paid considerably less compared to what they could earn in places like Kerala, Bangalore, or Mumbai. The daily wage rate system in Assam is

notably lower, making it difficult for workers to sustain themselves and their families. For instance, agricultural labourers typically earn between ₹250 and ₹350 per day, while construction workers may receive slightly higher wages, ranging from ₹300 to ₹450 per day. However, these rates often fluctuate based on regional disparities, skill levels, and seasonal demand. A pronounced gender gap also persists within the wage system. Women workers, particularly in sectors such as agriculture and domestic labour, tend to earn significantly less than their male counterparts, sometimes receiving 20-30 per cent less for similar tasks. This systemic inequality further exacerbates the economic vulnerability of women workers, limiting their capacity for financial independence and social mobility. Moreover, workers in Assam often face delays in receiving wages, creating financial insecurity and making local jobs less attractive. In contrast, when they migrate to other states, they not only earn higher wages but also receive payments more consistently and on time. This reliability and higher income potential act as strong pull factors for migration, as workers seek better economic stability and improved living standards in more prosperous regions of the country. So, villagers from Dhemaji seek better employment opportunities in urban areas to uplift their socio-economic status.

With limited industrialisation and job prospects in the region, migration to metropolitan cities offers prospects of higher wages, stable incomes, and overall financial security. These destinations provide employment in sectors like construction, manufacturing and factory work, transportation and delivery services, and hospitality, which are often more lucrative than local opportunities in Dhemaji. Since no female migrants were recorded during our field survey, an analysis of gender-based diversification in employment sectors could not be undertaken in this study. The duration of employment among the migrants varied considerably. While a small proportion of migrants secured jobs lasting over a year, the majority reported employment periods ranging from six months to one year. These variations were largely shaped by the seasonal and contractual characteristics of the work available. Although the employment destinations were diverse in nature, they consistently offered more lucrative opportunities compared to local options in Dhemaji, thereby underscoring the economic drivers behind the observed migration patterns. Migrants are often willing to endure the costs and challenges of relocation, including social dislocation and the financial burden of travel, in pursuit of a reliable income and a chance for economic

stability. For many, migration is seen as the only viable path to break out of poverty and provide a better future for their families.

3.1.2 Remittances and skill acquisition as pathways to improved well-being

'We live here with our children and elderly parents while our husbands work far from Dhemaji. It's hard, but we've accepted it because their sacrifice sustains us. The money they send helps us repair our homes; educate our children, and cover health expenses, things we couldn't afford otherwise. Without their support, we'd have nothing. Though we miss them deeply, we endure this separation because it's our only path to survival and progress.'—Female non-migrant, age 28, wife of a migrant worker, Borphukan Gaon, Dhemaji (Field Interview, 2024).

In Dhemaji, remittances act as a lifeline, improving household well-being in economically disadvantaged areas. Migrants' income supports essential services and quality-of-life improvements otherwise out of reach. Most remittances are sent monthly, with some quarterly or annually, primarily benefiting parents and wives of the migrants.

Families often allocate these funds based on immediate necessities, such as food, clothing, and healthcare, while others use them to invest in long-term goals like education, home improvements, or small businesses. For example, in communities with limited access to quality education, remittances are often used to cover school fees, purchase study materials, and provide essentials such as uniforms and learning supplies. This financial support helps ensure that children have access to better educational opportunities and a brighter future. As stated by one respondent ***'I use most of the money sent by his father as remittances to pay for my son's education, as it was our top priority'—*** Female non-migrant, age 40, wife of a migrant worker, Hatigarh village, Dhemaji (Field Interview, 2024).

The use of remittances is shaped by the community's economic and social conditions. In areas with poor infrastructure, families prioritise basic needs like repairing homes damaged by natural disasters, installing sanitation facilities, or covering healthcare costs. In agricultural households, remittances are crucial for boosting productivity and income stability. These funds are often spent on essential farming inputs like seeds, fertilisers, and equipment, which enhance yields and sustain livelihoods. Farming expenses typically fall into four key categories (Table 3).

Table 3: Key Agricultural Applications of Remittances

Source: Primary Survey, 2024

Expense categories	Purpose	Impact
Hiring labour	To ensure sufficient manpower during peak agricultural seasons like planting and harvesting	Timely completion of farming tasks, maximising yields
Purchasing seeds	To invest in high-yield or hybrid seeds that improve crop productivity	Increased agricultural output and income stability
Buying fertilisers and pesticides	To maintain soil fertility and protect crops from pests and diseases	Healthier crops and improved overall yield quality
Acquiring farming equipment	To modernise farming practices and reduce dependency on manual labour	Enhanced efficiency and reduced farming time

A portion of the funds is used to hire labour, particularly during peak agricultural seasons like planting and harvesting when additional manpower is crucial. As stated by many migrant families the planting season is the busiest time of the year for them. When they receive money from the earnings of the migrant member, they use a part of it to hire additional labourers to help in the fields. According to the migrant family members, ***'Without this support, it would be impossible to sow all the crop in time, the money ensures that we don't fall behind and can maximize the harvest, securing our livelihood for the months ahead.'—*** Male farmer, age 45, recipient of remittances from a migrant son, Rajanipur village, Dhemaji (Field Interview, 2024).

Money is also used to invest in hybrid seeds, which offer higher yields and better resistance to pests and diseases, thereby increasing the efficiency of their farming efforts. As said by a farming family, ***'Last year, I invested in hybrid seeds for our rice paddy. Although they were more expensive, the yield was nearly double compared to traditional seeds. The improved harvest allowed us to sell the surplus at the market, and we now plan to continue using hybrid seeds to enhance our farming output.'—*** Male farmer, age 61, recipient of remittances from a migrant son, Namoni Kekhuri village, Dhemaji (Field Interview, 2024). This transformative impact of remittances lies in their ability to empower families to adopt modern agricultural inputs that would otherwise remain beyond their financial reach. It also shows a forward-looking perspective, as the family plans to

continue using hybrid seeds, ensuring sustained improvements in farming efficiency and income generation.

A significant portion of remittance income is spent on fertilisers and pesticides to boost soil fertility and protect crops from pests, ensuring higher yields. Larger investments often include tube wells for consistent water supply and mechanised tools like tractors to streamline operations. These expenditures address immediate agricultural needs while modernising practices fostering long-term resilience and enhancing economic stability for farming households.

The financial contributions sent by migrants play a transformative role in empowering families in Dhemaji to break free from the cycle of poverty that has long kept them dependent on subsistence agriculture. For many households, farming has historically been their primary source of livelihood, but the returns from small, low-yielding agricultural plots often fail to meet basic needs. This reliance on traditional farming methods becomes even more precarious in the face of climate change, as erratic weather patterns, frequent flooding, and soil degradation further diminish agricultural productivity. A family member of migrant household revealed that ***'The money we received, bought tractor, to transform our farming. Tasks that took days now take hours, saving time and effort. We no longer rely on costly rentals and earn extra income by renting the tractor to neighbours. This investment has boosted our efficiency, financial stability, and community support'—*** Farmer families, mainly male remittance-supported households, age group 42–50, Rajanipur village, Dhemaji (Field Interview, 2024).

Remittances provide financial stability, enabling families to explore income-generating activities like small businesses or skilled labour, building resilience against economic shocks. For instance, one male respondent migrated to Kerala in 2018 and saved enough to return in 2023 and start a goat farming business and purchase a small truck in Dhemaji. His business now earns him ₹30,000 a month, inspiring his brother in Kerala to join him. He says, ***'When I was in Kerala, I saved money to start a new business in my hometown. Now, my hard work has paid off, and my business is flourishing.'***—Male return migrant, age 36, Moridhal Hah Sora village, Dhemaji town (Field Interview, 2024).

Remittances create a ripple effect, empowering communities and fostering self-reliance. Although women are less visible in migration statistics, they often use

remittances to start local businesses, thereby challenging traditional gender roles. One woman respondent said, ***"When my husband's remittance arrived, I saw an opportunity. I invested in a new loom and quality materials to restart weaving, turning it into a business that now supports many families. This money wasn't just for survival; it built a future for my children and our community."*** —Female non-migrant, age 46, weaver and self-help group member, Bhebeli village, Dhemaji (Field Interview, 2024).

This forward-looking investment not only uplifts individual households but also contributes to the socio-economic advancement of the region. By fostering hope, resilience, and opportunity, remittances serve as a critical mechanism for driving sustainable development and economic stability in a region often characterised by systemic challenges and vulnerabilities.

The transformative impact of skill acquisition through migration is evident when individuals apply expertise gained elsewhere to create opportunities in their home communities (Singh, 2019). Migrants often return with specialised knowledge from industries like manufacturing, construction, agriculture, and services, using these skills to address local needs, foster economic diversification, and create jobs. In Dhemaji, many returnees have leveraged skills learned during migration such as fisheries, advanced farming, bartending, brick making, and fabric manufacturing to establish small businesses and revitalise the local economy. For example, a migrant trained in fisheries in Jorhat used his savings to start a small fish farm on one *bigha* of land, eventually expanding it to 14 *bighas* while diversifying into vegetable farming, piggery, and fruit cultivation. He now employs nine staff members, illustrating the potential of acquired skills to drive personal and community growth. This expansion was enabled by strategic use of financial resources, technical training in sustainable practices, and favourable local conditions. By reinvesting in their home region, such entrepreneurs not only secure new income streams for their families but also contribute to local food security and economic resilience.

Similarly, migrants who gained expertise in farming during their time in agricultural hubs have introduced modern practices like organic farming, drip irrigation, and crop rotation, transforming traditional agriculture in the region. One respondent said about his journey: ***'I trained at the Krishi Vigyan Kendra (KVK) in Dhemaji, focusing on mastering organic farming techniques. With dedication and hard work, I've become a successful organic farmer and even***

established my own greenhouse. This brings me immense joy, and I aspire to help my village prosper in agriculture by sharing the knowledge and techniques I've gained to uplift our community.'—Male organic farmer, age 58, Bormathariani Gaon, Dhemaji (Field Interview, 2024).

Skill acquisition serves as a catalyst for transforming livelihoods, enabling individuals to transition from subsistence activities to market-driven practices. Training through agricultural hubs, formal programmes, and hands-on experience empowers rural communities with technical expertise and confidence to adopt innovative solutions. For instance, his greenhouse and organic farming efforts highlight how such skills boost yields, ensure healthier produce, and open niche markets for organic goods, contributing to both food security and economic diversification.

Others have applied industrial skills to launch enterprises addressing local needs. One respondent said, ***'In 2011, I worked in a brick factory in Kerala. After acquiring skills, I returned home and started my own brick business using savings and equipment brought from Kerala. Today, we manufacture 2,000 bricks daily, catering to local customers, government projects, and more. My wife manages client relations, and we've expanded to a new site. The key is applying skills where they matter most transforming our community.'***—Male return migrant, age 41, small-scale brick entrepreneur, Gopak Gaon, Dhemaji district (Field Interview, 2024). This shift from wage dependency to entrepreneurship underscores the multiplier effect of skill acquisition. By creating businesses, returning migrants circulate wealth locally, reduce reliance on external markets, and generate employment opportunities. Similarly, skilled returnees in textiles have started small workshops, provided jobs while serving local markets.

In the hospitality sector, returnees like Prafulla (name changed), who gained bartending experience in Bangalore, are revitalising rural economies. He stated: ***'After working as a bartender, I returned home and started a fast-food stall in Gogamukh, with plans to expand. Applying my skills locally has been rewarding.'***—Male return migrant, age 34, small food entrepreneur, Nepali Gaon, Dhemaji (Field Interview, 2024).

Such ventures introduce urban culinary trends to rural areas creating jobs, supporting local suppliers, and stimulating economic growth. Migration-driven

skill acquisition has immense potential to drive rural transformation, provided the ecosystem supports these entrepreneurial efforts.

These returnees serve as examples to others in the community, showing that migration can be more than a temporary escape from poverty. It can be an opportunity to learn, grow, and bring back valuable knowledge to help develop their own region.

3.1.3 Mental and psychological stress due to migration

For families left behind, remittances offer not just material support, but emotional reassurance, symbolising care and responsibility. However, the physical absence of migrants often strains familial bonds, creating emotional voids that impact well-being on both sides. Many migrants from Assam, especially from districts like Dhemaji, acknowledge the economic benefits of migration but feel emotionally torn. While migration is seen as a step toward financial improvement, the emotional toll of leaving behind their families and homes is difficult. After working for several years and accumulating savings, many express a desire to return to their villages, where their roots lie. Some even say they would stay if they could earn ₹10,000 per month locally, supporting their families with that modest income. Women migrant workers voice their sorrow: ***'Our children miss their fathers' love. During floods, it's only us facing the chaos. We connect through video calls, but is this the life we want? If our husbands could earn ₹10,000 a month, it would bring us so much joy. We don't ask for much, just food and a roof over our heads... but this life is tough.'***—Female non-migrant, age 30, Jiadhal Dihiri gaon, Dhemaji (Focus Group Discussion, 2024).

Migration, while providing better wages, comes with the emotional and logistical burden of maintaining two households. The dual responsibility of supporting families both at work and in the village is draining. Emergencies or family crises amplify this stress, as migrants often can't return home quickly, deepening their sense of helplessness. Many dream of returning home once they meet their financial goals. Migration's challenges can escalate, especially with unforeseen accidents. Madhab Das's (name changed) story highlights this duality. After an accident in Kerala in 2022 which left him unable to continue his job, he returned to Assam. His injury limits his ability to seek employment, and he now sustains himself through farming and fishing. Reflecting on his past, he says, ***'I worked hard in Hyderabad, Chennai, Kerala and earning well, thinking life would keep***

improving. But after the accident, everything changed. My hand is still not right, and the company couldn't take me back. I had no choice but to come home.'— Male return migrant, age 37, Rajanipur village, Dhemaji (Field Interview, 2024).

Madhab's experience captures the material benefits and emotional hardships of migration. While his earnings in other states allowed him to invest in agricultural infrastructure, the accident halted his aspirations, leaving him with physical and emotional setbacks. Despite the company's medical support, the lack of long-term assistance has limited his opportunities. His story underscores the precarious balance migrants face between material progress and the emotional toll of unforeseen hardships.

While migration brings financial benefits, it creates deep emotional voids, in the lives of those left behind and those who migrate. Children bear the brunt of this separation, growing up without the guidance and support of their parents, which weakens family bonds and creates long-term emotional consequences. For women, the struggles are amplified as they take on the dual burden of managing households and responding to climate-induced crises such as floods without adequate support. For migrants themselves, the journey is far from easy. Living alone in unfamiliar cities is not easy. They endure long hours of physically demanding work, often as daily wage labourers in industries far removed from their traditional roles as farmers. This shift not only challenges their physical endurance but also their sense of identity, as they grapple with the loss of respect and status associated with farming, a dignified and self-sustaining occupation in their own communities. Migration can open doors to better jobs, skill-building, and community growth, helping people rebuild their lives and support loved ones. But it also breaks families apart, disrupts traditions, and leaves many dependents with unstable incomes and uncertain futures. So, when we asked about the willingness to migrate, almost 80 per cent want to stay in their native villages (Figure 17) hoping for better opportunities where they are.

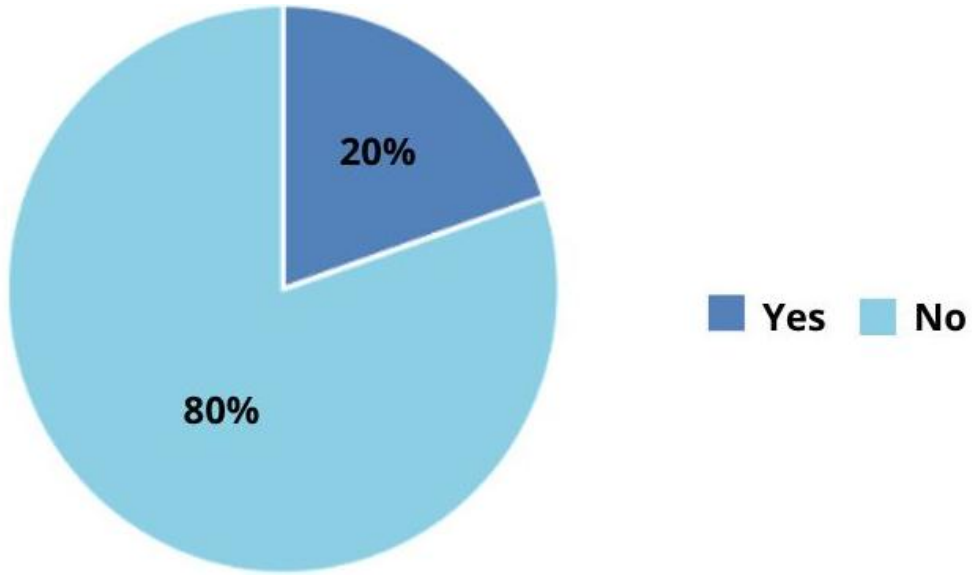


Figure 17: Willingness to migrate among migrant households
Source: Primary survey, 2024

3.2 The Subansiri Hydroelectric Power Project's impact on migration

The SLHEP is particularly significant in providing employment opportunities to marginalised communities in the region. Many residents have highlighted the project as a source of hope, especially in the aftermath of the COVID-19 pandemic. Several individuals said: *'After Covid-19, the younger generation stopped going outside. We secured some contractual jobs with this SLHEP project.'*— Male local residents, age 28-42, contract workers associated with SLHEP, Dhemaji (Field Interview, 2024). This sentiment reflects a broader perception that the project has the potential to bring transformative change to their lives. A few local workers, having secured jobs during the pandemic, have now obtained certificates, suggesting the possibility of future employment opportunities. It is important to note that many migrant workers returned to their home regions due to the disruptions caused by the Covid-19 pandemic, which further highlights the significance of local employment provided by SLHEP.

Among the total households surveyed, 55 workers from 27 households (30.7 per cent) reported involvement in the construction of the SLHEP. Notably, most of workers come from the regions of Gogamukh and Subansiri, which are near the project site (Figure 18). The workforce is predominantly comprised of Scheduled

Tribe (ST) communities, particularly the Mishing tribe, who represent a significant portion of the local population.

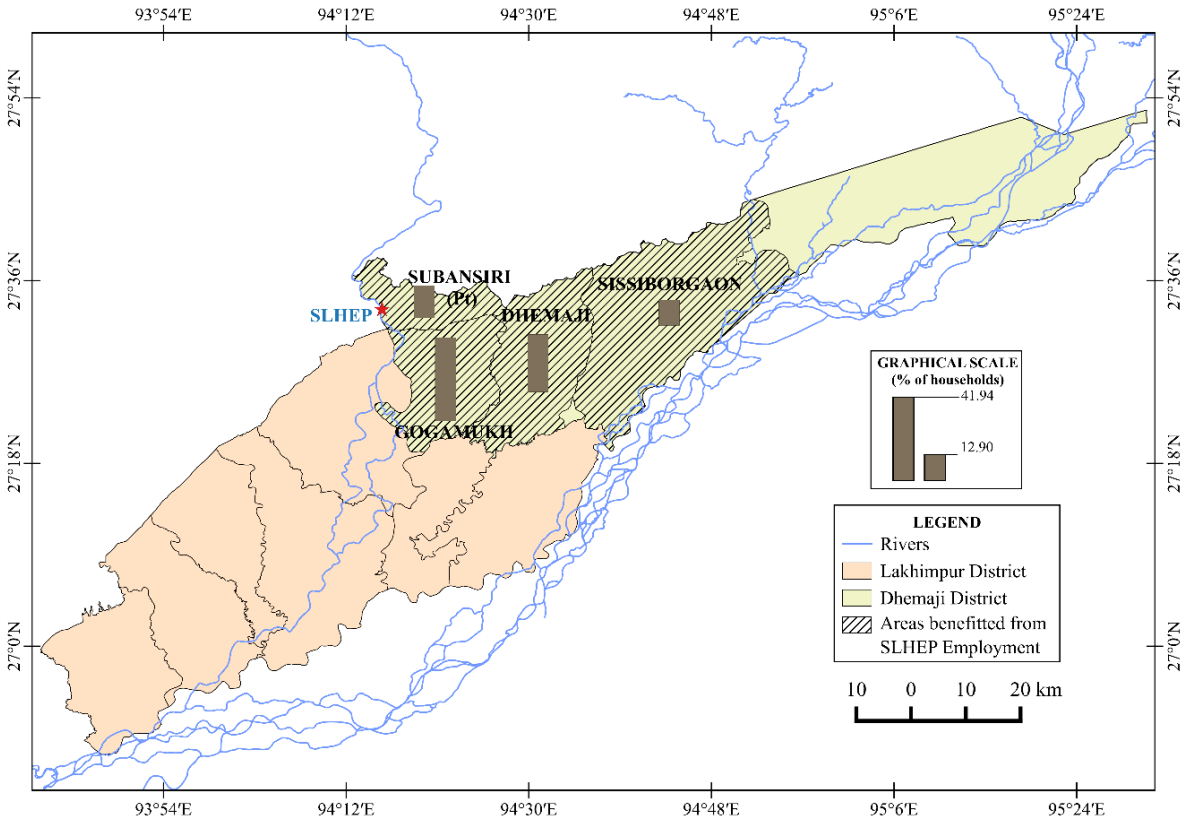


Figure 18: Spatial distribution of employment benefits from the SLHEP in Dhemaji
Source: Primary survey, 2024

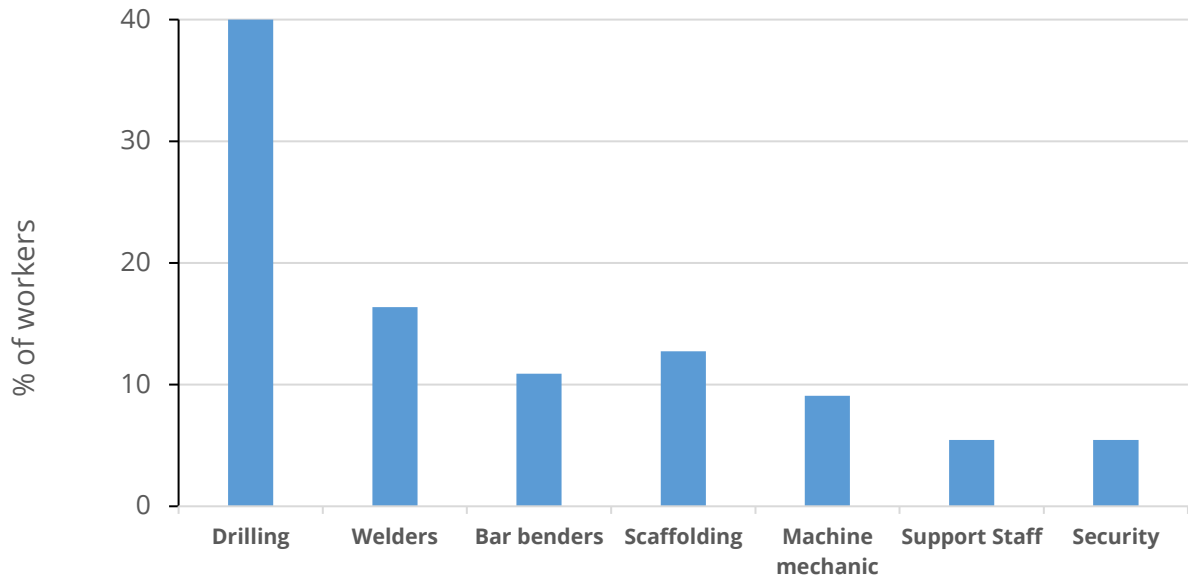
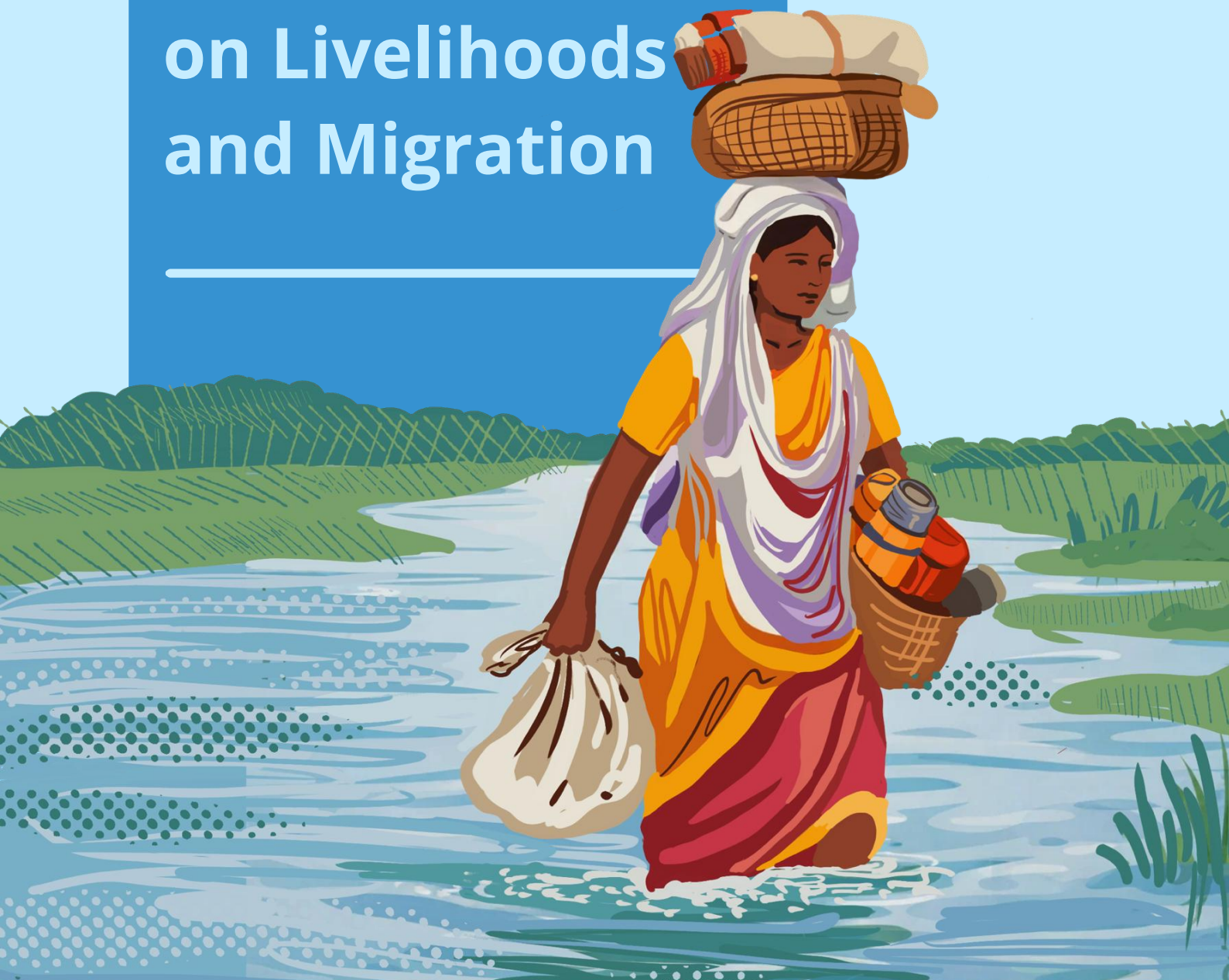


Figure 19: Type of work associated with the SLHEP
Source: Primary survey, 2024

In terms of job roles, local workers have been primarily assigned to more technical tasks, such as drilling and welding, reflecting their skill sets (Figure 19). Meanwhile, the demand for security and support staff has been comparatively lower. For some, the project has not only improved their financial stability but has also led to tangible improvements in their living standards. For instance, some individuals reported being able to purchase motorcycles, secure better housing, and experience greater job stability. The project has, therefore, provided substantial relief to migrant workers, particularly in the construction and operational sectors, fostering a sense of hope and stability for many families especially in the wake of the pandemic. However, it is important to note that most of these opportunities are temporary and ad hoc, lacking a focus on skill development that could lead to lasting improvements in livelihoods and job security. With the completion of the construction work of SLHEP, it is unlikely that all workers will secure alternative employment. ***'Once the dam construction ends, most of us will be left without work. These jobs gave us some income during the project, but what after that? There's no other big source of employment here. Many will have to move again to other cities'***—Male construction labourer at SLHEP, age 40, Jengrai gaon, Dhemaji (Field Interview, 2024). This highlights the importance of examining the situation through a just transition lens, which we explore next.

04

Evaluating the Subansiri Lower Hydroelectric Project's Impact on Livelihoods and Migration



4 Evaluating the Subansiri Lower Hydroelectric Project's Impact on Livelihoods and Migration

4.1 Interplay of just transition and the Subansiri lower hydroelectric project in the study region

The question of whether the SLHEP denotes a just transition lies at the crossroads of India's commitment to renewable energy development and the necessity to balance environmental goals with social equity. As India steps up its efforts to reduce greenhouse gas emissions and transition to renewable energy sources in line with global and national climate goals, the role of hydropower projects like SLHEP becomes more significant.

Hydropower is an essential component of a low-carbon energy transition offering a clean, renewable source of energy that supports grid stability and large-scale generation. However, this transition is not without its challenges, particularly when it comes to large-scale infrastructure projects such as SLHEP, which is set to become India's largest hydroelectric project. While SLHEP holds the potential to provide much-needed renewable energy, its location in a seismic zone and ecological sensitivity raise significant concerns about its environmental and social impacts. Large dams like SLHEP often disrupt local ecosystems, alter river flows, degrade water quality, and displace communities. In the case of SLHEP, these challenges are heightened in a region prone to flooding that is home to marginalised communities whose livelihoods and cultural identities are intertwined with the environment. The EIA process which is intended to mitigate such impacts has come under scrutiny for not adequately considering these social and ecological risks (Dekaraja & Mahanta, 2021; Dekaraja & Mahanta, 2022). This situation calls for a just transition approach, which ensures that renewable energy development does not disproportionately harm vulnerable communities while striving to meet environmental targets.

A just transition involves addressing distributive justice by ensuring that the benefits and burdens of projects like SLHEP are fairly shared among all stakeholders, particularly marginalised groups. It also requires procedural justice, which means engaging local communities in decision-making processes, and recognition justice, ensuring that the identities, rights, and knowledge of these communities are respected and incorporated into planning and implementation.

4.2 Distributional justice: Analysing the fair allocation of benefits and burdens

Hydropower stands as the world's foremost low-carbon electricity source (IEA, 2021a) and is expected to remain a dominant energy option, especially in the Global South, where a surge in dam construction is underway (Laura et al., 2023). While large hydropower projects offer substantial benefits, they also entail significant drawbacks, impacting a diverse range of groups, from local communities to regional and national bodies. Similarly, the Subansiri Dam has the potential to produce a complex array of environmental, social, and economic impacts, both positive and negative, which we examine in the following sections through the lens of justice.

4.2.1 Energy distribution

The project is to be commissioned in 2026. Once all the turbines are in operation, it will produce 7500 MWh of electricity in a 90 per cent dependable year and provide electricity to 17 Indian states as discussed in Table 4.

Table 4: Power allocation from SLHEP

Source: (Gupta & Ojha, 2022)

States	Power Allocation (MW)	% share of power
Assam	533 (25* + 508)	26.65
Arunachal Pradesh	274 (240* + 34)	13.7
Other Northeastern States (Manipur, Meghalaya, Nagaland, Tripura & Mizoram)	198	9.9
Northern States (Haryana, Punjab, Rajasthan, Uttar Pradesh, Chandigarh & Delhi)	500	25.0
Western States (Gujarat, Madhya Pradesh, Chhattisgarh, Maharashtra & Goa)	500	25.0

Note: *Free power.
Additional 5MW free power to Assam from NHPC from its own resources.

Assam would benefit the most from this project. At present, the state is running on a power deficit and is totally dependent on outside sources to meet the demand for power (Choudhury, 2023). The Chief Minister of the state himself

admitted the inability to meet the rising demand of 2500 MW in 2023 during peak hours due to exhaustion of state's own reserve of electricity. Earlier in 2021-22, the peak demand was 2138 MW (GOI, 2022). However, the residents of Dhemaji and Lakhimpur are not sure whether they would receive the electricity at a lower rate. According to some local villagers of Dhemaji and Lakhimpur, ***'We have been hearing a lot about the Subansiri dam and the electricity it will produce, but no one has ever explained at what rate we will receive it. Will we pay lower rates or the will the company (NHPC) just profit at our cost? Assam has been facing a lot of consequences due to this dam. But we are sure that Arunachal Pradesh is going to be benefitted from this scheme'—***Male local resident, age 47, farmer and community representative, Gogamukh, Dhemaji (Field Interview, 2024).

This concern shows that the promised benefits would not trickle down to the grassroot level. It also becomes evident from an RTI query on energy tariffs from this project which revealed that as per the NHPC's estimates on unit and rate of electricity, it would cost around ₹6.70 per unit as opposed to ₹3 per unit on the India energy exchange (Saikia, 2019). An academician and a local resident from Lakhimpur expressed grief during the consultation workshop regarding the non-uniformity in distribution of power between Assam and Arunachal Pradesh: ***'Arunachal is only benefitting from the project. There is minimal impact of this project in their part. Still, they are receiving 240 MW free power, while we (Assam) bearing the total risk of it are allotted a meagre 25 MW free power only. The state under the greatest risk is getting the lowest in return and they (NHPC) say that we will get maximum power (26.25 per cent). The irony could not be starker.'***

This discrepancy highlights project viability and efficiency. There is variability in power conditions in the villages of Dhemaji and Lakhimpur. While there is power in the town areas, rural areas lack electrification. Local NGOs have been actively participating in the installation of solar panels for the electrification of roads. However, the lack of electricity hampers other activities as well. Water pumps cannot be operated regularly due to uncertain electricity supply hampering irrigation thereby affecting agricultural productivity. These conditions highlight the importance of reliable and accessible energy resources in supporting regional development. The SLHEP holds significant potential to contribute to improved livelihoods and economic opportunities in the region. To fully realise this potential, it is important that the benefits of energy generation are extended to

local populations in a more inclusive manner. Strengthening the distribution and accessibility of energy can further enhance the project's capacity to support agricultural productivity, livelihood security, and broader development outcomes. In this context, aligning the project with principles of distributive justice through equitable access and affordability would help ensure that the advantages of increased energy availability are shared across communities, including those that are socially and economically marginalised.

4.2.2 Employment generation

In the Gogamukh revenue circle located in Dhemaji district, the implementation of the SLHEP appeared to be inducing significant changes in the lives of villagers in this historically underdeveloped region. The Gogamukh revenue circle has long faced economic stagnation, a lack of industrial development, and the challenges of climate-induced migration. Its subsistence-based agrarian economy is particularly susceptible to frequent flooding which disrupts livelihoods and damages infrastructure, thereby reinforcing cycles of poverty and underdevelopment (Barua et al., 2025). The COVID-19 pandemic of 2020 exacerbated the existing crisis, prompting the return of migrant workers and placing additional strain on local resources within an already fragile economy. Families' dependent on urban remittances experienced significant financial hardship. In this context, the SLHEP provided a rare form of relief, offering temporary employment at Rs. 750 per day, thereby delivering short-term stability in an otherwise uncertain and precarious environment. Some locals of Gogamukh said, ***'After COVID-19, the younger generation stopped going outside. We secured some contractual jobs for this NHPC project and hope they will hire more local people. Many of us hold certificates and possess skills, so if the government is willing, we can find work locally without needing to look for jobs in other states. This would allow us to earn a decent living while staying here.'***—Male local resident, age 28, contract worker at SLHEP, Bodoti Village, Dhemaji (Field Interview, 2024).

Ideally, from the lens of just transition, the dam should be a significant source of employment and development. It has provided stable incomes to some of the households in few subdivisions of Dhemaji, mainly Gogamukh, Subansiri, Dhemaji, and very few from Sissiborgaon where industrial development was previously limited.

In this context, a construction worker narrated his side of the story saying, ***'Before the Subansiri hydel power project I worked outside the state leaving my family here for uncertain jobs and unstable wage structure. Since joining here, I have acquired skills and started managing machinery. Now, I have my own house, I am staying with my family, bought a bike and our standards of living have risen. That is all I have always wanted to secure for a better future.'—***Male local resident, age 39, construction worker at SLHEP, Bhebeli gaon, Dhemaji (Field Interview, 2024).

Workers employed here will be provided with an employment certificate facilitating future job prospects such as involvement in the construction of the Dibang Hydropower Project in Arunachal Pradesh after SLHEP is completed. This aligns with the principles of the International Labor Organization (ILO) which emphasises labour rights, social protection, empowerment of marginalised communities and a just transition framework to ensure that 'no one is left behind'. NHPC has been employing workers for various types of work related to dam construction namely drilling, welding, bar bending, scaffolding, machine mechanical works, plumbing, and support and security staff. People who had previously worked outside in construction and plumbing have been absorbed here as contractual workers with wages ranging from ₹18000-₹22000 per month. Recently, the Government of Assam has launched initiatives for skill development through the Nirman Sakhi Portal (https://abocwwb.assam.gov.in/) where locals can register to receive training and certificates. Additionally, skill development training centres have been established in the Gogamukh region. Individuals completing these courses have been awarded certificates which may help them in securing opportunities in the construction of the upcoming Dibang Hydroelectric Power Project in Arunachal Pradesh. Around 7500 people have been employed by NHPC in the construction of dams (Gupta & Ojha, 2022).

However, a key question remained--does the SLHEP promote long-term employment opportunities in renewable energy by fostering skill development and workforce advancement? In this context, it is important to recognise that permanent and technically specialised roles in large hydropower projects necessarily require formal education, certified training, and specific technical competencies. As with any large infrastructure project, NHPC is mandated to employ skilled personnel who meet established professional and safety standards. To date, local engagement has largely taken the form of contract-

based employment, which, while providing short-term income support. Workers involved in the project are unable to find other jobs once the work is completed. Additionally, workers lack the skills required to transition into different fields. They are either returning agriculture or waiting for better job prospects. Mostly people living near the construction site have benefitted from it, but it is short-lived. SLHEP has provided only temporary and ad-hoc employment, and people worry that after the dam's commissioning, outside workers might take over maintenance work. This will leave local people behind especially with the fear that they might speak out if any internal issues arise. This questions inclusivity which is an integral part of just transition. While some anticipate future employment opportunities, some are disappointed with the present scenario as well. They said, ***'NHPC employs engineers and many workers from outside the region with their focus primarily on generation of hydroelectric power. These often neglect the concerns of local communities'***—Male members, age 38-47, local residents from Gogamukh area, Dhemaji (Field Interview, 2024).

In this context it becomes clear that the opportunities created by the project are largely confined to those living near the dam, primarily from Dhemaji district, though very limited. Residents from Lakhimpur, on the other hand, are notably excluded from these opportunities, despite being located downstream and bearing the brunt of the project's impacts. This disparity highlights a stark injustice, as those most affected by the dam's presence are the ones least involved in its economic benefits. A local worker at the construction site also said, ***'Once workforce was around 6000, but hardly few are from the local area'***— Male local resident, age 46, former contract worker, Gogamukh, Dhemaji (Field Interview, 2024). These perspectives point to the importance of complementary investments in education, vocational training, and skill-building initiatives across the region to ensure that local communities are better positioned to participate in the long-term employment opportunities associated with large renewable energy projects, in line with the inclusive objectives of a just transition.

Safety of the workers is also a concern. The death of workers at the site was rarely reported. Many workers spoke of the deaths that occurred on-site, ***'Most of the time a labourer dies it doesn't come in the news. We see an ambulance and understand that one or two people might have passed away'***—Male worker, age 35, construction labourer at SLHEP, Gogamukh, Dhemaji (Field Interview, 2024). Although long-term employment trajectories are still evolving, the project has

generated early positive momentum. With appropriate planning and targeted interventions, there is considerable scope to ensure that communities in both upstream and downstream regions benefit more fully and equitably from the project over the long term.

4.2.3 Infrastructure development

The construction of a large hydropower project is often accompanied by significant investments in infrastructure, including roads, bridges as well as improvements in healthcare and educational facilities, and the promotion of tourism. These developments create a strong foundation for regional growth. At the same time, there remains scope to further strengthen targeted transportation initiatives in the rural areas of Dhemaji and Lakhimpur to ensure that these broader infrastructural benefits are more evenly realised across the region. Many residents said, ***'We have been only hearing about electricity generation. But what we mostly need is better roads and good health care and educational facilities'***— Local villagers both male and female, age 37–43, Kadam gaon, Lakhimpur (Field Interview, 2024).

This statement highlights the disproportionate distribution of benefits in the areas that are affected the most. Even accessibility and connectivity to the project site is poor.

People from the Dhemaji Development Block 47 km from SLHEP were reluctant to commute to the project site owing to difficult road conditions and the lack of reliable transportation options. Due to the lack of transportational facilities, locals residing within 20 km of the project site are being employed and further downstream economic viability of the project remains uncertain.

4.2.4 Ecological impacts

People are grappling with the far-reaching consequences of hydropower construction, where large-scale projects often spark violence, agitation, and ongoing protests. Local communities fearing displacement, environmental degradation, and loss of livelihood, view these developments with deep apprehension. In this context, a 'just transition' could easily turn into a violent one. The construction of the Subansiri Dam in particular has triggered serious ecological, economic, and livelihood concerns, highlighting the urgent need for sustainable solutions.

The direct impact of this project is noticeable in the downstream areas of Lakhimpur where vast stretches of land are washed away every year with the increasing water level of the river. Rather than replenishing river water, floods now deposit large quantities of sediments creating a tremendous decline in water depth. The fragile ecosystem, being highly sensitive to these changes, has seen a reduction in fish populations which were once in abundance. Prolonged sedimentation has even affected the growth of trees that supported fish breeding. Boulder extraction from the foothills has worsened sedimentation. Gangetic dolphins now classified as 'endangered' in the IUCN Red List of threatened species were once found in abundance in the Brahmaputra and its tributaries. Locals have reported the disappearance of these dolphins from certain sites in river Subansiri.

'The Subansiri region in Arunachal Pradesh, being situated on soft sedimentary rocks, is more susceptible to earthquakes and unsuitable for large dams.' This statement was highlighted by an academic expert who said, ***'The sand in the area lacks the hardness required for such projects. While Arunachal Pradesh experiences minimal flooding, downstream areas in Assam would face severe flood-related challenges.'*** She noted that stronger coordination between the governments of Assam and Arunachal Pradesh could further improve outcomes and help address the challenges observed. While flooding is a major concern during the monsoons, a contrasting scenario prevails during the dry spells in a few villages within the Kadam Circle of Lakhimpur. As the interview continued, we came to know that the water level here has been decreasing since 2005, and the river here is now referred to as 'Mora Subansiri'- (dead Subansiri). People of this region, however, feel fortunate in a bitter sense as floods don't sweep away their belongings, cattle, and shelter anymore. Now they only mourn the loss of the water supply that once supported their livelihood.

The immediate impact of heavy showers is widespread in downstream areas when dam gates are opened as a necessary safety measure due to higher water discharge. When the decision to open the of dam gates is made, initial information is sent to the Circle Office by the NHPC. The NHPC then conveys the message to the respective village heads. However, there is a time lag between the being warning sent and received. Many villagers of Lakhimpur district of Assam expressed their anger while speaking about the flooding and the devastation as the warning comes too late from the Circle Office: ***'... by the time we get the information about a flood, the water level has already started to rise'—***Local

villagers, both male and female, age 37–52, farmers from downstream flood-prone area of Lakhimpur (Field Interview, 2024).

Villagers are left with nothing except for the damage that has already been done. They continued with frustration, ***'when we get the news, flood has already started sweeping away our homes, our cattle, our belongings, our everything and leave us with hopelessness, fear that we were never prepared for'***—Female resident, age 52, flood-affected villager from Naharani village, Lakhimpur (Field interview, 2024). These delays reflect the challenges of managing dynamic and recurrent risks, where responses are often initiated after events occur. Strengthening anticipatory and preparedness-based approaches offers an opportunity to reduce repeated emergency situations for affected communities. Placing greater emphasis on proactive planning can help ensure that vulnerable households are better protected and supported during recurring events.

4.2.5 Compensation and rehabilitation

Though the official figure shows 38 households displaced, the actual figure is more. Land Watch Conflict highlights that a total of 10433 hectares of land comprising 125000 households and a population of 600000 people have been affected by this project so far. As discussed earlier, the dam's construction has caused environmental degradation including flooding, sedimentation, and the destruction of ecosystems vital for local agriculture and fishing practices. Promises of financial compensation and additional social security benefits were reported as not being met. Many villagers said in interviews***, 'We have received no support from the agriculture department, and it feels like we're just being left in the dark. We're still waiting, but so far, nothing has materialized'***— Group of villagers, mainly male members, ages 47–55, flood-affected farming households, Kadam Gaon, Lakhimpur (Field interview, 2024).

Where floods have swept over the land and homesteads, a compensation of ₹95,000 per household was provided by the government to help them recover from the losses incurred in agriculture, housing, and other necessities. The NHPC has been undertaking riverbank protection measures up to 30 km downstream. Additionally, the Council office has requested the NHPC to build embankments to reduce the impact of soil erosion and flood. However, these embankments often get damaged after each flood despite repeated repairs. Instead of providing long-term solutions, vulnerable people are exposed to another period of flooding. At

present, geo bags are being supplied to control erosion of the embankments (Figure 20).

Local and political institutions have periodically extended relief support by distributing essential items such as potatoes, pulses, onions, and mustard seeds to assist farming households during times of need. These interventions play an important role in providing immediate support. At the same time, community feedback suggests that there is scope to strengthen the consistency, coverage, and transparency of relief distribution to ensure that assistance reaches households in a more equitable manner. Many fishermen of Lakhimpur said, ***'They moved us to a new area but left us with nothing to earn a living. We were told that relocation would make our lives better, but this was a way to isolate us in an area where infrastructure is poor and jobs are nil'***—Male respondent, age 48, Takugaon, Lakhimpur (Field Interview, 2024). This testimony highlights the importance of further strengthening rehabilitation efforts to better respond to the needs of displaced communities. Enhancing infrastructure provision, livelihood support, and access to essential social services would significantly support affected households in rebuilding their lives. Addressing these areas presents an opportunity to reduce distress, foster social stability, and reinforce a sense of inclusion and trust among communities impacted by the Subansiri dam project (The Sentinel Assam, 2022; The Times of India, 2024; The Assam Tribune, 2025).



Figure 20: Geo bags deployed to prevent bank erosion and reinforce embankment stability

4.2.6 Access to resources and services

With the construction of the dam, the NHPC has undertaken various activities to promote development and ensure better wellbeing of the people. Two schools, Kendriya Vidyalaya in Gerukamukh in Assam and Vivekanand Kendriya Vidyalaya in Arunachal Pradesh, have been set up. However, access to these facilities has been shaped by formal admission procedures, which primarily prioritise children of government employees. Expanding inclusion mechanisms could create opportunities for a broader section of the local population to benefit from these services.

NHPC has initiated several welfare-oriented programmes aimed at improving health and well-being in project-affected regions. Notably, the SPANDAN initiative i.e. mobile medical units staffed with doctors, nurses, and paramedical personnel has been reported to operate across five districts of Assam, namely Dhemaji, Lakhimpur, Sonitpur, Biswanath Chariali, and Majuli. Such initiatives reflect an institutional commitment to strengthening healthcare access in remote and underserved areas. At the same time, insights from field interactions suggest that awareness and visibility of these services at the local level may vary. A field investigator from Dhemaji indicated that neither she nor members of her household had directly encountered the mobile units, and similar observations were shared by participants during the consultation workshop, who expressed expectations for more consistent on-ground presence of these services. During the field visit, no mobile medical units were observed, pointing to the need for improved communication, monitoring, and outreach to ensure that intended beneficiaries are able to effectively access these facilities. In addition, NHPC's KALASH programme, designed to provide safe drinking water in the districts of Dhemaji, Lakhimpur, Sonitpur, Narayanpur, and Majuli, represents a proactive step towards addressing basic service needs. Field-level feedback, however, suggests that in some locations the presence of high iron content in water sources has affected usability, indicating a need for additional treatment measures and technical refinement.

Overall, while these programmes demonstrate positive intent and institutional engagement, aligning reported initiatives with consistent on-ground implementation and local conditions would further enhance their effectiveness. Strengthening transparency, feedback mechanisms, and adaptive

implementation can help maximise the long-term impact of NHPC's development efforts and reinforce trust among local communities.

4.3 Procedural justice: Ensuring fair processes and participation in decision-making

Since 2005, during dam construction, households have been struggling with two main types of procedurals (in) justice, namely insufficient access to information, lack of participation in the decision-making process.

4.3.1 Insufficient access to information

Across the research sites, respondents indicated that opportunities for engagement with NHPC were perceived as limited, particularly with respect to access to information on project design, implementation processes, and potential impacts. When the protest around the dam was in full swing between 2011 and 2014, these information gaps became more apparent and contributed to community concerns. Several residents expressed that they would have benefited from earlier and clearer communication regarding the project's broader implications, as well as more structured avenues for participation in decision-making processes. Similarly, during the initial phases of dam construction, access to Environmental Impact Assessment (EIA) documents was limited, reflecting procedural constraints that shaped information flow at the time. These experiences point to the importance of strengthening transparency, timely information dissemination, and inclusive communication mechanisms to foster greater trust and collaboration between project authorities and local communities. In this context an NGO worker from Lakhimpur village said ***'When we look at the past, the lack of access to information was a huge issue for the local communities. Without internet or proper means to distribute EIA documents, the people were kept in the dark about the impacts of the dam. Even now, during emergency situations like the opening of the dam gates occur; news reaches the villagers far too late, leaving us vulnerable and unprepared. This continuous information gap remains a significant barrier to effective participation in decision-making processes.'*** These experiences highlight the importance of timely and accessible information in enabling communities to better anticipate and prepare for potential risks, such as flooding or changes in river flow. Strengthening early communication and information-sharing

mechanisms would enhance local preparedness and support more resilient community responses.

4.3.2 Lack of participation in the decision-making process

'We are no one. Nobody comes here; no one asks what needs to be done. We are abandoned. Decisions are being made from top, and we are forced to accept'—Male farmer, age 50, resident of Kadam Revenue Circle, Lakhimpur district (Field Interview, 2024). He stated that current top-down processes invisibles local people and their needs, reflecting the deep sense of marginalisation and powerlessness felt in downstream Lakhimpur. The Subansiri River mainly flows through Lakhimpur after it enters Assam and as such, river flow changes post dam construction affects the villages of this district. Villagers who depend on the river for their livelihoods regularly navigate challenges arising from fluctuating water levels. While efforts are made to communicate these concerns to higher authorities, strengthening consistent and responsive engagement mechanisms would further support timely attention to local needs and enhance livelihood security.

Limited avenues for dialogue have underscored the need for more inclusive consultation processes. Since the project's inception, affected communities have raised concerns regarding agriculture, fisheries, and downstream safety, particularly given the dam's location in a landslide-prone region. These concerns were also echoed by academicians during the consultation workshop- ***'The instability of the terrain can potentially affect the dam's structural integrity, leading to catastrophic consequences. Furthermore, while the upstream areas may be relatively safer, the downstream regions are at a higher risk of flooding, which could submerge entire villages, agricultural land, and disrupt livelihoods. The lack of comprehensive studies to address these specific geological concerns raises significant doubts about the long-term safety of the project.'***

Over time, the collective mobilisation around the project gradually lost momentum, leaving many community members feeling that consistent leadership and representation were no longer readily available. Several villagers expressed a sense of uncertainty about whom to approach to discuss everyday challenges related to land, livelihoods, and safety. These experiences highlight the importance of sustained, non-disruptive communication channels and locally grounded support mechanisms to ensure that community concerns are addressed in a timely and continuous manner.

4.4 Recognition justice: Acknowledging rights, identities, and cultural significance

Issues of recognition justice are also visible in downstream Lakhimpur where indigenous communities reported feeling abandoned prior to and post dam construction. During the survey we identified two main issues related to recognition (in) justice: lack of representation and non-recognition, and sense of abandonment.

4.4.1 Lack of representation

People living by the Subansiri river have been grappling with fear and uncertainty. During protests, many activists voiced their concerns regarding the far-reaching environmental impacts which now seem to be true. A river activist and a social researcher in Karpunpuli gaon of Dhemaji district said, '***There were public hearings; representatives from the local community were also there. But their perception on the real implications of the dam's construction was generally lacking. Some of them were invited to the NHPC offices to dine. They came back as spokespersons showing up the ideas they could not understand. The NHPC officials attended meetings, signed papers and acted in a way as if local communities were elaborated and consulted in the decision-making. However, reality is different; local communities were pressurised to speak for the dam.'***

Attempts made by higher authorities to involve people from local communities appears to be an illusion. Had there been representatives who were well educated and had a better understanding of the consequences, they would have become the actual voices of vulnerable communities. Educated activists were few at the time, and they could not afford the money for legal proceedings. Villagers also said that the lack of representatives who could bring everyone together and voice their concerns was the missing link between decision makers and local people.

4.4.2 Non-recognition and sense of abandonment

The villagers in Lakhimpur are dependent on the rivers for their livelihood. The indigenous communities have reported a lack of acknowledgement and disrespect for their rights. The river Subansiri has dried up in places and there is flooding at others. These contrasting scenarios force them to face challenges regularly and repeatedly. The diversion of the river water upstream has affected places as far as 60 km downstream. A dam which was primarily constructed with

the aim of controlling floods has instead intensified them. People downstream, mainly fishermen and farmers, opposed the construction of the dam. However, they were never consulted. As a result, their real problems remain buried under the development this hydro power project could bring. ***'Our community depended on the river and would continue to depend on it if it remains alive. They (NHPC) came here, built the dam but never asked for our needs. We also protested, filed our petitions, but education was important, which we lacked. Now we feel the consequences only. Previously, floods were there, it has always been beneficial for us, but now we are sceptical about floods. It might appear at any time. We have no powers, and we are abandoned.'***—A fisherman in Balibheta village of Lakhimpur.

This sense of powerlessness and abandonment is a larger reflection of the marginalisation that questions the prevalence of recognition justice. While interviewing a 35-year-old female member in Naharani village of Lakhimpur she asked, 'Are you reporters? Please show our condition on your channel. No one had ever visited this village to talk to us. You are the first one who is listening to us.' Her words conveyed a sense of distance from institutional support systems, alongside a continued hope that wider attention would encourage greater responsiveness. These experiences underscore the importance of strengthening inclusive engagement and communication mechanisms so that diverse community voices are meaningfully acknowledged within the broader pursuit of sustainable development and a just transition.

This chapter explored the experiences of downstream communities in the Dhemaji and Lakhimpur regions in the context of the impending completion of India's largest hydroelectric power project, the SLHEP. As India advances towards its net-zero emissions target by 2070, hydropower occupies an important place within the country's energy transition. Against this backdrop, the chapter examined how distributive, procedural, and recognition dimensions are reflected in the lived experiences of communities in the two districts where project impacts are most pronounced. Together, the findings underscore that the outcomes of large hydropower projects are shaped not only by energy objectives, but also by how benefits are distributed, participation is enabled, and local realities are acknowledged in practice.

05

Discussion, Policy Pathways, and Way Forward



5 Discussion, Policy Pathways, and Way Forward

5.1 Hydropower, livelihoods, and local development

The study of the Subansiri Lower Hydroelectric Project (SLHEP) illustrates India's broader efforts to advance its energy transition while engaging with the socio-economic contexts of communities living in the project's downstream regions. As a major renewable energy initiative, the SLHEP contributes to national objectives of expanding clean energy generation, reducing dependence on fossil fuels, and supporting a low-carbon development pathway. At the same time, the study highlights the importance of integrating livelihood enhancement, social inclusion, and community resilience into large infrastructure projects, ensuring that energy transitions are both environmentally sustainable and socially responsive.

Addressing the first research question - how the SLHEP has influenced downstream livelihoods and migration dynamics - the findings suggest that migration from districts such as Dhemaji is shaped by long-standing structural factors, including limited local employment opportunities and recurring climate-related stresses. Migration, particularly among young men, remains an important livelihood strategy, enabling households to diversify income sources and strengthen financial security through remittances. These remittances play a constructive role in improving household well-being, supporting education, agricultural investments, and adaptive capacity in flood-prone areas.

Within this context, the SLHEP has demonstrated its potential to contribute positively to local employment, particularly during the construction phase and during periods of economic disruption such as the COVID-19 pandemic. The provision of temporary jobs offered valuable income support and helped many households cope with uncertainty. These experiences point to the scope for further strengthening the project's role in fostering local economic development through longer-term employment pathways, skill development initiatives, and stronger linkages with regional labour markets.

The findings suggest that by expanding post-construction employment opportunities, enhancing skill-building programmes, and supporting complementary economic activities, projects like the SLHEP can play an important role in reducing distress-driven migration and supporting more resilient local livelihoods. Such measures would further align renewable energy development

with inclusive growth objectives, ensuring that downstream communities benefit more fully from India's sustainable energy investments as the country continues its transition toward a greener and more resilient future.

5.2 Local economic development, infrastructure, and distributive justice under the SLHEP

The second research question examines whether the Subansiri Lower Hydroelectric Project (SLHEP) has contributed to local economic growth and infrastructure development while promoting transparency and community participation within a just transition framework. This section analyses the distribution of benefits and responsibilities associated with energy generation and employment creation through the lens of distributive justice (Figure 21). Although the project is yet to be fully commissioned, early field-level observations provide valuable insights into how communities are engaging with and experiencing the project during its implementation phase. These observations point to several positive outcomes, while also highlighting opportunities to strengthen longer-term and more inclusive development impacts.

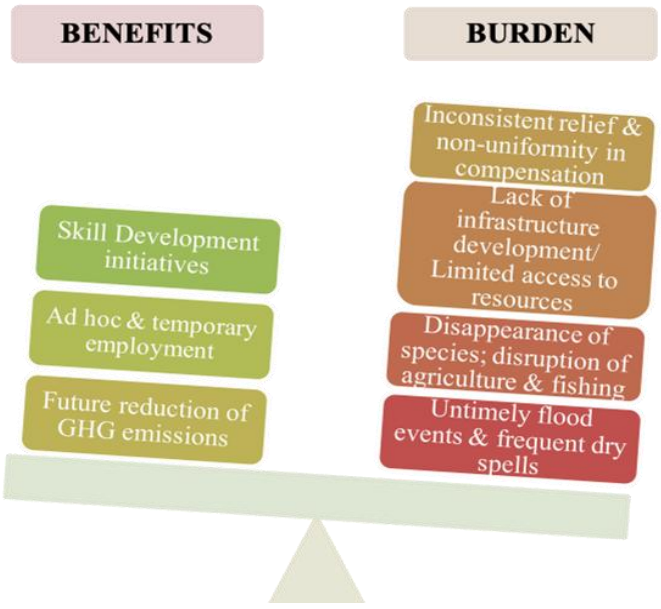


Figure 21: Distributive justice dynamics in the context of the SLHEP
Source: Prepared by authors based on field data, 2024

Large hydropower projects such as the SLHEP play an important role in supporting regional and national energy needs, contributing to industrial growth and urban development. At the same time, the findings suggest scope for further strengthening access to affordable and reliable electricity for rural and remote

communities, particularly those located near the project site. Enhancing local access can increase the developmental co-benefits of hydropower investments and reinforce their contribution to inclusive growth.

Employment generation during the construction phase has provided valuable short-term income opportunities for local households. These experiences highlight the potential for expanding skill development, training, and certification initiatives that can support more durable livelihood improvements and long-term job security. As the project moves toward completion, targeted workforce transition measures could help local workers access stable employment opportunities within the energy sector and related industries.

The experiences of project-adjacent communities also underscore the importance of managing environmental and livelihood considerations alongside development benefits. Strengthening compensation mechanisms, environmental safeguards, and adaptive management practices can help ensure that project-related impacts are addressed in a balanced and context-sensitive manner (Castro-Díaz et al., 2024).

More broadly, addressing underlying regional challenges such as gaps in education, livelihood diversification, and infrastructure can enhance the long-term contribution of hydropower development to community well-being. While large infrastructure projects often respond effectively to immediate development needs, integrating longer-term resilience and sustainability considerations can significantly strengthen their role in supporting inclusive and durable socio-economic outcomes.

5.3 Strengthening procedural and recognition dimensions of a just transition

The findings highlight the diverse ways in which procedural and recognition dimensions of a just transition are currently experienced by communities in the project region. Figure 22 illustrates the interconnected factors that shape decision-making processes, particularly for marginalised groups, and offers useful insights into how governance systems can be further strengthened. The analysis underscores the importance of enhancing access to information and expanding participatory opportunities, both of which play a critical role in building community resilience and enabling more meaningful engagement in decisions that affect everyday lives.

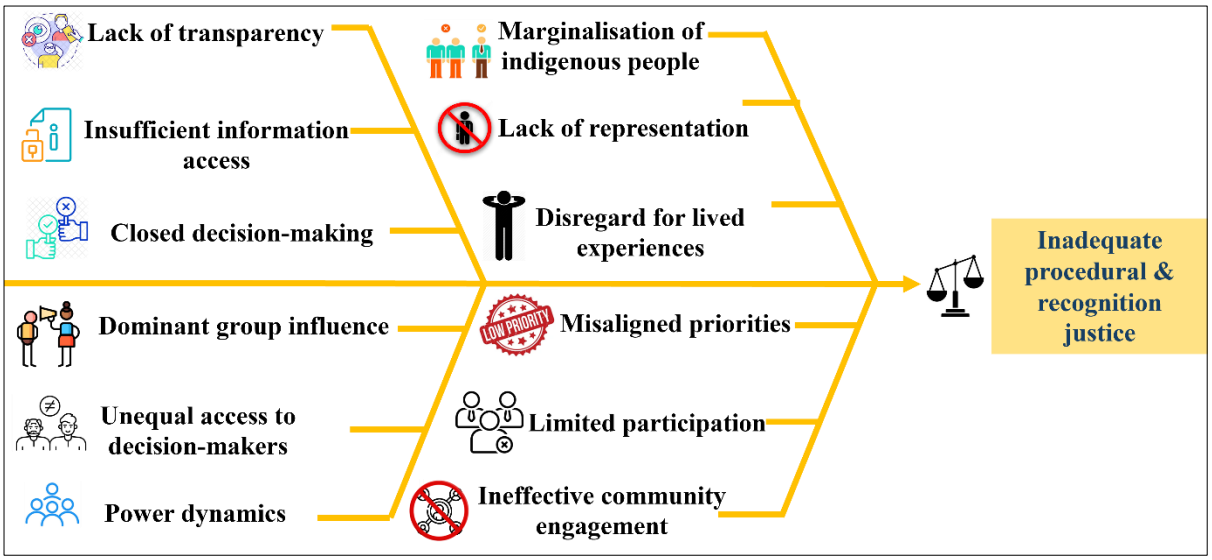


Figure 22: Barriers to a just transition

Source: Prepared by authors based on field data, 2024

From a procedural justice perspective, the findings suggest that transparent communication and inclusive participation are central to enabling effective engagement by all community groups. Where access to information and consultation mechanisms can be further strengthened, particularly for vulnerable populations, there is significant scope to improve trust, collaboration, and shared understanding. Differences in access to decision-making forums and institutional processes may influence how various groups engage with project-related discussions. Addressing these gaps through clearer communication channels, structured consultation platforms, and regular dialogue can support more balanced and equitable participation. Such measures are consistent with the broader objectives of a just transition, which seeks to reduce social inequalities and ensure that development processes are inclusive and fair (Heffron & McCauley, 2018).

The findings also highlight the importance of recognition justice, particularly in relation to indigenous and marginalised communities in Dhemaji and Lakhimpur districts (Figure 22). These communities possess valuable local knowledge and lived experience of environmental change, including flooding and climate variability. Strengthening mechanisms to recognise and incorporate these perspectives can enhance the effectiveness and legitimacy of development interventions. Community members acknowledge that flooding has complex impacts, including both challenges and benefits, and express a desire for flood

management approaches that are better aligned with local priorities and practices.

Enhancing recognition and participation can help bridge gaps between planning assumptions and on-the-ground realities, enabling policies and projects to respond more effectively to community needs. By fostering inclusive dialogue, valuing local knowledge, and strengthening institutional engagement, just transition processes can move beyond conceptual frameworks toward practical, context-sensitive implementation. Such an approach not only supports fairness and equity but also contributes to more sustainable, trusted, and resilient development outcomes.

In Table 5, we have summarised the key issues through the just transition lens, examining the status quo and the potential advantages of the SLHEP.

Viewed through a just transition lens, the SLHEP demonstrates significant potential to contribute to economic development, infrastructure expansion, and India's broader clean energy objectives. The analysis highlights how the project has already generated important opportunities, while also identifying areas where its long-term developmental impact can be further strengthened. In particular, expanding pathways for sustained employment, enhancing gender-responsive approaches, and deepening community engagement can help ensure that the benefits of hydropower development are more widely and equitably shared.

By prioritising long-term livelihood creation, inclusive participation, and social equity alongside energy generation, the SLHEP can further align with the principles of a just transition. Strengthening mechanisms that amplify the voices of marginalised groups and integrating local knowledge into decision-making processes will enhance both the effectiveness and legitimacy of project outcomes. Through such adaptive and inclusive approaches, the SLHEP can serve as an important example of how large-scale renewable energy investments can support not only India's energy transition, but also more resilient, fair, and inclusive development pathways for all stakeholders involved.

Table 5: Key issues through the just transition lens

Just Transition key Issues	**Scenario**	
	Status quo	*Advantages of construction of hydro power under NHPC*
Economic diversification and creation of job opportunities	1. **High** rates of **unemployment** 2. **Lack** of **diverse industries** 3. **Temporary work** in agriculture	1. **Creation of construction** work to operational roles and support services in Gogamukh and nearby areas. 2. **Absorption of 80%** of the working population **during COVID-19 pandemic** ensuring higher work security
Equity and inclusivity of affected workers to ensure justice		
Equity at workplace	1. **Same work, unequal pay**: Low wages compared to workers in places like Kerala, Bangalore, or Mumbai. 2. **Delays in receiving wages**, creating financial insecurity and making local jobs less attractive	1. **Same work same pays**: no discrimination based on wage rate. 2. **Timely payment** facilitating financial security 3. **No women engagement**, women are not even allowed near the project work.
Equity to access to basic amenities	1. Inequality in access to basic amenities. 2. Presence of Jal Jeevan Mission pumping station. However, **water for daily use** has high **iron content**, making it **unfit** to use in **agriculture** and in rural areas. Condition is relatively **better** in the **urban areas**. 3. **Moderate** condition of **health facilities**, though hospitals are far off. 4. **Road** condition is **poor**. Rills, gullies pose a problem in connectivity during the monsoon	
Attainment of energy justice	**Irregularity in power supply** in city areas of the district, while **rural households lack electrification**	1. **Hydropower** is expected to meet **local and regional electricity demands**, supporting both residential and industrial growth. 2. Support **new economic activities**, attract **small industries**, and **improve** the overall **standard of living** in the region.

Just Transition key Issues	Scenario	
	Status quo	*Advantages of construction of hydro power under NHPC*
Sustainable agricultural practices	1. **Frequent soil erosion** and **devastating floods** due to unpredictable rainfall patterns. 2. Increasingly **unstable** nature of **agriculture** and **declining productivity** due to flooding. 3. **Agriculture-**a **less viable** source of livelihood, leading many to seek **alternative employment** opportunities in other regions.	1. Post completion of lower Subansiri project, the area is expected to undergo a **transformative change** with **access to more consistent irrigation** 2. Effective cultivation will contribute to **food security** and **increasing agricultural productivity** across the district.
Labour support and human resource development	**1.** **Self-skill acquisition** of **migrant** workers supported **new businesses** in fisheries, farming techniques, bartending, brick making, fabric manufacturing, and work in pipe companies. **2.** Construction of a **skill training centre** set up in February 2024 under the **initiatives of the Government of Assam in Gogamukh** being trained by **Larsen & Tourbo construction company**. The centre aims to provide a skilling programme on construction, plumbing, painting, making floors, carpentry, installation of solar equipment and electrical wiring.	**Skilled and temporary** labourers associated with **construction and drilling in Subansiri hydel power** plant will be provided with a **certificate** post completion of the work which would enable them to apply to other hydropower plant sites, preferably the Dibang Multipurpose Project (DMP) in Arunachal Pradesh.
Inclusive and participatory decision-making process	1. **Discrimination** regarding participation in decision making process. 2. The indigenous Mishing people are generally not considered. **Their voices remain unheard**.	**Not applicable**

5.4 Future policy directions and actions in the context of just transition

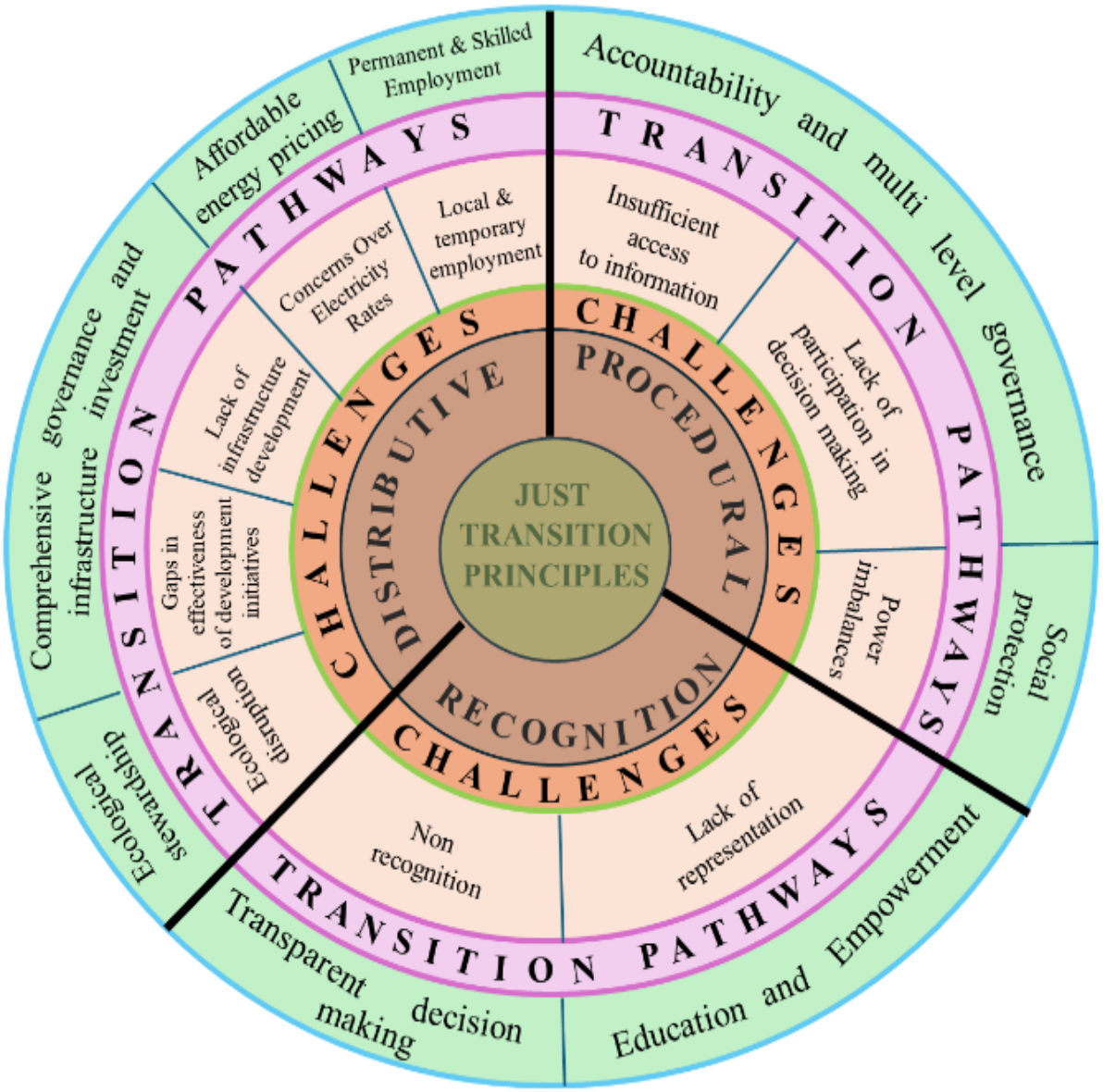


Figure 23: Challenges and pathways of just transition
Source: Prepared by authors based on field data, 2024

Building on the third research question, this section outlines future policy directions and actions that can strengthen just transition outcomes in hydropower-affected regions. The findings suggest that achieving a just transition requires an integrated policy approach that simultaneously addresses livelihood security, environmental sustainability, and inclusive governance. Figure 23 provides a conceptual representation linking justice principles, community-level

challenges, and policy pathways that can guide more equitable and sustainable development trajectories in the context of large infrastructure projects such as the SLHEP.

The analysis underscores the importance of embedding distributive, procedural, and recognition justice within the design and implementation of hydropower development. From a distributive perspective, future policies can further enhance the developmental impact of hydropower by ensuring affordable and reliable energy access for rural and project-adjacent communities, alongside broader investments in infrastructure that support job creation and local economic diversification. Expanding skill development and training initiatives can equip local populations with the capacities needed to engage in emerging economic opportunities, supporting long-term livelihood resilience and reducing distress-driven migration.

From an environmental and resilience perspective, responsible resource management and restoration of ecological balance are central to sustaining long-term benefits. Strengthening environmental safeguards, adaptive management practices, and local monitoring systems can help ensure that development outcomes remain aligned with ecological sustainability, particularly in climate-vulnerable regions.

Procedural justice emerges as a key enabler of effective and inclusive policy implementation. Strengthening multi-level governance mechanisms linking local, state, and national actors can enhance coordination and ensure that policy decisions reflect local priorities while remaining aligned with national energy and climate goals. Inclusive decision-making processes, supported by transparent information sharing and regular consultation, can foster trust and collaboration among stakeholders.

Recognition justice further highlights the importance of valuing local knowledge, lived experiences, and social diversity in shaping development pathways. Integrating social protection measures and targeted support for vulnerable groups can ensure that the transition process remains inclusive and responsive. Education, awareness-building, and community empowerment play a vital role in strengthening participation, addressing concerns, and transforming perceptions of large infrastructure projects. Together, these measures can help ensure that

future policies promote a just, inclusive, and sustainable energy transition that benefits both communities and the environment.

5.5 Conclusion

Hydropower occupies an important place within pathways toward a just transition, given its potential to support decarbonisation, energy security, and long-term development objectives. The experiences from regions such as Dhemaji and Lakhimpur demonstrate that the social and economic outcomes of hydropower development are closely shaped by how projects are planned, implemented, and embedded within local contexts. When social, environmental, and livelihood considerations are proactively integrated into project design, hydropower initiatives can generate broader and more inclusive development benefits.

The findings highlight that the pursuit of a just transition extends beyond emissions reduction alone. It represents a wider socio-economic transformation that reshapes livelihoods, institutional priorities, and development pathways. By aligning renewable energy investments with principles of equity, inclusion, and environmental stewardship, hydropower projects such as the SLHEP can contribute not only to climate mitigation goals but also to improved quality of life, strengthened local economies, and enhanced community resilience.

With inclusive planning, shared benefits, and responsive governance, the energy transition can become a catalyst for sustainable development creating pathways where economic progress, social well-being, and ecological integrity advance together. Such an approach ensures that both people and ecosystems can thrive alongside India's long-term climate and energy ambitions.

06

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Appendix I: Questionnaire

Dhemaji, Lakhimpur, Assam

Questions for the households:

1. For how many years are you staying in this village? (please ask about their history of settlement) What is the main livelihood activity of your family?

2. How do you assess the direct impact of climate variability (e.g., changing rainfall patterns, extreme temperatures) on agricultural productivity in your village over the last decade?

3. Which specific climatic events (floods, droughts, cyclones, etc.) have had the most significant long-term effects on the local environment and livelihoods? Please specify with examples and impacts.

4. What are the key push factors driving climate-induced migration in your village (e.g., crop failure, resource scarcity, livelihood loss)?

5. How many members from your family have been migrated due to climate-related issues, and what are the main destinations (urban, regional, international)? Provide migration patterns and trends over the past decade.

6. How would you characterise the type of migration predominantly observed (e.g., seasonal, temporary, permanent), and how has climate change influenced these patterns?

7. What role does gender play in shaping migration patterns in your village? Are men or women more likely to migrate due to climate pressures? Elaborate on intra-household decision-making.

8. How does climate-induced migration affect the social structure of the village, particularly in terms of population composition (youth, elderly, gender imbalances)?

9. What percentage of migrants return to the village after seasonal or temporary migration, and what factors determine their decision to return or stay away?

10. How has climate-induced migration affected the health and well-being of migrants and non-migrants in your village? Focus on physical and mental health, malnutrition, and disease prevalence.

11. Are there any observable increases in climate-related health risks (e.g., vector-borne diseases, heat stress) that have coincided with migration patterns?

12. What impact has migration had on vulnerable populations (women, children, the elderly) who remain in the village, particularly concerning food security and health?

13. Are there cases of "trapped populations" in your village who are unable to migrate despite severe climate risks, and what are the main barriers to their mobility?

14. To what extent do you think migration is a viable long-term adaptation strategy to climate change, or does it pose additional socio-economic risks? Evaluate based on observed migration outcomes.

15. How have remittances from climate migrants contributed to the resilience of households that remain in the village? Analyse the economic and social impact of remittances.

16. What role does education and skills training play in preparing potential migrants for life outside the village, particularly in terms of employment and resilience?

17. Are you dependent on this dam economically?

18. What other benefits did you receive till date?

19. Did the project bring any major developmental changes in this region? State what are those.

20. How is the access of electricity in this region?

21. Do you think hydropower would help in electricity generation in your area?

22. Do you have proper access to school, health care facilities, water, sanitation and transport?

23. The dam is constructed to control flood. Share your insights on this.

24. How is the irrigation facility developing after the dam construction?

25. Is there any displacement due to the dam construction?

26. How did the government address those issues of displacement?

27. Where are the displaced people rehabilitated?

28. Share your insights on compensation received and related discrepancies if any.

29. Did the dam boost agricultural productivity? (Detailed remarks)

30. Were you consulted before the dam construction?

31. What was your part in the conflict around dam construction?

32. Do you proper representation to hear your opinions? State your insights on this.

Questions for the officials, activists, social workers and academicians:

33. How effective have government policies or programs (such as drought relief, flood management) been in mitigating the drivers of climate-induced migration? Discuss national and local-level initiatives.

34. What institutional mechanisms are in place at the local level to manage migration flows due to climate change? Include government and community-based organizations.

35. How would you assess the` role of international or national NGOs in providing support for climate adaptation and migration management in your village?

36. Is there a formal framework in your region for recognizing climate refugees or internally displaced persons (IDPs), and how does it address the protection and rights of migrants?

37. What role do land tenure systems and property rights play in influencing migration decisions in the face of climate change? Consider both legal and customary land systems.

38. What long-term adaptation strategies have been employed by your village to reduce the vulnerability to climate impacts, and how effective have they been in curbing migration? Examples: community-based resource management, climate-resilient infrastructure.

39. What challenges does your administration face in managing climate-induced migration, and how do you plan to address them?

40. How can the impact of Subansiri be managed?

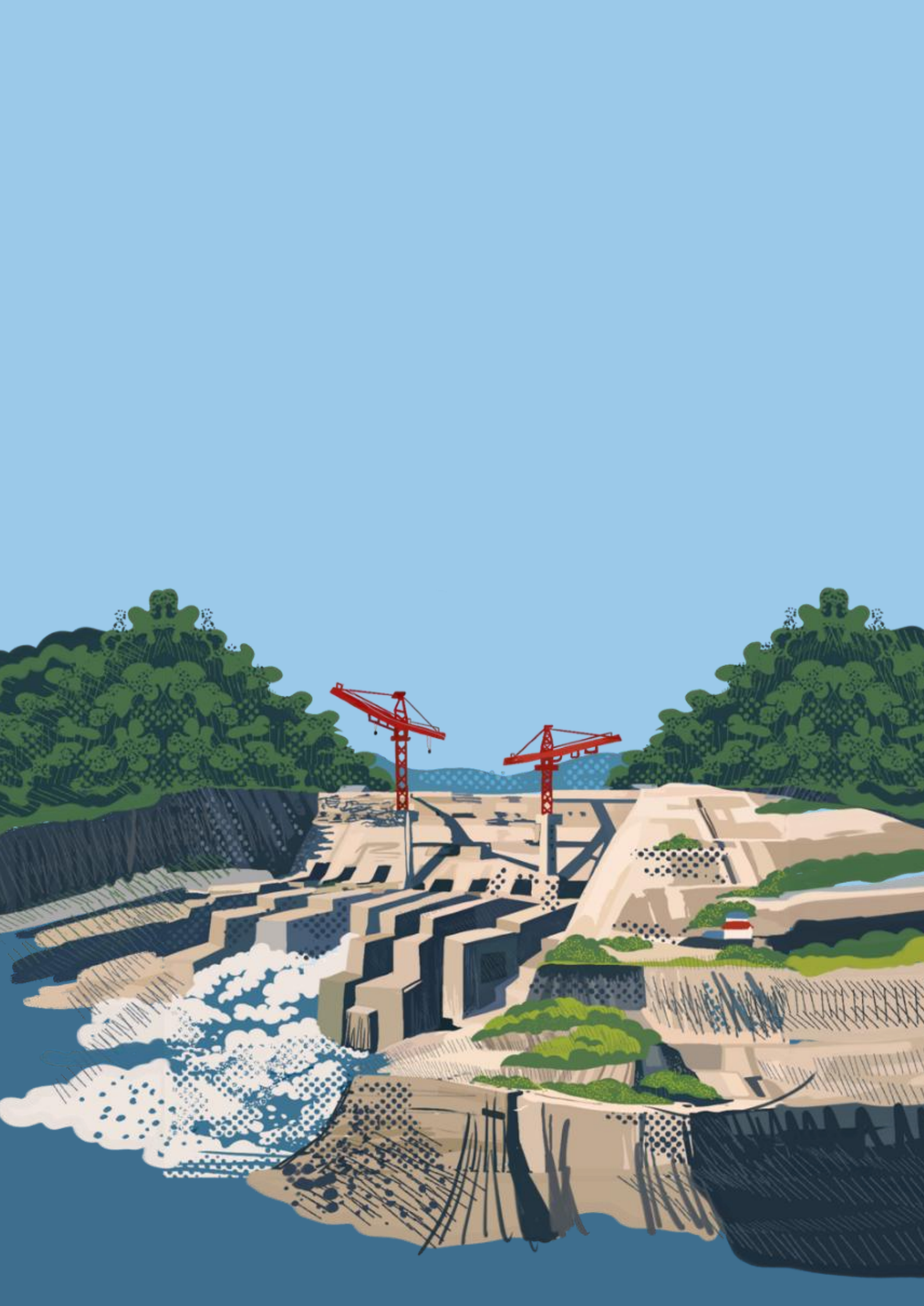
41. Hydel power has so much potential to deliver clean energy, but the negative impacts are greater. So, which source should be used now?

42. From an ecological point of view, what is a just transition?

43. How can you save the river when a major hydel power project is in operation?

44. What are the details of the conflict related to the construction of the dam?

45. The Brahmaputra has great potential to generate hydropower. How can we balance the need for clean energy and reduce environmental degradation while generating hydropower?



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