

Title of Project Report: Effects of Tourism on Human Development Index (HDI) in Uttarakhand

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Highlights of the Study:

- 1. Qualitative Analysis:** The study examines how tourism influences the three core dimensions of the Human Development Index, i.e. health, education, and income. It uses secondary data from the Global Data Lab, UNDP, and government sources to interpret the various findings.
- 2. Tourism–HDI Feedback Model:** Study shows a concept of “Tourism–HDI Feedback Model”. Cyclical interactions between tourism and HDI through various dimensions are presented.
- 3. Evaluation of Government Policies:** The study reviews the government policies towards tourism sector. It then suggests the improvements which are based on inclusiveness, employability and sustainability of tourism sector.
- 4. Intra-state Disparities:** The paper highlights the inequalities found between developed plains districts and less developed hill districts in Uttarakhand, irrespective of their tourism potential.
- 5. Calculation of HDI:** This work uses the calculation formula and approach based on official UNDP 2020 methodology. The calculated HDI value (0.682) for Uttarakhand state is closely matched with the reported result of 0.681 (for year 2022).
- 6. Policy Recommendations:** The study recommends practical steps such as carrying-capacity zoning, green infrastructure, women-led cooperatives, and HDI-linked monitoring for sustainability of Tourism sector in Uttarakhand

Mapping of Highlights:

Highlight	Type of Contribution	Manuscript Section
1	Conceptual and analytical linkage	Sections 2 & 5
2	Theoretical innovation	Section 5.5
3	Policy evaluation	Section 4
4	Regional analysis	Section 5.1–5.4
5	Quantitative validation	Appendix 1
6	Practical recommendations	Conclusion

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Effects of Tourism on Human Development Index (HDI) in Uttarakhand

Abstract: Uttarakhand is hailed as Dev-Bhoomi for its Hindu and Sikh holy sites, sacred peaks and rivers. Tourism in Uttarakhand has evolved into a central driver of the state's economic and social transformation. However, its effects are not limited to the economics and have far reaching impacts on various other societal indices of state. This study examines the interaction of state tourism with the three pillars of the Human Development Index (HDI)—health, education, and standard of living. The findings show that while tourism strengthens infrastructure and creates income for state populace, it also intensifies ecological stress and demographic imbalance in fragile mountain districts. Therefore, tourism's developmental role depends on governance, inclusion, and sustainability. Central and state government's Tourism Policy has shown a mark a shift toward integrating HDI-based metrics into tourism planning. The study proposes a Tourism–HDI Feedback Model, which positions tourism not merely as an economic engine but as a vehicle for capability expansion and ecological resilience. Done right, it can turn Uttarakhand's natural bounty into an enduring human-development dividend.

1. Introduction

The Human Development Index (HDI), introduced by the United Nations Development Programme (UNDP) in 1990, quietly changed the grammar of development. For decades, growth had been measured in numbers i.e. GDP per capita, output, fiscal ratios, metrics that spoke of economies, not of people. The HDI introduced a fresh perspective by associating development with expanding human capabilities. It rests the analysis on three essential aspects of human well being: health, education, and standard of living (UNDP, 1990; Sen, 1999; UNDP, 2023).

HDI reframed progress as the enhancement of human potential rather than a mere accumulation of income (UNDP, 2023). Yet beneath those aggregate figures lie asymmetries, especially in topographically challenged regions. Uttarakhand, a Himalayan state carved out of Uttar Pradesh in 2000, illustrates this paradox with remarkable clarity: an economy rising on tourism's shoulders, and a population still climbing toward equitable human development.

Over time, HDI became an important instrument to study nations' progress. Yet it has not escaped criticism. Scholars have argued that the HDI ignores the effects of political freedoms, ecological sustainability, and inequalities on populace (Stiglitz, Sen & Fitoussi, 2009; Sagar & Najam, 1998; Stewart, 2013). Others question the rationale of equal weighting of its components. Further, its reliance on national averages blurs the region specific disparities (Chakravarty, 2003; Ravallion, 2012).

Responding to such concerns, the UNDP introduced complementary indices like: Inequality-Adjusted HDI (IHDI), Gender Development Index (GDI), Gender Inequality Index (GII), Multidimensional Poverty Index (MPI), and the Planetary Pressures–Adjusted HDI (PHDI) (Klugman et al., 2011; Alkire & Santos, 2010; UNDP, 2020; Steffen et al., 2015).

Realizing the importance of tourism towards HDI, the World Economic Forum (WEF) designed an instrument known as The Travel and Tourism Development Index (TTDI) (formerly known as the Travel and Tourism Competitiveness Index (TTCI)). The index measures the popularity and potential of tourism sector for individual countries (TTDI, 2021). Countries are ranked by their regulatory framework; business environment/infrastructure; and human, cultural, and natural resources. In addition to rankings, the report includes detailed country profiles, featuring key indicators sourced from organizations such as the World Bank, the World Tourism Organization, and the World Travel and Tourism Council.

Tourism in Uttarakhand

According to the Global Data Lab (2022), Uttarakhand's HDI stood at 0.681. This is above India's national average (0.644) yet below neighboring hill state of Himachal Pradesh (0.715). Himachal Pradesh (HP) has a more planned and spatially balanced urban planning compared to Uttarakhand's uneven, tourism-centric development pattern (NITI Aayog, 2023; Planning Commission of India, 2013). Therefore, although the Himalayas, sacred rivers, and cultural depth make Uttarakhand tourism's magnet but the same mountains that draw millions of visitors to Uttarakhand also hinder access to healthcare, education, and markets for Uttarakhand's remote populace (Government of Uttarakhand, 2022). Additionally, Uttarakhand thrives on seasonal tourism and remittances, which are fragile against landslides, floods, and climate shocks (Bahuguna, 2010). Therefore, the business model based on tourism is active in Uttarakhand, but its robustness and resilience is always in doubt.

Tourism sector creates jobs, builds infrastructure, and fuels service economies, but also strains ecology, culture, and social equity. At present, this unchecked expansion has begun to test the carrying capacity of fragile mountain systems. Without proper restraint, tourism can easily shift from being a profitable business model to an additional stress on Uttarakhand's economy and ecology (UNWTO, 2022). The state government has recognized this delicate balance. It has attempted to widen the scope of tourism beyond pilgrimage. Policies are made for popularizing the adventure, wellness, and eco-tourism. The vision is inclusive towards rural entrepreneurship, homestays, skill-building, and women's cooperatives.

There are still some deeper questions which needs to be answered. For example: does the surge in visitors and investment actually translate into higher human development outcomes, or does it merely inflate short-term GDP figures? What types of costs (cultural, environmental, ecological, and social) involved with tourism? What is the interaction between tourism and HDI? Is it one

way or constitute a feedback loop? How government interventions align tourism growth with long term sustainability? Using secondary data from UNDP, Global Data Lab, NITI Aayog, and state reports, this study explores these questions and proposes a positive feedback loop between tourism and HDI vis-a-vis 6 dimensions of economy, infrastructure, culture, education, health and environment. Ultimately, the study argues that tourism can transform from an income-generating activity into a medium of compassionate human progress. Uttarakhand state offers a living laboratory on such sustainable tourism practices.

2. Literature Review

2.1 Theoretical Perspectives on Tourism and Development

Travel happens when inner desires like curiosity, escape, or faith meet outer lures such as landscape, culture, or climate, as described in Push–Pull Theory (Crompton, 1979). Uttarakhand’s holy sites and sacred rivers are among the greatest attraction among tourists. These factors eventually transform into livelihood, belonging, and pride for the locals (UNWTO, 2022).

The Resource-Based and Sustainable-Tourism Theory (Butler, 1980; Weaver, 1997) reminds us that nature’s gifts are both enablers and limits. Uttarakhand has 65 percent forest cover which needs to be sustained. True progress comes when tourism balances income with ecological respect—through community-run circuits, local cooperatives, and carrying-capacity planning (UNEP & UNWTO, 2005). The Tourism Area Life Cycle (TALC) (Butler, 1980), meanwhile, tells a cautionary tale: every destination moves from discovery to decline unless it reinvents itself. Uttarakhand’s hill towns, often bursting at the seams, are proof enough that rejuvenation via wellness, rural, or agro-tourism isn’t optional, it’s survival.

Then there’s the Dependency and Political-Economy Approach (Frank, 1967; Britton, 1982; Bianchi, 2009), which pulls no punches. It warns that when profits leak outward and ownership concentrates in a few hands, local people lose twice—first economically and then socially. That story feels familiar in the Uttarakhand hills. Strengthening cooperatives, pushing fair-trade procurement, and nurturing micro-ventures are some of the initiatives that could reverse the trend.

Carrying-Capacity and Systems Theory (Getz, 1991; Farrell & Twining-Ward, 2004) adds an ecological dimension: mountain systems, much like human bodies, have limits. When tourism crosses those thresholds, the damage isn’t easily undone. Doxey’s Irritation Index (1975) reminds policymakers of the fact that local host populace's patience may wear thin if the local communities are left out of planning. Transparent decisions and participatory councils must be employed as social glue to sustain tourism in Uttarakhand.

2.2 Economic Impacts and HDI Relevance

Tourism contributes nearly seven percent to India's GDP and about a quarter of the state's income (WTTC, 2023; Government of Uttarakhand, 2022). Sectors like local transport, hotels, food stalls, and handicrafts all thrive on tourism. Studies show that robustness of any tourism business model depends mostly on the presence of local ownership (Das & Rana, 2020). Until the income generated is distributed among the locals, the resilience of tourism business will always be in doubt. Further, Uttarakhand's tourism income comes in waves of pilgrimage peaks and festive bursts. This is then followed by lean months with almost negligible tourism business. Government policies and public-private partnerships that diversify tourism circuits beyond the Char Dham routes could help remove these uncertainties (NITI Aayog, 2023).

2.3 Social Dimensions: Education, Health, and Gender Equality

Tourism helps develop airports and is most often accountable for upgrading of basic road infrastructure and medical facilities in destination state. In Dehradun, Almora, and Nainital, new training institutes now offer hospitality and adventure courses that help young people, especially in rural areas, earn a foothold in the service economy (Ministry of Tourism, 2025). Still, patchy internet, digital illiteracy, and gender gaps keep many from tapping into new opportunities. Scholarships, SHG-linked credit, and stronger school-tourism partnerships could bridge that divide.

On the health side, the story is mixed. Infrastructure built for pilgrims often serves locals too. Ambulances and clinics made for tourists also assist the locals. But the increasing tourist crowds also bring pollution. There is increased water and sanitation stress, which peaks during tourist seasons. Smarter choices like electric buses, proper waste segregation, sustainable water supplies and improved sanitation services may help remove these irritants (UNEP, 2021).

Women form the backbone of tourism worldwide (UNWTO, 2022). In Uttarakhand also, women participate in tourism business by organizing self-help groups and homestays (UN Women India, 2021). However, limited land ownership and lack of capital are obstacles in the path of such initiatives. Government can help these groups by adopting gender-responsive budgeting and entrepreneurship support.

2.4 Cultural Preservation and Transformation

In Uttarakhand, tourism has breathed new life into cultural practices and traditional crafts like local folk performances (Richards, 2018). But there's a thin line between culture and demonstrations. Rituals should not be modified or staged just for the entertainment of visitors, else their uniqueness and sacred essence is lost (Cohen, 2019). Authenticity of culture and

dignity of work must be kept alive while interacting with tourists. UNESCO (2022) calls this cultural sustainability where development is associated with preserving one's roots.

2.5 Environmental Externalities and Sustainability Linkages

It's no secret that tourism leaves its footprints—literal and carbon. In the fragile Himalayas, rapid hotel construction, rising traffic, and unchecked waste have scarred towns like Nainital, Mussoorie, and Rishikesh (UNEP & UNWTO, 2021; Government of Uttarakhand, 2022). Evidence shows that places embracing eco-standards breathe cleaner air and enjoy longer tourist loyalty (Gössling & Hall, 2019).

Policy-wise, sustainability must move from being a polite suggestion to a binding rule—one that ties carrying-capacity data to tourism licenses and district-level monitoring.

2.6 Synthesis of Empirical Evidence

Across India's hill states, the story is consistent: tourism lifts HDI when people have a real say (Das & Rana, 2020; UNDP India, 2021). When locals participate in tourism activities and earn appropriate income from it, roads, schools, and markets also develop. Transparency thus is essential in the dealings between locals and higher authorities, big hotel chains or out of state tour operators. But where greed and overuse take hold, progress backslides. Similarly, environmental decay can undo years of social gain (Gössling & Hall, 2019; Cohen, 2019)..

Comparisons with Himachal Pradesh and Sikkim are telling. In those states, community-led ecotourism and conservation-linked incentives yield stronger HDI results. For Uttarakhand, the path forward depends on how well it connects its tourism goals with the trio of health, education, and environment. Growth alone won't do—it must be participatory, balanced, and kind to the land that hosts it.

2.7 Research Gap and Relevance for Uttarakhand

Although a lot of research on Uttarakhand tourism has taken place, there is still a need for study which views the association between tourism and HDI. Further, Uttarakhand tourism's post COVID-19 performance also requires proper investigation (WTTC, 2023).

This study looks at how tourism interacts with the HDI's three core dimensions in Uttarakhand, treating it not as an isolated industry but as a lever of social transformation. The central idea is practical, not utopian: tourism must internalize equity, environmental restraint, and community participation if it hopes to sustain both visitors and the valleys that host them.

Tourism can lift living standards and broaden choices, yes—but without balance, it risks hollowing out the very society it seeks to enrich. In Uttarakhand's delicate mountain economy,

that tension between promise and peril is sharper than anywhere else. The next section discusses those trade-offs in detail..

3. Costs of Tourism in Uttarakhand

Tourism can help build the state's infrastructure, medical facilities, water resources, sanitation setup and economy, but a fast-paced, loosely regulated expansion of tourism sector can also erode the very foundations of human development it seeks to build. The same forces that generate income, mobility, and infrastructure also press hard upon fragile ecosystems and tight-knit hill communities..

3.1 Social Costs: Inequality, Crime, and Community Disruption

Inequality and social tensions arise when there is unequal distribution of rewards for the same labor. Most often, the outside tour operators and big hotels capture a disproportionate share of tourism revenue, while local host populace get a very small amount of earnings through tourism. This disparity keeps the human development without equity (Bianchi, 2009).

Migration increases the disparity between haves and have-nots. When young people gravitate toward Dehradun, Haridwar, or Nainital for seasonal work, their remittances bring temporary relief to the ageing parents but it hurts the rural cohesion and agricultural productivity (NITI Aayog, 2023).

Increasing crowds in pilgrimage and leisure towns often bring in pickpockets, thieves and other criminals to that place. Drugs and substance abuse with illegal trafficking is present in tourist destinations worldwide (Gössling & Hall, 2019). Local police records in Uttarakhand show regular spikes in theft and harassment during peak seasons (Government of Uttarakhand, 2023). Meanwhile, the growing commercialization of sacred spaces has blurred moral boundaries, turning places once known for spirituality into profit-driven marketplaces.

Land speculation and displacement compound these problems. Opening new hotels and resorts have already pushed up property prices and more and more locals are selling their ancestral lands. This changes the demography of the hills which is already less populated than urban centres or towns. Collective landholdings are going down, which further weakens the social fabric that historically protected these mountain communities.

3.2 Cultural Costs: Commodification and Loss of Authenticity

Tourism may persuade the locals to repackage tradition for sale (Cohen, 2019; UNESCO, 2022). In Uttarakhand, fairs like *Nanda Devi Mela* or pilgrimages such as the *Char Dham Yatra* lose their charm when they are staged for visitors in greed for increased incomes.

Sometimes, tourism also changes the unique nature and identities of local hosts.. Cafés and boutique resorts replace mud-and-wood homes, while imported décor and clothing trends blur the once-distinct Kumauni and Garhwali aesthetics. As youth lean toward urban aspirations and moves to urban centers, the intergenerational chain of dialects, folk songs, and crafts starts breaking (Richards, 2018).

There is also increased pressure on gender roles due to tourism sector. As tourism gives visibility to women workforce, new issues like workplace harassment and intra-couple jealousy have started to surface among locals (UN Women India, 2021).

3.3 Environmental and Ecological Costs

The steep slopes and glacial systems that make Uttarakhand breathtaking also make it perilously fragile. Unplanned tourism into ecologically vulnerable sites carries serious ecological consequences that can easily reverse decades of human-development progress.

Deforestation and Habitat Fragmentation: Hotel expansion and road widening in rural remote villages to provide better facilities for incoming tourists have chipped away at forest cover, especially in Chamoli and Rudraprayag. Between 2010 and 2020, patches of high-altitude forest shrank despite national afforestation drives (Forest Survey of India, 2021). This has eventually invited increased landslides and less space for wildlife.

Pollution and Waste: Increased crowd of tourists brings in more pollution of water and soil with sewage and plastic. Air pollution in urban tourist places has become a nightmare (CPCB, 2022). Hill towns like Nainital and Mussoorie generate thousands of tones of solid waste every year, which is far too much for their sanitation setups. Therefore, much of this waste ends up into valleys and lakes (UNEP, 2021).

Climate Vulnerability: In 2013, Kedarnath disaster came as catastrophic flash flood and landslide event (NDMA, 2014). Sinking and cracking of the ground in Joshimath (2023) and the Chamoli glacial burst (2021) reminded the perils of unchecked construction and climate change.

Biodiversity Loss: Tourist intrusion into sanctuaries like Corbett Tiger Reserve and the Valley of Flowers disrupts breeding cycles and wildlife behavior (UNEP & UNWTO, 2021). The disappearance of pollinators and forest fauna leads to ecological decline which eventually evolves into human insecurity.

Comparative analyses from other Himalayan states shows that if environmental degradation crosses a certain threshold, tourism's HDI gains turn negative (Das & Rana, 2020; Gössling & Hall, 2019). In simple terms: the same sector that lifts income can, without restraint, pull health and education down.

Recognizing these interlinked risks, policymakers in Uttarakhand have started planning for resilience-based governance. Next section discusses recent government initiatives aimed at promoting tourism expansion with long-term human development outcomes.

4. Effectiveness of Government Interventions in Promoting Sustainable Tourism in Uttarakhand

Tourism in Uttarakhand is a source of livelihood as well as a strain on fragile mountain systems. Aware of this delicate balance, the state government has, over the past decade, tried to make tourism both profitable and planet-friendly. The Uttarakhand Tourism Policy 2020, in step with India's National Tourism Policy 2022, sets the tone for this approach: diversify tourism, include local communities, and make the entire process environmentally responsible.

The policy looks impressive on paper, and several visible gains have followed. Yet, the implementation gaps, and persistent inequities have limited how far these initiatives have actually advanced human development across the hills.

4.1 Policy Framework and Achievements

The Tourism Policy 2020 takes a broad-based view of growth. The state wants to democratize tourism's gains across all sections of society (Government of Uttarakhand, 2023). Its central idea, "Tourism for All and by All," invites the tribals, villagers, women's groups, and youth entrepreneurs to become a part of the tourism story.

Concrete progress is visible. Under the Uttarakhand Tourism Development Board (UTDB), ropeway projects and helicopter services in Auli and Kedarnath have reduced travel time and increased feasibility for physically challenged tourists. This move has also opened new income streams for the locals. Digital ticketing has streamlined pilgrim management in popular and overly crowded tourist destinations. Adventure-sport in Rishikesh and Tehri has attracted the younger, high-spending tourists. These projects are essential for sustaining the income component of the HDI.

Uttarakhand populace has an inherent bias towards forest conservation, as was evident during "Chipko Andolan" (Ishizaka 2013). Sensing this, Himalayan Homestay Scheme and Mission Eco Development has linked biodiversity as an integral part of income generation with tourism. Further, Uttarakhand state has collaborated with UNDP India to associate SDGs benchmarks in tourism sector (UNDP India, 2021).

4.2 Implementation Challenges

Many challenges still persist. Enforcement is the biggest stumbling block. Despite well-meaning clauses, illegal construction, plastic littering, and waste dumping continue in eco-sensitive belts, partly because responsibilities overlap between multiple departments i.e. Tourism, Urban Development, Forest, and Disaster Management (NDMA, 2022).

Infrastructure development in remote areas is another challenge. Many renewable-energy and solid-waste projects get stalled due to limited funds, especially in remote or topographically challenged areas where logistics costs are far more steep than plain areas like Dehradun or Haridwar.

Equity remains a sore point. Most investments still gravitate toward big names like Mussoorie, Corbett, and the Char Dham corridor. This leaves interior districts such as Champawat or Bageshwar outside the limelight. This skewed focus widens intra-state inequality and contradicts the very spirit of HDI-based planning. Gender equity is also hard to achieve specially in remote areas of state and tourism sector also suffers from the same (UN Women India, 2021).

Further, climatic challenges like Landslides, glacial-lake outbursts, and flash floods increasingly disrupt connectivity (NDMA, 2022). Therefore, Uttarakhand government must install early-warning systems and provide the disaster-preparedness training for tourism operators all over the state.

4.3 Opportunities for Reform

If there's one thing Uttarakhand's experience proves, it's that governance matters as much as geography. For long-term human-development gains, government must proactively engage with the tourism sector.

1. **Integrated Institutional Coordination:** Government must bring the distinct but essential departments like environment, transport, and rural-development on the same page and reduce the bureaucratic *red tapism* when dealing with tourism sector.
2. **Decentralized Planning:** Villagers and their local bodies must have a say in managing the tourism revenue and spending of conservation funds. This would ensure accountability in tourism practices and make its foundations resilient.
3. **Green Financing and Incentives:** State government should put its weight behind providing Eco-tax rebates, green bonds, and low-interest credit lines to smaller entrepreneurs. The move should be associated with adoption of renewable energy and waste-management systems.

4. **Skill and Digital Capacity Building:** Expanding the *Tourism Skill Mission* and digital-marketing training for youth and women will close the employability gap between hill and plain districts.
5. **Monitoring and Transparency:** Uttarakhand government must invest in GIS-based dashboards to track the various environmental indicators. Satellite imagery and ground sensors must be used to update environmental conditions, and analyze trends. Data-driven decisions should be implemented by monitoring the visitor volumes. The share of local hosts in tourism income must be made transparent and accountable.

Nevertheless, beyond these policy measures, the real measure of progress lies in the everyday lives of people scattered across Uttarakhand's valleys and ridges. The following section therefore traces how tourism and Uttarakhand's Human Development Index (HDI) interact together.

5. Discussion on Tourism and HDI Positive Feedback Loop in Uttarakhand

According to the Global Data Lab (2022), the state's HDI stands at 0.681 (Calculated in Appendix 1). It is above India's average (0.644) but below Himachal Pradesh (0.715). The Uttarakhand's HDI has risen from 0.627 (1990) to 0.681 (2022), as shown in Figure 1. It shows that the state has progressed in terms of its health, education and income standards (UNDP, 2023). Yet the HDI numbers are not evenly divided across the state. The state's capital Dehradun, and planar districts like Haridwar and Nainital are far ahead in HDI numbers in comparison to hilly and remote districts like Bageshwar or Champawat. This fact also gives an insight on tourism's dividends, where accessibility and governance decides the share in sector's earnings (NITI Aayog, 2023).

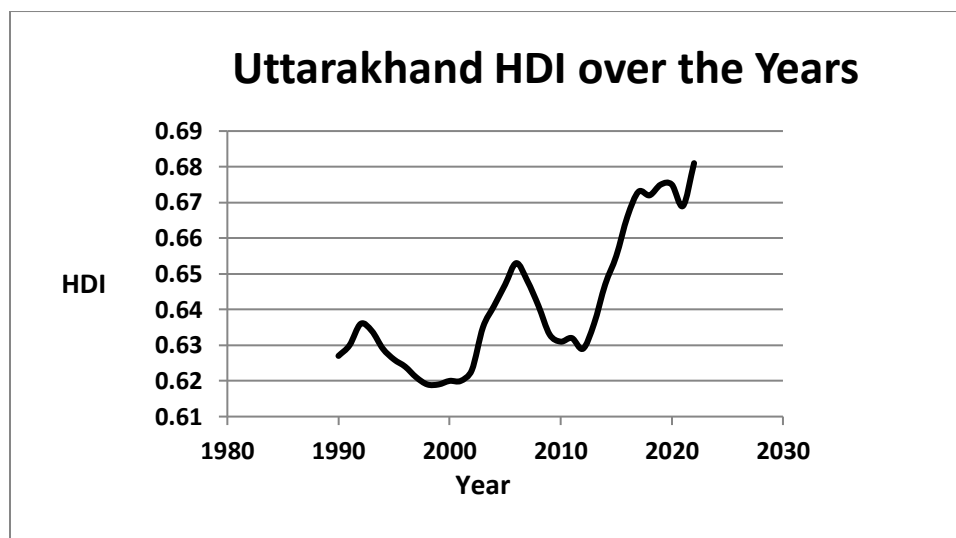


Figure 1. Uttarakhand HDI over the Years

[<https://globaldatalab.org/shdi/table/shdi/IND/?levels=1+4&interpolation=0&extrapolation=0>]

5.1 HDI in National and Regional Perspective

The HDI offers a lens that captures more than growth. Uttarakhand's score of 0.681 situates it ahead of large northern states such as Uttar Pradesh (0.599) and Bihar (0.577) but still below Kerala (0.758) and Goa (0.760) (Wikipedia contributors, 2023). The comparison is instructive: Kerala's excellence rests on sustained social investment; Goa's on a diversified, regulated tourism economy. Uttarakhand lies somewhere in between; its tourism intensity comparable to Goa's but its institutional reach closer to Himachal's. Figure 2 shows the HDI for Indian states in year 2022.

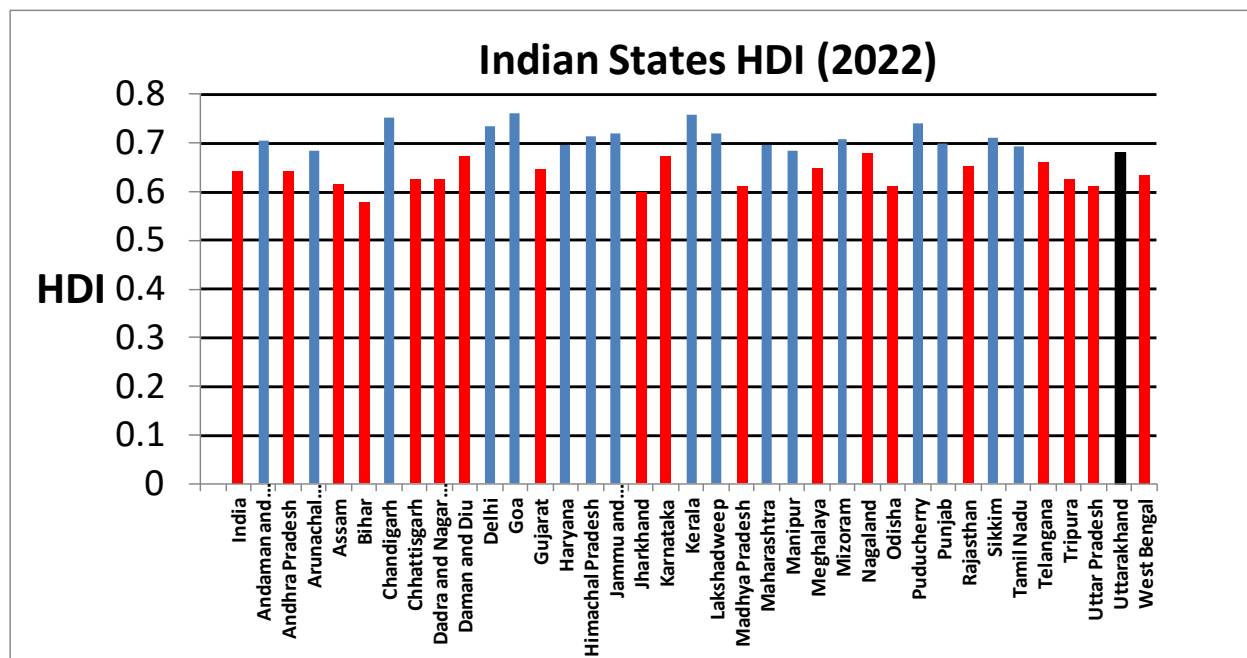


Figure 2. Indian States' HDI in year 2022

[https://en.wikipedia.org/wiki/List_of_Indian_states_and_union_territories_by_Human_Development_Index?utm_source=chatgpt.com]

The contrast underscores the central puzzle of this study: tourism has created economic buoyancy but not yet the same breadth of human capability expansion. The following subsections explore the HDI's interaction with tourism.

5.2 Health, Tourism, and the Wellness Dividend

Tourism in Uttarakhand remains more than a seasonal economic pulse. It is a powerful social process that binds health, education, income, and environment into a single, interdependent fabric. Tourism's infrastructural development has expanded access of basic medical facilities across the hills. The Char Dham corridor, Ayushman Bharat, and National Health Mission

investments have multiplied emergency posts, ambulances, and tele-medicine links in districts like Chamoli and Uttarkashi (MoHFW, 2020; UNDP India, 2021). Hospitals such as AIIMS Rishikesh now serve both pilgrims and residents. The state's health index of 0.734 exceeds the national mean but trails coastal leaders (Global Data Lab, 2022).

However, the same tourism sector also stresses sanitation and water systems across the state (CPCB, 2022; UNEP, 2021). Disaster episodes like the 2013 Kedarnath floods have periodically erased years of progress (NDMA, 2014; NDMA, 2022). In short, tourism improves health infrastructure when ecologically managed.

5.3 Education, Skills, and Capability Formation

Education lies at the heart of both tourism quality and human development. Uttarakhand's education index of 0.627 is above the national average but below the neighboring hill state of Himachal Pradesh (Wikipedia contributors, 2023). Tourism sector's progress in Uttarakhand has been responsible for government's initiatives like vocational institutes in Dehradun, Almora, and Nainital. These institutes train local population in streams like hospitality, adventure guiding, digital marketing, and eco-management (World Bank, 2022). Women literacy in finance and communication has been increased by Homestay cooperatives and SHG-based enterprises (UN Women India, 2021).

However, schooling in remote areas is still an issue and youth involved in tourism related seasonal works often misses their classes. Rural youth often migrate to urban centres for tourism related activities, which also affects their enrolments (ASER Centre, 2022). State government should device a new curriculum where tourism-linked skilling is associated with formal curricula. This would align perfectly with Sen's (1999) vision of capability expansion.

5.4 Income, Livelihoods, and Inequality

Uttarakhand's income index of 0.686 suggests tourism's material impact. Tourists spend money on hotels, homestays, transport, food, handicrafts, and small retail. Adventure sports, Yoga outlets, and peaceful resorts in remote hilly villages diversify earnings. Overall, tourism sector contributes almost 25% in the state's GSDP (Government of Uttarakhand, 2022).

However, the income from tourism is rarely distributed evenly across the stakeholders (Bianchi, 2009). The challenge also lies in stabilizing tourism income throughout the year. Government must device tourism policies which could provide durable livelihoods through credit access, cooperatives, and micro-insurance (NITI Aayog, 2023).

Comparatively, Himachal Pradesh's decentralized governance ensures that tourism revenues cycle through local budgets; Uttarakhand can emulate this model to narrow inter-district gaps (Planning Commission, 2013).

5.5 The Tourism–HDI Feedback Cycle

Tourism and human development form a feedback loop i.e. a “development helix” that can spiral upward or downward depending on governance. Following are some of the dimensions which show this `feedback cycle:

- **Tourism → Economy → HDI:** Visitor spending increases local demand and tax revenue, which fund schools, health centers, and digital infrastructure.
- **Tourism ↔ Infrastructure ↔ HDI:** Better roads, ropeways, broadband, and sanitation lift accessibility for both residents and tourists, reinforcing health and education indices.
- **Culture ↔ Tourism ↔ HDI:** When communities curate festivals and crafts, cultural identity strengthens social cohesion and mental well-being (Richards, 2018; UNESCO, 2022).
- **Tourism → Education & Skills → HDI:** Expanding vocational and digital literacy programs converts tourism's labor demand into structured capability formation.
- **Tourism → Health & Wellness → HDI:** Wellness circuits and preventive-care awareness improve local health behaviors, raising life expectancy and productivity.
- **Tourism ↔ Environment ↔ HDI:** Eco-tourism and biodiversity stewardship preserve the natural capital that underpins long-term prosperity (UNEP & UNWTO, 2021).

However, the loop may give a negative feedback if the ecological, environmental, cultural or societal limits are breached. Even distribution of tourism income is also an important factor to keep the feedback positive. For example, higher incomes may coexist with declining health and education, flattening the HDI curve (Gössling & Hall, 2019; Das & Rana, 2020).

Equity and inclusion is equally critical to maintain the positive feedback and sustaining the loop. Expanding women's access to property rights, credit, and digital platforms ensures that tourism revenues translate into household HDI gains. Panchayat-level planning would ground the sector in everyday welfare priorities. For example, tying tourism taxes to local health posts and schools is one such idea.

5.6 Comparative Insights and Cross-Learning

Cross-state comparison sharpens perspective. **Kerala** exemplifies social investment preceding tourism boom; **Goa** illustrates how regulated tourism sustains high HDI; **Himachal Pradesh** demonstrates decentralized delivery in difficult terrain. Uttarakhand state must also invest in

learning and integrating such progressive policies into its tourism sector to climb into the high-HDI bracket (UNDP, 2023).

Lessons can also be learned from tourism sectors operating outside India. Mountain regions like Nepal's Annapurna and Bhutan's Phobjikha Valley have shown that by controlling visitor numbers and evenly distributing tourism income can provide sustainable tourism model (UNEP, 2021). Such models could inspire Uttarakhand's district-level tourism zoning and benefit-sharing frameworks.

5.7 Integrating Tourism Metrics with HDI Planning

To institutionalize this synergy, HDI indicators must enter tourism dashboards. Three practical steps can anchor this integration:

1. **District HDI–Tourism Mapping:** Use disaggregated data to identify which circuits yield the strongest education, health, and income spill-overs.
2. **Earmarked Tourism Revenue:** Innovating tourism taxes which could be invested into local health care, digital classrooms, and women's cooperatives.
3. **Green HDI Accounting:** Include ecological indicators within HDI reporting (Steffen et al., 2015).

Such alignment would transform HDI from a diagnostic tool into a policy dashboard guiding sustainable tourism management.

5.8 Toward a Human-Centered Tourism Model

The evidence across sectors converges on one insight: tourism's highest value lies not in its contribution to GDP but in its capacity to expand human freedoms. The HDI moves from abstraction to lived experience when villagers become entrepreneurs.

Conversely, when roads crumble, schools empty during peak seasons, or rivers choke under plastic, the HDI's progress graph conceals regression beneath its decimals. The balance between tourism income and associated costs will decide the states developmental destiny.

Uttarakhand's story is about geographical, economic, and human ascent. Tourism has lifted incomes, modernized infrastructure, and exposed remote communities to global flows. Yet the climb is far from complete. The next leap will depend on turning each tourist arrival into a catalyst for capability: a child who stays in school, a mother who runs a homestay, a village that manages its forest sustainably. In that transformation lie the state's true measures of success.

If guided by inclusion, equity, and ecological balance, Uttarakhand can evolve from a “Dev Bhoomi” visited for its sanctity to a “Vikas Bhoomi” celebrated for its humanity. It could become a model of mountain resilience where prosperity and preservation walk the same trail.

6. Conclusion and Future Research

Tourism’s influence on Uttarakhand’s human development is visible and subtle. Tourism sector can act as catalyst for multidimensional driver of progress. Numerous examples are present which show districts involved in tourism circuit perform better in HDI in comparison to the districts which still lack tourism programs. This work demonstrates that tourism expands incomes and employment, accelerates skill development, and enhances healthcare and education through improved connectivity.

However, the HDI progress is not evenly distributed across the state. Prosperity is visible in towns which host pilgrims or tourists. On the other hand, remote villages which are not yet included in the tourism circuit lag behind in HDI. The benefits are visible as better roads, jobs, and some new schools, but the costs linger too: hills scarred by construction, erratic earnings that vanish with off-seasons, and women still left out of decision-making spaces. The real issue isn’t about making tourism grow — it’s about steering that growth wisely. What this study noticed is simple yet telling: when local people own the process, when women take part in shaping it, and when the environment isn’t treated as expendable, tourism genuinely lifts human well-being.

Human development goals must be included directly into tourism planning. Lessons from neighbors like Himachal Pradesh, Sikkim, and even Bhutan show that prosperity lasts only where governance stays inclusive and growth respects the land’s limits.

Ultimately, Uttarakhand’s path to higher human development will depend on transforming tourism from a revenue stream into a rights-based, capability-expanding institution. The mountains will always draw pilgrims and trekkers, but whether those journeys uplift the locals will depend on how wisely the state balances economy with ecology, and faith with fairness.

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Appendix 1: Calculating HDI in Uttarakhand (2022)

The **Human Development Index (HDI)** is a composite measure assessing three key dimensions of human development:

1. **Health:** Measured by life expectancy at birth.
2. **Education:** Evaluated through mean years of schooling and expected years of schooling.
3. **Standard of Living:** Assessed via Gross National Income (GNI) per capita.

Methodology and Secondary Data Analysis

Step 1: HDI Formula Overview

HDI is the **arithmetic mean** of three normalized indices:

$$\text{HDI} = \frac{\text{Health Index} + \text{Education Index} + \text{Income Index}}{3}$$

Step 2: Health Index

Formula (Using the Current UNDP Methodology)

$$\text{Health Index} = \frac{(\text{Life Expectancy} - 20)}{85 - 20}$$

Given: Life Expectancy (LE) = 67.72 years

$$\text{Health Index (HI)} = \frac{(67.72 - 20)}{85 - 20} = \frac{(47.72)}{65} = \mathbf{0.734}$$

Step 3: Education Index

Formula (Post-2010 UNDP Method):

$$\text{Education Index} = \frac{\frac{(\text{Expected Years of Schooling (EYS)} + (\text{Mean Years of Schooling (EYS)})}{18}}{2} \frac{15}{15}}$$

Given: Expected Years of Schooling (EYS) = 13.24

- Mean Years of Schooling (MYS) = 7.769

$$\text{Education Index (EI)} = \frac{\frac{(13.24) + (7.769)}{18}}{2} = \frac{0.7356 + 0.5179}{2} = \frac{1.2535}{2} = \mathbf{0.627}$$

Step 4: Income Index

$$\text{Income Index (II)} = \frac{(\ln(\text{GNIpc}) - \ln(100))}{(\ln(75000) - \ln(100))}$$

Where (GNIpc) = Gross National Income per capita

- Natural Log of Gross National Income (GNI) per capita (ln GNIpc) for Uttarakhand = 9.148
→ Convert to actual GNI per capita:
- $\text{GNIpc} = e^{9.148} \approx 9466.16$

Substitute:

$$\text{Income Index (II)} = \frac{(9.148-4.605)}{(11.225-4.605)} = \frac{4.543}{(6.62)} = \mathbf{0.686}$$

Step 5: Final HDI Calculation

$$\text{HDI} = \frac{\text{Health Index} + \text{Education Index} + \text{Income Index}}{3}$$

Substitute values:

$$\text{HDI} = \frac{0.734 + 0.627 + 0.686}{3} = \frac{2.047}{3} = \mathbf{0.682}$$

Final Results Summary:

Dimension	Index Value
Health Index	0.734
Education Index	0.627
Income Index	0.686
Final HDI	0.682

This calculated HDI of 0.682 in appendix 1 for Uttarakhand matches closely with the HDI value reported by **Global Data Lab's 2022 for Uttarakhand** (0.681). This also confirms that the official figure is based on the **current UNDP methodology**. Uttarakhand's 2022 HDI of 0.681, places it in the "Medium Human Development" category.