People’s Guide to Energy: Tehri Dam, Uttarakhand, India

Introduction

Standing over 260 metres high on the Bhagirathi river, a tributary of the Ganges, Tehri dam is one of the tallest dams in the world. It has been a part of India’s hydropower development plan since 1960, and under construction since 1978, with financial and technical assistance from the former Soviet Union[1]. It is also currently being expanded to include a pumped storage plant. However, the project spent several years in limbo due to fierce debates over its economic feasibility[2] and resilience to local geological activity[3] and flooding[4]. These concerns have led to criticism from environmental and social advocacy groups, and cases being filed in the Supreme Court[5].

In this paper, I focus on the experience of women through this tumultuous time by reviewing existing literature about the dam. Beginning with an overview of both the positive and negative material outcomes of Tehri dam, I will transition into an analysis of its impacts at a local level. This analysis relies heavily on interviews with women who were displaced by the construction, and utilizes theories of uneven development, energy sacrifice zones, and the gendered aspects of energy justice movements. I argue that such a large-scale transformation of the physical and social environment of these people has given rise to feelings of unfamiliarity and discomfort, along with a loss of culture associated with the geographic region. Moreover, there are significant gendered elements of this displacement, and women have experienced the relocation much differently than men. Many of these differences have not been taken into account in policy designed by the Government of India to calculate compensation for displacement and relocation. Given the complexity and reach of the dam and the networks associated with it, I will conclude
by touching upon some broader effects of the dam and by suggesting potential topics for further research.

**Water and Power**

Tehri dam is part of a larger hydroelectric project, the Tehri Hydro Power Complex, in the state of Uttarakhand, India. The complex is managed by the Tehri Hydro Development Corporation (THDC) and houses three major power projects:

- Tehri Dam & Hydro Power Plant (1000 MW)
- Koteshwar Hydro Electric Project (400 MW)
- Tehri Pumped Storage Plant (1000 MW)\(^6\)

Some major benefits of the project include flood moderation\(^7\); an increase in electricity generation capacity in North India by 2400 MW; the stabilization of existing irrigation over 604,000 hectares by the provision of a reliable supply of water and expansion of irrigation coverage to 270,000 hectares of previously uncovered land\(^8\); and a supply of 270 million gallons of drinking water per day to the national capital and Uttar Pradesh\(^9\), one of India’s most densely populated states. To get a sense of the scale and importance of this drinking water, consider the following: according to 2011 census data, Uttar Pradesh is home to roughly the population of Brazil residing in an area not much larger than the United Kingdom\(^1\). Of the water supplied, roughly 162 million gallons per day is supplied to Delhi, meeting the requirements of 4 million people, and 108 million gallons per day of drinking water is sent to the towns and villages of Uttar Pradesh, meeting the requirements of 3 million people\(^10\). However, especially in the city, water is not equally distributed. While Delhi receives 66 gallons (250L) of water per

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\(^1\)The Economist has created an excellent [interactive map](http://example.com) that summarizes some key statistics about India, including GDP and population by state.
capita per day\textsuperscript{[11]} – comparable to much of Europe\textsuperscript{[12]} – from both Tehri dam and the Yamuna river, an estimated 40-50\% is lost from either theft or leakage through old pipes\textsuperscript{[13]}. From what remains, the actual availability varies from as much as 132 gallons (500 L) per capita per day to just 8 gallons (30 L) per capita per day\textsuperscript{[14]}. In the summer months, when water is especially short in supply, people in areas that have low or irregular connectivity to municipal water have to depend on expensive tankers\textsuperscript{[15]}. This lack of supply coupled with the cost of a water tanker, which is often prohibitively high for people in some parts of the city, makes access to adequate water nearly impossible for poorer people, and only widens the gap between those with regular access to the resource and those without.

As with many big infrastructure projects, Tehri dam is not without its deficiencies. If we turn our attention to the dam’s immediate vicinity, we find significant impacts on the loss of biodiversity in the lower Himalayas, a nontrivial carbon footprint from the production of methane by the decomposition of vegetation under the reservoir, and the ‘terraforming of a whole landscape’\textsuperscript{[16]}, all of which supplement the aforementioned risks of earthquakes, landslides and floods. Besides the alteration of the physical space around the dam and its associated networks there are also subtler, but equally important, social consequences. The most prominent issue at stake is the displacement and relocation of approximately 85,000-100,000 people as a direct consequence of the dam’s construction\textsuperscript{[17]}.

**The Women of Tehri Before Displacement**

As in much of rural India, the population displaced by the construction of the dam was mainly Hindu, organized by the caste system, and a patrilineal, patrilocal joint family formed the basis for organization of property and land\textsuperscript{[18]}. The mountainous nature of the area often dictated that villages were small, as were family holdings of land, which in turn made agriculture labor-
intensive, requiring the participation of all family members, irrespective of gender – a subsistence economy[19]. This allowed women and men to share many physical and social spaces in their everyday life. The small size of most villages and integrated working culture was an important factor in the creation of a strong sense of togetherness and community within a village, of which women formed a crucial part. One individual commented, “In our villages, women had freedom. We could go to any place, anywhere. Men and women used to work together in fields; they would go together to the forests.”[20]. It was also often the case that the men migrated to the plains for work and would send money back home, making the household and local community the domain of women[21]. This absence of men is part of what confers the identity of ‘stewards of the land’[22] upon women, in addition to many of their identities as mothers. It is this identity that some have argued make women more susceptible to any alteration in their environment, such as the kind caused by the construction of Tehri Dam, and also giving them a certain degree of ‘moral legitimacy’[23] while protesting any negative outcomes of the dam.

Aside from the ‘subsistence’ and ‘money order’ economies, a large portion of the population depends on forests for their livelihood[24], and local people claimed *haq-haqook* (traditional rights) and free access to these resources[25]. Forests were a source of fuel (wood), fodder, housing materials (timber, stones, roof slate), herbs and medicinal plants, and raw materials for agricultural equipment[26]. Since the household, and so also much of the forest-related work, was commonly seen as the domain of women, the presence of the forest served a dual purpose in promoting equality: it not only reduced the extent of women’s economic dependence on men by giving women control over valuable natural resources, but also created a social space, and thus a support system, almost exclusively for women. Both of these factors were key sources of empowerment and support for women in pre-displacement societies.
Yet another artifact of the small, tightly-knit village communities was a sense of security. People observed that “[day or night, there was no fear – in the village we felt secure,” and that “in the village [they] used to spend more time outside of the house than inside… There was no restriction and one could go anywhere.” Others noted that they felt entirely comfortable wearing their family jewelry out in the village and the forest without fear of being robbed. All these comments reinforce the feeling of familiarity and safety that residents felt their local community provided. Together with the beauty and quality of their physical environment, this sense of belonging also afforded people a general sense of wellbeing and a comfortable life.

**Consequences of Displacement**

No matter which narrative you follow, it’s nearly impossible to deny that the vast majority of people displaced had minimal to zero agency in the siting of the dam. Once the location of the dam had been decided, those living in the region that was to become the reservoir had no choice but to relocate – either by means of the monetary compensation they received for their land, or to the land allocated to them by the government. As a result, they all, in one form or another, experienced a kind of involuntary displacement. Here, a “temporary reordering of space, time, relationships, norms and psycho-social-cultural constructs” resulted in “dissonant culture” because of the destabilization of “routine culture.” Michael Cernea’s ‘Impoverishment Risk Reconstruction’ (IRR) model outlines some of the potential outcomes of improper displacement and relocation. These are landlessness, joblessness, homelessness, marginalization, social disarticulation, loss of access to common property and services, food insecurity, and increased morbidity and mortality. I will expand on the first five of these in relation to the lived experience of displaced women for the case of Tehri dam.
It is important to remember that the average family did not own a great deal of land, and therefore was not the recipient of the kind of compensation that would allow them to find a comparable quality of life elsewhere. Families were given the option of relocating to either two acres of rural land, or half an acre of land near an urban center[^32]. In either case, people faced high construction costs (since they had to pay for building materials that were earlier freely available in the forests), and were only given a possession certificate for the land rather than full legal ownership[^33]. This meant that they could not use their property as collateral on any bank loans they might need to offset the expense of relocating and building a new house. Furthermore, women were generally left out of the calculation for compensation since land ownership was in the name of the male head of the family. These policies also treated women who were divorced, deserted or widowed as independents and ineligible for compensation[^34]. The suppression of a woman’s legal power has also been seen at a broader, national level. For instance, only recently did a Delhi High Court clarify that women, too, could be the legal head of a Hindu Undivided Family (HUF) while there previously was ambiguity[^35]. The people who chose to settle in rural areas faced difficulties adjusting to a new culture of farming. Promised all basic amenities by the government, they struggle to meet the costs of water to irrigate their land[^36] – therefore deprived of yet another resource that was once free of charge. For those who did manage to meet the costs, it was only by switching from practicing a highly sustainable, diverse, crop rotation system to producing cash crops (commercial crops)^[37]. While these crops do increase the family’s income, the family now has to rely on the marketplace to purchase food rather than growing it themselves. They have been pushed into being more dependent on the market and being consumers in a money economy rather than utilizing forest resources in a sustainable, subsistence economy.
With the loss of forests and the labor-intensive agricultural practices came the loss of several elements of the preexisting social culture of the mountains and much of the equality that it promoted. Women have thus experienced ‘social disarticulation’ in the following ways. First and foremost is the decrease in significance of panchayats [local/village governments], especially during relocation to more urban areas. Since community organization once used to be within the purview of women, they experience a significant decrease in power as their voice is not just silenced, but deemed irrelevant. Women who are relocated to more rural areas with their families, often in the plains, experience an enormous shift in attitudes towards the expected gender roles regarding the workforce. In the mountains, there was relatively greater equality in the division of labour, whereas in the plains, women who participate in the workforce (whether working on the land, or seeking employment outside the home) are looked down upon as socially inferior\(^38\). Those who do conform to the new norms are made to be prisoners within their own homes, and those who resist the enforcement of these norms are labelled as outcasts for their pahadi [inhabitant of the mountains] culture. In both cases, the net result is a severing of ties with their immediate surroundings, leading many to a feeling of extreme isolation\(^39\). One study found that over half the women were illiterate, and all relied on agriculture in some form as a family occupation before displacement; and two-thirds changed dressing habits, three-quarters changed food habits, over 90% changed their celebration of festivals and other social events, and more than half changed their religious practices in some form after displacement\(^40\). Closer to the location of the dam, the situation isn’t much better. The locals did not get the benefits of development, and some villagers claimed that even their regular commute was impacted by the presence of the dam, since they had been denied passage through it\(^41\). All in all, we see modified physical and social landscapes, but against the will or liking of the local community.
What Happened in Between?

Let’s take a closer look at the period between pre- and post-displacement society. At Tehri Dam, we see that the concentration of the flow of resources into “chokepoints and bottlenecks”\(^{[42]}\) affords those who control these bottlenecks tremendous power over not only the immediate vicinity of the dam, but also the networks associated with it. The dam becomes a nexus of power in the form of wealth, water, and electricity – it converts the rich, physical resources of water in the Himalayas into highly desirable forms of energy. However, as we’ve seen this far, these physical networks and topographies are deeply tied to social networks and human geographies. Hence, the physical bottleneck is also a bottleneck of social power, and in this case the chokepoint is dictated in large part by the Government of India through the THDC.

In such a scenario, due to the entrance of interests external to the existing community, “land ceases to be a part of national space and becomes instead a series of miniature corporate spaces”\(^{[43]}\), minimizing any influence locals may have on their immediate surroundings. Gray Brechin, when speaking about the conversion of fossil fuels to material wealth, observed “natural wealth excavated from the depth and piled up on the surface”\(^{[44]}\). In the case of a dam, this idea is inverted: we are submerging a wealth of biodiversity and human culture in search of a wealth of energy, water, and money.

Especially in a mid-development country like India, which is trying to cement its place as a major global power and reach higher levels of development (a large part of which involves material development – whether in the form of public infrastructure or reliable energy networks), it is tempting to make the case against the wellbeing of small, local communities for the promise of more widespread economic growth and benefits to millions of people\(^{[45]}\). However, if we consider the fact that the rural communities around the dam have limited political, economic and
social power, we can see the area as an “energy sacrifice zone”[^46], where the interests of these communities are seen as less important and more easily given up. For one, many of the amenities (say in the form of electricity and water), come at the expense of the subsistence economy and local resource management. Further, many of the benefits of the dam are redirected away from the local region towards the city and more densely populated areas. If we view the impacts that the displacement has with a gendered lens, as we have done so far, these inequities are thrown into even sharper relief. Given that, in the absence of men and the presence of the local subsistence economy, women played an important role in organizing the social and political discourse of the region, and that expectations of gender roles varied from the mountains to the plains, the question of intention in situating the dam comes to the fore. Since the experience of dislocated women speaks to greater gender inequality outside of the pahadi culture, it is logical to wonder whether the location of the dam was selected by “seek[ing] to avoid communities that that are most capable of mounting an effective opposition,”[^47] as has been documented in cases of environmental injustice worldwide. If this is the case, then it could be that the dam was situated through the gendered expectation that there would be minimal resistance, and that any dissent could be easily silenced, bought, or otherwise kept in check.

As has been made clear by now, there are both merits and demerits to the Tehri Dam. However, we must keep in mind that “[i]n the process of developing a particular region, capital creates some of the very conditions that can mitigate against future developments”[^48]. In other words, there are unintended consequences to large development projects, which need to be well-considered from a “plurality of positions rather than singular, homogenous entity”[^49]. It is of paramount importance that of these perspectives must include the view that natural resources may not quite so ‘natural’ after all, and are instead ‘part physical entity, part social category’[^50].
Conclusion and Future Work

While examining the effects of Tehri Dam on the displaced population, we found that women were affected by relocation in significantly different ways than men. The dam acted as a chokepoint that altered not just the topography, but also the social geography of the surrounding region. Women experienced an increase in gender-based inequality through a variety of different means. Their economic freedom, expressive freedom, and political agency were limited due to the imposition of different gender norms, which restricted their ability to find work and form social and political networks, in their new communities. However, recognizing the failings of the current policies at the national level highlights the need for a more equitable system of relocation and compensation that acknowledges and acts upon the lived experiences of women. Some failings, such as the lack of water for irrigation on relocation land, are logistic and require the attention of state and federal governments. On the other hand, it is possible to improve the standard of living in a more local context as well. Promoting tourism\(^5\) in the area, and tapping into the skills of local artisans to develop cottage industries\(^6\) could attract revenue that would bolster the local economy, and help lay the groundwork for a more just distribution of wealth.

Besides the issues raised in this paper, a multitude of other facets of the dam may be explored to better understand the contexts within which the dam operates. These may include the desire to support a fast-growing economy at the national level, the use of water as a strategic resource between China, India, Pakistan and Bangladesh\(^7\), downstream environmental impacts on the Ganges-Yamuna system, improving water usage and providing equal access in the national capital\(^8\), and the religious significance of the Ganges river\(^9\).

References


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