Multidimensional Poverty Indicators: A Comparative Analysis of Bihar and Uttar Pradesh

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Abstract

This study examines poverty in India through a multidimensional lens, recognizing that deprivation extends beyond income. Focusing on Bihar and Uttar Pradesh—two of the nation's most economically disadvantaged states—it explores how health, education, and living standards intersect to shape overall well-being. The research assesses changes in multidimensional poverty between 2015–16 and 2019–21 using nationally representative data. Employing the Multidimensional Poverty Index (MPI) framework developed by the Oxford Poverty and Human Development Initiative and the United Nations Development Programme (OPHI, 2020; UNDP, 2021), the analysis draws on secondary data from NFHS-4 and NFHS-5. It measures deprivation across indicators such as nutrition, education, health, sanitation, electricity, clean cooking fuel, household assets, and financial inclusion. Findings reveal that India's MPI fell from 24.85% to 11.28%, with Bihar's rate declining from 51.89% to 33.76% and Uttar Pradesh's from 37.68% to 22.93%. Despite progress, persistent inequalities—particularly in health and living conditions—highlight uneven development. The study emphasizes inclusive, context-sensitive policies to ensure equitable poverty reduction.

Keywords

Education, Health, India, Living Standards, Multidimensional Poverty

1. Introduction

Poverty assessment has evolved from a narrow, monetary-based approach to a broader multidimensional perspective that recognises the complex and interrelated deprivations households face in daily life (Alkire & Foster, 2011; UNDP, 2021). Traditional measures of poverty, which rely solely on income or consumption, often fail to capture other essential aspects of human well-being such as access to education, healthcare, sanitation, and living standards (Sen, 1999; World Bank, 2023). The recognition that poverty extends beyond economic insufficiency led to the development of composite indices that integrate multiple dimensions of deprivation. This paradigm shift reflects a deeper understanding of poverty as a state of capability deprivation—where individuals lack the opportunities and resources to lead meaningful and dignified lives (Alkire & Santos, 2010; Dreze & Khera, 2022).

The Multidimensional Poverty Index (MPI), introduced by the Oxford Poverty and Human Development Initiative (OPHI) in collaboration with the United Nations Development Programme (UNDP), provides a comprehensive framework to evaluate poverty at national, regional, and local levels (OPHI, 2020). The MPI uses a set of indicators across three broad dimensions—health, education, and living standards—to measure the intensity and breadth of deprivation. This framework moves beyond monetary poverty by considering factors such as nutrition, child and maternal health, years of schooling, sanitation, electricity, and access to assets. India's adoption of the MPI through NITI Aayog has enabled the nation to monitor multidimensional poverty more systematically, aligning with its Sustainable Development Goal (SDG) commitments, particularly SDG 1 ("No Poverty") and SDG 10 ("Reduced Inequalities") (NITI Aayog, 2021; UNDP, 2022).

India's multidimensional poverty assessment has drawn attention to significant regional disparities. According to the National Family Health Survey (NFHS-4) 2015–16, approximately 24.85% of India's population was living in multidimensional poverty. However, the NFHS-5 (2019–21) revealed a notable decline to 14.96%, indicating that nearly 135 million individuals have moved out of multidimensional poverty in just five years (IIPS & ICF, 2021; NITI Aayog, 2021). This remarkable improvement can be attributed to enhanced access to education, improved maternal and child health outcomes, increased electrification, and targeted government initiatives such as the Pradhan Mantri Awas Yojana, Swachh Bharat Mission, and Ayushman Bharat (Chaudhuri & Gupta, 2020; UNDP, 2022). Despite these achievements, India's poverty reduction remains uneven, and some states continue to lag significantly behind others in key development indicators (World Bank, 2023).

Bihar and Uttar Pradesh—two of India's most populous and socio-economically challenged states—consistently exhibit higher levels of multidimensional poverty compared to national averages (Andrabi, 2021; Pradhan & Kandapan, 2022). Bihar, for instance, remains among the states with the highest deprivation rates in nutrition, maternal health, sanitation, and asset ownership, reflecting the need for targeted social and infrastructure interventions (Jagadeshwaran et al., 2022; Arora & Singh, 2025). Uttar Pradesh, while showing some progress, still faces multidimensional deprivations, particularly in rural areas and among marginalised social groups (Srivastava et al., 2023). Comparative state-level analyses of such poverty indicators offer critical insights into the effectiveness of public policies, governance frameworks, and implementation mechanisms (Tripathi & Yenneti, 2020; NITI Aayog, 2023).

The comparative study of Bihar and Uttar Pradesh is especially significant because both states together account for nearly one-fourth of India's total poor population (UNDP, 2021; World Bank, 2023). While economic reforms and welfare schemes have yielded measurable outcomes, persistent structural challenges—such as high fertility rates, gender disparities, and limited educational attainment—continue to impede inclusive growth (Sen, 1999; Dreze & Khera, 2022). Furthermore, disparities between rural and urban populations within these states underscore the importance of analysing poverty through a multidimensional lens, as monetary growth alone fails to ensure human development (OPHI, 2020; Arora & Singh, 2025).

This study, therefore, aims to provide an indicator-wise descriptive analysis of multidimensional poverty in Bihar and Uttar Pradesh using data from NFHS-4 and NFHS-5. It seeks to identify key areas of deprivation, assess progress over time, and propose policy directions for poverty alleviation. By contextualising the findings within India's broader poverty-reduction framework, the paper contributes to a more comprehensive understanding of how health, education, and living standards interact to shape well-being in the two states (Tripathi & Yenneti, 2020; Srivastava et al., 2023).

1.1 Research Objectives

1) To analyse indicator-wise changes across Bihar and Uttar Pradesh between NFHS-4 and NFHS-5
2) To compare poverty reduction trends in both states.
3) To highlight policy implications and provide recommendations for targeted interventions.

2. Literature Review

A spatial analysis of multidimensional poverty in India revealed substantial regional disparities and highlighted the geographic concentration of deprivation in certain states (Andrabi, 2021). The article uses the secondary data from the NITI Aayog report, based on the dataset of NFHS-4. The result concludes that Bihar exhibits the highest poverty, and this state is in the worst condition and highly deprived in 10 out of 12 indicators, along with Madhya Pradesh and Uttar Pradesh.

Recent studies have explored the linkage between livelihood diversification and multidimensional poverty reduction in rural regions (Onyeyirichi & Deepika, 2025). The main objective of this article is to examine the poverty at the household level, and this article collects the data through primary method using a questionnaire, and the result concludes that Bihar is the poorest and least developed and is the third most populous state in India.

Das, Paria, and Firdaus (2023) explored multidimensional poverty in India through a regional lens, linking their analysis to the broader Sustainable Development Goals (SDGs) framework presented in Poverty and Inequality by Udaya Wage. This chapter assesses multidimensional poverty in India using data from the NFHS for the period 2005-06 and 2015-16, and this focuses on formulating policies and programmes to overcome state-level disparities and to achieve Sustainable Development Goals in India.

Arora and Singh (2025) examined socio-religious disparities in multidimensional poverty across Uttar Pradesh, identifying how community-based inequalities deepen regional deprivation patterns. The main objective of this research article is to study the Multidimensional Poverty in Uttar Pradesh, revealing specific deprivations faced by the social and religious groups. This study uses the secondary method and the data from NFHS rounds conducted between 2005-06 and 2019-21. The findings concluded using the data states that the scheduled tribes and Muslims face a high poverty level and intense deprivations mainly in nutrition, cooking fuel, sanitation and education.

Pradhan and Kandapan (2022) analyzed the uneven burden of multidimensional poverty in India through a caste-based lens, revealing that marginalized caste groups experience significantly higher deprivation levels across education, health, and living standards. The main objective of this study is to assess India's multidimensional poverty across social groups. This research article collects the data from the secondary method and uses the data from the NFHS-4 round which was conducted in the year 2015-16. The result shows the highest

multidimensional poverty index is in Bihar (0.268) followed by Jharkhand (0.201) and Uttar Pradesh (0.18).

An econometric analysis of the dynamics of the Multidimensional Poverty Index in the BIMARU states highlighted structural and policy-driven factors contributing to persistent poverty, emphasizing regional disparities and the need for targeted interventions (Srivastava, Kumar, & Srivastava, 2023). The main objective of this article is to analyse multidimensional poverty in seven states of India- Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan and Uttar Pradesh. This article focuses on three key indicators, namely infant mortality rate, birth rate and education dropouts. The data used here is taken from NFHS-4 conducted in the year 2015-16. And the result stated that Madhya Pradesh emerges at the top with a low level of Multi-dimensional Poverty Index, followed by Uttar Pradesh and the selected states. Uttar Pradesh struggles with a high infant mortality rate and birth rate.

Several scholars have examined poverty measurement through multidimensional lenses. For instance, Tripathi and Yenneti (2020) analyzed poverty disparities across Indian states, while other researchers have applied similar frameworks in different national contexts to assess the effectiveness of poverty reduction policies. This article measures the multidimensional poverty index in India and uses the data from the National Sample Survey on "Consumption Expenditure" for the years 2004-05 and 2011-12. This article considers three main indicators: standard of living, education and income at the household level. The result shows that Jharkhand, Uttar Pradesh, Rajasthan, and Bihar have higher poverty headcount ratios.

A state-wise analysis of multidimensional poverty in India revealed significant inter-state disparities in health, education, and living standards, highlighting how regional socioeconomic conditions and policy implementation differences contribute to variations in poverty intensity (Jagadeshwaran, Ashok, Vidhyarathi, Nirmala Devi, & Santosh, 2022). This paper aims to study the multidimensional poverty index at the state level in India. The paper uses the secondary method for data, and the data has been collected through the reports and the data published by the NFHS. The result stated that Uttar Pradesh was among the other states which observed a reduction in multidimensional poverty, and Bihar was among the states which was high in multidimensional poverty.

Authors	Year	Methodology	Key findings	Gap

Tripathi, S. & Yenneti, K.	2020	Secondary (NSS)	Measured MPI using the standard of living, education, and income	Less recent data
Andrabi, J.A.	2021	Secondary (NFHS-4)	Bihar exhibits the highest poverty; deprived in 10 of 12 indicators	Lacks a comparative study with UP
Pradhan, B. & Kandapan, J.	2022	Secondary (NFHS-4)	Highest MPI in Bihar, followed by UP	No trend analysis
Jagadeshwaran et al.	2022	Secondary (NFHS)	UP reduced MPI, Bihar high	No detailed indicator-wise comparison
Das, P., Paria, B. & Firdaush, S.	2023	Secondary (NFHS previous survey)	Focused on policies to reduce state disparities	Limited to policy suggestions
Srivastava, V.D. et al.	2023	Secondary (NFHS-4)	Analysed infant mortality, birth rate, and education dropout	Limited indicators
Onyeyirichi, O.A. & Deepika, M.G.	2025	Primary (questionnaire)	Bihar poorest at the household level	State-level comparisons missing
Arora, A. & Singh, S.P.	2025	Secondary (NFHS)	Social-religious disparities in UP	Focused only on UP

Table 1: Summary of Recent Empirical Studies on Multidimensional Poverty in India (2020–2025)

2.2 Research Gap

Although several studies examine socio-economic deprivation in India, there is a lack of comparative analyses between Bihar and Uttar Pradesh, particularly tracking changes across NFHS-4 and NFHS-5. This paper addresses this gap by analysing state-specific progress, indicator-wise disparities, and policy effectiveness.

3. Methodology

Data Source-This study is based entirely on secondary data collected from two rounds of the National Family Health Survey (NFHS-4, 2015–16; NFHS-5, 2019–21), which provide unit-

level data on health, nutrition, education, and living standards (International Institute for Population Sciences [IIPS] & ICF, 2021). The NFHS serves as one of India's most comprehensive demographic surveys and is a crucial source for monitoring Sustainable Development Goals (SDGs) related to health and poverty (Kumar & Singh, 2021).To ensure methodological consistency, this research aligns its framework with the Multidimensional Poverty Index (MPI) developed by the Oxford Poverty and Human Development Initiative (OPHI) and adopted by NITI Aayog for national poverty measurement (OPHI, 2020; NITI Aayog, 2021). The MPI methodology's inclusion of diverse indicators enables a nuanced assessment of deprivations across both states (Alkire & Foster, 2011; Mahapatra & Das, 2022).Additionally, NITI Aayog State Reports and other government publications were examined to validate state-level poverty estimates and progress toward the SDGs, particularly SDG 1 (No Poverty) and SDG 10 (Reduced Inequalities) (UNDP, 2022; NITI Aayog, 2023; Sharma & Das, 2023).

Study Area - The analysis focuses on the Indian states of Bihar and Uttar Pradesh, which together account for a substantial share of India's multidimensionally poor population (Andrabi, 2021). Both states exhibit persistent deprivations across major MPI indicators such as nutrition, sanitation, and maternal health (Pradhan & Kandapan, 2022; Singh, 2023). Previous studies have highlighted that these regions face structural challenges such as low literacy rates, inadequate access to healthcare, and limited infrastructure that exacerbate multidimensional poverty (Verma & Sharma, 2024).

Indicators-The study considers eight indicators grouped under three MPI dimensions, as widely recognised in poverty literature (Tripathi & Yenneti, 2020; Jagadeshwaran et al., 2022):Health: Nutrition, Adolescent Mortality, and Maternal Health , Education: Years of Schooling , Living Standards: Cooking Fuel, Sanitation, Electricity, and Asset Ownership

These indicators were measured as percentages of deprived populations using NFHS-4 and NFHS-5 datasets (IIPS & ICF, 2021; Kumar & Singh, 2021).

Analysis- A comparative descriptive design was applied to evaluate the temporal change in multidimensional poverty between NFHS-4 and NFHS-5.

The analysis involves three core steps (Srivastava et al., 2023; UNDP, 2021):

- Indicator-wise comparison between NFHS-4 and NFHS-5 for Bihar and Uttar Pradesh.

- Calculation of poverty reduction percentage to quantify the improvement in each indicator between the two survey rounds.
- Descriptive interpretation using graphs and tables for better visualisation and policy analysis (Chaudhuri & Gupta, 2020; Mahapatra & Das, 2022).

Formula for Poverty Reduction (%)

$$\text{Poverty Reduction (\%)} = \frac{(\text{NFHS-4 value} - \text{NFHS-5 value})}{\text{NFHS-4 value}} \times 100$$

This formula captures the proportional decrease in deprivation for each indicator across both states. It provides a simple yet effective measure of progress in multidimensional poverty reduction (Author's calculation based on NITI Aayog, 2021; Sharma & Das, 2023).

Progress in Poverty Reduction: Bihar vs. Uttar Pradesh (NFHS-4 and NFHS-5)

STATES	NFHS-4 (2015-16)	NFHS-5 (2019-21)	POVERTY REDUCTION
BIHAR	51.89%	33.76%	-18.13%
UTTAR PRADESH	37.68%	22.93%	-14.75%

Table 2: Comparison of Poverty Reduction in Bihar and Uttar Pradesh Based on NFHS-4 (2015–16) and NFHS-5 (2019–21)

Source: Author's compilation of Multidimensional poverty of two states based on NFHS-4 and NFHS-5, NITI Aayog state wise report, 2021.

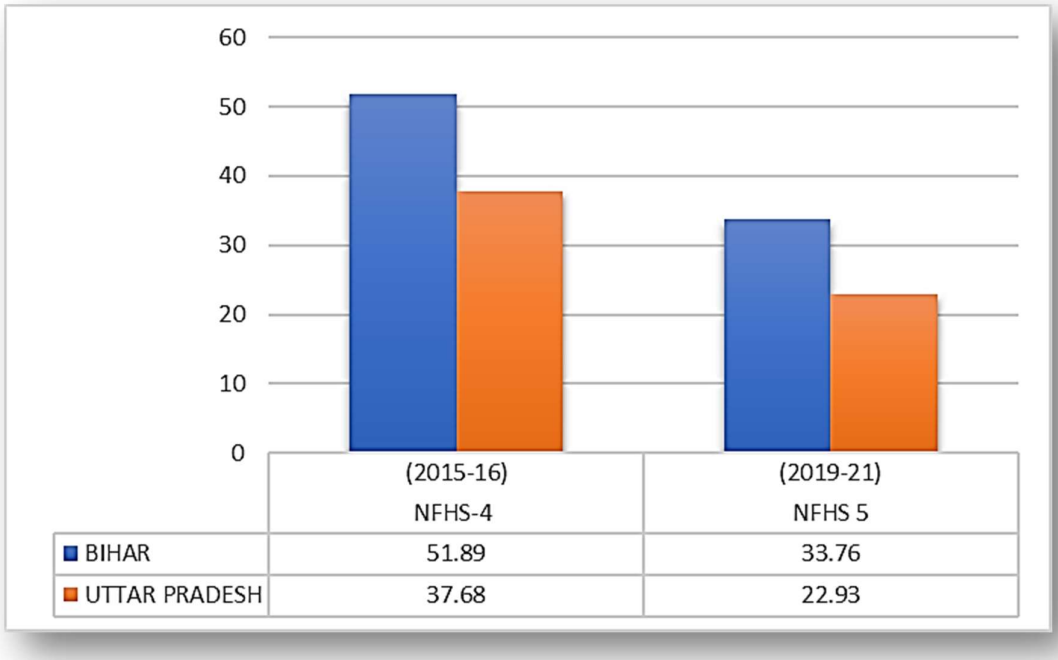

Figure 1: Conceptual framework of the Multidimensional Poverty of two selected states from MPI baseline report, NITI Aayog 2021.

Indicator-wise Deprivation Comparison: NFHS-4 (2015–16)

Indicator	Bihar (%)	Uttar Pradesh (%)	Difference
Nutrition	51.87	44.47	7.4
Adolescent Mortality	4.58	4.97	-0.39
Maternal Health	45.61	35.44	10.17
Years of Schooling	26.26	17.49	8.77
Cooking Fuel	82.92	68.85	14.07
Sanitation	73.49	63.65	9.84
Electricity	39.86	27.43	12.43
Assets	24.32	12.44	11.88

Table 3 Deprivation Indicators in Bihar and Uttar Pradesh Based on NFHS-4 (2015–16)

Source: Author's compilation from Ministry of Health and Family Welfare. (2017). National Family Health Survey (NFHS-4), 2015–16: India Fact Sheet. International Institute for Population Sciences (IIPS).

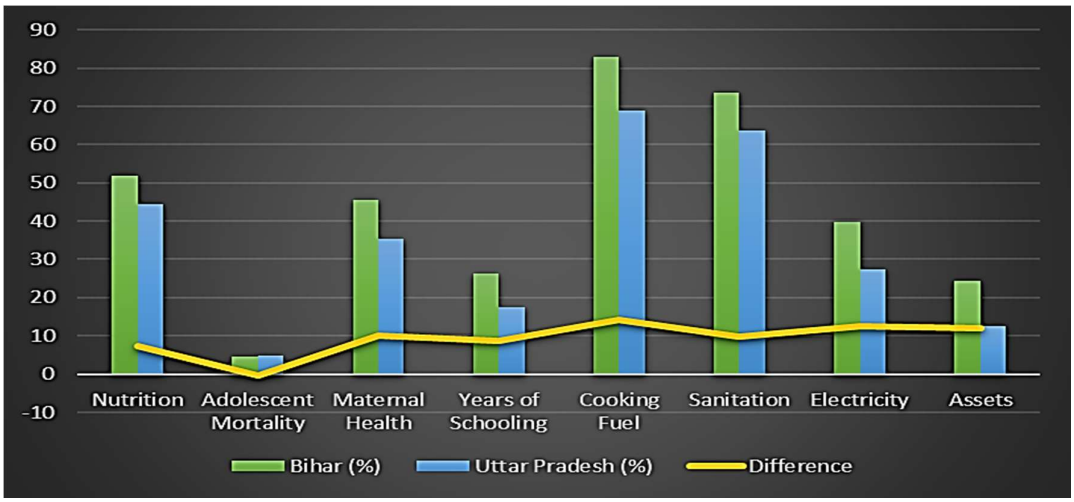

Figure 2: Conceptual framework of Indicator-wise comparison of two selected states from, mohfw 2017, NFHS-4.

NFHS-5 (2019-21)

Indicator	Bihar (%)	Uttar Pradesh (%)	Difference
Nutrition	42.20	36.43	5.77
Adolescent Mortality	4.14	3.54	0.6
Maternal Health	37.21	30.03	7.18
Years of Schooling	22.29	13.18	9.11
Cooking Fuel	63.30	52.92	10.38
Sanitation	50.78	31.61	19.17
Electricity	3.67	9.16	-5.49
Assets	20.25	7.80	12.45

Table 3 Deprivation Indicators in Bihar and Uttar Pradesh Based on NFHS-5 (2019–21)

Source: Author's compilation Ministry of Health and Family Welfare. (2021). National Family Health Survey (NFHS-5), 2019–21: India Fact Sheet. International Institute for Population Sciences (IIPS).

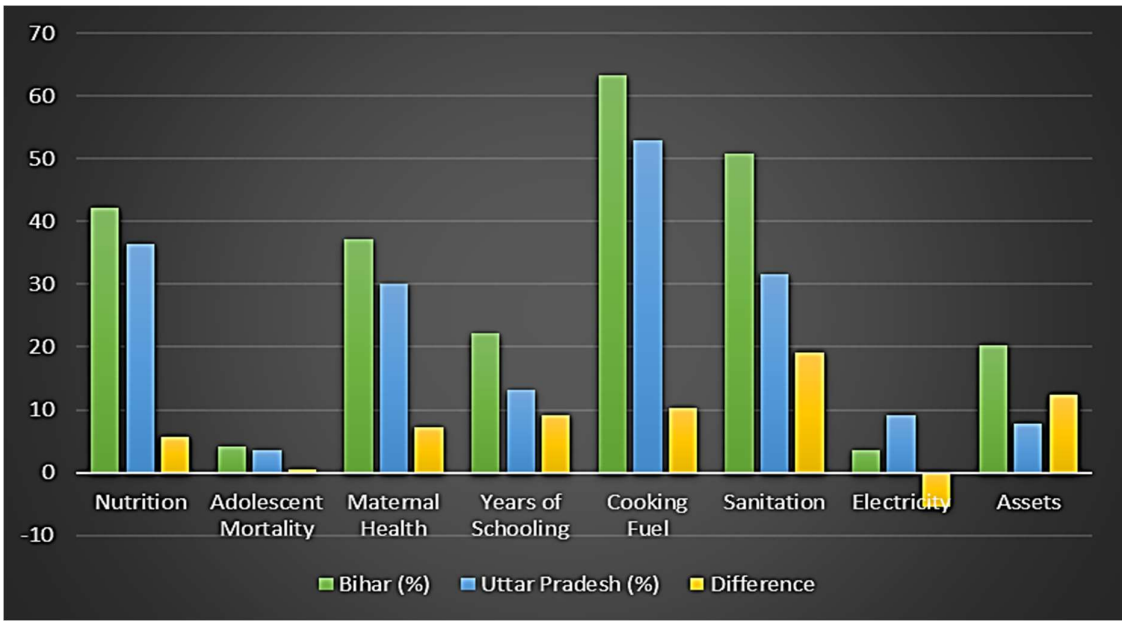

Figure 3: Conceptual framework of Indicator-wise comparison of two selected states from, mohfw 2021, NFHS-5.

4. Key Insights

1) Nutrition, maternal health, and education remain major deprivations in Bihar, though improvements are observed.

2) Uttar Pradesh performs relatively better in cooking fuel, sanitation, and electricity, highlighting effective state-level interventions.

3) Electricity shows a unique trend: Bihar has improved from 39.86% deprivation to 3.67% (probably rural electrification), while UP shows 9.16% deprivation, indicating regional differences.

4) Asset ownership disparities reflect wealth inequality; Bihar consistently lags behind.

5. Policy Implications

The comparative findings from NFHS-4 (2015–16) and NFHS-5 (2019–21) underscore measurable progress in reducing multidimensional poverty across both Bihar and Uttar Pradesh, yet persistent disparities continue to reflect unequal development trajectories. Bihar's poverty reduction rate (18.13%) and Uttar Pradesh's (14.75%) highlight broad improvement, but indicator-wise analysis reveals that Bihar remains more deprived in nutrition, maternal health, and asset ownership. These patterns echo prior research that attributes Bihar's slower progress to weak institutional capacity, inadequate infrastructure, and gender inequality (Dreze

& Khera, 2022; Pradhan & Kandapan, 2022). Uttar Pradesh's relative gains in sanitation, electricity access, and cooking fuel use suggest the positive impact of large-scale policy initiatives such as the Swachh Bharat Mission, Saubhagya Yojana, and Ujjwala Scheme (NITI Aayog, 2023). Bihar, however, continues to lag due to limited outreach and poor implementation efficiency in rural regions, confirming earlier observations by Andrabi (2021) and Srivastava et al. (2023) regarding uneven subnational policy performance. The results also reflect broader national trends reported by UNDP (2022) and OPHI (2020), where progress in basic services has not fully translated into improved human capabilities. From a policy standpoint, the findings reaffirm the need for localized and inclusive development strategies. First, targeted interventions in nutrition, maternal and adolescent health, and education quality are essential to breaking intergenerational cycles of deprivation. Second, infrastructure development—particularly in rural electrification, sanitation, and clean cooking fuel—should be prioritized through state-specific convergence programs. Third, inclusive governance mechanisms, including participatory budgeting and decentralized planning, can enhance responsiveness to local needs (IIPA, 2023).
Moreover, integrating poverty reduction programs with Sustainable Development Goals (SDG 1, SDG 3, SDG 4, and SDG 10) can help ensure coherence between national and state-level initiatives. Strengthened monitoring and evaluation systems, using NFHS and NITI Aayog dashboards, will further improve accountability and policy targeting. Ultimately, multidimensional poverty alleviation requires not only income growth but also institutional innovation, gender equity, and social empowerment to ensure that economic development translates into human well-being. In regions such as Bihar and Uttar Pradesh, development strategies must be rooted in local realities. Programs focused on nutrition, education, and maternal health are most effective when they reflect community-specific challenges and cultural dynamics. By aligning these efforts with the Sustainable Development Goals—especially those targeting hunger, health, and education—governments can better address disparities in service delivery. Bihar's recent improvements in sanitation (SDG 6) and Uttar Pradesh's adoption of a state-level SDG dashboard illustrate how localized planning can accelerate progress (NITI Aayog, 2023; Government of Uttar Pradesh, 2023). Equity in governance demands more than policy inclusion; it requires dismantling entrenched social barriers. In both states, caste and gender inequalities continue to shape access to resources and representation. Tools like participatory budgeting and decentralized planning have shown promise in amplifying marginalized voices and improving accountability (IIPA, 2023). When

paired with robust data systems—such as citizen feedback platforms and real-time monitoring—these approaches can transform SDG targets like gender equality and reduced inequalities into measurable outcomes.

Further recommended areas which require government interventions are-

1) Targeted Interventions: Nutrition, education, maternal and adolescent health.

2) Infrastructure Development: Sanitation, electricity, and clean cooking fuel.

3) Inclusive Governance: Address caste, gender, and social disparities.

4) Monitoring & Evaluation: Strengthen data collection and feedback mechanisms.

5) SDG Alignment: Integrate state programs with Sustainable Development Goals.

6. Conclusion

The comparative analysis of NFHS-4 and NFHS-5 data highlights a gradual reduction in multidimensional poverty in Bihar and Uttar Pradesh. While progress is evident in areas like nutrition, maternal health, education, and access to basic services, disparities remain significant, particularly in Bihar.

Bihar continues to experience higher deprivation across nearly all indicators, indicating slower development, limited healthcare access, and educational challenges. Uttar Pradesh, although better, still faces multidimensional poverty issues.

To ensure inclusive development, state-level strategies should focus on gender equity, universal access to health and education, improved infrastructure, and targeted welfare programs. Strengthening governance, enhancing local implementation, and monitoring policy effectiveness will be crucial to achieving meaningful poverty reduction.

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