Factors Influencing the Variation in HDI scores across Different Districts of West Bengal

Research Paper By Avisha Saraf

Abstract:

This paper attempts to stress the need of understanding comprehensive metrics of development such as the Human Development Index, which was introduced by the United Nations Development Programme in 1990's, although the attention of gauging HDI metrics at sub-national and sub-regional levels have been sparse. The paper attempts to trace the changes in HDI scores across different districts of West Bengal, through the three pivotal studies of its calculation during 2004, 2011 and 2022. This paper inquires how assessing HDI scores at sub-regional levels can aid in identifying areas of contention, as well as, prepare us with better policy planning and social audits to gauge the implementation of those policies. This paper argues how the comprehensive, cohesive and continuous availability of data is essential for better governance and enhances the ability of the state to improve the quality of life for its people.

Introduction

District is the most primary unit of administration and governance in India, it is also the most effective unit in instrumenting social transformation. Considering the large spatial expanse, as well as, the significantly large population under its ambit, the national and sub-national units of governance and administration (despite holding more financial and political power) are rendered somewhat inadequate in spearheading social transformation, due to a variety of reasons, largely stemming from the size and population under their purview, along with the statistical treatment that the social issues are gauged with tend to misrepresented on account of the large scale data that is being dealt with. The aggregates of large-scale data sets have their own limitations in providing a clear picture of ground reality and the extrapolations that they're subjected to might further distort the pursuit of identifying areas of concerns and plausible pathways of reform. Although, the directives and the funding are decided by the national and sub-national (i.e., state) legislature and administration, the districts (sub-regional units of governance and administration) are the most pivotal arenas of addressing social concerns, as their size and the population within them facilitates transparency, accountability and the last mile delivery, as well as, monitoring of the programmes and policies.

Despite districts being the primary source for the collection of data, revenue and even the selection of representatives, the collation and presentation of data, as well as, the peculiar considerations of programmes and policies with regards to varying social concerns tend to be largely inclined towards the national and sub-national units. Hence, the potential for deploying the role of an observatory upon the governance and administration of sub-regional units are multi-fold, as they would be able to provide the most appropriate information and real-time analysis of the most pressing developmental needs, as well as, identifying the opportunities for cost-cutting and allocating funds as per the most immediate priority. The emphasis on sub-

regional units in terms of undertaking globally deliberated developmental goals has only recently gained attention amongst scholarly circles and policy makers, this is evident by the lack of district level data on various concerns, human development index being one of them. Various attempts have been made amongst scholars to shift towards the creating a human development index that reflects the standards of human development within districts and the variations within it, these attempts have used the conventional parameters (i.e., health, education and income) although the metrics that are deployed in gauging them have been changed, due to the lack of availability of district level data (Chaurasia, 2022, 2022, 2023; Dey et al., 2024; Ghislandi et al., 2019).

Human development is the most crucial form of investment, as it is utilized to create the infrastructure and practices that provide better living conditions for people. The investment and attention that is paid towards human development is essential for the creation of human capital, through the inculcation of capacity building endeavors, productivity enhancing opportunities, community cohesion practices and sustainable circular economies. This paper addresses the variation of Human Development Index scores in West Bengal with the attempt to investigate the potential and apparent causes for these differences, it aims to examine the changes between the HDI scores across districts between 2004 and 2022 and explicate the plausible explanations of these changes. The overarching intent of the paper is to demonstrate the level of sub-regional analysis is pivotal and often dismissed in the social, economic and political deliberations, as well as observance of essential parameters of development, which are lopsided towards sub-national and national levels due to the suppositions of them holding greater relevance or presenting an overarching picture of the stature of developmental needs.

The Human Development Index (HDI), developed by the United Nations Development Programme (UNDP), offers a critical lens to assess West Bengal's uneven development, where districts like Kolkata boast high scores (0.80) akin to developed nations, while Purulia (0.55) lags behind, mirroring sub-Saharan averages. By integrating health (life expectancy, infant mortality), education (literacy rates, dropout levels in tribal zones), and economic prosperity (GNI per capita, agrarian vs. industrial income) (United Nations Development Programme, 2024), HDI exposes stark contrasts: Kolkata's thriving service sector coexists with Malda's migrant labor-driven precarity (Ayushmaan et al., 2020). Unlike GDP, which masks these disparities, HDI's multidimensionality reveals how urban-centric policies neglect rural healthcare infrastructure and tribal education gaps. For West Bengal's policymakers, addressing these imbalances—such as improving primary health centers in Jangalmahal or vocational training in Cooch Behar—is vital to achieving equitable growth under SDG 10.

Research Questions

This research aims to address the following questions:

- What are the means and methods available for researchers to calculate the Human Development Index scores at district level?
- Assess the availability of data to undertake the calculation of Human Development Index scores at sub-regional level as per United Nations Development Programme method?
- The key variables deployed by researchers for the calculation of modified Human Development Index scores at sub-regional level, and why?
- Gauge the causes of the differences in the Human Development Index scores across different districts

This paper identifies and traces the human development across the calculations made about human development index of West Bengal across 2004, 2011 and 2022 by various sources, it assesses the development of district level Human Development Index in West Bengal and how its observance has impacted growth or lack thereof.

Review of Literature

India ranks 134th out of 193 countries, with a score of 0.644 points (United Nations Development Programme, 2024), while there has been less attention paid towards the human development scores at sub-national and sub-regional levels. Considering that there are various attempts made by the scholars and think tanks, there are no comprehensive and continuous studies that are conducted for the Human Development Index, especially at sub-national and regional levels. The existing studies tend to divulge from the conventional method of calculating HDI, which entails the metrics of 'life expectancy' for health, 'mean years of schooling and expected years of schooling' for education and 'gross national income per capita' for livelihood, instead, the maintain the broader parameters of education, health and income through inculcating different parameters of '(i) literacy rate, (ii) completing high school as percentage of enrollment in 1st grade, (iii) percentage of the 21+ population who are graduates' under the purview of 'education', '(i) under-5 Mortality Rate (death Rate per 1000 live births), (ii) under-5 children suffering from malnutrition, (iii) adults suffering from anaemia' within the ambit of 'health', and '(i) weekly average earning of casual workers, (ii) monthly per capita expenditure, and (iii) percentage of adult male workers employed locally' under the rubric of 'livelihood', for the creation of 'modified human development index' (Chaurasia, 2022, 2023; Dey et al., 2024; Ghosh, 2023). Most attempts that are made towards an assessment or evaluation of HDI scores at sub-national or sub-regional levels rely on

extrapolations or inferences due to the lack of reliable data considering that most research tend to rely on the last data-set produced by the state which was published during 2004 (Chakraborty, 2024; Das, 2017; S. K. Dey, 2015; Purohit, 2008).

Sub-regional analysis of the Human Development Index (HDI) has gained increasing scholarly attention in the context of Indian states, with West Bengal often serving as a significant case study due to its stark inter-district disparities. The foundational West Bengal Human Development Report which was published by the 'Development and Planning Department' (West Bengal, 2004), which offered one of the earliest district-wise assessments, highlighting how urban-industrial centers such as Kolkata and Howrah outperformed predominantly agrarian districts like Purulia, Birbhum, and Malda (Hanagodimath, 2013). Such a precedent led to the studies that conducted a comprehensive spatial and temporal assessment of HDI across various sub-regional units using principal component analysis, noting the widening gap in economic development indicators between urbanized and peripheral districts (Liang et al., 2021). Scholars have also emphasized upon the multidimensional nature of development by incorporating gender and infrastructure variables, observing that educational attainment remained relatively equitable while income continued to show high variation (Suryanarayana et al., 2016). In 2023, various scholars had laid emphasis on the contextualizing the spatiality of multi-dimensional poverty in rural and urban India, whereby they have deployed GIS-based spatial mapping to visualize HDI trends, demonstrating significant clustering of low-development districts in the western and northern regions of the state (Mondal et al., 2023). Despite these efforts, several critical gaps persist in the literature, there have been considerable debates and deliberations that reflect on the limitations of traditional HDI calculations and propose alternative frameworks to better capture intra-state disparities (Chaurasia, 2022; Das, 2017).

Most existing studies rely on decadal data, with limited incorporation of recent post-2011 census updates which overlooks contemporary developmental trajectories (Chaurasia, 2013, 2022, 2023). Furthermore, while HDI components—health, income, and education—are individually analyzed, there is a paucity of integrated statistical modeling that evaluates their interdependence at the district level. Studies also tend to focus on comparative ranking rather than causal inferences about underlying socioeconomic factors, such as landholding patterns, public investment in education, and employment structure. Additionally, there is a lack of longitudinal analyses that track policy impacts on HDI evolution across districts. These gaps signal the need for a more dynamic, multidimensional, and data-driven inquiry into sub-regional human development in West Bengal.

Tracing the Trajectory of Human Development across Districts in West Bengal

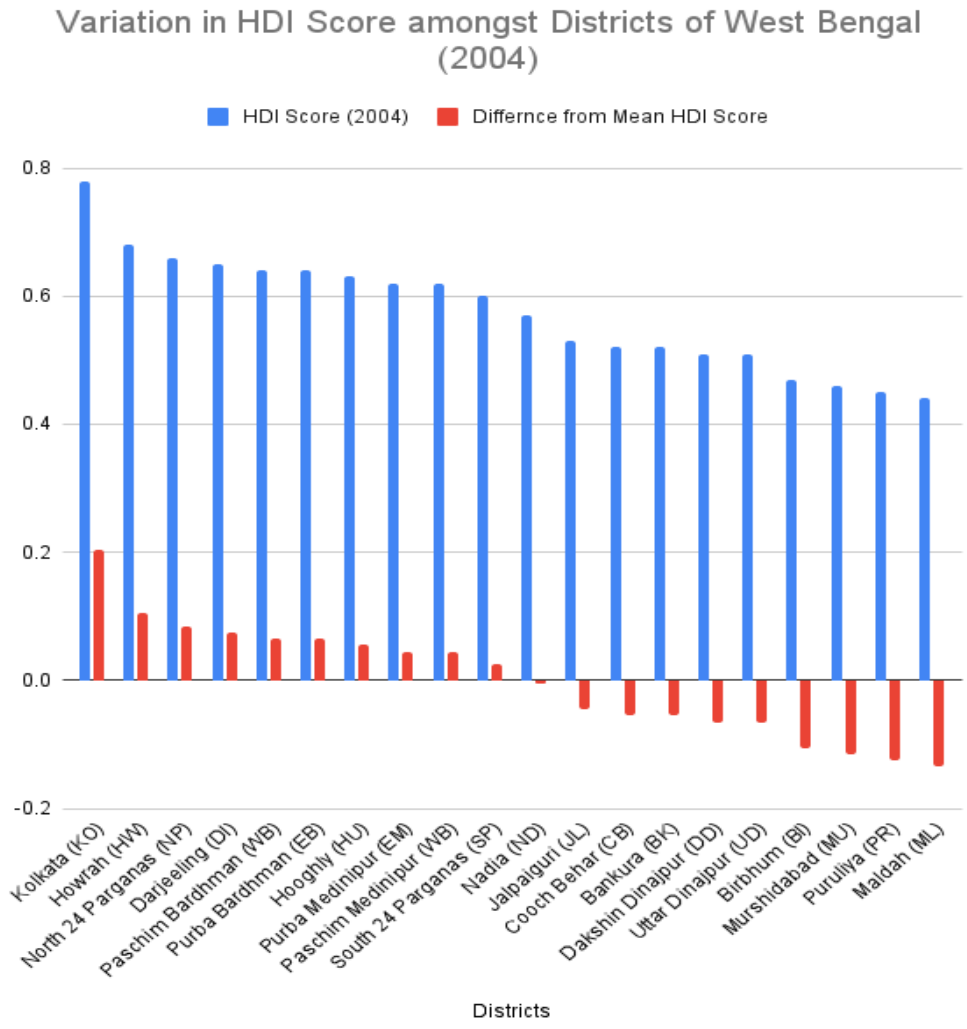
This section draws from the 3 most pressing scholastic works that have been conducted regarding the sub-regional analysis of Human Development Index across West Bengal; it reflects on the changes and the variations between the HDI scores across three pivotal points of its measurement during 2004, 2011 and 2022. The first calculation which was conducted in 2004 was the result of a proactive measure by the state government towards the observance of the extent of variations in Human Development across various districts (West Bengal, 2004), the second has been a product of scholastic research in the field of geography, wherein the 2011 census data has been used to portray the extent of variations in Human development across states (Ghosh, 2023) and the most recent research has gained a lot of traction, this research has assessed the district level human development through analyzing the districts positions in Human development as per the standards of UNDP in 2022, as well as, endorsed a fellow alternative technique for calculating the same, namely, Maziotta-Pareto Human Development Index, which uses more relevant and nuanced metrics of analysis (S. Dey et al., 2024).

HDI Score across Districts in West Bengal (2004)		
District	HDI Score	Deviation from the Mean HDI Score
Kolkata (KO)	0.780	0.205
Howrah (HW)	0.680	0.105
North 24 Parganas (NP)	0.660	0.085
Darjeeling (DI)	0.650	0.075
Bardhman	0.640	0.065
Hooghly (HU)	0.630	0.055
Purba Medinipur (EM)	0.620	0.045
Paschim Medinipur (WB)	0.620	0.045
South 24 Parganas (SP)	0.600	0.025
Nadia (ND)	0.570	-0.005
Jalpaiguri (JL)	0.530	-0.045
Cooch Behar (CB)	0.520	-0.055
Bankura (BK)	0.520	-0.055
Dakshin Dinajpur (DD)	0.510	-0.065

Uttar Dinajpur (UD)	0.510	-0.065
Birbhum (BI)	0.470	-0.105
Murshidabad (MU)	0.460	-0.115
Puruliya (PR)	0.450	-0.125
Malda (ML)	0.440	-0.135
Mean: 0.575; **Standard Deviation**: 0.091		

HDI Scores across Districts in West Bengal (2004)
Source: (West Bengal, 2004)

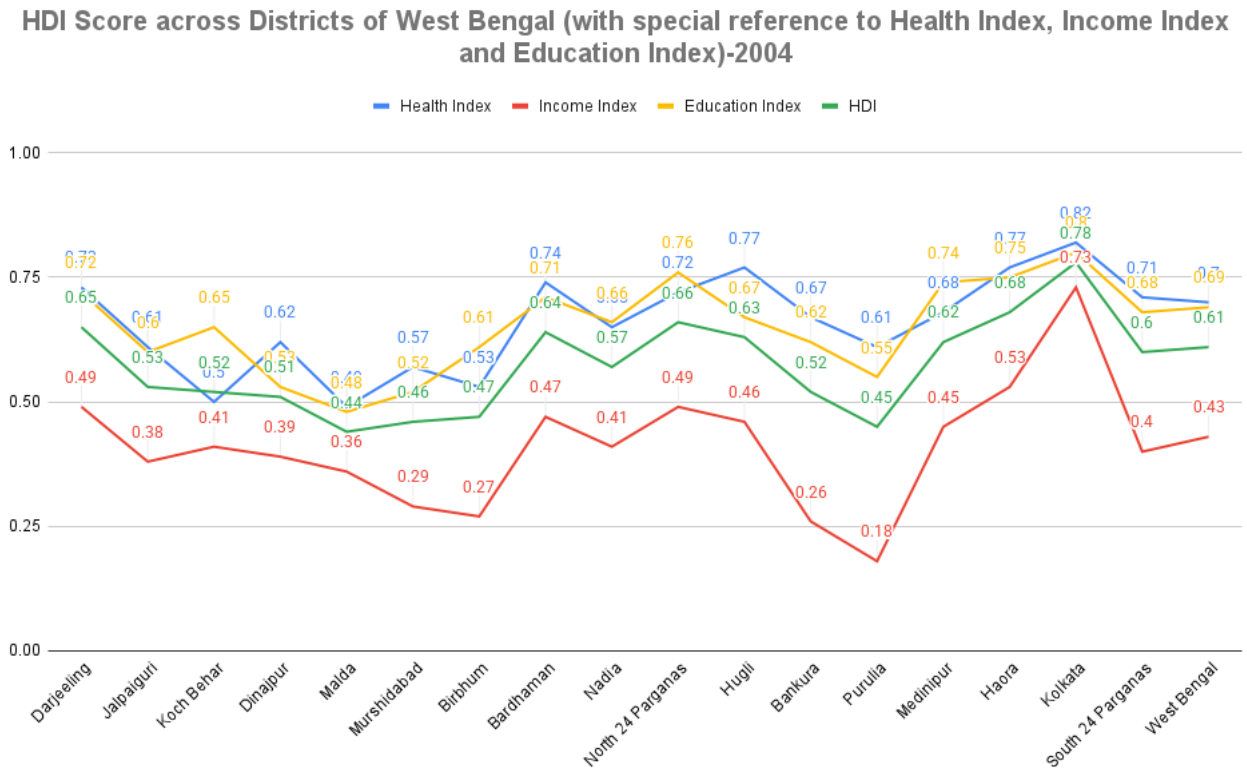
The Human Development Index (HDI) across the districts of West Bengal reveals significant regional disparities, primarily influenced by variations in income, health, and education indices. Urban districts like Kolkata, Howrah, and North 24 Parganas consistently top the HDI charts due to better infrastructure, healthcare services, educational institutions, and economic opportunities. In contrast, rural and agrarian districts such as Purulia, Murshidabad, and Malda lag behind, with particularly low income indices playing a major role in suppressing their overall HDI scores. While the education and health indices show relatively balanced performance across districts, income inequality remains the most decisive factor. Comparing historical data from 2004 with recent trends, it's evident that while some districts have progressed modestly, others have seen minimal change, maintaining the urban-rural divide. The root causes of these disparities include unequal resource allocation, limited access to quality services in rural areas, and historical development patterns favoring urban-industrial centers. Overall, targeted policies focusing on rural economic enhancement, health access, and educational outreach are essential to bridging these development gaps.



Variations in HDI Score amongst Districts of West Bengal (2004)
Source: (West Bengal, 2004)

In 2004, West Bengal exhibited significant disparities in the Human Development Index (HDI) across districts, revealing a clear urban-rural divide in health, education, and income indicators. Kolkata, as the state's urban nucleus, ranks highest in HDI (0.78) due to its advanced healthcare systems, educational institutions, and economic diversity. Similarly, North 24 Parganas and Hugli demonstrate strong literacy rates and employment opportunities, reinforcing their positions as high-performing districts. In contrast, agrarian districts such as Purulia and Bankura display low HDI scores (below 0.50), primarily due to economic stagnation and infrastructure deficits. The Income Index shows the starkest variation, with urban districts thriving on industrial and service-based economies, whereas rural regions struggle with income-generation constraints. While the Health Index is relatively stable, some districts, such as Murshidabad and Uttar Dinajpur have reported to lack sufficient medical infrastructure, leading to lower overall development scores. The Education Index, though strong in urban centers, remains uneven in districts like Malda and Murshidabad, reflecting gaps in school enrollment and accessibility. These disparities required targeted policy interventions, focusing on rural

economic revitalization, educational outreach, and healthcare accessibility to ensure equitable human development across the districts within the state.



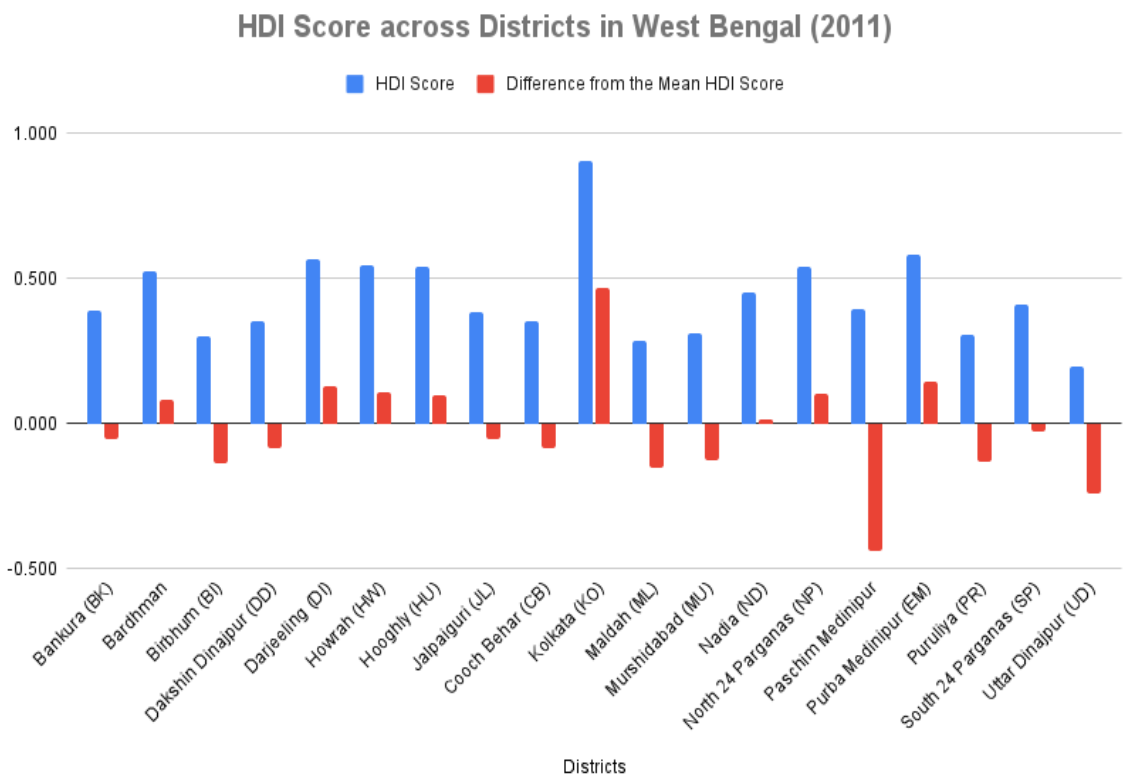
HDI Score across Districts of West Bengal (with special reference to Health Index, Income Index and Education Index)-2004
Source: (West Bengal, 2004)

In 2011, Human Development Index (HDI) across districts in West Bengal underscores a stark developmental imbalance, shaped by a complex interplay of economic, infrastructural, and policy-driven factors. The extreme disparity between Kolkata (0.906) and Uttar Dinajpur (0.197) reflects the uneven distribution of resources, industrialization, and governance effectiveness. Kolkata's dominance in income (0.995) and health (0.965) stems from its robust urban infrastructure, access to specialized healthcare, and diversified employment opportunities, particularly in the post-liberalization era. In contrast, Uttar Dinajpur's abysmally low Health Index (0.076) signals severe deficiencies in medical facilities, high maternal and infant mortality rates, and inadequate public health interventions. A deeper examination of HDI components reveals that education alone does not guarantee high human development outcomes. While districts like Bankura (0.665) and Purulia (0.671) maintain moderate Education Index scores, their low health and income indices prevent substantial HDI improvements. Malda, for instance, has a fair Education Index (0.613) but suffers from poor health (0.112) and income (0.125), resulting in an overall HDI of 0.284. This suggests that economic stagnation and weak healthcare infrastructure are critical barriers to human development.

HDI Score across Districts in West Bengal (2011)		
District	HDI Score	Deviation from the Mean HDI Score
Bankura (BK)	0.387	-0.051
Bardhman	0.522	0.084
Birbhum (BI)	0.302	-0.137
Dakshin Dinajpur (DD)	0.351	-0.088
Darjeeling (DI)	0.566	0.127
Howrah (HW)	0.545	0.106
Hooghly (HU)	0.539	0.100
Jalpaiguri (JL)	0.385	-0.054
Cooch Behar (CB)	0.352	-0.086
Kolkata (KO)	0.906	0.468
Maldah (ML)	0.284	-0.155
Murshidabad (MU)	0.312	-0.127
Nadia (ND)	0.451	0.012
North 24 Parganas (NP)	0.543	0.104
Paschim Medinipur (WB)	0.393	-0.439
Purba Medinipur (EM)	0.581	0.143
Puruliya (PR)	0.308	-0.130
South 24 Parganas (SP)	0.410	-0.029
Uttar Dinajpur (UD)	0.197	-0.241
Mean: 0.439; **Standard Deviation**: 0.158		

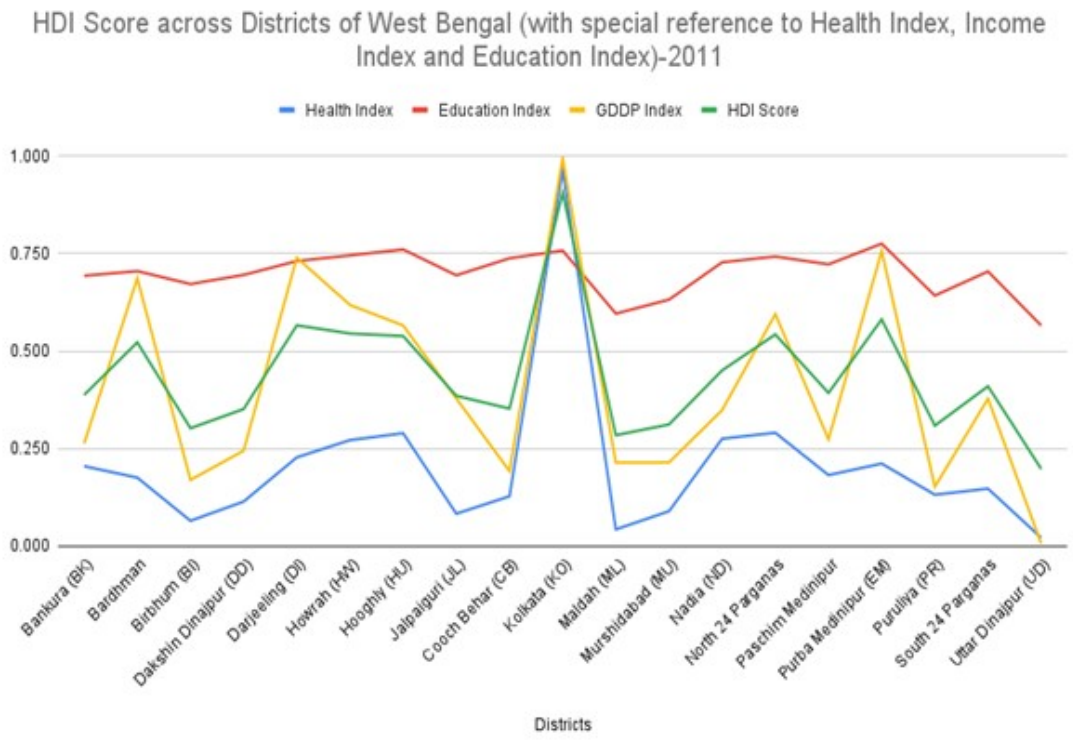
HDI Score across Districts in West Bengal (2011),
Source: (Ghosh, 2023)

The urban-rural divide is further exacerbated by disparities in healthcare access. Kolkata's near-perfect Health Index (0.965) contrasts sharply with Uttar Dinajpur (0.076), highlighting the inadequacy of rural health infrastructure, including shortages of medical personnel, poor sanitation, and limited hospital accessibility. Additionally, income disparities mirror industrialization patterns, with Kolkata and its adjacent industrial belts benefiting from post-liberalization investments, while agricultural districts remain economically stagnant. The mismatch between education levels and economic opportunities in some districts suggests a phenomenon of brain-drain, where educated youth migrate to urban centers due to a lack of local employment prospects.



Variations in HDI Score amongst Districts of West Bengal (2011)
Source: (Ghosh, 2023)

Policy interventions, though present, have struggled with effective implementation. Programs such as Sarva Shiksha Abhiyan, National Rural Health Mission (NRHM), Midday Meal Scheme, and Backward Regions Grant Fund (BRGF) were operational during this period, yet their impact varied significantly. Purulia, a BRGF target district, still reported low HDI (0.309) with a Health Index of only 0.109, indicating gaps in scheme execution. Similarly, Dakshin Dinajpur, covered under NRHM, recorded a Health Index of 0.110, among the lowest in the state. Birbhum, despite BRGF assistance, had the second-lowest Income Index (0.186), suggesting that generic policy frameworks failed to address district-specific constraints effectively. Research suggests that historical land tenure systems, agrarian distress, and socio-political marginalization contribute to these disparities. Northern districts, particularly Uttar Dinajpur and Malda, have historically faced challenges related to land fragmentation, low agricultural productivity, and seasonal migration, which weaken economic stability. Additionally, caste and gender-based inequalities play a role in limiting access to healthcare and employment, further entrenching developmental gaps.



HDI Score across Districts of West Bengal (with special reference to Health Index, Income Index and Education Index)-2011
Source: (Ghosh, 2023)

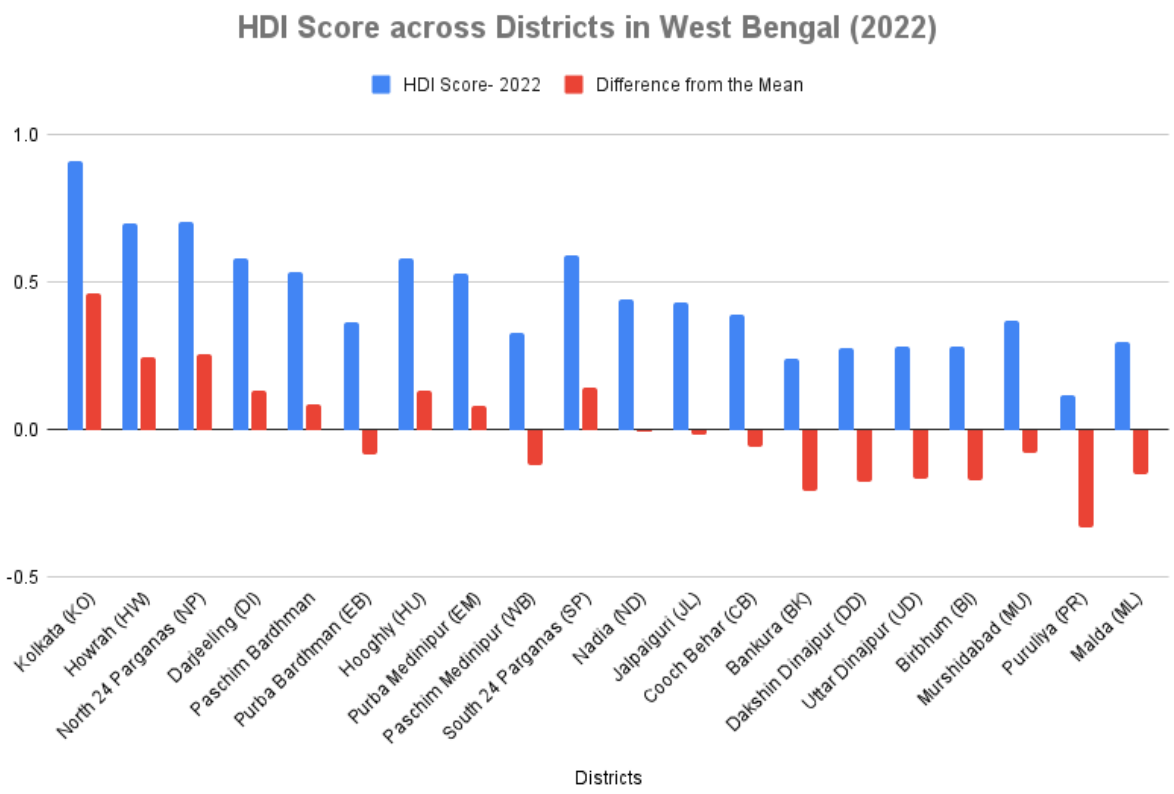
The 2022 Human Development Index (HDI) across districts of West Bengal presents a nuanced picture of progress and persistent inequalities, shaped by economic, infrastructural, and policy-driven factors. While Kolkata (HDI: 0.909) continues to lead, far exceeding the state average of 0.448, districts such as Puruliya (HDI: 0.118), Malda, Dakshin Dinajpur, and Bankura remain among the lowest performers. The Education Index highlights a stark divide, with Kolkata achieving a perfect score of 1.000, while Uttar Dinajpur and Puruliya struggle below 0.1, reflecting deep-rooted educational inequalities. Similarly, Health Index disparities persist, with South 24 Parganas (0.728) and Darjeeling (0.729) showing resilience, whereas Murshidabad (0.307) and Paschim Medinipur (0.308) continue to lag behind. A component-wise trend analysis underscores structural inconsistencies, particularly in Livelihood Index (Income), which remains volatile and unevenly distributed. While Howrah (0.751) and North 24 Parganas (0.720) exhibit strong economic performance, Purba Bardhaman (0.254) and Puruliya (0.057) remain economically weak. Notably, South 24 Parganas has improved in healthcare access, likely due to rural health interventions such as sub-centres and mobile clinics. However, Paschim Medinipur's decline across all indices raises concerns, especially given its mid-level HDI performance in 2011. The coefficient of variation across indices (Education: 0.520, Health: 0.429, Livelihood: 0.486) underscores persistent inequality, despite policy efforts.

HDI Score across Districts in West Bengal (2022)		
District	HDI Score (2022)	Deviation from the Mean HDI Score
Kolkata (KO)	0.909	0.461
Howrah (HW)	0.697	0.249
North 24 Parganas (NP)	0.705	0.257
Darjeeling (DI)	0.581	0.133
Paschim Bardhman (WB)	0.535	0.087
Purba Bardhman (EB)	0.366	-0.082
Hooghly (HU)	0.583	0.135
Purba Medinipur (EM)	0.531	0.083
Paschim Medinipur (WB)	0.329	-0.119
South 24 Parganas (SP)	0.592	0.144
Nadia (ND)	0.443	-0.005
Jalpaiguri (JL)	0.434	-0.014
Cooch Behar (CB)	0.392	-0.056
Bankura (BK)	0.239	-0.209
Dakshin Dinajpur (DD)	0.275	-0.173
Uttar Dinajpur (UD)	0.285	-0.163
Birbhum (BI)	0.28	-0.168
Murshidabad (MU)	0.372	-0.076
Puruliya (PR)	0.118	-0.330
Malda (ML)	0.297	-0.151
Mean: 0.448: Standard Deviation: 0.192		

Variations in HDI Scores Across Districts of West Bengal (2022), Source: (Dey et al., 2024)

Between 2011 and 2022, the Government of West Bengal implemented several initiatives aimed at improving HDI outcomes, including Kanyashree and Sabuj Sathi for female education, Swasthya Sathi for universal health coverage, and Utkarsh Bangla for skill development. While these policies have uplifted districts like South 24 Parganas and Hooghly, implementation bottlenecks and infrastructural gaps have

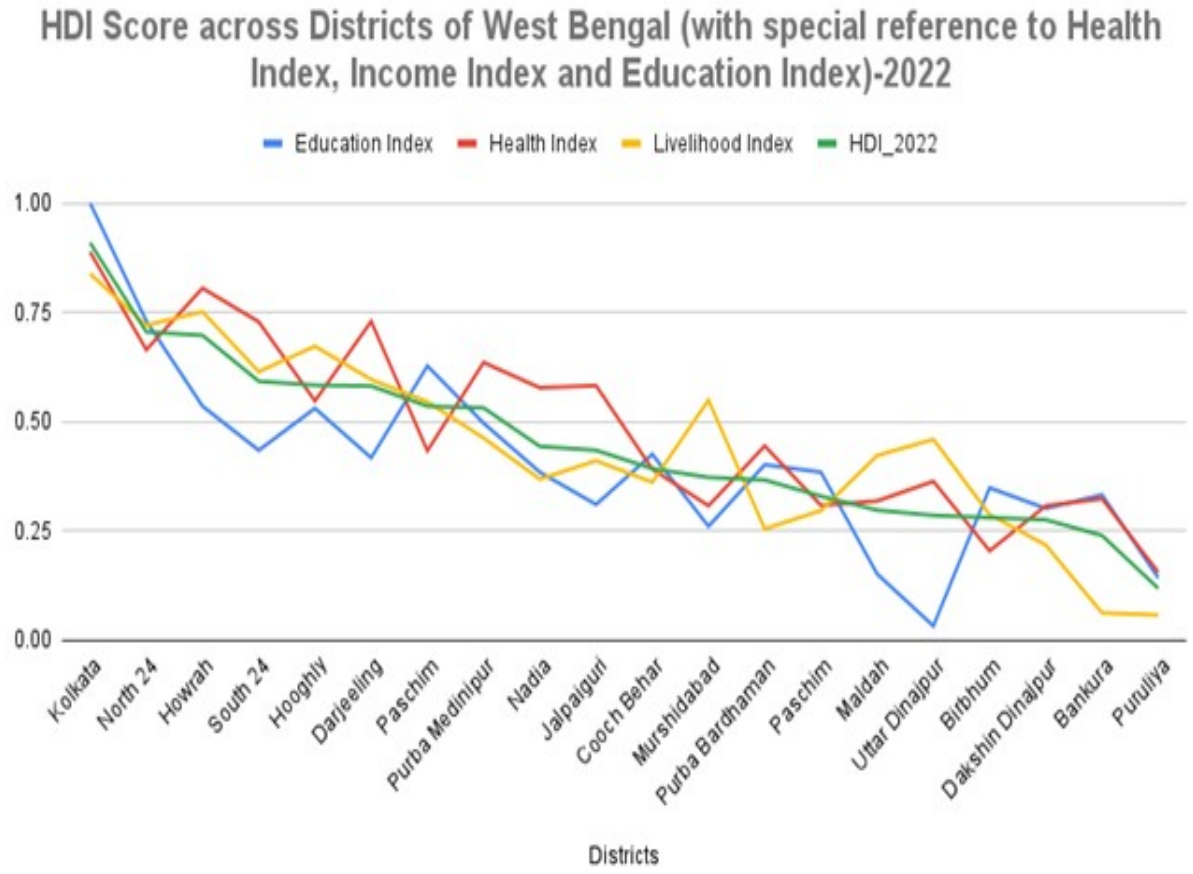
hindered inclusive development, particularly in tribal and remote districts. The widening education divide, with Puruliya and Uttar Dinajpur falling further behind despite nearly two decades of intervention, signals the need for stronger district-specific action plans. Moreover, while healthcare delivery has improved, income disparities persist, emphasizing the need for economic diversification, rural industrialization, and targeted public investment.



HDI Score across Districts in West Bengal (2022),
Source: (Dey et al., 2024)

Recent studies suggest that regional disparities in West Bengal are further influenced by historical land tenure systems, agrarian distress, and socio-political marginalization. Northern districts, particularly Uttar Dinajpur and Malda, have historically faced challenges related to land fragmentation, low agricultural productivity, and seasonal migration, which weaken economic stability. Additionally, caste and gender-based inequalities play a role in limiting access to healthcare and employment, further entrenching developmental gaps. The persistence of such inequalities reflects the broader challenge of translating policy intent into tangible impact, particularly in historically marginalized regions. Addressing these disparities requires localized policy frameworks, strengthened healthcare infrastructure, and economic diversification beyond agriculture. Without robust mechanisms to enhance income generation and healthcare accessibility, education alone will remain insufficient in elevating human development outcomes across the state. Future interventions must focus on

district-specific strategies, ensuring that economic growth, healthcare accessibility, and educational reforms are tailored to the unique challenges of each region.



HDI Score across Districts of West Bengal (with special reference to Health Index, Income Index and Education Index)-2022
Source: (Ghosh, 2023)

Explanations for Variations of HDI Score across Districts of West Bengal

The Human Development Index (HDI) across the districts of West Bengal exhibits notable disparities, shaped by a complex interplay of socio-economic, infrastructural, and historical factors. These variations underscore the uneven distribution of resources and development interventions across the state, reflecting broader challenges in achieving equitable growth.

Urban-Rural Divide

The urban-rural divide is one of the most significant drivers of HDI variations across West Bengal. Urbanized districts such as Kolkata, Howrah, and North 24 Parganas consistently record higher HDI scores due

to their concentrated infrastructure, institutional advantages, and diversified economic opportunities. Kolkata, as the state's economic and administrative capital, exemplifies this disparity. The city hosts premier educational institutions (e.g., Presidency University, Jadavpur University, and IIM Calcutta), ensuring high literacy rates and skilled labor. Its healthcare ecosystem comprising AIIMS Kalyani, Apollo Hospitals, and government-run SSKM Hospital provides superior medical access, contributing to higher life expectancy. Economically, Kolkata's IT hubs (Salt Lake Sector V), financial centers, and media industries generate high-wage employment, elevating per capita income. In contrast, rural districts like Purulia, Bankura, and Uttar Dinajpur face systemic disadvantages rooted in agrarian dependency, infrastructural neglect, and limited industrialization. Purulia, for instance, relies heavily on rain-fed agriculture, leaving incomes vulnerable to monsoon variability. Unlike Kolkata's diversified economy, Purulia lacks significant industrial or service-sector growth, resulting in lower wages, seasonal unemployment, and outmigration of youth. The district's educational infrastructure is underdeveloped, hence, the schools suffer from teacher shortages, high dropout rates (especially among girls), and inadequate digital access, perpetuating low literacy. Healthcare access is similarly constrained, with fewer primary health centers (PHCs), scarce specialists, and long travel distances for critical care. Infrastructural gaps further entrench rural-urban disparities**.** While Kolkata enjoys well-paved roads, metro connectivity, and reliable electricity, rural districts struggle with unmetalled roads, erratic power supply, and poor public transport. For example, Bankura's remote villages often lack all-weather roads, delaying ambulance services and school attendance. Digital exclusion exacerbates the problem—limited internet penetration hinders e-governance, online education, and telemedicine, widening the development gap.

Health Infrastructure and Accessibility

Healthcare accessibility is a pivotal determinant of HDI disparities across West Bengal, with stark contrasts between urban and rural districts. Kolkata and Hooghly exemplify high-performing regions, where dense healthcare networks comprising tertiary care hospitals, specialized private clinics, and robust government health programs—ensure superior health outcomes. Kolkata alone accounts for over 30% of the state's hospital beds, with institutions like Medical College Hospital, SSKM, and AMRI offering advanced treatments, attracting patients statewide. The city's infant mortality rate (IMR) of 18 per 1,000 births rivals developed nations, while its maternal mortality ratio (MMR) of 70 per 100,000 reflects institutional delivery access (MHFW, 2021). Hooghly benefits from proximity to Kolkata and industrial investments (e.g., Bandel's pharmaceutical hubs), which bolster health infrastructure. Whereas, Murshidabad and Uttar Dinajpur grapple with systemic healthcare deficits, perpetuating low HDI scores. Murshidabad's IMR (32) and MMR (110) are nearly double Kolkata's, attributed to only 1 PHC per 50,000 people (vs. 1 per 20,000 in Kolkata). While, Uttar Dinajpur, a border district, has 40% of its PHCs non-functional due to staff shortages, forcing villagers to travel >20 km for basic care. Rural districts face 60% vacancies for doctors and nurses (WB Health Report, 2023), as

professionals prefer urban postings. Murshidabad's riverine geography disrupts ambulance services, while Uttar Dinajpur's porous Bangladesh border complicates disease surveillance (e.g., malaria outbreaks). Also, low female literacy in Malda and Murshidabad delays health-seeking behavior, especially for maternal care. Government interventions like Swasthya Sathi, a universal health insurance scheme, have made strides in providing insurance coverage to 80% of rural households, although such policies face operational hurdles due to the lack of awareness**.**

Economic Structure and Employment Opportunities

The Income Index, a critical component of the Human Development Index (HDI), reveals acute economic disparities between urban and rural districts in West Bengal, driven by structural inequalities in industrialization, employment opportunities, and economic diversification. Districts like Kolkata, Howrah, and North 24 Parganas benefit from concentrated industrialization, a thriving service economy, and global trade linkages. Kolkata, as the state's financial and commercial hub, hosts major IT/ITES hubs (Salt Lake Sector V, New Town), contributing significantly to high-value employment and per capita income. The presence of multinational corporations (TCS, Cognizant, PwC) and financial institutions (SEBI, RBI regional office) ensures a steady influx of white-collar jobs, with average salaries 3-4 times higher than those in rural sectors. Also, Howrah's manufacturing belt is home to engineering, textiles, and chemical industries which provides stable wages for skilled and semi-skilled laborers. The Kolkata Port, one of India's oldest, further facilitates trade, boosting ancillary businesses in logistics and retail. In contrast, Bankura, Birbhum, and Purulia remain trapped in low-productivity agrarian economies, with limited industrial or service-sector penetration. Bankura's heavy reliance on mono-cropping (primarily paddy and maize) leaves farmers vulnerable to climate shocks, declining groundwater levels, and volatile market prices. The average landholding size has shrunk to less than 0.5 hectares due to inheritance fragmentation, making subsistence farming unviable for many. Birbhum's laterite soil restricts high-yield agriculture, forcing seasonal migration to neighboring states for menial labor. Unlike Punjab (food processing) or Maharashtra (cooperatives), West Bengal's rural districts lack value-addition industries (e.g., rice mills, cold storage), keeping farm incomes depressed. With minimal vocational training centers, rural youth lack qualifications for formal sector jobs, perpetuating informal, low-wage work (e.g., construction, daily labor) while poor road connectivity and erratic electricity deter private investment in rural industrialization. Arguably, the political resistance to industrialization (e.g., Singur fallout) has stifled manufacturing growth in potential rural hubs. Small farmers in Bankura struggle to secure loans for irrigation or diversification due to limited banking penetration.Outmigration of working-age populations to cities or other states (e.g., Kerala, Gujarat) deprives rural districts of human capital.

Educational Attainment and Literacy Levels

Education disparities play a pivotal role in shaping HDI variations across West Bengal's districts, reinforcing cycles of privilege in urban centers and deprivation in rural peripheries. While districts like Kolkata, North 24 Parganas, and Howrah boast high literacy rates (over 90%) and superior learning outcomes, agrarian and border districts such as Malda, Murshidabad, and Uttar Dinajpur struggle with deep-rooted systemic failures that perpetuate educational inequity. Kolkata and its neighboring districts benefit from a concentration of high-quality educational institutions, both public and private. Elite schools like South Point, La Martiniere, and Modern High—along with premier universities (Presidency, Jadavpur, and St. Xavier's)—ensure that students receive globally competitive education. Also, government initiatives like Kanyashree Prakalpa (conditional cash transfers for girls) have boosted female enrollment in urban schools. Teacher-student ratios in Kolkata's secondary schools average 1:25, compared to 1:50+ in rural schools, as well as, digital infrastructure (smart classrooms, online resources) is widely available, unlike in villages where electricity and internet access remain erratic. In contrast, Malda and Murshidabad face chronic underinvestment in education, hence, 40% of government primary schools in Murshidabad lack functional toilets which contributes to high dropout amongst girls' post-puberty. Multi-grade teaching is common due to teacher shortages, compromising learning quality. Child labor remains prevalent in Malda's mango orchards and silk farms, pulling children (especially boys) out of school. Reports have suggested that 25% of sanctioned teacher posts in Uttar Dinajpur are vacant. Para-teachers (contractual staff), who form 30% of the teaching force in rural Bengal, often lack formal training.

Historical and Socio-Cultural Context

Historical legacies cast a long shadow over contemporary HDI outcomes in West Bengal, creating entrenched disparities between regions that benefited from colonial-era investments and those relegated to neglect. Kolkata, as the former capital of British India (1772–1911), inherited a foundation of institutional, economic, and educational infrastructure that continues to shape its developmental edge. Meanwhile, peripheral districts like Purulia, Birbhum, and Cooch Behar, excluded from colonial modernization, remain burdened by structural deprivation and cultural inertia, perpetuating low HDI scores. The British developed Kolkata as a global trade hub, establishing the Port of Calcutta**,** railway networks, and jute/tea industries—legacies that still drive commerce. Even after independence, these assets facilitated industrial clustering (e.g., Hooghly's manufacturing belt) and service-sector growth (e.g., IT in Salt Lake). Elite institutions like Presidency University (1817), Calcutta Medical College (1835), and St. Xavier's (1860) were established under colonial rule, with the intention of creating a skilled workforce pipeline. The Bengali Renaissance (19th century) fostered progressive social reforms, elevating literacy and gender equity, the advantages of which are evident as in Kolkata, female labor force participation is 25% as compared 12% in Purulia,(according to Periodic Labour Force Survey). Purulia, part of the Chotanagpur Plateau, was bypassed by colonial railroads and industries,

remaining agrarian and forest-dependent. Similarly, Birbhum's laterite soils were deemed unfit for cash crops (indigo, jute), reegating it to subsistence farming**.** Land reforms in the 1950s–70s fragmented holdings without industrialization, trapping districts in low-productivity agriculture. Focus on urban proletariat over rural development deepened disparities (e.g., Maoist insurgency in Jangalmahal).

Policy and Governance

Governance effectiveness is a decisive factor in mitigating HDI disparities across West Bengal, with urban districts consistently outperforming rural areas due to uneven policy implementation, administrative biases, and systemic inefficiencies. While Kolkata, Howrah, and other urban centers benefit from proximity to power structures and better oversight, districts like Purulia, Malda, and Cooch Behar face bureaucratic neglect, fund diversion, and weak last-mile delivery, exacerbating development gaps. Kolkata's inclusion in the Smart Cities Mission ensured Rs. 1,000+ crore in infrastructural upgrades (e.g., metro expansion, road modernization), similarly, Howrah's industrial corridor status attracts private-sector partnerships, improving employment-linked HDI indicators. Urban areas are subject to faster decision-making due to direct oversight by state secretariats. Digital governance initiatives (e.g., online land records, e-district portals) function more smoothly in urban zones with better internet penetration. Whereas, Panchayat funds in Murshidabad often suffer from delayed disbursal or misuse, as has been flagged by the Comptroller and Auditor General. There have been reported instances of 'ghost projects' where rural infrastructure budgets are siphoned and such practices remain unchecked due to weak audits (for instance, incomplete PHCs in Purulia). Welfare schemes (e.g., Kanyashree, Swasthya Sathi) are often politicized, with beneficiaries selected based on allegiance rather than need. Border districts (e.g., Cooch Behar) receive ad-hoc attention only during elections.

Geographical Constraints

West Bengal's geographical diversity, while culturally and ecologically rich, presents distinct developmental hurdles, exacerbating disparities in human development across its regions. From the Himalayan foothills to the Gangetic floodplains, each zone contends with terrain-specific constraints that impede infrastructure, economic stability, and access to essential services—key determinants of HDI. The rugged Himalayan terrain complicates road construction, leaving villages like Sandakphu and Mirik isolated during monsoons due to landslides. This results in limited connectivity delays and emergency healthcare access, reflected in Darjeeling's higher maternal mortality ratio (MMR: 95 per 100,000) compared to plains districts (MHFW, 2021). Tea plantations employ 60% of Darjeeling's workforce, but low wages (₹250–300/day) and seasonal layoffs perpetuate poverty. Despite global demand for Darjeeling tea, value addition (e.g., packaging, tourism) remains underdeveloped due to policy neglect. Also, political disputes such as Gorkhaland agitation disrupts governance, diverting resources from development to conflict resolution. The Ganga-Padma river

system inundated 30% of Malda and 25% of Murshidabad in 2022, this had damaged more than 150+ schools leading to disruption of education for more than 50,000 students. Such floods also contaminate water resources and prove to be a potential cause of water-borne diseases. Also, these frequent floods result in 'silt deposition' which reduces soil fertility and forces farmers into debt-driven migration (fir instance, Malda's laborers migrate to Kerala to work in the construction sector). Only 12% of farmers in Murshidabad are covered under PM Fasal Bima Yojana. In Sudarbans delta, Cyclone Amphan (2020) destroyed 1,200 km² of farmland, pushing HDI in Gosaba Block to 0.52. Salinization caused by such natural disasters renders soil unfit for traditional rice farming, reducing yields by 40%**.** Also, mangrove conservation is prioritized over livelihood alternatives, leaving fishermen exposed to tiger attacks and dwindling catches.

Conclusion:

The variations in HDI score across the districts of West Bengal reflect the various forms of living standards that persist within the same state, it narrates a story of neglect and disparity, whereby the life chances of the citizens within the same state are highly determined by their geographical location. The likeliness of being able to avail essential needs and the altercations of the imperative by the state towards such quintessential needs for a quality life narrate a story of caution. This narrative often stays hidden due to the erratic interest in assessing the most common developmental metrics across sub-regional levels, the lack of observation and available data makes such it a difficult exercise (even unreliable, in many cases), as the data upon which such assumptions, extrapolations or aggregates are premised on are often standing on shaky foundations. The attention to Human Development enables us to solve the riddles that are ridden in providing quality of life, as having better education and healthcare facilities would enhance people's productivity and enable them towards better life choices, also, the growing need for up-skilling and vitality would lead to more investment in education and health-care. These essential needs and their fulfillment would further enhance the circular economy in a more localized atmosphere and enable better avenues of livelihood generation. The potential of investing into building human capital and creating social safety nets prove to be very beneficial in society, appropriate resource allocation and reverence in discourse can help us attain the same.

Bibliography

- *Chakraborty, Dr. S. S. (2024)*. An In-depth Analysis of Human Development in India with Reference to West Bengal: A Critical Perspective. *International Journal of Advanced Multidisciplinary Research and Studies*, *4*(3), 535–539. https://doi.org/10.62225/2583049X.2024.4.3.2818

- *Chaurasia, A. R. (2013)*. Social Class and Residence Disparities in Human Development in Madhya Pradesh, India. *Indian Journal of Human Development*, *7*(2), 275–299. https://doi.org/10.62225/2583049X.2024.4.3.2818

- *Chaurasia, A. R. (2022*). Surface Measure of Human Development: Alternative to HDI. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4228534

- *Chaurasia, A. R. (2023)*. Human Development in Districts of India, 2019–2021. *Indian Journal of Human Development*, *17*(2), 219–252. https://doi.org/10.1177/09737030231178362

- *Das, A. (2017)*. Re-examining human development in West Bengal, India. *Journal of Social and Economic Development*, *19*(2), 341–364. https://doi.org/10.1007/s40847-018-0054-6

- *Dey, S. K. (2015)*. Regional Inequality of West Bengal: A District Level Study. *The Bangladesh Development Studies*, *38*(1), 101–117.

- *Dey, S., Ray, J., & Majumder, R. (2024)*. Spatial inequality in sub-national human development index: A case study of West Bengal districts. *Sustainable Futures*, *8*, 100330. https://doi.org/10.1016/j.sftr.2024.100330

- *Ghosh, T. (2023)*. Gender Ineqality in Education as Determinant Of Regional Disparity: A District Level Analysis of the State of West Bengal, India. *International Journal of Humanities and Social Science Invention (IJHSSI)*, *12*(4), 2319–7722. https://doi.org/10.35629/7722-12041727

- *Hanagodimath, S. V. (2013)*. Sub-State HDI in Karnataka and West Bengal: An Analysis of Regional Disparity. *International Journal of Creative Research Thoughts*, *1*(2), 2320–2882.

- *Liang, H., Li, N., Han, J., Bian, X., Xia, H., & Dong, L. (2021)*. Investigating the Temporal and Spatial Dynamics of Human Development Index: A Comparative Study on Countries and Regions in the Eastern Hemisphere from the Perspective of Evolution. *Remote Sensing*, *13*(12), 2415. https://doi.org/10.3390/rs13122415

- *MHFW, M. of H. and F. W. (2021*). *National Family Health Survey (NFHS-5)- 2019-2021 (Compendium of Fact Sheet)* (pp. 49–54). Ministry of Health and Family Welfare. https://www.nfhsiips.in/nfhsuser/nfhs5.php

- *Mondal, S., Kumar, S., & Mishra, A. P. (2023)*. Contextualizing spatiality of multidimensional poverty in rural and urban India: A geographical perspective. *Belgeo*, *1*. https://doi.org/10.4000/belgeo.59421

- *Purohit, B. C. (2008*). Health and human development at sub-state level in India. *The Journal of Socio-Economics*, *37*(6), 2248–2260. https://doi.org/10.1016/j.socec.2007.12.002

- *Suryanarayana, M. H., Agrawal, A., & Prabhu, K. S. (2016).* Inequality-adjusted Human Development Index: States in India. *Indian Journal of Human Development*, *10*(2), 157–175. https://doi.org/10.1177/0973703016675793

- West Bengal (Ed.). (2004). *West Bengal human development report 2004* (1. publ). Development and Planning Dep., Gov. of West Bengal.