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Trajectory of Development and Disaster in Garhwal Region

Aarushi Chandola

Department of Political Science, Ram Lal Anand College, University of Delhi, India

Email: aarushi.ps2019@rla.du.ac.in

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ABSTRACT

The formation of Uttarakhand in 2000 came hand in hand with a lot of expectations of region based governance and development which would be sensitive to ecological and social realities of the Himalayan region. Nonetheless, over the past twenty five years, Garhwal region in Uttarakhand has undergone a fast paradigm of infrastructural-based development that has seen development of roads, hydropower, urbanisation and growing pilgrimage tourism. Although such efforts have often been talked about in the context of economic growth and connectivity, they have brought new environmental pressures and susceptibility to disasters as well as unequal local benefits. This paper dwells down on the nexus of development, ecology and governance in Garhwal through a multidisciplinary approach taking historical analysis, policy report, scientific report and preliminary field work as its basis. The research will entail a systematic survey of the plains and semi-urban respondents and interviews on the hilly villages of Pauri Garhwal to have an impression of the locals regarding development and environmental change. The paper tends to exposes the persistent paradoxes of growth through infrastructure projects in the unpredictable mountainous regions by situating the new development in the history of ecological marginalisation and local opposition. It assumes the necessity to launch an action towards participatory, ecologically responsible, and locally oriented types of development in Garhwal Himalaya.

Introduction

Garhwal, the central Himalayan region of modern Uttarakhand, is at a strategic crossroad between competing discourses of development, environmental sustainability, and political governance.Over the past two and a half decade ,The region has undergone an augmented regime of infrastructure-based growth, consisting of highways, hydro-power plants, pilgrimage circuits, and urban sprawl, along with a series of ecological upheavals and catastrophes. This intersection uncovers some of the most fundamental questions of progress, the distribution of benefits and burdens, and the logic of politics that controls this Himalayan landscape. These concerns are historically rooted in the relations between livelihoods and ecology in the Central Himalaya on the one hand, and the state power on the other.

The social structure in Garhwal had developed around a close interdependence of forests and agriculture (Guha, 1989), where subsistence livelihoods were based on controlled access to communal resources including forests, pastures and water. Colonial forest policies perturbed this balance by transforming forests into revenue assets, controlled by the state, and, thereby, turned ecological change into social struggle. Guha argues that the administration of forests in the Himalaya was a form of social control that undermined the autonomy of the peasants and created a lasting form of resistance. As a result, forest satyagrahas and the Chipko movement became the movement of defending the traditional rights, the security of livelihood and the moral economies that are inherent to nature.

The creation of Uttarakhand as the twenty-seven state of India in 2000 has to be understood as a part of ecological marginalisation and popular opposition history. As Kumar asserts, the statehood movement emerged as a result of years of neglect by the inherent plains-based administrative and developmental preferences of Uttar Pradesh which did not attend to the hill-specific vulnerabilities (Kumar, 1999).The vision presented in slogan Matu-Pani Hamaru, Chha-Hichhunu Bouen Bhi" (Our soil, our water, our forests are our own) denoted demand for regional particular governance and need of control of the state's own resources, sensitivity to the environment, and political dignity.In contrast to linguistic statehood movements, the movement of Uttarakhand was based on livelihood erosion, out-migration and ecological vulnerability, making development its main axis (Kumar, 2001).

The cultural and political uniqueness of Garhwal can be discussed as the inseparable part of the rugged landscape, scattered population, and dependence on subsistence and forest products. Historically social life has been structured in terms of collective labour and gendered ecological knowledge, particularly the participation of women in fuel, fodder and water management (Guha, 1989).

In spite of the statehood promise, the development after 2000 shows that there are still contradictions. Kumar notes that market-oriented models gain more importance in the political sphere of post-state (Kumar, 2001). The urban centres have been enjoying the benefits but hilly Garhwal is still living under livelihood pressure, a repetition of the inner hillplain rift and environmental susceptibility (Guha, 1989).

Literature Review

Scholarly engagement with Uttarakhand has consistently foregrounded the region as a site of ecological fragility, state-led development, and popular resistance. Among the seminal works, Guha (1989), redefines Himalayan environmentalism by placing it in the context of subsistence struggles and not in the context of abstract conservation ethics. In his discussion on how peasants have opposed the colonial and post colonial policies on forests, Guha indicates that environmental movements in the Himalaya are a result of material reliance on forests and day-to-day survival. The work continues to be pivotal in the understanding of environmental protest in Uttarakhand since the work is socially grounded and placed in historical context.

This historical-political prism is extended by the interventions of Pathak. Pathak (2005) presents the Tehri Dam not as a simple infrastructural undertaking but as an erasure of culture that dislocates memory, identity and political defiance as well as physical space. His research focuses on how the post-colonial history of extractive state logic builds on the colonial one and places the development controversies of Uttarakhand within longer histories of marginalisation and resistance.

Much literature has been devoted towards displacement as a result of major infrastructure projects, especially hydro power. Agrawal (2013) records how the growth of hydropower in Uttarakhand has continued to ignore the environmental evaluation and the social cost making the mountain population more susceptible. A gendered approach to displacement as a result of the Tehri Dam Asthana (2012) shows how women are marginalized in rehabilitation policies which focus on male land ownership and ignores the care work and livelihood strategies of women. These studies, combined, reveal development as an unbalanced process in which visibility of infrastructures is more important than social justice and human security.

Subsequent scholarship after 2013 has become more politicised around the stories of disasters in Uttarakhand. Kala (2014) challenges the discourse of floods and landslides being natural occurrences and asserts that ecological instability has been aggravated by uncontrolled buildings, tourism, and development planning. Sati and Gahalaut (2013) also admit that extreme rainfall and geomorphic

processes are also important factors, yet lacking disaster zoning and control turned disasters into hazards. In more recent work, Bera et al. (2023) associate land subsidence in Joshimath with poor geology aggravated by hydro power projects and high-speed urbanisation, and points to governance failures and the absence of attention to Himalayan geomorphology.

Another important theme is tourism-based development. The analysis of the Gangotri pilgrimage circuit conducted by Sati (2018) shows that the current infrastructure is not only above the ecological threshold, but also disproportionately overloads residents of the area. Kala (2014) goes further to criticize mass religious tourism in creating precarious jobs and exacerbating environmental pressures, as it demonstrates a gap between the state discourses of development and ecological realities. Choudhary (2024) provides an analysis of the controversy on land laws in Uttarakhand that discloses the tensions between the locals and the foreign investors. The paper demonstrates how the increase in land acquisition leads to price increase and endangered cultural identity and environmental sustainability.

Nevertheless, in spite of this rich academic literature, the literature often discusses environment, development, tourism, and disasters separately and considers Uttarakhand as a rather homogenous unit. The given research is aimed at filling these gaps by incorporating these areas and focusing on Garhwal as the main unit of analysis and, thus, analyzing how infrastructure development, religious tourism, and disaster susceptibility are interconnected phenomena.

Methodology

This is an exploratory research that is based on mixed-method design, which combines structured questionnaire of 30 people living in plains and semi-urban centres of Garhwal (Haridwar, Tehri, Rishikesh, Kotdwar) with semi - interviews in the hilly villages of Pauri Garhwal (Agroda, Dhandhan, Dharkot) of about 5-7 people. To enhance the rigour of analysis, secondary literature has been reviewed systematically (academic books, articles, civic documents, and government sites). The government reports and the Uttarakhand State Archives have been analyzed to obtain a very broad context.

Discussion and Result Analysis:

■From Development to Deals? Bureaucracy - Contractor nexus

Garhwal infrastructure is intricately bound up in the politics of visibility, investment flows, and contractor influence in its contribution to the development planning, implementation and experience of development on the ground. A good example is the Rispana-Bindal Elevated Road Project in Dehradun,

which is a grand project that was approved by the Government of Uttarakhand with the central accord. This project consists of two elevated corridors constructed across Rispana and Bindal rivers, a total length of 26 kilometers, an official combined project cost of about 6,252 crores (3,743 crores on the Bindal stretch and 2,509 crores on Rispana stretch) and covers a total land area of extensive land including government, private, and forest lands and hundreds of affected structures fall within its alignment. (Public Works Department Government of Uttarakhand,2025)

An additional iconic infrastructure project is the Char Dham All Weather Road Project in Uttarakhand, which would enable year-round connectivity across the Himalayan area on holy pilgrimage paths. In this programme, 43 of 53 approved packages of 683 km out of 825 km were approved and further development is being undertaken under judicial and administrative review. Although these projects are presented as the resolution to connectivity, economic development, and tourism development, they also depict how bureaucratic inertia and extensive capital outflow tend to serve the interests of scale and visibility over ecological responsibility and agency(Press Information Bureau Government of India Ministry of Road Transport & Highways,2022). This trend has been criticised by scholars that view infrastructure-led development in the steep mountainous landscapes, and find that connectivity projects can unintentionally augment social and ecological precariousness in the absence of balanced investment in social infrastructure and disaster preparedness (Sati, 2018).

The cost and magnitude of the projects like Rispana- bindal and Char dham compares sharply to the ongoing lack of certain basic services like healthcare in the hill areas which indicate that the resource flows of investments tend to concentrate on high-profile engineering projects rather than on the full-scale development that is locally based.

■From Land to Leverage? Bhu Kanoon and Shifting Control

During the early-to-mid 2020s, the socio-political mobilisation of the demand of Bhu Kanoon (land law) increased in Uttarakhand, which was expressed through popular slogans such as bhoo kanoon lao, Uttarakhand bachao and Uttarakhand maange bhoo kanoon.(Choudhary K.,2024) notes that this mobilisation did not emerge as an immediate event; instead, it represents long-term fears in the minds of local people about land loss, speculative real-estate growth, and the growing impact of non-residing investors in the process of acquiring second-homes, resorts, and retirement houses.

In contrast to demonstrations against a particular infrastructure project, the Bhu Kanun movement is an even more general statement of territorial belonging, cultural continuity, and ecological responsibility.

The ethnographic findings of Uttarakhand reported in 2024 highlight the effect of increasing land prices, lack of agricultural land, and the process of transforming cultivable plots into real-estate resources that have contributed to the development of a sense of displacement among the locals who are increasingly seeing the current land laws as biased towards the investors at the expense of the locals(Choudhary K.,2024). Thus, the demand to tighten land control is projected not as exclusionary politics, but as defence of food security, sustainable livelihood, and the social structure of hill societies.

The policy of land regulation in Uttarakhand has historically been characterised by the frequent reversals in policies. (Choudhary K.,2024) outlines how limitations on foreign ownership of land were imposed in 2003, tightened in 2007, and then greatly loosened in 2018 with promises of investment-led growth and creation of jobs. However, the continued movement of people, the growth of the so called ghost villages and the unbalanced developmental results suggest that this liberalisation did not provide active benefits to the local population on the long-run scale. This changeability of policies has undermined popular faith and made land a major political issue.

(Choudhary K.,2024) also warns that the mere existence of legal limitations might not address the underlying structural problems of speculative markets, dominance of contractors, lack of employment opportunities, and inadequate social infrastructure. In this respect Bhu Kanoon is a strong political statement as well as a continuing struggle of the definition of development, its course and beneficiaries in Uttarakhand.

■From Growth to Strain? Testing the Hills' Limits

The idea of carrying capacity has gained relative significance on how tourism and pilgrimage can be managed in the delicate Himalayan territories. Carrying capacity refers to the limit of the number of visitors or the extent of the development that an ecosystem can withstand without environmental degradation or ecological imbalance (Uttarakhand State Pollution Control Board, 2023). The rapid expansion of pilgrimage tourism in the Char Dham region has significantly increased the pressure on natural resources and infrastructure. To take an example, over 3.47 million pilgrims visited the Char Dham shrines in 2019 (160,000 more in 2022), and the numbers are projected to reach about 6 million by 2025, which increases the environmental and management issues (Kuniyal et al.,2025).

Investigations of the Gangotri pilgrim circuit also show the lack of infrastructural capacity like poor transportation, parking, and accommodation despite the fact that the area attracted more than 436,000 pilgrims in such sites as Gangotri, Uttarkashi, and Bhatwari (Sati, 2018). One can also see the impact of

environmental pressures, such as in the case of Kedarnath, which produces up to 1.5-2 tonnes of waste on average every day during peak season (Kuniyal et al.,2025).

These issues highlight the acute necessity of the carrying-capacity-based planning and sustainable tourism management in the Himalayan pilgrimage sites.

■From Development to Disaster? Governing Emerging Risks

The cases of disasters in the Uttarakhand Himalaya, especially in the Garhwal part, are not only reported in the academic and official materials as sudden natural phenomena but also the outcomes of the interaction between the natural geological processes and the ongoing anthropogenic interventions in the delicate mountainous ecosystems. Empirical disaster evaluations and government-funded technical documentation constantly show that extreme events like floods, landslides, rock-ice avalanches and land subsidence reach devastating size when geologic vulnerability is enhanced by uncontrolled construction, hydrologic interference, and infrastructure growth.

The Garhwal region of Uttarakhand is located in a very active seismic zone that is controlled by major thrust systems with the Main Central Thrust being one of them. The historical seismicity, the 1991 Uttarkashi earthquake (Mw 6.8) and the 1999 Chamoli earthquake (Mw 6.6) are examples of how the area is inherently vulnerable. Deterministic seismic hazard analysis, which uses an earthquake catalogue between 1953 and 2020, provides an estimate of the peak ground acceleration between 0.12⁻ 0.70g. These results suggest that there is a possibility of the ground shaking being very high and that the existing seismic design standards in India are not reflecting the real level of hazard (Sharma & Sarkar;2023).

The Kedarnath disaster of 2013 is one such example of this interaction. In his thorough geological assessment (2013), Dhruv Sen Singh places Kedarnath town on the outwash plain of the Chorabari and Companion glaciers, in both the discarded and active river channels of the Mandakini system. Singh records how intrusion of glacio-fluvial deposits cut down the discharge capability of the river during massive precipitation. Severe heavy rains and cloudbursts between 15 -17 June 2013 caused landslides, damming of rivers with debris and the creation of temporary lakes causing the following flash floods (Singh, 2013). Notably, Singh believes that such hydrometeorological events are unique to the Himalaya, but the amount of destruction was increased by being built in hazardous areas, encroaching along riverbeds, deforestation, and destabilizing slopes with explosions and road networks (Singh, 2013).

Another similar trend is the 7 February 2021 Chamoli rock-ice slide, widely covered in the Courmayeur Living Lab technical manual. According to the report, the rock and ice that was set free by the Rontigad peak in Chamoli district comprised about 27 million cubic metres and made it a Rontigad debris flow and a flash flood that eradicated two hydropower projects and took away the lives of about 200 people (Kanungo & Dash, 2025). It is highlighted in the assessment that the event was intensified by enormous entrainment of the debris and water saturation by its flow, which was observed at distances of 150km downstream. Coordinated actions between the local administration, District Disaster Management Authority (DDMA), and the National Disaster Management Authority (NDMA) included the Post-Disaster Needs Assessment (PDNA) and the scientific investigations (Kanungo & Dash, 2025).

The 2023 land-subsidence crisis in Joshimath only intensifies the importance of slow-onset, development-related disasters. According to Kanungo et al. (2025), Joshimath is located on an old landslide that consists of loose and weathered boulders and fine sediments. The authors record an eruption of muddy water at Jaypee Colony on 2 January 2023, which was later accompanied by extensive fissure ground, building, and ground shaking between 3 and 8 January. They mention that subsidence risk had been previously noted by the Mishra Committee (1976), and that disruption of the aquifers and modified hydro-geological conditions were major factors. CSIR-CBRI estimated the damage of 2,364 buildings in nine administrative zones, which led to evacuations, demolition, and relocation organized by the state disaster management authority of Uttarakhand (USDMA) and the National Disaster Management Authority (NDMA) (Kanungo et al., 2025).

In all these recorded instances, the governance of disaster in Uttarakhand is institutionally sound in coordinated response; preventive regulatory provisions, however, are lacking. The report by Courmayeur Living Lab reiterates the need to have hazard-vulnerability-risk mapping, techno-legal controls, drainage planning, and enforcement of building by-laws in Himalayan towns, which have, however, suffered unequal application (Kanungo et al., 2025).

This governance gap is revealed in the urban planning systems of Haridwar and Rishikesh in the Development Plans and the Final Master Plan. These reports pre-empt the growth of tourism sector, development of infrastructure, widening of roads as well as development of the river front along the Ganga corridor and at the same time recognize environmental sensitivity associated with floods, drainage congestion, and seismic exposure. The existing regulatory control over development and land use is still not strong enough and some tension between the priorities of development and mitigation of the disaster-risk is obvious (Government of Uttarakhand, Final Master Plan).

The Bhudev application, in this bigger framework of governance, is a state-initiated technological project aimed at earthquake preparedness. The USDMA documentation suggests that the app sends early-warning notifications in case of seismic events: earthquakes of magnitude 5.0 and greater send sound-based alerts, and earthquakes under magnitude send informational alerts. The app also allows sharing location with USDMA in post-earthquake emergency to aid a rescue effort and is technically accessible in the Google Play Store and App Store (USDMA, Bhudev App documentation).

Overall, the scientific and planning documents, and data demonstrate that the disasters in Uttarakhand are not the one-time accidents but the continuation of the geological sensitivity and development decisions. Although the system of emergency response has become more effective, the tendency toward poor preventive regulation and the lack of involvement of the population make disasters the structural effects of the priorities in governance instead of inevitable phenomena of nature (Singh, 2013; Kanungo et al., 2025).

Field based findings:

●Ethnographic Research

A survey was conducted from October 2025 and still ongoing ;which compares the results of the study between hill (rural) and plain (urban -semi-urban) areas of Garhwal, with Male and Female participation rate as 60% and 40% respectively. Agrarian livelihoods, dispersed settlements, and greater reliance on local ecological resources characterise hill areas(villages in Pauri Garhwal), and service-based economies, more frequent institutional interaction, greater mobility, and an urban-influenced cultural and linguistic milieu characterise plains and semi-urban centres such as (Haridwar, Rishikesh, Kotdwar, and Dehradun). Since this research is not complete, the analysis provided below reflects initial trends and not definite statements.

Welcomed and/or Unwelcomed: Is Development Welcomed?

■Conditional Acceptance of Development.

According to the results of the survey, the development in Garhwal is viewed as conditional and ambivalent. Whereas 30% of the respondents consider the infrastructure projects like roads, tunnels, dams and Char Dham-related works as decisively beneficial, a larger proportion (56.7%) of the respondents find them to be beneficial to some degree only. This implies that there is a recognition that there exist trade offs between connectivity and disruption as opposed to their acceptance or rejection.

■Widening of the Road as the Most Disruptive Intervention.

Of all the projects, road widening was seen by 66.7% of people as the most disruptive intervention, with religious tourism coming in second (23.3%). Landslides, deforestation and disruption of normal life were the most common associations of road widening that the respondents made. Even residents of the plains, who supposedly gain more directly the advantages of being connected, were aware of such environmental and social costs.

■Development Without Social Infrastructure (Hill Perspective)

This ambivalence is emphasized in interview narratives of hilly Pauri Garhwal. The frequent phrases like *"vikas kuch nahin hua, bilkul nahin", "kuch bhi vikas nahin hai, thoda bahut vikas hua hai par waisa nahin jaisa hona chahiye tha"* that indicate a perception that development has been constrained and shallow. It was in large measure restricted to roads and irregular water supply, where it was recognized. A structural discrepancy between infrastructure growth and basic welfare is noted by the predictable presence of no local hospitals, distant travel (20-22km), and absence of emergency transport.

■Perception of Environmental Change and Disaster.

There is a high level of environmental awareness: 83.3% of the surveyed people believe that the environment has changed in the last 20 years to a great extent, and 90% of people consider forests as extremely important. Mostly, disasters are viewed as both natural (56.7%) and human-made (30%) with the aggravating factors considered as deforestation, unplanned construction, tunnelling, and road cutting. This sentiment was echoed by interviewees, with one remarking, "*aapdaa to kuch manav nirmit bhi hai aur prakritik bhi hai"* and the other interviewee agreeing that it was the collective responsibility: "*in aapdao mein kahin na kahin hum logon ka bada yogdaan hai*".

■Governance, Participation, and Uneven Development.

Every respondent considered government support after the disaster as inadequate (only partially) and 50% believed that relief and compensation had a political touch. There has still been low participation in planning especially in the hills. In general, although the residents of the plains enjoy the direct advantages of the development, the communities that live in hills incur disproportional ecological and social burdens. However, both sides are united by the demand to have a balanced and sustainable development, which highlights the constraints of infrastructure-based development in the fragile mountain areas.

Result Analysis:

As per the Academic literature and Survey findings ; the study concludes that the Development in Garhwal is perceived by people in the ‘state of dilemma' as it is neither completely condemned nor accepted; It is conditional and negotiated. As even though the popular ventures such as the All weather roads continues to be associated with Progress and Connectivity and source of employment but the scientific study and the existing literature presents different perspective that is that of ecological fragility and seismic vulnerability of the zone; the top-down approach applied while forming policies and the impact brought by the ‘burden of development' on mountains that makes it prone to disasters ; To this debate stands the prime question“What is the value of development if unchecked growth ultimately threatens the survival of the state itself?”. This study presents the Third Perspective - that is connoted both in the survey and literature and that is of balanced and context-sensitive growth—a model of development that is environmentally sustainable as per the capacity of the state, socially inclusive of both that of hills and plains, and informed by bottom-up participation from local communities.

Future Pathways

The future of Garhwal needs to be rethought to escape the paradigms that focus on tourism and infrastructures that conceptualize the mountains as passages or locations rather than spaces that can be inhabited. Sustainable development should be based on enhancing livelihoods, decentralized services and ecological boundaries. Scientific carrying-capacity evaluation highlights the urgency of having a recalibration of development planning in order to avoid overloading the environment and social fragmentation.

The alternative way of tourism involves culture-based and community-based tourism, which is a livelihood model that can offer livelihoods without overexploitation of the environment like the mass pilgrimage model. The increase of infrastructure should be accompanied by disaster-risk planning incorporating the local ecological knowledge and the participation-governance frameworks. Incorporating social justice into environmental planning is vital to break the patterns of displacement and catastrophe, and instead provide the opportunities to live towards resilient and inclusive futures in the core of the socio-ecological landscape of Garhwal.

Conclusion

The experience of Garhwal in the last twenty-five years brings out the contradiction of development in weak mountainous areas. As statehood has offered people-focused governance, there have been

numerous instances where infrastructure-driven development has recreated past instances of marginalization and environmental stress. With Garhwal as its central focus as an integrated socio-ecological-political space, it is important to include the official disaster management structures, carrying-capacity initiatives, and field perceptions that have been used to reveal that sustainable futures must be tied to re-align development with the aspirations, knowledge and rights of the people in the region.

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