



Bihar's Human Development Journey: A Post-1991 Exploration

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ABSTRACT

This research delves into Bihar's transformative human development journey post the liberalization policy of 1991, with a particular focus on the period from 1993-94 to 2020-21. Utilizing the Human Development Index (HDI) as a key metric, the study analyzes the dynamics of Income, Health, and Education in Bihar. The paper aims to uncover nuanced socio-economic trends and provide comprehensive insights into the state's developmental landscape. The study builds upon existing literature on human development and economic reforms in India, contributing to the understanding of Bihar's unique socio-economic context post-1991. The objectives include studying the changes in Income, Health, and Education, exploring the temporal evolution of Bihar's HDI, and comparing it with the national HDI to contextualize Bihar's development in the broader national landscape. The methodology employs the HDI, incorporating life expectancy, expected years of schooling, mean years of schooling, and gross national income per capita. Findings reveal a transformative journey marked by economic growth, improved healthcare, and significant strides in education, reflecting Bihar's commitment to enhancing residents' quality of life. The temporal evolution of HDI reflects Bihar's success in adopting a holistic approach to development. Despite positive trends, the comparative analysis emphasizes the need for targeted policies and sustained efforts to uplift Bihar's human development indicators and align them more closely with national benchmarks. The study proposes comprehensive policy recommendations encompassing economic diversification, healthcare infrastructure enhancement, education sector reforms, rural development initiatives, women empowerment programs, technology integration, and a robust monitoring framework to bridge the developmental gap and foster holistic development in Bihar.

Keywords: Human Development Index, HDI, Bihar, Health, Education, Life Expectancy, Income Index

INTRODUCTION

Bihar, one of India's most populous states, has long been emblematic of the multifaceted challenges and opportunities woven into the country's socio-economic fabric. The state's socio-economic conditions, marked by historical complexities and evolving dynamics, necessitate a nuanced examination. As the second-most populous state in India, Bihar plays a pivotal role in shaping the nation's developmental trajectory.

The socio-economic landscape of Bihar reflects a tapestry of contrasts, encompassing pockets of progress amid persistent challenges. Historically, the state has grappled with issues such as poverty, low literacy rates, and inadequate healthcare infrastructure. However, in recent years, Bihar has witnessed notable transformations, with periods of economic growth capturing national attention. This duality prompts an exploration into the shifting patterns of Bihar's socio-economic conditions, laying the foundation for a scientific analysis of the quality of life in the state.

The imperative to study the quality of life in Bihar stems from its unique position in India's demographic and economic landscape. As a state that has undergone phases of stagnation and subsequent growth, understanding the nuances of the changing socio-economic conditions is crucial. This research seeks to unravel the layers of Bihar's developmental journey, with a specific focus on the factors that contribute to the quality of life experienced by its residents.

In this context, the Human Development Index (HDI) emerges as a key metric for scientific analysis. The HDI, a composite measure of income, health, and education indicators, provides a comprehensive lens through which to assess the well-being of a population. As Bihar traverses the trajectory of economic reforms and developmental interventions, the HDI becomes a critical tool for discerning the impact of these changes on the lives of its people.

The significance of the HDI lies in its ability to transcend traditional economic metrics, offering a holistic perspective on development. While GDP per capita measures the economic output of a region, the HDI delves deeper, incorporating life expectancy, educational attainment, and income levels. This multifaceted approach is particularly relevant in Bihar, where the quality of life is shaped by a confluence of factors beyond economic indicators.

By scientifically analyzing the HDI and its components in Bihar, this research aims to unravel the intricate relationship between socio-economic conditions and the quality of life. Such an investigation is not merely an academic pursuit but a pragmatic endeavor with profound implications for policy formulation. Understanding how Bihar's HDI has evolved over time and the factors influencing its trajectory provides a roadmap for informed decision-making, ensuring that developmental interventions are targeted and effective.

In summary, Bihar's socio-economic conditions present a compelling landscape for scientific exploration. This research seeks to delve into the changing patterns of the state's quality of life, employing the Human Development Index as a key analytical tool.

LITERATURE REVIEW

The evolution of Bihar's human development since the liberalization policy of 1991 reflects a complex narrative of challenges, progress, and regional dynamics. This literature review synthesizes key insights from relevant studies and identifies a research gap that underscores the need for a comprehensive, integrated analysis of Bihar's Human Development Index (HDI) encompassing income, health, and education dimensions.

Ghosh's (2014) inter-district analysis provides a crucial starting point. Focused on the periods 2001–03 and 2009–11, the study utilized the District Human Development Index (DHDI) to gauge trends. The findings revealed substantial inequality among districts, emphasizing the need for nuanced, district-specific interventions. It underscored the importance of considering the diverse socio-economic landscape within Bihar for effective policy formulation.

Building on this, Richa Kumari et al. (2020) explored Bihar's growth story since 1980, categorizing it into pre and post-economic reform periods. This study delved into the factors influencing economic downturns and recoveries, offering a temporal understanding of Bihar's economic trajectory. However, the study primarily focused on economic aspects, leaving a gap in the comprehensive assessment of human development.

Santra et al.'s (2014) district-level analysis of structural changes in Bihar's economy during 1999 to 2010 added a critical dimension. The study highlighted shifts in sectoral contributions and emphasized the need for cautious planning and government initiatives to navigate economic structural changes effectively. However, it primarily addressed economic shifts, leaving gaps in assessing the correlated impacts on human development indicators.

To contextualize Bihar's journey, comparative studies with other states like Punjab (Singh et al., 2024), Haryana (Singh, 2022), Assam (Singh & Aneja, 2022), Tamil Nadu (Singh & Rusat, 2022), and Chhattisgarh (Singh & Rai, 2023) contribute valuable insights. These studies emphasize the significance of sustained economic growth, robust healthcare infrastructure, educational opportunities, and inclusive policies in driving human development. However, the fragmented nature of these studies limits their ability to offer a cohesive understanding of Bihar's specific trajectory.

Research Gap:

Despite these insightful contributions, a conspicuous research gap emerges – the absence of a comprehensive, integrated analysis of Bihar's HDI that considers income, health, and education dimensions in tandem. Existing studies provide valuable snapshots of specific periods, sectors, or dimensions of human development. Still, a holistic exploration that synthesizes these aspects into a unified narrative is lacking.

A comprehensive study could assess the temporal evolution of Bihar's HDI since 1991, providing a nuanced understanding of the state's overall developmental trajectory. This integrated approach is crucial for policymakers, scholars, and development practitioners seeking a comprehensive view of Bihar's progress and challenges. Such an analysis would not only fill a crucial research gap but also offer a foundation for evidence-based policymaking.

Moreover, Bihar's unique socio-economic landscape necessitates a region-specific exploration. The state's diverse districts, each with its distinct challenges and opportunities, warrant a granular analysis to formulate targeted interventions. By addressing these gaps, a comprehensive study could offer actionable insights for policymakers aiming to enhance Bihar's overall HDI and improve the quality of life for its residents.

In conclusion, the existing literature provides valuable perspectives on Bihar's human development journey. However, a research gap exists, calling for a comprehensive, integrated analysis of Bihar's HDI that considers income, health, and education dimensions simultaneously. Such a study would not only contribute to academic discourse but also offer practical insights for policymakers navigating the intricacies of Bihar's developmental landscape.

OBJECTIVES OF THE PAPER

1. To study how Income, Health, and Education have changed in Bihar from 1993-94 to 2020-21.
2. To explore how the Human Development Index (HDI) in Bihar has developed over this time.
3. To compare Bihar's HDI with the national HDI to understand how Bihar's development compares to the overall country.

DATA AND METHODOLOGY

The Human Development Index (HDI) is a commonly used tool to evaluate the overall quality of life of a population. It takes into account three critical aspects of human development: a long and healthy life, access to knowledge, and a decent standard of living. The HDI uses various metrics such as life expectancy, expected years of schooling, average years of schooling, and gross national income per capita to create a single index that captures the overall performance of a nation in these areas.

A long and healthy life, as measured by life expectancy at birth;

Education as measured by expected years of schooling for children at school age and by the mean years of schooling that adults aged 25 and above have undertaken;

A decent standard of living as measured by Gross National Income (GNI) per capita in terms of purchasing power parity (PPP) in US dollars.

TABLE 1 Human Development Index Parameters Ranges

Dimensions	Indicator	Minimum	Maximum
Health	Life expectancy (years)	20	85
Education	Expected years of schooling(years)	0	18
	Mean years of schooling(years)	0	15
Standard of living	Gross national income per capita (2011 PPP \$)	100	75000

Formulae for estimation of HDI

1. Health Index

$$\text{Health Index} = \frac{\text{Life expectancy at birth} - \text{Min.value}}{\text{Max.value} - \text{Min.value}}$$

2. Education Index

$$\text{Mean years of schooling (MYS) index} = \frac{\text{Mean Year of Schooling} - \text{Min.value}}{\text{Max.value} - \text{Min.value}}$$

$$\text{Expected years of schooling (EYS) index} = \frac{\text{Expected Year of Schooling} - \text{Min.value}}{\text{Max.value} - \text{Min.value}}$$

On the basis of MYS and EYS, we calculate Education Index:

$$\text{Education Index} = \frac{\text{MYS index} + \text{EYS index}}{2}$$

3. Income Index

$$\text{Income Index} = \frac{\ln(\text{PCY(PPP)}) - \ln(\text{Min.PCY})}{\ln(\text{Max.PCY}) - \ln(\text{Min.PCY})}$$

4. Human Development Index

$$\text{HDI} = \left[[\text{Health Index}] \cdot [\text{Education Index}] \cdot [\text{Income Index}] \right]^{\frac{1}{3}}$$

DATA SOURCES

This study relies on secondary data specific to Bihar for various indicators of human development. To assess life expectancy at birth, data from the Sample Registration System (SRS) Abridged Life Tables, published by the Office of the Registrar General of India, is used. This dataset is considered a reliable source for death statistics in India, incorporating information from multiple years of the ORGI SRS-abridged life tables and some segments from the RBI's official website. For evaluating expected and mean years of schooling, self-estimation is drawn from the Employment and Unemployment survey of the National Sample Survey Office (NSSO) and Periodic Labor Force Survey (PLFS). The mean year of schooling is estimated by averaging the schooling years of the population aged 24 and above in Bihar. Expected years of schooling are determined by averaging the schooling years of individuals aged 21-24, assuming a continuation of the present education status. Regarding per capita income, the study utilizes purchasing power parity (PPP) based data, converting it into international currency using the PPP exchange rate of India estimated by the World Bank for different years. The analysis includes Bihar's per capita income data from different years, adjusted for constant prices of 2011-12. For international comparisons, the data is converted into a standardized currency using the purchasing power parity (PPP) exchange rate derived from the year 2011-12, with the established value of Rs 15.55 for each dollar, as reported by the World Bank

FINDINGS OF THE STUDY

Trends of Income, Health and Education indicators in Bihar

The exploration of Income Health and Education indicators in Bihar over the period of 1993-94 to 2020-21, as delineated in Table 2, unfolds a nuanced narrative that extends beyond numerical data, delving into the socio-economic dynamics that have shaped the state's developmental landscape.

TABLE 2 Trends of Income, Health and Education indicators in Bihar

Year	PCY(\$) based on PPP	Life expectancy	MYS	EYS
1993-94	755	59.3	2.4	4.2
1999-2K	822	63.0	2.7	4.4
2004-05	971	64.4	3.2	4.6
2011-12	1513	68.1	3.9	6.2
2017-18	1891	69.3	5.1	8.5
2020-21	1938	69.9	5.1	9.2

Commencing with the year 1993-94, Bihar's Per Capita Income (PCY), based on Purchasing Power Parity (PPP), was recorded at \$755. This marked the starting point for our analysis, reflecting the economic landscape of the state at the onset of the study period. The life expectancy during this period stood at 59.3 years, illustrating the prevailing health conditions. In terms of education indicators, the Mean Years of Schooling (MYS) was at 2.4 years, and the Expected Years of Schooling (EYS) were at 4.2 years. These education metrics provided insights into the educational landscape of Bihar, capturing both the average years of schooling completed and the expected years for individuals in the specified age group.

Moving forward to the year 1999-2000, there was a noticeable increase in PCY, reaching \$822. This uptick suggests an improvement in the economic landscape, reflecting potential advancements in income distribution and overall economic well-being. The life expectancy during this period increased to 63.0 years, indicating positive developments in health outcomes. The education indicators also exhibited slight improvements, with MYS rising to 2.7 years and EYS to 4.4 years.

The year 2004-05 witnessed further economic growth, with PCY reaching \$971. This period marked a notable phase in Bihar's development, possibly influenced by economic policies and regional initiatives. Life expectancy continued its upward trajectory, reaching 64.4 years, indicating enhancements in healthcare and overall well-being. The education indicators demonstrated positive trends as well, with MYS increasing to 3.2 years and EYS to 4.6 years. These educational improvements hinted at advancements in the accessibility and quality of education within the state.

As we progressed to 2011-12, Bihar experienced a significant leap in economic indicators, with PCY soaring to \$1513. This substantial increase underscored a period of economic prosperity and improved living standards. Life expectancy continued its upward trend, reaching 68.1 years, indicating sustained improvements in healthcare infrastructure and outcomes. The education metrics witnessed substantial growth, with MYS escalating to 3.9 years and EYS to 6.2 years. These educational advancements portrayed a positive outlook for the state's human capital development.

In the subsequent years, 2017-18 and 2020-21, Bihar continued its upward trajectory in economic indicators. PCY reached \$1891 in 2017-18 and \$1938 in 2020-21, showcasing consistent economic growth. Life expectancy also exhibited a gradual rise, reaching 69.3 years in 2017-18 and 69.9 years in 2020-21, reflecting ongoing improvements in healthcare and overall well-being.

The education indicators in 2017-18 and 2020-21 showcased significant progress. Mean Years of Schooling increased from 5.1 years to 5.1 years, and Expected Years of Schooling rose from 8.5 years to 9.2 years. These advancements in education metrics highlighted Bihar's commitment to enhancing educational opportunities and accessibility for its population.

In summary, the trends in Income, Health, and Education indicators in Bihar paint a comprehensive picture of the state's developmental journey. The economic growth, improvements in life expectancy, and significant strides in education reflect a multifaceted approach to development. Bihar's story, as revealed by these indicators, is one of progress and a commitment to enhancing the quality of life for its residents.

The Temporal Evolution of Human Development Index (HDI) in Bihar

The data presented in Table 3 outlines the trends of the Human Development Index (HDI) and its associated components in Bihar over a span of nearly three decades, from 1993-94 to 2020-21. Each index - Income, Health, Education, and the overall HDI - provides valuable insights into the state's progress across key dimensions of human development.

TABLE 3 Trends of Human Development and its Associate Index in Bihar

Year	Income Index	Health Index	Education Index	HDI
1993-94	0.305	0.605	0.197	0.331
1999-2K	0.318	0.662	0.212	0.355
2004-05	0.343	0.683	0.234	0.380
2011-12	0.410	0.740	0.302	0.451
2017-18	0.444	0.759	0.406	0.515
2020-21	0.448	0.768	0.426	0.527

Examining the evolution of the Human Development Index (HDI) in Bihar over the years offers a profound insight into the state's overall progress in key dimensions of well-being. Beginning with the inaugural year of our study, 1993-94, the Income Index stood at 0.305, indicating the economic dimension of development. Simultaneously, the Health Index and Education Index were recorded at 0.605 and 0.197, respectively. This marked the foundational phase of Bihar's HDI, portraying a scenario where income levels were relatively low, and investments in health and education were crucial components of the state's developmental landscape. The overall HDI for 1993-94 was computed at 0.331, capturing the composite well-being of Bihar's populace.

Progressing to the year 2004-05, the trends in the three key indices reveal a noteworthy transformation. The Income Index saw an increase to 0.343, indicating an improvement in economic prosperity. The Health Index and Education Index rose to 0.683 and 0.234, respectively, signifying advancements in healthcare and education. The comprehensive HDI for Bihar in 2004-05 reached 0.380, marking a substantial leap from the initial years of the study period. This era reflects a pivotal phase in Bihar's development, characterized by concerted efforts to enhance income levels, healthcare infrastructure, and educational opportunities.

Fast-forwarding to 2020-21, the most recent point of analysis, Bihar's HDI paints a picture of sustained progress. The Income Index, standing at 0.448, signifies ongoing economic growth. Health and Education Indices have seen considerable advancements, reaching 0.768 and 0.426, respectively. The overall HDI for 2020-21 is calculated at 0.527, showcasing a significant improvement from the earlier years. This contemporary snapshot of Bihar's HDI

underscores the state's commitment to holistic development, evident in the continued focus on economic well-being, healthcare accessibility, and educational quality.

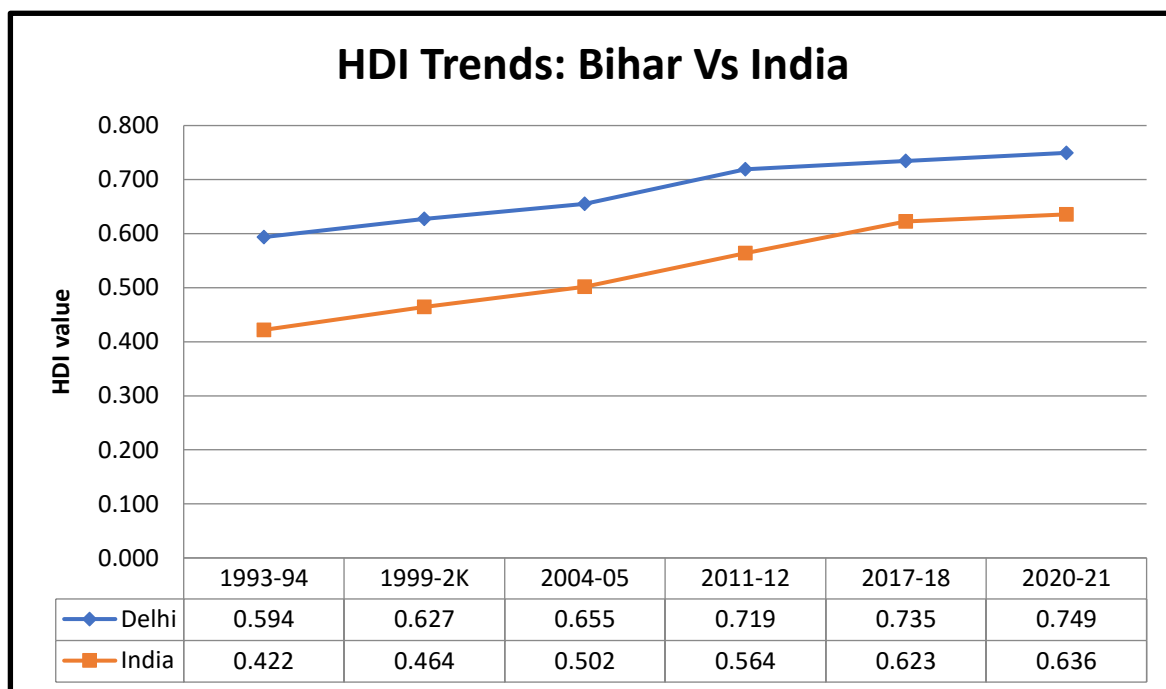
Delving into the nuances of each index, the Income Index reflects the economic dynamics of Bihar, showcasing a steady increase over the years. This suggests a positive trend in income levels, potentially influenced by economic policies, industrial growth, and infrastructural development. The Health Index demonstrates a commendable rise, indicating improvements in healthcare services, life expectancy, and overall health outcomes. Bihar's commitment to bolstering its healthcare infrastructure is evident in this upward trajectory. Similarly, the Education Index portrays significant progress, reflecting investments in educational institutions, curriculum enhancements, and efforts to increase literacy rates.

The overall HDI trends for Bihar signify a comprehensive and sustained developmental journey. The state has moved beyond addressing singular dimensions of well-being to adopting a holistic approach. The 2020-21 HDI of 0.527 is indicative of Bihar's success in creating an environment where economic prosperity, good health, and quality education converge to uplift the standard of living for its residents.

In conclusion, the trends in Bihar's HDI from 1993-94 to 2020-21 encapsulate a narrative of progress and commitment to holistic development. The state has traversed a path of economic growth, improved health outcomes, and enhanced educational opportunities. These indices collectively reflect Bihar's resilience and dedication to fostering a prosperous and sustainable future for its populace.

A Comparative Analysis of Bihar's HDI with India's HDI:

Examining Bihar's Human Development Index (HDI) in comparison to the national HDI provides valuable insights into the state's relative progress within the broader context of the country's development. Beginning with the baseline year of 1993-94, Bihar's HDI stood at 0.331, while the national HDI was slightly higher at 0.422. This marked the initial point of reference, highlighting a development gap between Bihar and the nation as a whole. The subsequent years, up to 2004-05, witnessed incremental increases in both Bihar's and India's HDI. However, Bihar's HDI consistently lagged behind the national average during this period



Moving forward to 2004-05, the comparative analysis reflects a notable upward trajectory for both Bihar and India. Bihar's HDI increased to 0.380, indicative of developmental advancements. Yet, despite this progress, the state's HDI remained below the national average, which had risen to 0.502. This scenario underscores the relative challenges Bihar faced in catching up with the overall development trends in the country. The gap, although reduced, emphasized the need for sustained efforts to bridge the disparities.

Fast-forwarding to the most recent data point in 2020-21, Bihar's HDI has seen substantial improvement, reaching 0.527. This signals commendable progress over the years, reflecting the state's commitment to comprehensive development. However, it is crucial to note that despite the positive trajectory, Bihar's HDI continues to be lower than the national average, which stands at 0.636. This indicates that while Bihar has made significant strides in enhancing its human development indicators, it still operates within a lower range compared to the overall level of the nation.

The interpretation of these trends suggests that Bihar has indeed made notable progress in narrowing the developmental gap with the rest of the country. The positive momentum in HDI reflects the state's efforts in areas such as economic growth, healthcare, and education. However, the persistent disparity with the national average underscores the complexity of development challenges faced by Bihar. It implies that while Bihar has improved, it remains a work in progress, and sustained efforts are required to further elevate its HDI and align it more closely with national benchmarks.

In summary, the comparative analysis of Bihar's HDI with the national HDI from 1993-94 to 2020-21 illustrates a journey of improvement and convergence. Bihar has witnessed positive development trends, but the challenge lies in further accelerating progress to bridge the gap with the overall national development level. The data emphasizes the need for targeted policies and interventions to uplift Bihar's human development indicators and ensure that the state's residents enjoy a quality of life in line with the broader aspirations of the nation.

POLICY RECOMMENDATIONS

To propel Bihar towards enhanced human development and bridge the existing gap with the national average, a comprehensive set of policy recommendations is imperative. These suggestions encompass economic, healthcare, and educational dimensions to foster holistic development.

1. Economic Diversification and Job Creation:

- **Encourage Industry Diversity:** Promote a diversified industrial base to reduce dependence on specific sectors. This entails incentivizing emerging industries and technology-driven sectors to create a robust and dynamic economic landscape.
- **Skill Development Programs:** Implement targeted skill development programs aligned with industry needs. This would enhance employability, particularly in high-growth sectors, and contribute to income growth.

2. Healthcare Infrastructure Enhancement:

- **Invest in Healthcare Facilities:** Increase public investment in healthcare infrastructure, focusing on the expansion of primary healthcare centers and hospitals. Ensure that these facilities are adequately equipped and staffed to address the healthcare needs of the population.
- **Health Awareness Campaigns:** Launch comprehensive health awareness campaigns to educate the populace on preventive healthcare measures, leading to a healthier and more productive population.

3. Education Sector Reforms:

- **Quality Improvement:** Prioritize measures to improve the quality of education at all levels. This includes curriculum updates, teacher training programs, and the incorporation of technology in education delivery.
- **Access to Education:** Implement initiatives to enhance access to education, especially for marginalized communities and remote areas. This may involve the development of more schools, scholarship programs, and innovative solutions for remote learning.

4. Rural Development Initiatives:

- **Agricultural Modernization:** Invest in modern agricultural practices, including technology adoption, to increase productivity and income levels for farmers.
- **Rural Infrastructure Development:** Enhance rural infrastructure, including roads, electricity, and irrigation facilities, to improve the overall quality of life in rural areas.

5. Women Empowerment Programs:

- **Skill Training for Women:** Implement targeted skill development programs for women to enhance their economic participation. This can include vocational training and entrepreneurship development.
- **Healthcare Access for Women:** Ensure improved access to healthcare for women, with a focus on maternal and reproductive health.

6. Technology and Innovation Integration:

- **Digital Connectivity:** Invest in digital infrastructure to ensure connectivity even in remote areas. This facilitates access to information, online education, and digital services, fostering economic and social inclusion.
- **Innovation Hubs:** Establish innovation hubs and incubators to encourage entrepreneurship and the development of local solutions to address regional challenges.

7. Monitoring and Evaluation Framework:

- **Data-driven Decision Making:** Develop a robust monitoring and evaluation framework to track the impact of policies over time. This will facilitate evidence-based decision-making and allow for timely adjustments to policy interventions.

8. Public-Private Partnerships (PPPs):

- **Collaboration with Private Sector:** Foster partnerships with the private sector for infrastructure development, skill training, and job creation initiatives. This collaboration can leverage the expertise and resources of the private sector for public welfare.

Implementing these policy suggestions requires a coordinated and sustained effort from both the government and other stakeholders. By addressing economic, healthcare, and educational aspects comprehensively, Bihar can lay the foundation for sustained and inclusive human development, narrowing the gap with the national average.

CONCLUSION OF THE STUDY

Bihar's developmental journey from 1993-94 to 2020-21 showcases commendable progress in income, health, and education indicators. The state's Per Capita Income (PCY) has surged from \$755 to \$1938, reflecting robust economic growth. Life expectancy has risen from 59.3 to 69.9 years, and educational metrics have seen substantial improvements.

The Human Development Index (HDI) for Bihar has evolved consistently, reaching 0.527 in 2020-21. While the state has made significant strides, a developmental gap persists when compared to the national average, which stands at 0.636. This underscores the need for sustained efforts to align with national benchmarks.

The paper concludes with policy recommendations focusing on economic diversification, healthcare enhancement, education reforms, rural development, women empowerment, technology integration, and a robust monitoring framework. These proposals aim to bridge existing gaps and foster inclusive and sustainable development in Bihar. The findings and recommendations contribute to the discourse on Bihar's development, providing insights for stakeholders invested in the state's holistic well-being.

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