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Evidence for health policy







DRIVERS OF DECLINE IN STUNTING IN INDIA

AN EXEMPLAR ANALYSIS

2025

DRIVERS OF DECLINE IN STUNTING IN INDIA

AN EXEMPLAR ANALYSIS

STUDY PARTNERS

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FOREWORD

I am pleased to present this report titled "Drivers of Stunting Decline in India: An Exemplar Analysis." This report highlights the efforts of BIRAC and the Grand Challenges India Initiative in improving child nutrition. The work focuses on understanding and addressing the factors that contribute to stunting, a condition where in children are shorter than normal for their age due to poor nutrition. Through this report, we aim to share valuable insights and encourage further actions to reduce child undernutrition in India.

This report emphasizes the importance of comprehensively evaluating the complex factors that influence stunting, a critical public health challenge in India. Despite significant obstacles, notable progress has been made, particularly among the most vulnerable populations. This success underscores the effectiveness of government initiatives and the value of collaborative action across various sectors.

Recognizing the multifaceted nature of child nutrition, we have adopted a holistic approach to understanding the drivers of change. This report goes beyond a simple compilation of data, serving as a valuable resource for identifying the key factors that have contributed to the positive trajectory in reducing stunting prevalence in India.

I extend my sincere gratitude to all those who contributed to this important initiative. Collaboration and knowledge sharing are essential for advancing our shared mission. I trust that this report will serve as a guide, inspiring innovative approaches to developing equitable solutions and transformative policies for improving the well-being of children in India."

(Dr. Rajesh S. Gokhale)

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We would like to extend our sincere gratitude to Dr. Rajat Goyal, Saif ul Hadi, Dr. Jessy Joseph, Smriti Bhagi, and the Health Systems and Policy Research team at the IAVI, Gurugram – domain center for Maternal and Child Health at KniT for their technical contribution and expertise.

Special thanks are due to our partners, including Post Graduate Institute of Medical Education and Research Chandigarh, IAVI, All India Institute of Medical Sciences Delhi, All India Institute of Medical Sciences Rishikesh, Tata Institute of Social Sciences Hyderabad, and Exemplars in Global Health, for their unwavering support and collaborative efforts in forming crucial links with the exemplar states and aiding in navigating technical intricacies. We would also like to extent our heartfelt gratitude to Khyati Tiwari, Narasimha Rao from UNICEF Hyderabad Office; Jayati Mitra and Farheen Khurshid from UNICEF West Bengal Office for their contributions in facilitating support and linkages with the respective state governments. The Knowledge Integration and Translational (KnIT) platform Scientific Advisory Group chaired by Siddharth Ramji, and the Technical Advisory Group chaired by Dr. Zulfiqar A Bhutta, including Anura Kurpad, Purnima Menon, Dr. Rajib Dasgupta, Per Ashorn, and Dr. Suneeta Krishnan, is acknowledged for their guidance and expertise which has not only fortified the technical robustness of the study but have also been instrumental in shaping its far-reaching policy implications.

Our heartfelt gratitude also goes out to the internal our team at GCI-BIRAC comprising of Dr. Madhavi Chandra, Dr. Richa Vashishtha, Ms. Arshi Mehaboob, Dr. Debanjana Dey, Dr. Monica Sharma, Ms. Mitika Kashyap and Mr. Ritesh Kumar Jaiswal for their valuable contributions in organizing technical reviews and consultations with experts. We also sincerely thank Dr. Shirshendu Kumar Mukherjee for contributing during his tenure as Mission Director.

A special note of gratitude goes to Niranjan Bose, Goutham Kundru, Karin Lapping, Jamal Yearwood and Jenny Lee from Exemplars in Global Health for their unwavering support and collaboration in the ensuring global audience for this work. We would also like to mention the contributions of Prashant Panjiar and his team for their exceptional photography, enhancing the visual appeal of this report.

This acknowledgment is a tribute to the collaborative spirit and dedication of all involved, without whom this report would not have achieved its professional and impactful stature.

(Jitendra Kumar)
Managing Director

List of abbreviations

GDP	Gross Domestic Product
LPG	Liquefied Petroleum Gas
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NFHS	National Family Health Survey
NGO	Non Governmental Organisation
INR	Indian Rupee
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene

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Executive Summary

Stunting in children remains a pressing global health challenge and the burden continues to affect low-income and middle-income countries disproportionately. South Asia has grappled with a high prevalence of stunting for decades and with concerted efforts, the region's progress has been commendable. India too, has demonstrated a reduction in stunting from 1993 to 2020, with rates falling from 58% to 35% with a rate of decline comparable to that of South Asia. Additionally, one of the most striking features of India's stunting reduction journey is the equitable nature of its progress. India has witnessed a significant decline in stunting rates across its most vulnerable groups, notably, among the under-5 children in the lowest 20% wealth group that show a steeper decline (59% to 46%) compared to highest 20% wealth group (26% to 23%) – suggesting that the maternal and child nutrition policies and programs implemented in India have effectively targeted those who need it the most.

This report examines the interplay of various determinants, policy and programmatic interventions at a national and sub-national level to identify the key drivers that have enabled India and its exemplar states to make such significant strides in stunting decline – with an aim to aid in accelerating this decline to meet global nutrition targets. This study uses a multi-pronged exemplar approach of a) assessing data quality; b) rigorously analysing stunting trends and sub-group variations and c) converging of evidence from multiple sources such as secondary data, policy documents, program reports, policy makers and community level perspectives, to come up with best practices that could further help with the stunting decline journey of India despite its complexities.

This study suggests that childhood stunting is a systems-level issue and a complete multisectoral approach that aligns top-down policies with bottom-up implementation strategies can be sustained and expanded upon with an emphasis on concerted efforts by the health, education, WASH, women's empowerment, and food security sectors. The report also emphasizes how crucial it is to empower functionaries and the community to take charge of these projects and to build capacity at the village, district, and state levels.

Intensified focus on gender mainstreaming for ensuring that interventions address the specific needs of women and girls, contributing to more equitable outcomes emerges as pivotal for accelerating progress. Additionally, disaggregating monitoring of outcomes across all levels – for the identification of disparities and the tailoring of interventions to address the needs of vulnerable groups – is essential for assisting India in effectively approaching the goal of meeting global nutrition targets.

Additionally, to expedite progress even further, India needs to prioritize novel solutions that center around the life cycle approach to child nutrition. It is commonly known that maternal nutrition—an indicator that should be pursued not only during perinatal periods but right the from formative years—determines both birth weight and childhood stunting. From adolescence onward, making investments in proactive pre-conception interventions, nutritional assessments and resolution of the gaps in the assessments through dietary counseling, micronutrient supplementation, and supplemental nutrition, emerge as important.

This study tells the unique story of how the combined effects of positive momentum across 12+ sectors in India have come together to impact stunting and how leverging key insights and strategies from what has been found to work at scale, and addressing persisting challenges with targeted policies, can accelerate the trajectory towards achieving nutrition targets, ensuring the well-being of the most vulnerable populations and achieving the vision of Viksit Bharat by 2047.



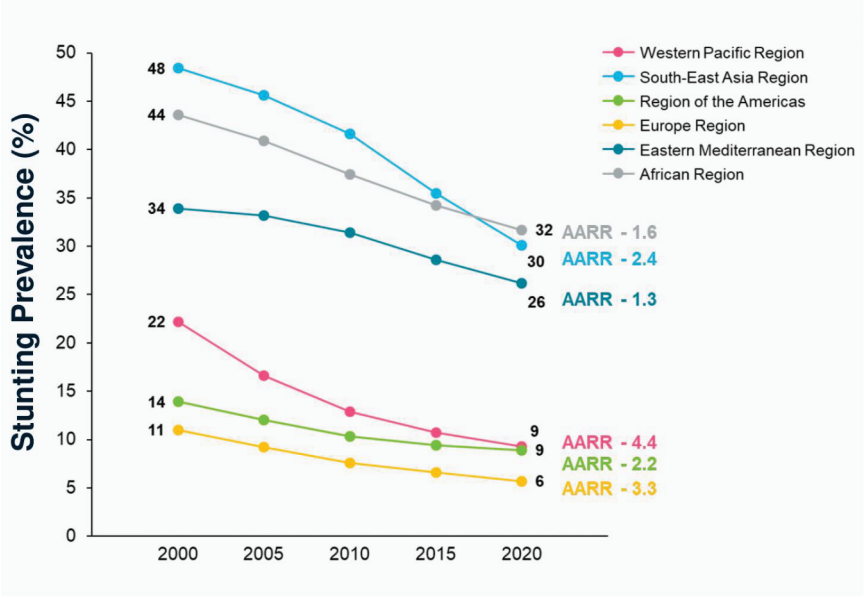


1. Introduction

1.1 Nutrition: the global picture

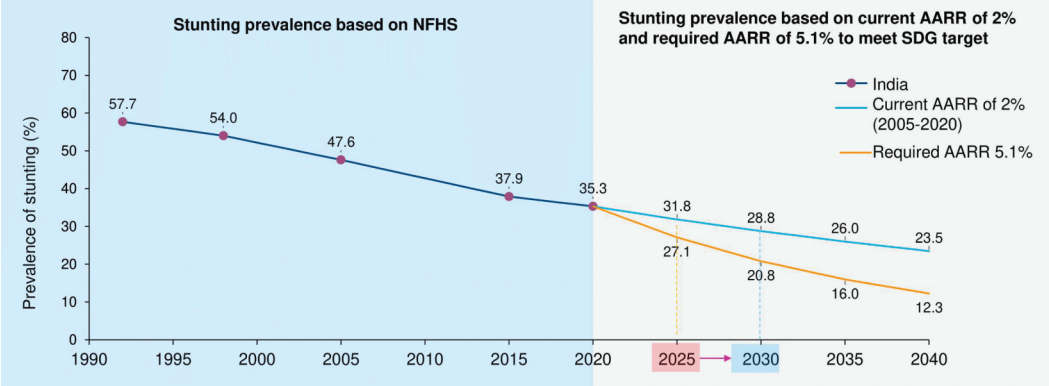
Globally, progress has been made in reducing chronic undernutrition, with stunting rates among children under 5 years of age steadily declining since 2000, where the prevalence dropped from 33% to 22% in 2020. The South-East Asia region has seen significant progress, reducing stunting at an annual rate of 2.4%, surpassing reductions seen in Africa, East Mediterranean, and the Americas with a point higher. (Figure 1)

Figure 1: Global trends in stunting decline



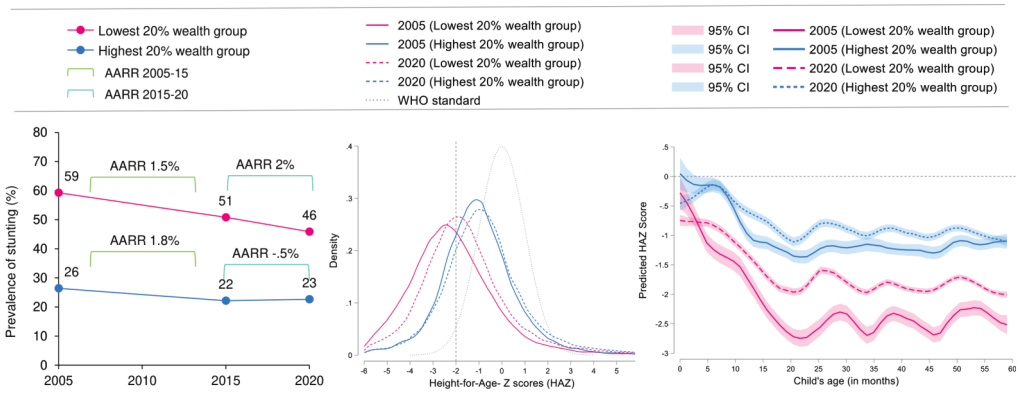
Simultaneously, India too witnessed a reduction in stunting from 1993 to 2020, with rates falling from 58% to 35% with an decline rate comparable to that of South Asia. (Figure 2)

Figure 2: Stunting prevalence based on current AARR of 2% and required AARR of 2.9% to meet the SDG targets



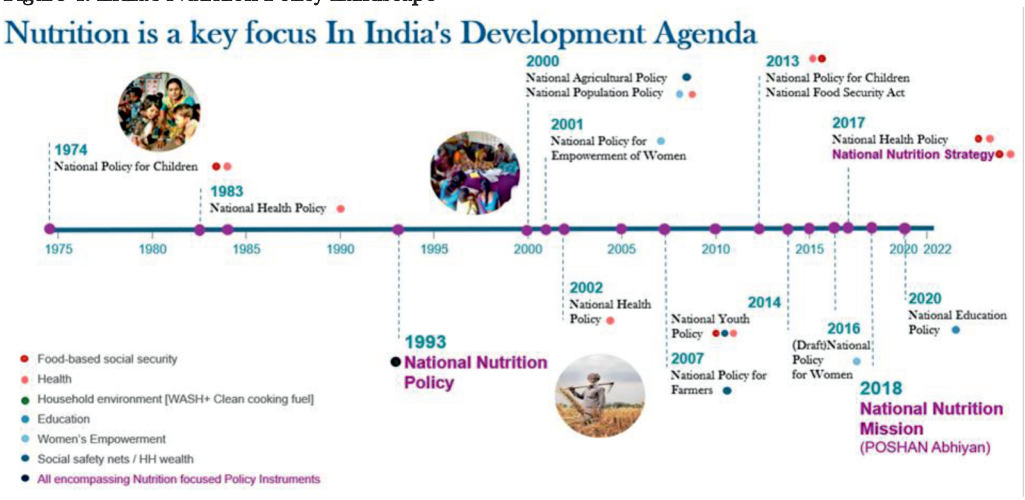
Analysis of the past three rounds of NFHS data revealed significant improvements in stunting rates, particularly among disadvantaged groups. Notably, improvements were observed in stunting among the bottom four quintiles compared to the highest wealth groups, reducing the gap between the highest and lowest wealth quintile by 10% from 2005 to 2020 period. The lowest wealth quintile saw stunting decline from 59% to 46%, with an annual reduction of 1.5% (2005-2015) and 2% (2015-2020). Notably, the distribution of height-for-age Z-scores shifted more significantly towards the WHO reference for the lowest wealth group compared to the highest. Moreover, both wealth groups show improvements linear growth faltering from age 2 to 59 months, with the lowest quintile demonstrating more substantial change than the highest wealth quintile (Figure 3).

Figure 3: Stunting declined significantly, especially among the economically disadvantaged. The 2015-2020 period shows a promising trend.



Nutrition has always been a key focus in India's development agenda, since 1993 with the launch of National Nutrition Policy. Guided by the country's policies and administrative efforts in the following years laid the foundation for multisectoral actions. This decrease reflects India's unwavering commitment to address childhood undernutrition, aligning with the United Nations' 17 Sustainable Development Goals. (Figure 4)

Figure 4: India's Nutrition Policy Landscape



However, in 2020, a staggering 149.2 million children under the age of 5 worldwide, which is about 22.0%, were found to be stunted. This issue hits hardest in regions like South Asia and Africa. There are huge differences between countries, and India bears a heavy load, with about 63 million stunted children, almost a third of the global total. Despite efforts, India's progress in reducing stunting may not meet the targets set. Adding to the challenge is the vast diversity among Indian states. While some have made significant strides in reducing stunting over the past decade, others have seen little change, showing that progress is unevenly spread.

To further accelerate progress in reducing stunting and achieve the global targets, India must continue to work towards addressing the disparities in progress to achieve the Sustainable Development Goals (SDGs) related to reducing childhood malnutrition. By focusing on areas where things are going well, we can quickly and efficiently learn about effective strategies on a large scale, ultimately improving outcomes for everyone. Thus, the positive outliers or exemplary states provide us with a myriad of opportunities and lessons to learn from about what works at scale.

1.2 How we chose Exemplar states?

We selected Exemplar states using the change measured across NFHS 3 (2005) and NFHS 4 (2015). In our examination of 28 Indian states, we used the following three criteria for selection: (1) decline in prevalence of stunting, (2) decline in prevalence of severe stunting, and (3) decline in prevalence of stunting in the poorest wealth quintile. A state's performance was deemed exemplary if the rate of decline was more than the median of all states in all three criteria. States with a compounded annual rate of change above the median in three criteria—stunting prevalence, severe stunting prevalence, and stunting prevalence in the lowest wealth quintile—were shortlisted to be Exemplar states.

The state of Andhra Pradesh was bifurcated into Andhra Pradesh and Telangana State in 2014. Thus, NFHS-3 presents data from united Andhra Pradesh, whereas NFHS 4 presents data from Andhra Pradesh and Telangana separately. To ensure comparability, we pooled NFHS 4 data from Andhra Pradesh and Telangana and henceforth referred to it as Andhra Pradesh & Telangana State. Of India's 28 states, nine states met the three selection criteria. Of these, Andhra Pradesh and Telangana State, Punjab, Uttarakhand and West Bengal. were selected for detailed analysis. The four states showed improvement in stunting rates over and above the national median, as seen in Figure 5 below.

The four selected states— Andhra Pradesh and Telangana State, Punjab, Uttarakhand and West Bengal. —stood out among the rest not only because of their exemplary performance, but also because of the unique context they represented across the country. Though we selected states based on performance from 2005 to 2015, within each state we also drew insights from earlier periods for contextual understanding of the state's performance. We also used the latest survey (NFHS 5, 2020) to understand recent achievements.

Figure 5: Stunting prevalence in India and its Exemplar states
Sources: NFHS 2 (1998), NFHS 3 (2005), NFHS 4 (2015), and NFHS 5 (2020)

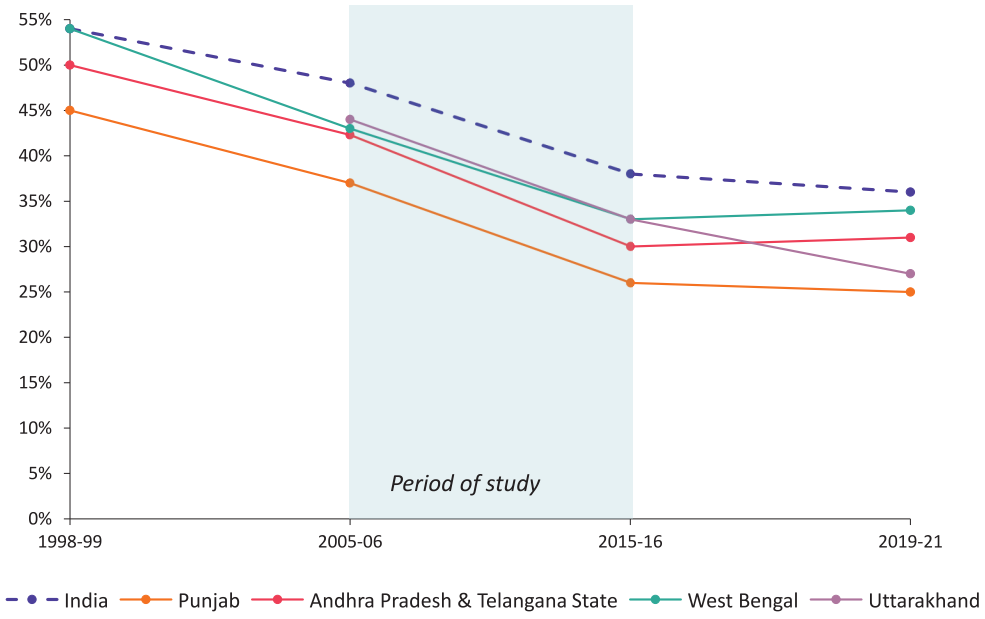
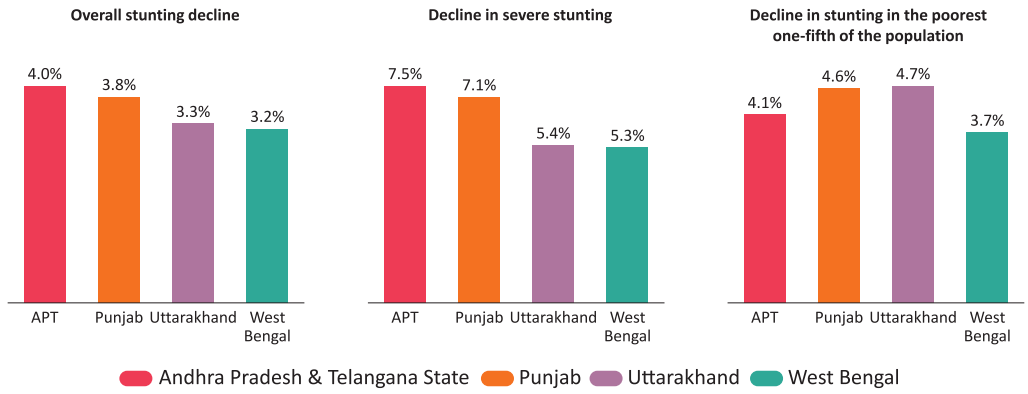
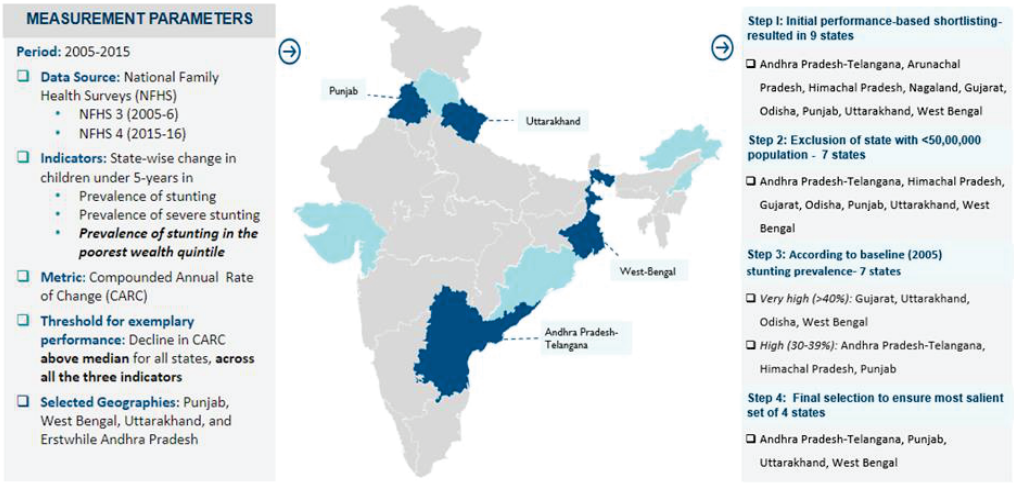


Figure 6. Average Annual Rate of Reduction (AARR) Of stunting in Exemplar states.
Sources: NFHS 3 (2005) and NFHS 4 (2015)



1. Diagram: Exemplar State Selection



1.3 Unique Approach: Going Beyond Data to Unveil Contextual Dynamics

Understanding these Exemplar performances required a data-guided and in-depth examination of each state's context, policy measures, and stakeholder perspectives. A mixed-method case-study methodology was thus used.

A statistical analysis having helped shortlist the factors responsible for change across time, these factors were probed with evidence from literature, stakeholder interviews, and policy documents. What's effective in terms of each state's policy choices, interventions, and implementation strategies was identified. Being both in-depth and contextual—a context that includes events over a set period—requires a variety of data from multiple sources. From these sources we developed convergent evidence using an integrative approach thus increasing confidence rendering events accurately.

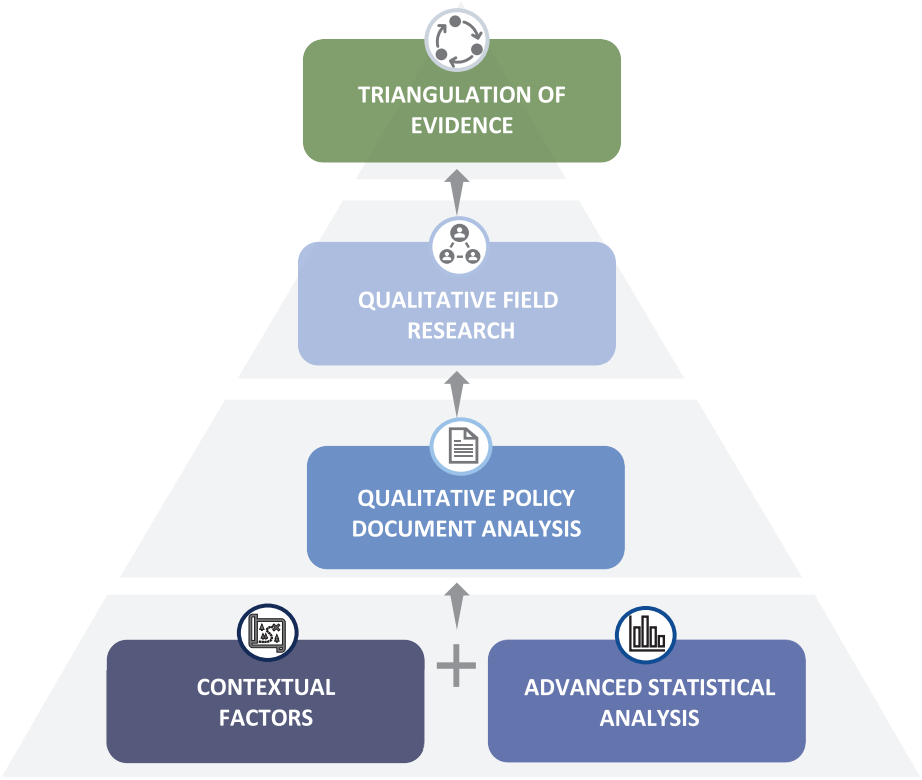
Survey data sources included National Family Health Surveys, the Comprehensive National Nutrition Survey, the Indian census, the Sample Registration System, National Sample Surveys, the Annual Status of Education Reports, the Planning Commission and Ministry of Social Justice and Empowerment, and NITI Aayog State Statistics.

Policy and program data included program documents, strategy documents, plan-of-action documents, portals and dashboards, evaluation reports, economic surveys, national and state budgets, legislations, executive instruments, press releases, parliamentary questions, development sector reports, and scientific publications.

Stakeholder interviews and **group discussions** were conducted at three levels. At the state level: Chief Secretary and administrative secretaries (current and retired), and program managers from the departments of Women and Child Development, Health, Education, Rural Water Supply and Sanitation, and Food Supplies. At the district level: Officers from an average-performing district in the state. At the village level: Frontline workers and community.

Converging multiple sources of evidence allowed us to strengthen validity of findings.

1. Conceptual diagram: Mixed Methods Case Study design



CONTEXTUAL FACTORS

Understand how the contextual environment shapes what has been done/ can be done/should be done.

Literature review to study the state's unique context within the overall national context that enables or hinders the policy choices using the following lenses:

- Historic-geographic
- Political
- Demographic
- Economic
- Socio-cultural

ADVANCED STATISTICAL ANALYSIS

Identify the factors responsible and their percentage contribution for change in stunting across time

1. Descriptive analyses
a)Subnational variation in outcomes and determinants over time in select states
b)Equity analyses of Stunting prevalence by: Wealth quintile, Residence, Gender, Social-status
2. **Multivariable Regression decomposition analysis** provide% contribution by determinants for child HAZ change
3. Sensitivity Analysis: Difference-in-Difference Analysis

QUALITATIVE POLICY DOCUMENT ANALYSIS

Understand policy actions undertaken, the motivation for their inception, implementation strategies employed, and the overall impact observed.

1. Identify policy actions applied across departments which were directly or indirectly responsible for stunting decline or were impacting one or more of the known determinants of stunting.

2. Describe the evolution and impact of the policy actions by using information from strategy documents, executive reports, dashboards, press releases.

QUALITATIVE FIELD RESEARCH

Gain diverse stakeholder perspectives about what worked on ground, how was it implemented, for whom and in what context.

Stakeholder perspectives: Conduct in-depth interviews to get insights relevant to stunting decline at three levels:

- National-level
- State-level
- District-level
- Sub-district and community

1.4 Strengths and Limitations of data

The NFHS data provides standardized information on sampled populations, representative at national and state levels, which enabled us to track progress in childhood malnutrition outcomes and their determinants. This publicly available data offers valuable insights into maternal and child anthropometry, household characteristics, and access to health services.

Child anthropometry: While studying the child anthropometry, we observed significant improvements in survey methods across time, like stricter better-trained human resources, investments in state-of-the-art equipment, validation exercises, and the utilization of technology, particularly in monitoring data quality through field check tables. Corresponding improvements could be noted in completeness of birth date records and height measurement, representativeness, reduction in measurement errors like rounding and position mismatch. We also observed implausible values and standard deviations for the latter rounds (NFHS4) for all exemplar states were within acceptable range (Please refer **Figure 7** and **Table 1**). Despite improvements, there's still room for further reduction of measurement errors.

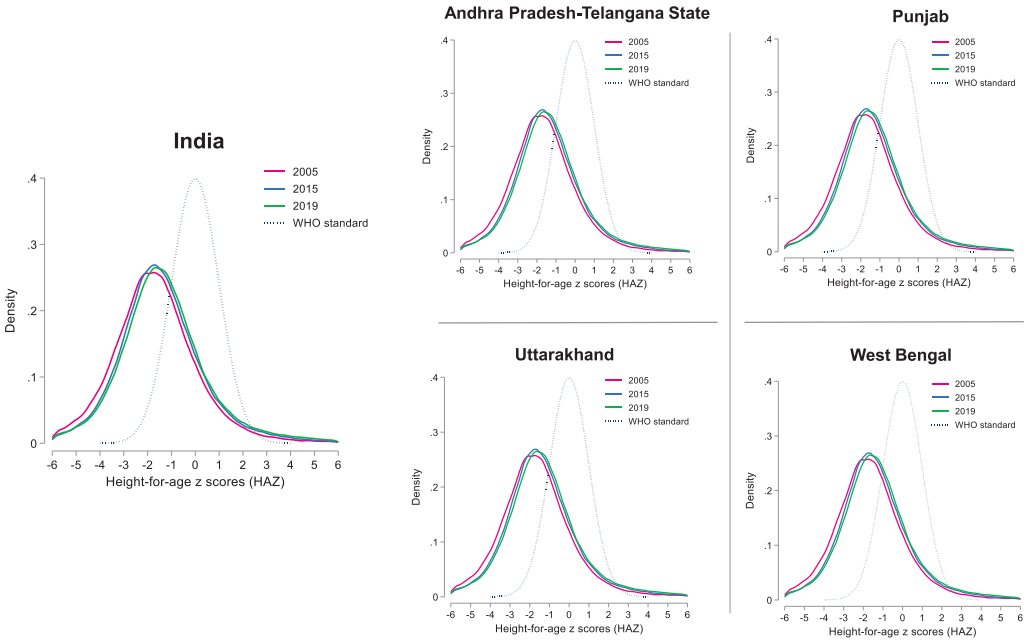


Figure 7 Positive distributional shifts in Child HAZ scores observed from 2005 to 2020 (Smooth distribution curves indicate improved data quality and low measurement error)

Table 1: Summary statistics of anthropometric data quality indicators from NFHS-3 to 5

	India			APT			Punjab			Uttarakhand			West Bengal		
	NFHS3	NFHS4	NFHS5	NFHS3	NFHS4	NFHS5	NFHS3	NFHS4	NFHS5	NFHS3	NFHS	NFHS	NFHS3	NFHS4	NFHS5
Survey characteristics															
Sample size	51555	259627	232920	2292	5555	10151	1307	5216	5616	1228	5825	3784	2368	5328	5618
Survey period	Dec 05 - Aug 06	Jan 15 - Dec 16	Jun 19- May 21	Dec 05 - Apr 06	Mar- Aug 15	Jul - Nov 19	Dec 05 - Mar 06	Jan - Jun 16	Jan 20 - Apr 21	Apr 06 - Jul 06	Jan - Jul 15	Dec 19 - Apr 21	Dec - May 05	Feb - Jul 15	Jun - Nov 19
Estimates at state/district level	State	District and State		State	District and State		State	District and State		State	District and State		State	District and State	
Training Method	Centralized	Cascade	Cascade	Centralized	Cascade	Cascade	Centralized	Cascade	Cascade	Centralized	Cascade	Cascade	Centralized	Cascade	Cascade
Quality assurance - using Field check Tables	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

	India			APT			Punjab			Uttarakhand			West Bengal		
	NFHS3	NFHS4	NFHS5	NFHS3	NFHS4	NFHS5	NFHS3	NFHS4	NFHS5	NFHS3	NFHS4	NFHS5	NFHS3	NFHS4	NFHS5
Data Quality Metrics															
Sex ratio	918	914	925	870	889	904	743	864	904	893	885	973	964	946	965
Completeness of DOB (> 90% Acceptable)	68.9	91.6	95.0	81.1	92.8	95.4	85.7	95.8	94.9	78.9	93.6	95.7	78.3	95.6	96.8
Completeness of Height (> 90% Acceptable)	84.87	91.34	90.66	82.37	84.97	87.84	88.52	94.77	88.41	88.19	92.39	89.35	88.81	93.04	94.11
Proportion of mismatches between length/height measurement position and recommended position	11.76	4.61	4.45	13.74	6.15	5.80	9.64	1.13	3.65	0.55	3.81	3.11	7.18	3.46	4.33
Height - Digit Preference Score (DPS) (< 20 Acceptable)	14.9	11.2	10.7	13.3	10.6	9.7	8.2	10.1	9.4	10.9	15.0	10.6	14.7	9.4	10.8
HAZ Implausible, % (< -6 or > 6) (> 1% poor)	2.94	1.90	2.36	3.07	0.66	2.78	0.86	1.42	1.49	2.68	1.88	1.21	2.23	1.15	2.48
Standard deviation (>1.8 concerning)	1.76	1.78	1.84	1.63	1.50	1.83	1.58	1.55	1.62	1.64	1.90	1.69	1.55	1.54	1.76
Skewness (-0.5 to 0.5 Acceptable)	0.53	0.63	0.65	0.42	0.43	0.78	0.18	0.51	0.33	0.09	0.64	0.48	0.45	0.54	0.55
Kurtosis (2 to 4 Acceptable)	4.13	4.25	4.27	4.06	4.22	4.54	3.25	4.46	4.19	3.11	3.99	4.04	3.78	4.71	4.43

Also, worth noting down is some increase in measurement errors in NFHS 4 and 5 when compared to NFHS-3, which could be due to increase workload (see table xx greater sample). In addition, NFHS-5 faced unique challenges of COVID pandemic and thus surveyors could be expected to have faced higher refusals and lower supervision.

Characteristics of other variables used as proxies for known determinants: It is important to consider certain limitations. The data on maternal and child dietary intake relies on 24-hour recall, which can introduce errors and make trend analysis challenging. Similarly, self-reported information on childhood diseases may not be reliable for tracking changes over time. Variables such as a child's weight at birth and a fathers' education and occupation often have high non-response rates or poor recall. Certain variables, such as household toilet and piped water supply, may not fully capture actual practices or quality.

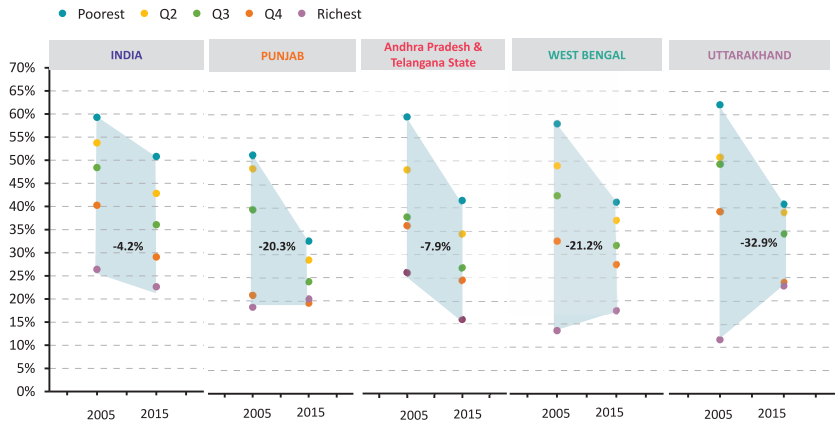
Despite these limitations, utilizing credible and high-quality multidimensional data improves our understanding of nutrition issues and supports evidence-based policymaking. It is crucial to acknowledge both the strengths and weaknesses of the data to make informed interpretations. Identifying these gaps provides a chance for the scientific community to enhance data quality in future surveys, which will further strengthen programmatic and policy decisions.

Leveraging reliable data on coverage, quality, scale, and nutritional outcomes enhances our knowledge of nutrition challenges and facilitates evidence-based policymaking in this field. By recognizing the limitations of the data and working towards improvement, we can further enhance the impact of our efforts to address malnutrition effectively.

1.5 The trajectories of each state

Based on World Health Organization growth reference, among the four states selected, Andhra Pradesh & Telangana State, Uttarakhand, and West Bengal started from a 'very high' (>40%) prevalence of stunting among under-5 children in 2005, whereas Punjab started from a 'high' prevalence (30% to 39%). All four states had trajectories of decline better than the national average, and by 2015 West Bengal and Uttarakhand were at 33%, Andhra Pradesh & Telangana State was at 30%, and Punjab at 26%. Stunting reduction in these states demonstrated exemplary improvement in equity across wealth groups (see Figure 8) and undernutrition improved across social groups like castes and tribes.

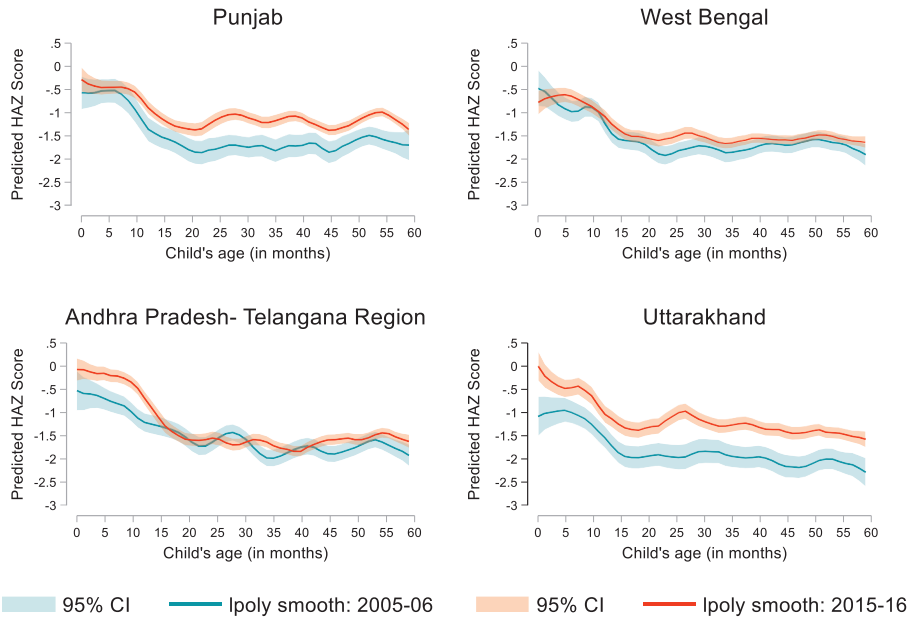
Figure 8. Stunting prevalence across wealth quintiles in India and its Exemplar states



Sources: NFHS 3 (2005) and NFHS 4 (2015)

Despite improvement in equity among all four states, there were some variations across the states. For example, child growth faltering curves (Figure 9) reveal there are multiple paths towards success.

Figure 9. Change in height-for-age z-score curves in Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

Uttarakhand and Punjab had the most substantial change in height-for-age z scores across the age of the child—Uttarakhand more so than Punjab. Andhra Pradesh & Telangana State and West Bengal had improvements in limited age groups; for example, in the age groups 0–18 months and 20–30 months, respectively. It must also be noted that according to the recent NFHS 5 (2019–2021), Uttarakhand was the only Exemplar state that continued reducing stunting, with prevalence declining to 27%, demonstrating strategies for more sustained gains multiplying impact that have yielded past success.

1.6 State-specific context:

The success of any region is heavily determined by their contexts, for example, the distinct enablers and challenges that shape policy formulation, implementation, and outcomes. By highlighting these nuances, the report offers valuable insights into the diverse geopolitical, socio-economic, cultural, and governance dynamics across exemplar states, underscoring the importance of tailoring policy responses to local needs and addressing state-specific variations. The best practices when defined along with their context, will enable decision makers to adapt these better to their respective contexts.

Context at a glance:

	ANDHRA PRADESH	TELANGANA STATE	PUNJAB	UTTARAKHAND	WEST BENGAL
GEOGRAPHY	• Located in southern peninsula, divided into Coastal and Rayalseema • Uneven rainfall distribution and susceptibility to droughts and cyclones	• Landlocked state, majority rural, arid climate • Irregular rainfall, prone to droughts	• Border state, diverse geography: hills, plains, fertile soil, landlocked • Agriculture reliance brings environmental risks: water degradation, scarcity and natural resource depletion	• Hilly state with difficult to access regions in Northern India • Bordered by China (Tibet) and Nepal • Susceptible to earthquakes, landslides and floods	• Himalayas, Gangetic plain, Coastal region • Prone to conflicts • Vulnerable to seasonal floods, shares borders internationally
ECONOMICSS	• 'Bejewelled rice bowl of India.' • State's contribution to the gross state value: Agriculture (29% to 33%), Manufacturing, Industry (24% to 26%), Services (41% to 47%) • Key port: Vishakhapatnam	• Predominantly agrarian, rising IT export powerhouse. • Rapidly growing fisheries sector • Sixth highest national GDP contributor in 2020-2021. • 31% GDP growth	• Breadbasket of India' during Green Revolution. • Traditionally agrarian, transitioning to service sector. • 'Shifted to services post-1990s economic reforms. • High international out-migration, remittances impact GDP	• Agrarian economy with shift to industries and service sectors • Sacred sites, well known for religious tourism • Rapidly advancing, 7% Annual Growth Rate ('00-'05) • Male out-migration due to regional imbalances and limited employment opportunities	• Agriculture mainstay: tea, rice production. • Key entry point for Southeast Asian markets. • Western, Sundarbans, North Bengal industrially lagging, low private investments • Informalized economy
POLITICS	• Post-bifurcation political shift • Caste dominated politics • Admin. decentralizaton with 3 capitals: • - Amravati (Legislative capital) • - Vishakhapatnam (Executive capital) • - Kurnool (Judicial capital)	• 57 years undivided; Telangana separation demand fueled by discontent over under-development and unemployment. • 2014: Telangana formed.	• 1970s-1990s: State turbulence, President's Rule imposed. • Armed dissent, political turmoil marked the era • Politicial stability in current age	• Previously a part of Uttar Pradesh • Uttarakhand: Underdevelopment, regional disparities between hilly and plain regions led to statehood. • Special status granted and shift in political power • Frequent change of power	• 1947 partition impact: refugee influx, poverty. • Long-run political stability • Decentralization of power to Panchayati Raj institutions
SOCIODEMOGRAPHICS	• Rural population (70%) • Scheduled castes 16%, tribes 7%; facing poverty, resource challenges • Diverse demographic: Hindus 89%, Muslims 10%, Christians 1% • Internal migration from rural to urban in search of job opportunities	• Rural population (61%) • Hindus 85%, Muslims 13%, Christians 1% • 10% tribal population: struggle with poverty, unemployment, migration due to natural resource degradation and terrain • Internal migration from rural to urban in search of jobs	• Predominantly rural population • Punjab: Sikh majority (58%), significant SC population (31.9%) • Patriarchal gender norms perpetuating inequalities. • High international out-migration, and internal migration in search of jobs	• 70% rural population • Historic Upper Caste forms a major share of the population • State dominated by Hindu population • High women's participation in civic life, domestic life, political life. • Domestic out-migration	• 68% of the population living in rural areas, 5% ST and 23% SC • 5% tribal, 23% SC. Hindus 71%, Muslims 27%, Christians 1%. • Domestic out-migration for jobs • Immigration from Bangladesh

1.6.1 Punjab

Punjab, in northwest India, encompasses three distinct geographical regions: hilly areas in the northeast, undulating foothills, and fertile plains with alluvial soil. There are regional disparities in economic growth between the Majha, Doaba, and Malwa regions of Punjab. As a border state, Punjab frequently deploys troops in these areas, which impacts civilian access and dampens investments. From the 1970s to the mid-1990s, the state experienced internal political turmoil and armed dissent, resulting in extended periods of President's Rule (suspension of state government and imposition of direct central government control).



Punjab's economy has traditionally been driven by agriculture and dairy but has been transitioning to the service sector. Known as the 'breadbasket of India' for its agricultural modernisation during the Green Revolution of the 1960s and 1970s, it later shifted to the service sector after economic reforms in the early 1990s.

Despite the shift to the service sector, Punjab's heavy reliance on agriculture and dairy has continued and led to environmental challenges. The intensive use of water for irrigation—coupled with the extensive use of chemical fertilisers and pesticides—has resulted in water degradation and natural resource depletion. The overexploitation of groundwater has led to declining water tables, making the state susceptible to water scarcity and drought. Additionally, the excessive use of chemicals has caused soil degradation and water pollution, impacting both human health and the ecosystem.

Punjab's population of 2.77 million consists mostly of Sikhs (58% in 2011). Scheduled castes constituted 31.9% of the population as of 2011. Gender norms in Punjab are deeply influenced by patriarchal values, which often perpetuate traditional gender roles and inequalities in society. It experiences significant international out-migration, with 16.2 international emigrants per 1000 residents. Remittances from emigrants totalled 11.4% of the state GDP in 2007-2008, Amounting to a substantial contribution to the states's GDP and also ranking the state amongst the top 5 states with such high contribution.

1.6.2 Andhra Pradesh & Telangana State

The formation of Andhra Pradesh in 1956, resulting from the amalgamation of Andhra State with the Telangana Region of Hyderabad State, is rooted in the historical reorganisation of Indian states based on linguistic criteria. Despite 57 years of existence, undivided Andhra Pradesh witnessed a fervent demand for a separate Telangana State, fuelled by discontent with post-reform Andhra Pradesh's competitive populist politics. This discontent was exacerbated by new geographies of accumulation, injustice, and exclusion arising from historical differences between the Andhra (Seem Andhra) Region, part of the Colonial Madras Presidency, and Telangana, which operated under a feudal system. The movement culminated in the creation of two separate states, Andhra Pradesh and Telangana, in 2014.

Undivided Andhra Pradesh comprised 23 districts across three main regions: Northern Circars (Coastal Andhra), Rayalaseema (Ceded Districts), and Telangana. Post-bifurcation, Andhra Pradesh retained 13 districts, absorbing tribal dominated mandals from Telangana's Khammam District. Presently, Andhra Pradesh is divided into 26 districts, while Telangana, which initially had 10 districts, has expanded to 33.

Andhra Pradesh is often referred to as the 'bejewelled rice bowl of India.' Despite facing challenges, such as farmer suicides linked to capitalist practices from the 1980s Green Revolution, the state's agriculture contributed 29% to the gross state value added in 2015-2016. With a population of about 84.7 million, Andhra Pradesh has a diverse demographic composition, with 89% Hindus, 10% Muslims, and 1% Christians. Scheduled castes and tribes constitute 16% and 7% of the population, respectively, with tribal populations grappling with poverty due to geographical challenges and resource degradation.

Telangana, characterised by a predominantly hot and dry climate, is a landlocked state with 61% of its population residing in rural areas. The 2011 census reported 85% Hindus, 13% Muslims, and 1% Christians in the state. Over the years, Telangana has witnessed remarkable economic growth, becoming the sixth highest contributor to the national nominal GDP in 2020-2021. The state's GDP experienced a notable 31.12% growth in the past decade, driven by efforts to diversify the economy and the significant contribution of information technology exports.



Both states face geographical challenges, including uneven rainfall distribution and susceptibility to droughts. Land and agriculture remain crucial for their predominantly agrarian economies, sustaining the livelihoods of marginalised social groups (scheduled castes, scheduled tribes, and other 'backward' or disadvantaged classes). The scheduled tribal population still faces poverty due to challenging terrain, water scarcity, and natural resource degradation, leading to rural unemployment and migration out of the area for better work opportunities. Meanwhile, there have been efforts to diversify the economy exhibiting a shift towards the service sector. Additionally, Telangana has been a major contributor of information technology exports, contributing immensely to the state's economic growth.

Post-bifurcation, the political scenario changed in Andhra Pradesh, with the Telugu Desam Party returning to power in coalition with the Bhartiya Janta Party, In the 2019 Assembly Election, the Yeduguri Sandinti Rajasekhara Reddy Congress Party secured a sweeping victory with 151 seats, and Y.S. Jaganmohal Reddy became the Chief Minister of Andhra Pradesh. Whereas, in Telangana, the Telangana Rashtra

Samithi emerged victorious in the 2014 general elections, with Kalvakuntla Chandrashekar Rao sworn in as the first Chief Minister of the state. The Telangana Rashtra Samithi maintained its dominance in the 2018 Telangana Legislative Assembly election, while the Indian National Congress, Telugu Desam Party, All India Majlis-e-Ittehadul Muslimeen, and the Bharatiya Janata Party constituted the prominent opposition parties.



1.6.3 West Bengal

West Bengal, a state in eastern India, features diverse geography: the Himalayan region, the Gangetic plain, and the coastal region. Sharing international borders with Bangladesh, Nepal, and Bhutan, it is strategically positioned to serve as an entry point for Southeast Asian markets. Its geography also predisposes some regions of the state to seasonal flooding.

West Bengal is home to 91.3 million people, 68% of whom live in rural areas, with 5% belonging to scheduled tribes and 23% to scheduled castes. The majority are Hindus (71%), followed by Muslims (27%), and Christians (1%). Agriculture is the main livelihood, and the states is a major producer of tea and rice. The western districts, the Sundarbans delta area, and part of the North Bengal districts remain industrially underdeveloped. The 1947 partition of India deeply impacted West Bengal, causing an influx of refugees and widespread poverty. Under the Communist Party of India, the state saw political stability with a focus on land reforms and social welfare, but it also experienced deindustrialisation and rising inequality. In the 1960s, the village of Naxalbari witnessed peasant uprisings. The Trinamool Congress took power in 2011, but political violence persists.



1.6.4 Uttarakhand

Uttarakhand, a mountainous state in Northern India, is bordered by Tibet and Nepal. It has one of the world's youngest range of mountains—Nanda Devi, Kamet, and Badrinath—making it susceptible to earthquakes and landslides. The state's Char-dhams (four sacred Hindu temples) and sacred rivers, Ganga and Yamuna, attract religious tourism. It is divided into two administrative divisions, Kumaon and Garhwal.



Uttarakhand faced underdevelopment and regional growth disparities, which eventually led to its push for separation from Uttar Pradesh in 2000. In 2003, it received special status and was granted statehood. Since then, Uttarakhand experienced frequent changes in political power with no single party dominating the political landscape.

Post-bifurcation, Uttarakhand's positioned itself as one of India's rapidly advancing states, boosting a robust annual growth rate of 7% from 2000 to 2005. The state has an agrarian economy; however, regional imbalances and limited employment opportunities have led to male out-migration, resulting in women taking on household and farm responsibilities.

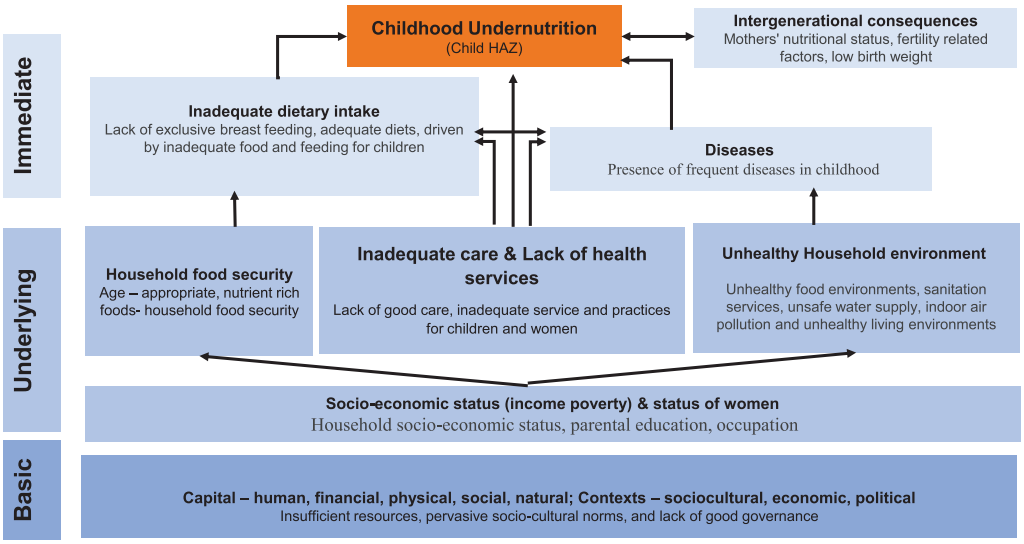
Uttarakhand's women are renowned for their active social and environmental activism, exemplified by the Chipko movement (a forest conservation movement), which began in 1973 and inspired subsequent global environmental movements.



2. How the Exemplar states responded to drivers of childhood stunting

Nutrition—including childhood stunting—is influenced by a complex interplay of diverse biological and socioeconomic factors. The summary of determinants of undernutrition provided in the framework below (**Diagram 3**) helps to delineate basic, underlying, and immediate causes of stunting and their interplay.

3. Diagram: Contextually adapted UNICEF nutrition framework illustrates the multifactorial drivers of stunting.



[1]United Nations Children's Fund. 2013. 'Improving Child Nutrition, The achievable imperative for global progress,' New York.

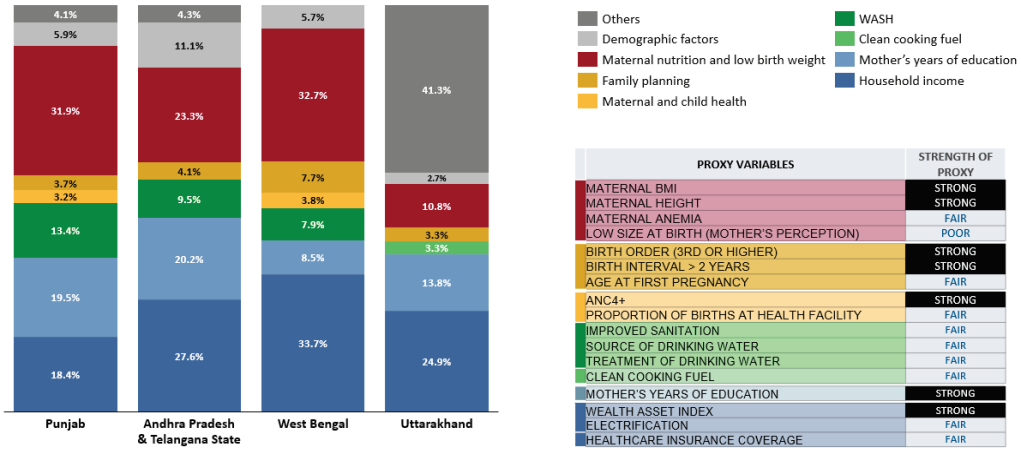
Source: United Nations Children's Fund (UNICEF). Improving Child Nutrition: The Achievable Imperative for Global Progress. New York: UNICEF; 2013.

This framework sheds light on the immediate factors crucial for achieving optimum nutrition, growth, and development. These factors include dietary habits, behavioural patterns, and the overall health of the child and the mother. However, these immediate determinants are not isolated, as they are profoundly impacted by the underlying factors of food security, availability of caregiving resources, and environmental conditions.

Furthermore, these underlying factors themselves are shaped by basic determinants, such as political, economic, and social conditions, at both national and global levels. Additionally, the capacity, resources, and governance structures in place also play significant roles in shaping the underlying factors.

In this section, we used this comprehensive framework to better comprehend the multifaceted nature of stunting and the intricate connections between various determinants in the selected states in India. This knowledge empowered us to identify targeted interventions and policies addressing the root causes of stunting and promoting healthier growth and development among children.

Figure10. Subnational linear decomposition (2005-2015)



PROXY VARIABLES	STRENGTH OF PROXY
MATERNAL BMI	STRONG
MATERNAL HEIGHT	STRONG
MATERNAL ANEMIA	FAIR
LOW SIZE AT BIRTH (MOTHER'S PERCEPTION)	POOR
BIRTH ORDER (3RD OR HIGHER)	STRONG
BIRTH INTERVAL > 2 YEARS	STRONG
AGE AT FIRST PREGNANCY	FAIR
ANC4+	STRONG
PROPORTION OF BIRTHS AT HEALTH FACILITY	FAIR
IMPROVED SANITATION	FAIR
SOURCE OF DRINKING WATER	FAIR
TREATMENT OF DRINKING WATER	FAIR
CLEAN COOKING FUEL	FAIR
MOTHER'S YEARS OF EDUCATION	STRONG
WEALTH ASSET INDEX	STRONG
ELECTRIFICATION	FAIR
HEALTHCARE INSURANCE COVERAGE	FAIR

Figure 10 shows the percentage contributions of various factors influencing childhood undernutrition across Indian states from 2005 to 2015. The findings highlight the significance of improving maternal nutrition and low birth weight (~30%), household socioeconomic status (~25%), education (~15%), access to health and family planning services (~10%), and better environmental conditions like safe water, sanitation, and cleaner fuel (~10%) in reducing stunting rates. It is also important to note that certain factors, such as the status of women, children's dietary patterns, and the overall physical and social aspects of the region, are crucial but challenging to quantify using available data. We will explore these factors in more detail through evidence generated from qualitative methods as we investigate the specific change story associated with each driving factor.

Although we tried to be exhaustive as possible, some factors cannot be well measured or understood based on our current knowledge.

Given this intricate web of factors, in each section, we first briefly look at the larger historical picture, discuss what the Government of India has done to address the direct and indirect causes of childhood stunting, and finally look at some of the policies and interventions taken by the four states which have made them Exemplar states. Given our reliance on survey data, we focus on the years 2005 to 2015, though our discussion will also consider events and policies beyond those years. In this report, we use the UNICEF nutrition framework to examine the following eight drivers (in the decreasing order of percent contribution to change in child HAZ as described in Diagram 3 of childhood undernutrition and assess national and state-level initiatives for each:

Nutritional Interventions

1. Maternal nutrition status and low birth weight in newborns
2. Child's dietary intake

Indirect Interventions that impact nutrition

3. Access to health services
4. Household Environment: Water, Sanitation and Hygiene (WASH) and clean cooking fuel
5. Education
6. Household Socio-economic status
7. Women's status
8. Physical infrastructure and connectivity

PART I

NUTRITIONAL INTERVENTIONS

- Maternal Nutrition and Low Birth Weight in Newborns
- Child's Dietary Intake



MATERNAL NUTRITION STATUS AND LOW BIRTH WEIGHT IN NEWBORNS



“So, there was one person who told me that if we provide pregnant and lactating mothers with good nutrition, we could impact the children for the next 20 generations; In Andhra Pradesh, we provide hot cooked meals to pregnant and lactating mothers to provide the best to the mothers at the least cost, designed in a way that operationally, it works.”

- Government Official
WCD, Andhra Pradesh

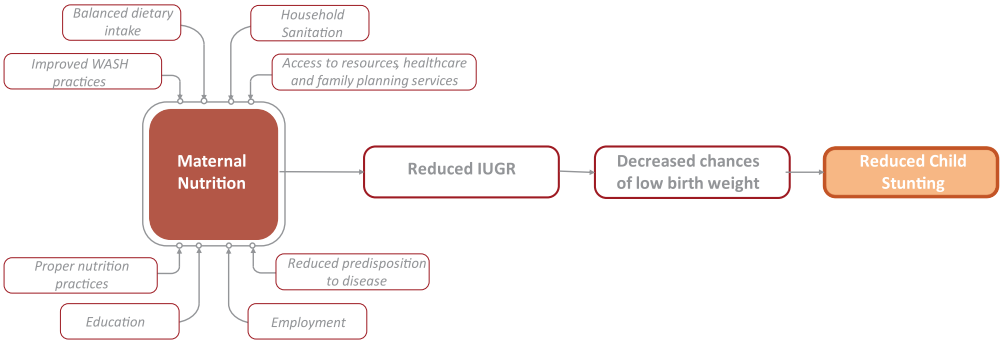
2.1 Maternal nutrition status and low birth weight in newborns

Why maternal nutrition and birth weight in newborns are important to stunting:

- **Inadequate maternal nutrition**—characterised by deficiencies in macronutrients, micronutrients, or both—**can lead to intrauterine growth restriction, low birth weight, and compromised linear growth** in early childhood.
- Maternal malnutrition **also increases the risk of preterm birth, which further increases the likelihood of low birth weight.**
- Ensuring proper **maternal pre-pregnancy nutrition** and **adequate weight gain during pregnancy** are vital for promoting optimal linear growth and preventing stunting in children, highlighting the importance of interventions and programmes that address the nutritional needs of women before pregnancy, during pregnancy, and thereafter.



2.Causal Pathway 1: Maternal Nutrition and Stunting



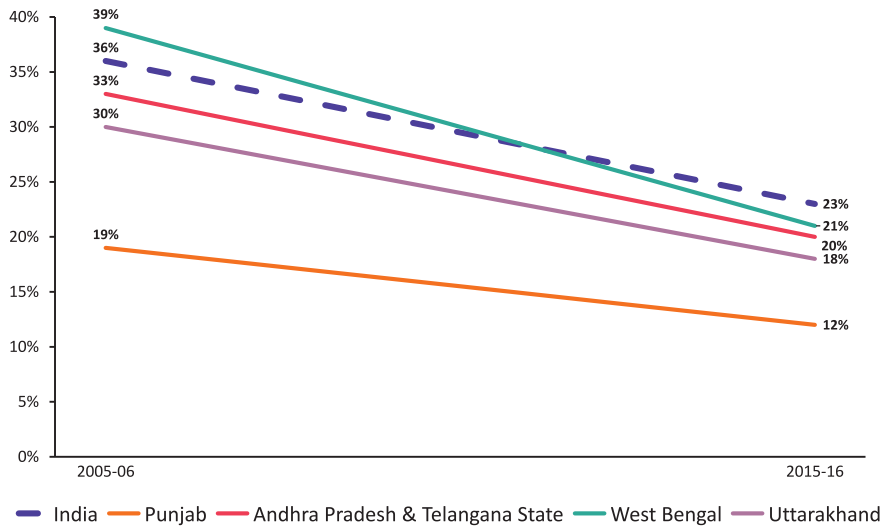
2.1.1 Food security in India and the Exemplar states and its impact on maternal nutrition

Maternal nutrition is an important reflection of food security. Positive strides in reducing the percentage of women with low body mass index, nationally and across Exemplar states (as seen in Figure 11), has been a hallmark of improving food security. The interventions that will be covered in the following sections address either household or individual food security.

It is noteworthy that a woman's nutrition status is determined not solely by food intake but also by one's hygiene and sanitation environment and access to health services. Further, for a woman, food availability and access often do not translate into utilisation of those resources due to gender-biased intrahousehold food allocation practices which are often difficult to measure and report. Female children bear the brunt of these discriminatory practices over the years, resulting in poor nutrition and health status during adolescence and young adulthood—the narrow age band when childbearing is concentrated. The nutrition status for women of reproductive age, however, improves with increasing age and fertility (often after bearing two to three children), which could be a result of improved status within the household.

Over the years, India has made remarkable strides in ensuring food availability. Partly due to advancements in agriculture, the nation has in recent decades successfully averted large-scale famines, which were prevalent in the past. Consequently, India has not only achieved self-sufficiency in food production, but it has also emerged as a major global food supplier. The purchasing power of individuals has also increased in this same period, driving greater access to a wide diversity of food. However, it is important to note that despite these strides, nutrition security remains a prevalent issue within India, especially among marginalised populations. A significant challenge is food or retail inflation, which affects the affordability and accessibility of food for many households. Rising prices of essential food items can lead to increased financial burden, especially for vulnerable populations.

Figure 11. Percentage of low maternal body mass index and its Exemplar states



Sources: NFHS 3 (2005) and NFHS 4 (2015)

The states of Punjab, Andhra Pradesh & Telangana State, West Bengal, and Uttarakhand have their own advantages and disadvantages in food security. Common to all states is an ability to produce their own food to some extent. Each state has unique advantages: Punjab excels in wheat and dairy production, Andhra Pradesh & Telangana State and West Bengal have specialised fisheries systems, and Uttarakhand benefits from a prolific horticulture belt. However, all four states also experience common challenges, such as poverty, inequality, and gender discrimination.

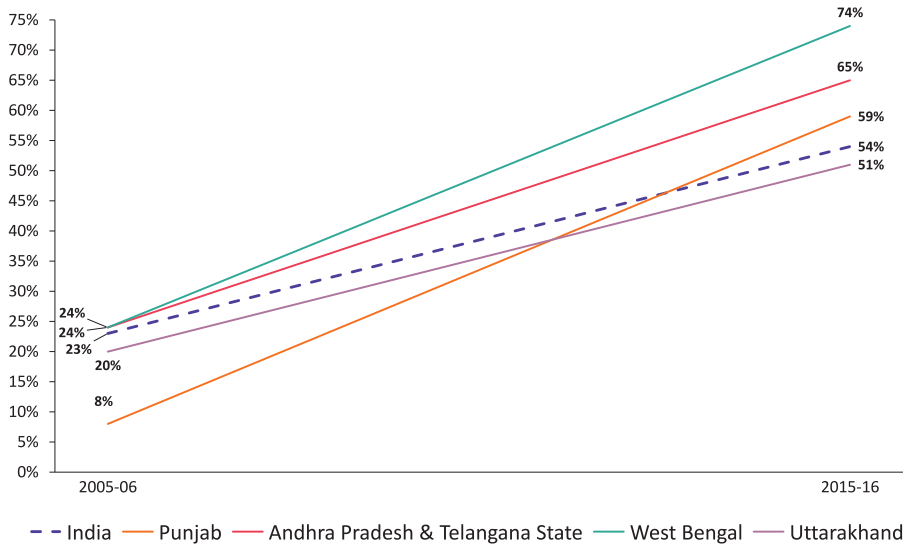
West Bengal carries the burden of its past, including persistent inequalities resulting from the precolonial, feudal zamindari system that subjugated the population to elite landowners, and the 1947 partition from East Bengal (now Bangladesh), that led to the influx of millions of refugees. These historical factors have influenced access to resources and exacerbated socioeconomic disparities, thus affecting food security. Persistent inequalities have at times led to insurgent groups and armed conflicts in some regions of the state. Like Andhra Pradesh & Telangana State, West Bengal is also subject to floods, cyclones, droughts, and significant disparities between rural and urban areas. These factors not only complicate food security, but they also make it harder to achieve equity in access to all survival resources for the population.

2.1.2 National interventions that have led to improvements.

Keeping in mind that each state is freighted with its own history and set of circumstances, we will look at some national-level initiatives that have played a significant role in shaping food security programmes in India.

Integrated Child Development Services, launched in 1975, was a foundational initiative addressing the nutritional needs of pregnant and lactating mothers and children. One of the largest outreach efforts in the world, it incorporates various components to benefit children below 6 years of age and expectant/nursing mothers, including initiatives related to health, nutrition, water, sanitation, hygiene, and education. For women, it offers supplementary nutrition, nutrition and health education, immunisation, and health check-ups with referral services. The supplementary nutrition component of the programme reached more than 50% of the population by 2015 and all Exemplar states performed above the country average (Figures 12 and 13 on Supplementary Nutrition Programme coverage for pregnant and lactating mothers).

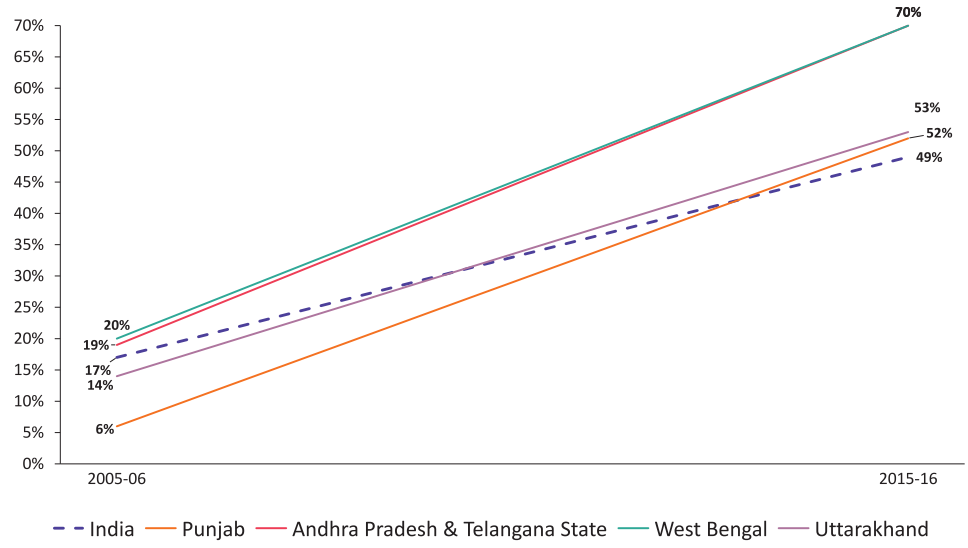
Figure 12 . Percentage of mothers who received Integrated Child Development Services from an Anganwadi center during pregnancy (any services) in India and its Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

In 1997, the Targeted Public Distribution System was launched, followed by the Antyodaya Anna Yojana in 2000, which aimed to provide subsidised food to the poorest families in India. The Mid-Day Meal scheme was introduced in 1995, and between 1995 and 2004, its coverage expanded exponentially, particularly due to a Supreme Court order mandating cooked meals in primary schools. The Government of India introduced the Kishori Shakti Yojna scheme for girls 11 to 18 years of age, followed by the Nutrition Programme for Adolescent Girls to address undernutrition among out-of-school adolescent girls. These schemes were merged into the Rajiv Gandhi Scheme for Empowerment of Adolescent Girls, launched in 2011 (recently renamed the Scheme for Adolescent Girls). Initially implemented in 200 selected districts, this scheme provided supplementary nutrition, health check-ups, counselling, education, vocational training, and more. The infrastructure for Integrated Child Development Services, including Anganwadi centres, served as the delivery platform. However, programme coverage remained low.

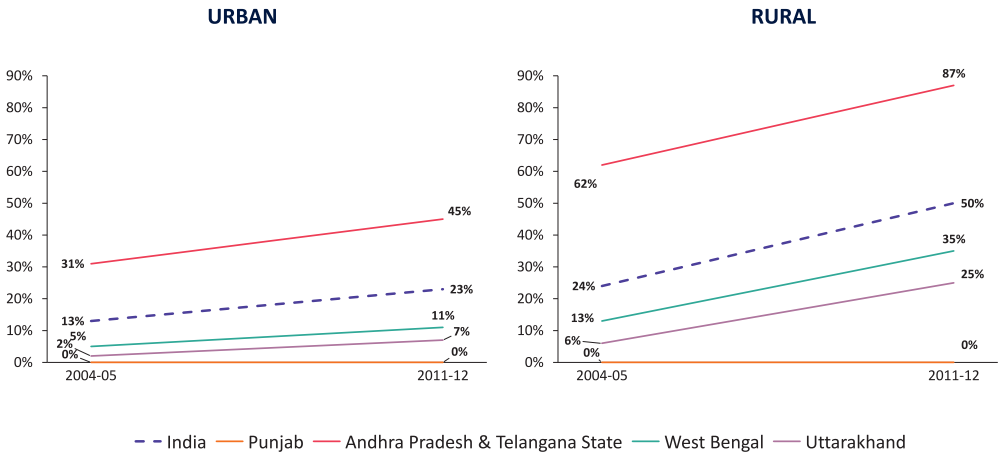
Figure 13 . Percentage of mothers who received Integrated Child Development Services from an Anganwadi Centre while breastfeeding (any services) in India and its Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

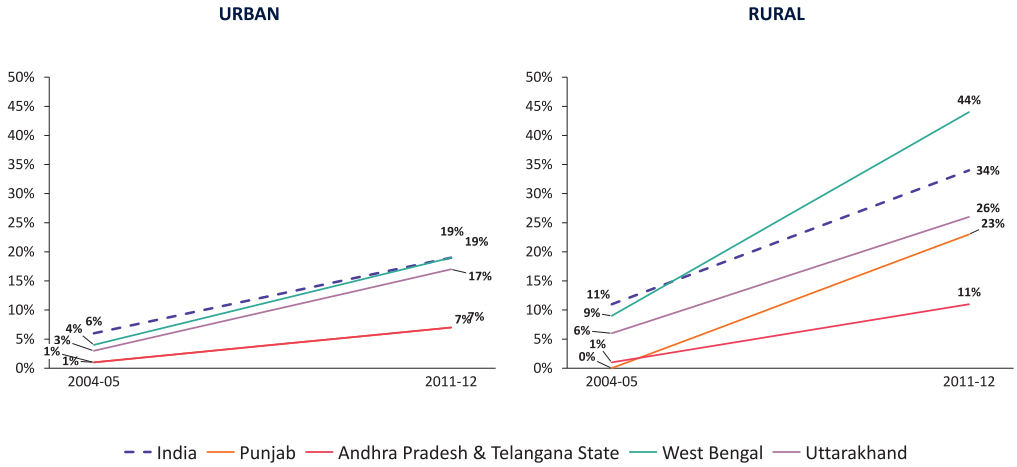
The Targeted Public Distribution System, launched in 1997, is a food security intervention that provides food grain (rice, wheat) commodities at subsidised rates to impoverished households. The implementation of the National Food Security Act in 2013 strengthened the Targeted Public Distribution System by providing enforceability and enhancing the benefits-eligible population to better reach the most vulnerable. Under the scheme, since 2013, an entitlement of a minimum 5 kg of food grains per person per month was ensured for priority households. Targeted Public Distribution System coverage has seen steady improvement over the past two decades (see Figures 14 and 15), with the steep rise in Andhra Pradesh & Telangana State being particularly noteworthy.

Figure 14. Percentage of the population that obtained rice from the Targeted Public Distribution System in India and its Exemplar states.



Source: NSS (2004-2012)

Figure 15. Percentage of the population that obtained wheat/flour from the Public Distribution System in India and its Exemplar states.

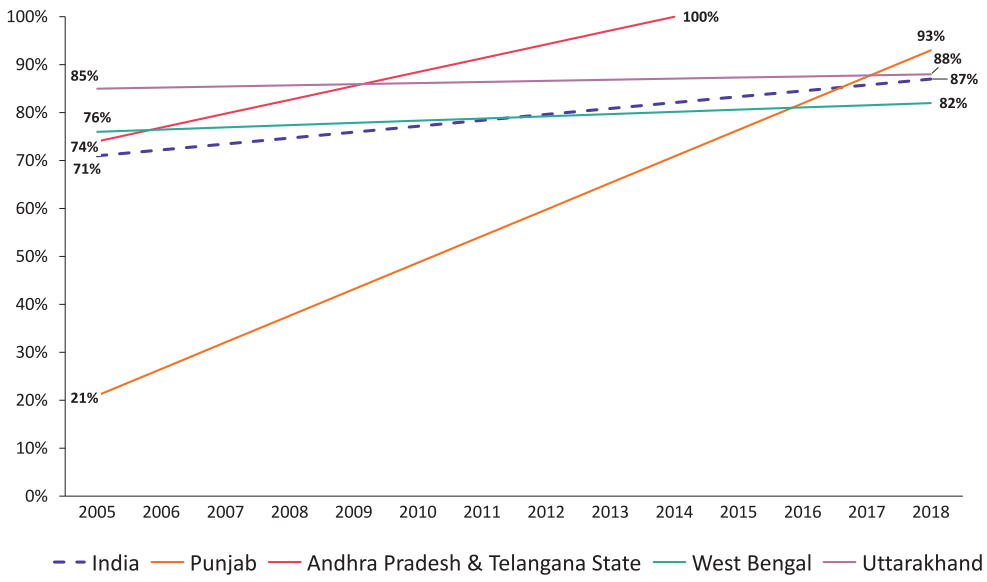


Source: NSS (2004-2012)

The Mid-Day Meal scheme was introduced in 1995 to provide a hot-cooked meal to students 6 to 14 years of age in government, government-aided, and local body-run schools. It aims to not only improve children's nutrition, but also to promote school attendance and enhance enrolment and retention. Full Mid-Day Meal scheme exposure among mothers has been linked to better height outcomes for children. Coverage expanded exponentially through 2004, due mostly to a Supreme Court order mandating cooked meals in primary schools. The availability of midday meals in Indian schools further increased from 71% to 87% between 2005 and 2018, according to survey data. Three of the Exemplar states exceeded this

already high national average: Andhra Pradesh & Telangana State (100%), Punjab (93%), and Uttarakhand (88%), as shown in Figure 16.

Figure 16. Availability of midday meal in primary schools in India and its Exemplar states

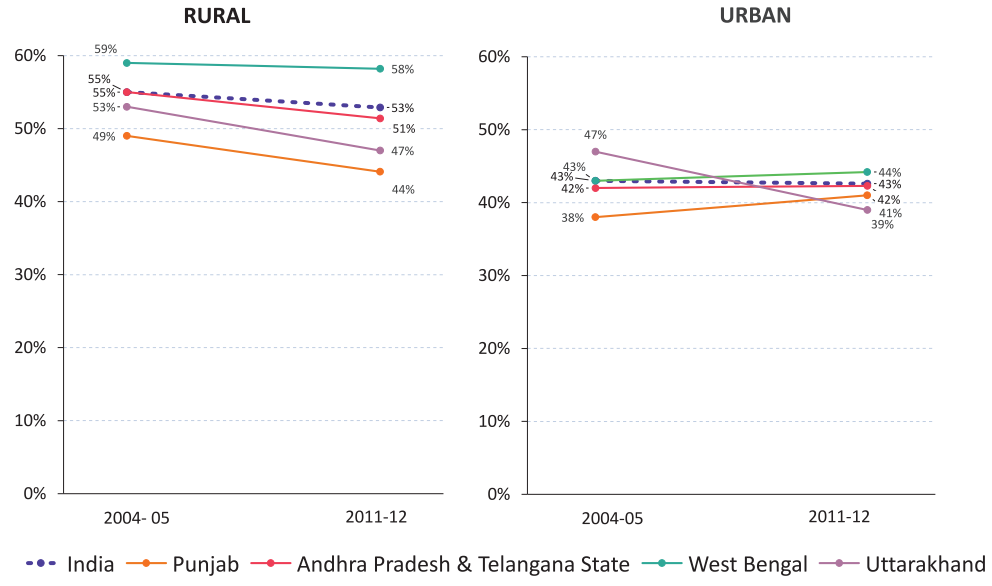


Source: ASER (2005-2018), Note: Andhra Pradesh & Telangana State's study period for this figure is only until 2014

Overall, these programmes share the common goal of ensuring food security and improving nutritional outcomes. They target different segments of the population, including children, expectant/nursing mothers, and families living below the poverty line. While Integrated Child Development Services focuses on comprehensive development and healthcare, the Mid-Day Meal scheme aims to enhance school attendance and provide nutritious meals, and Targeted Public Distribution System addresses food grain distribution for the targeted population. Together, these programmes contribute to a comprehensive approach to address the multifaceted challenges of food security and nutrition in India.

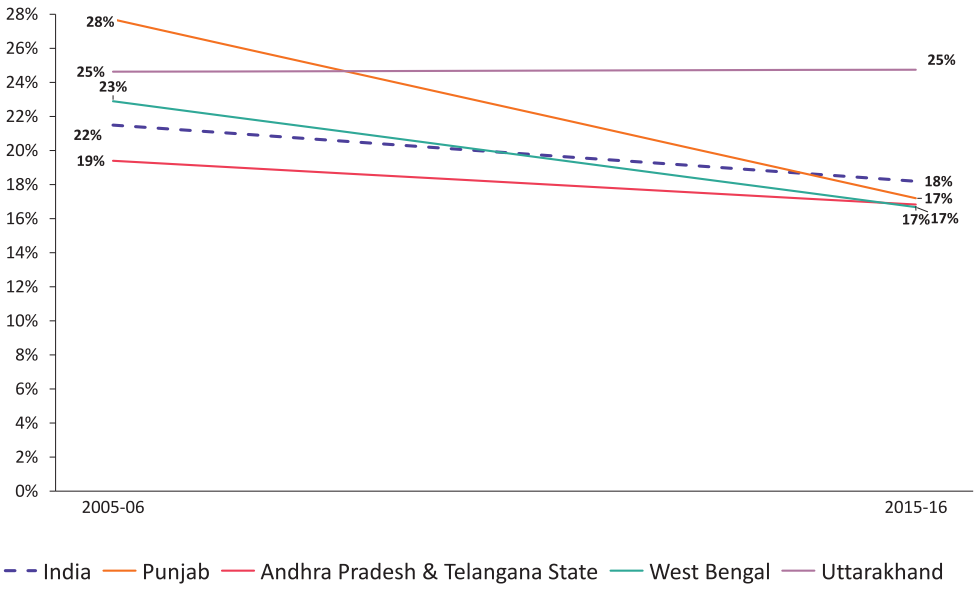
In a result that must be largely credited to these various large-scale interventions, between 2005 and 2015, the prevalence of underweight mothers in India declined by almost half (from 36% to 23%) and a small, lagged improvement was observed in mothers' height (<1.45 cm increase in average height). Another positive sign is the decreasing proportion of monthly household spending on food in rural areas between 2001 and 2012 (Figure 17). Progress in LBW is also apparent alongside improvements in maternal BMI, as demonstrated in the survey data (as seen in Figure 18). However, it's important to recognize the potential challenges in interpreting the data due to significant missing values.

Figure 17. Proportion of total monthly per capita expenditure on food in India and its Exemplar states



Source: NSS (2004-2012)

Figure 18. Percentage of Low birth weight in India and its Exemplar states



2.1.3 Interventions at the state level over and above the national mandate

To further strengthen the national programmes, supplemental interventions were deployed at the state level, often resulting in results above the national average.

In Andhra Pradesh & Telangana State, the Mid-Day Meal scheme was extended beyond the national mandate to provide meals in primary school, providing meals through Class 10 (equivalent to 10th grade, typically 15-16 years old). The state also launched its own initiatives under the Targeted Public Distribution System. The Mana Biyaam ('Our Rice') and Rs 2 per Kg Rice plans offered essential food at subsidised prices to low-income families. After 2014, within eight aspirational districts of Telangana, the state government distributed fortified rice kernels containing iron and Vitamin B12 to Anganwadi centers and mid-day meal programs.
Punjab, Uttarakhand, and Andhra Pradesh & Telangana State have established robust procurement systems for wheat and rice under the Targeted Public Distribution System (TPDS). Punjab modified its existing food assistance Atta Dal scheme (launched in 2007) and expanded beneficiaries under the National Food Security Act, while Uttarakhand launched the State Food Yojana in 2014 to cater to needy families not covered by the National Food Security Act, Moreover, these states provided pulses (like lentils, green gram, split chickpeas) at subsidised rates along with cereals: Punjab offers 5 kgs of pulses per month per family, Andhra Pradesh & Telangana State, and West Bengal provide 1 kg, and Uttarakhand provides 2 kgs.

To ensure regular supplies, all four states have implemented strategic procurement and distribution measures, maintained buffer stocks of food grains, and supported food security in remote areas. Andhra Pradesh–Telangana Region introduced innovative programmes like the One Full Meal programme, which has been iterated many times, and is currently known as YSR Sampoorna Poshana Plus in Andhra Pradesh and Aarogya Lakshmi in Telangana. The hallmark of this programme is supervised feeding for pregnant and lactating women, deviating from the common practice of providing only take-home rations. Uttarakhand has also enhanced the Integrated Child Development Services by adding additional nutrient components through schemes such as Mahila Poshan Yojana, Mahalakshmi Kit, and Annapurak Poshan Yojana. Uttarakhand and Punjab also innovated in this area, recruiting women self-help groups to carry out the distribution of take-home ration packets, a community engagement initiative that has helped the programme adapt to seasonal and local food availability. Lastly, Andhra Pradesh established its own government-owned organisation, Andhra Pradesh Foods, to produce fortified supplementary foods, ensuring quality and nutritional value. Post-2014, Andhra Pradesh Foods was changed to Telangana Foods which continues to function and produce ready to eat food for pre-school children, lactating mothers, and pregnant women, etc. and

State-level interventions may not have provided a magic cure but have certainly had a real and measurable impact on the nutrition and health of pregnant and lactating women, promoting their health and well-being along with the overall development of children. They are a large part of these states' relative success in reducing childhood stunting.

supplies to both Andhra Pradesh and Telangana. Moreover, the state government of Telangana implemented one of the most expansive state-level food security interventions in the country, known as the Annapurna scheme. This scheme offers affordable and hygienic meals, open to anyone, at a nominal cost of Rs. 5 per serving. Starting with eight centers in 2014, the program has since expanded to 150 centers, providing over 35,000 lunches daily. Further, to address social determinants of nutrition, the Department of Women and Child Development in Andhra Pradesh launched a programme called MARPU ('The Change') in 2016. The idea was to break down gender barriers and enhance health and nutrition-seeking behaviour among pregnant and lactating women in urban slums. By promoting convergence between various government departments, including Health, Women's Development and Child Welfare, Panchayat Raj (traditional village-level government), Rural Water Supply and Sanitation, and Rural Development, the programme aimed to achieve a significant reduction in infant mortality, maternal mortality, and malnutrition. Though it was a successful demonstration of the impact of convergence, the programme could not be scaled up and sustained.

These state-level interventions, though they have not provided a magic cure, have had a real and measurable impact on the nutrition and health of pregnant and lactating women, promoting their health and well-being along with the overall development of children. They are a large part of these states' relative success in reducing childhood stunting.

Key takeaways

- Inadequate maternal nutrition can lead to risk of preterm birth, intrauterine growth restriction, low birth weight, and compromised linear growth in early childhood. Approximately 30% of the change in child undernutrition measured in Exemplar states was attributed to improvements in maternal nutrition status.
- Amidst the context of improving food availability and better purchasing power, unequal access to resources persisted across the population.
- National flagship programmes such as the Integrated Child Development Scheme, Targeted Public Distribution System, and Mid-Day Meal scheme enhanced food-based social security throughout the life cycle with improved coverage over the study period.
- Exemplar states improved beneficiary targeting (Atta Dal scheme), included pulses in national government-provided food grains (Atta Dal scheme, State Food Yojana), extended coverage to older adolescents enrolled in schools (Mid-Day Meal scheme, Andhra Pradesh &Telangana State), and provided hot-cooked meals as supplementary nutrition to mothers, deviating from the national take-home-ration mandate (one full meal).
- The role of proper pre-pregnancy nutrition of mothers and adequate weight gain during pregnancy in promoting optimal linear growth and preventing childhood stunting is crucial, necessitating interventions and programmes that address women's nutritional needs well before, during, and after pregnancy.



CHILD'S DIETARY INTAKE



“Balamrutham has been quite beneficial for malnourished children in the state of Telangana. It is the weaning food packets supplied under ICDS to provide calorie dense food to children between 7 months to 3 years. Telangana Foods ensures that it is meaningfully prepared, where the composite is as per the recommendations provided by National Institute of Nutrition (Hyderabad). It contains wheat, dal, milk powder, sugar and oil.”

- Administrative Staff Member
Telangana Foods

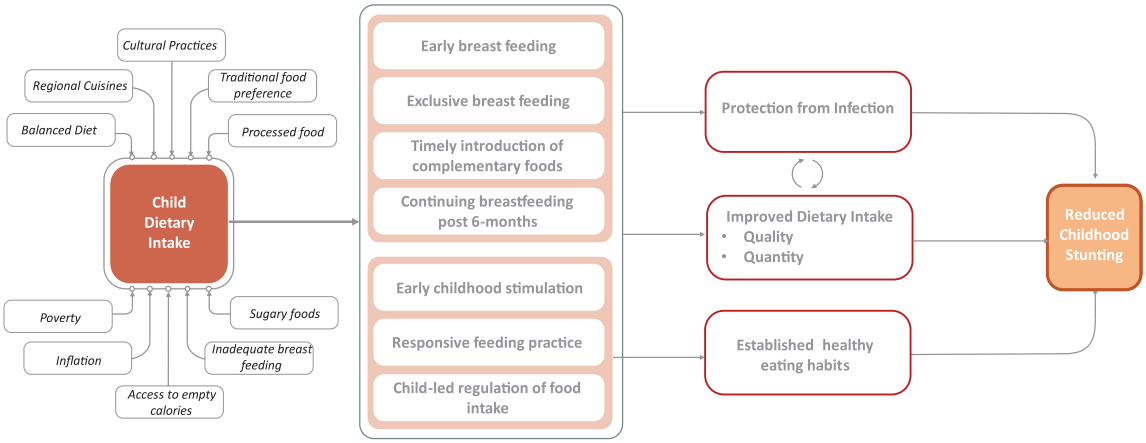
2.2 Child's dietary intake

Why infant and young child feeding practices and dietary intake are important to stunting:

- **Early initiation of breastfeeding paired with exclusive breastfeeding** for the first 6 months of life, introducing nutritionally adequate complementary foods, and continuing breastfeeding after six months **provides essential nutrients and protects against infections.**
- **Early childhood stimulation, responsive feeding, and allowing children to regulate their own food intake, establishes healthy eating habits and improves a child's development**. Limiting sugary and processed foods helps prevent childhood obesity.
- **Inadequate dietary intake is a direct cause of stunting; however, nutrients often cannot be absorbed fully if disease is present.**
- **A diverse and balanced diet that includes fruits, vegetables, whole grains, proteins, and healthy fats is essential for meeting nutritional needs**. Nutrient-rich foods, fortified cereals, eggs, fish, poultry, and dairy products help prevent nutrient deficiencies.
- **Adequate intake of micronutrients—**including iron, zinc, vitamin A, vitamin Bs, vitamin C, and vitamin D**—is important to childhood growth, increasing immunity and preventing infection.**



3. Causal Pathway 2: Child's dietary intake and Stunting



2.2.1 Influences on a child's diet in India

Cultural practices play a significant role in the eating habits of Indian children. In India, 20% to 39% of the population is vegetarian. Traditional food preferences, regional cuisines, and family customs also heavily impact the types of foods consumed.

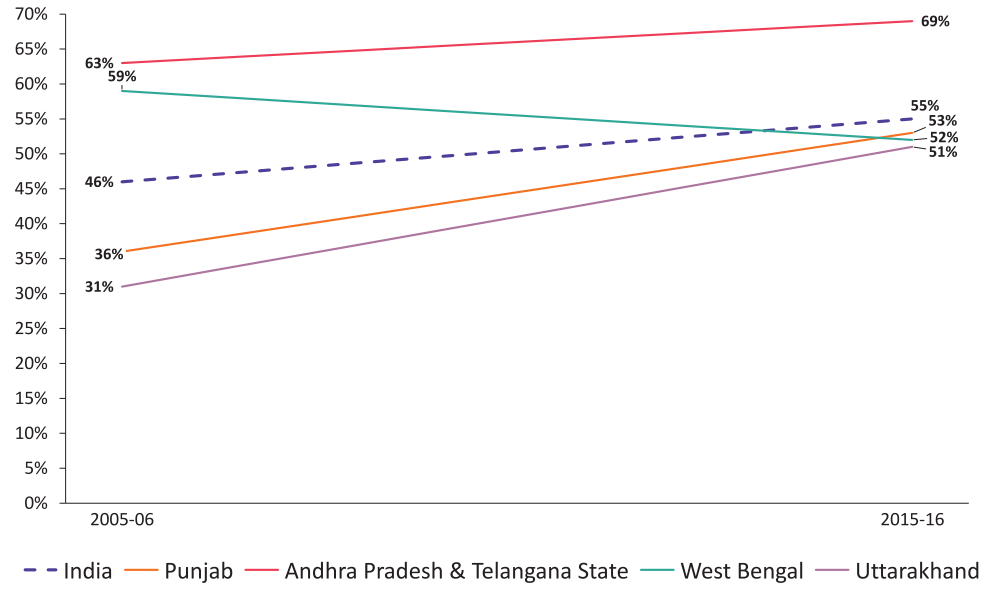
Furthermore, poverty, inflation, and the easy availability of sugary and empty-calorie food options have worsened the malnutrition problem. Affordability and accessibility to nutritious foods are compromised, leading to an increased consumption of processed and unhealthy foods. This combination of cultural practices, inadequate breastfeeding, and the impact of poverty and food availability contributes to the persistence of malnutrition and its detrimental effects on the health and well-being of children in India.

2.2.2 National interventions that have led to improvements: Emphasis on Infant and Young Child Feeding practices.

Efforts by the Integrated Child Development Services and the National Health Mission to improve Infant and Young Child Feeding practices have been multipronged. In India, good breastfeeding practices, including early initiation and exclusive breastfeeding, are prevalent but face challenges due to lack of awareness, incorrect beliefs, societal pressures, and lack of support. The use of bottles, formula milk, and improper feeding techniques can lead to inadequate nutrient intake, increased risk of infections, and missed opportunities for establishing bonding through breastfeeding. Moreover, the aggressive marketing and easy availability of commercial infant formula, which is inferior to breast milk, further exacerbates the problem. The establishment of the National Health Mission has made significant contributions to improving exclusive breastfeeding practices in India, as well as increasing antenatal care visits, promoting institutional deliveries, and enabling postnatal care. Breastfeeding-friendly hospitals have been established to support and encourage mothers to initiate and continue exclusive breastfeeding. Since its implementation in 1992, the legislation aimed at regulating the marketing and distribution of infant formula has helped ensure that breastfeeding is not undermined. These efforts by the programs and policies along with the growing awareness among population have helped create improved health outcomes for infants and young children. The improved rate of exclusive breastfeeding in Andhra Pradesh & Telangana State is worth highlighting, as it increased from 63% in 2005 to 69% in 2015. The rest of the country still averages around 55% but is moving in a positive direction.

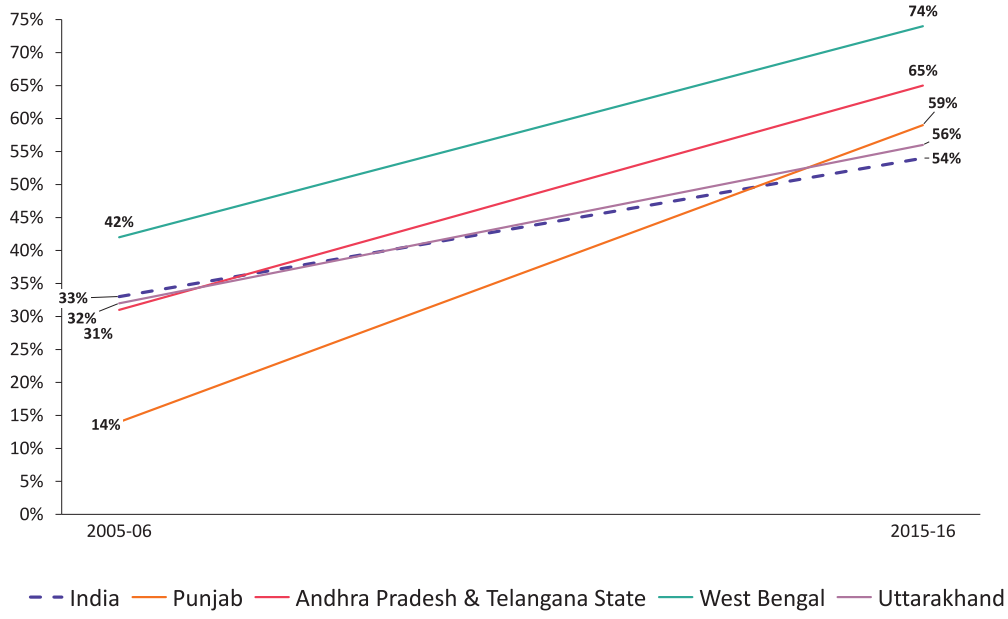


Figure 19. Exclusive breastfeeding under 6 months in India and across Exemplar states



Sources: NFHS 3 (2005) and NFHS 4 (2015)

Figure 20. Children aged 0-71 months who received Integrated Child Development Services from an Anganwadi centre (any service) in India and its Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

2.2.3 What the Exemplar States did to support the national programmes

As they did for programmes aimed at mothers, all four states strengthened national programmes aimed at child nutrition by, among other things, providing quality supplementary nutrition. Over and above the national mandate in Integrated Child Development Services, West Bengal, Andhra Pradesh, and Uttarakhand added fruits, seasonal vegetables, local produce, and eggs to enrich the diets of children. In Andhra Pradesh, the Giri Gorumuddalu Scheme (2014) catered to the specific nutritional needs of malnourished tribal children and eventually was scaled up for all children 6 months to 6 years of age in tribal areas. Along similar lines, Uttarakhand in 2020 supplemented the package of services under Integrated Child Development Services for children, adding twice-weekly egg and banana to the cooked food menu under a scheme called Baal Palash. West Bengal uniquely focused on hot-cooked meals for children 6 months to 6 years of age and introduced fortified wheat flour and micronutrient sprinkles well before other states. Andhra Pradesh & Telangana State improved its take-home ration of weaning food and scaled up production of this food under the brand name Balamrutham. This product caters to the supplementary nutrition requirements for children 6 months to 3 years of age and has become a well-known product of AP Foods, developed in consultation with UNICEF and the National Institute of Nutrition. In Uttarakhand and Punjab, women self-help groups develop, package, and distribute their own take-home ration packets. All four states had supplementary nutrition programme coverage above the national average of 48% for children 6 months to 6 years of age, with West Bengal in the lead at 72%, followed by Andhra Pradesh & Telangana State at 69%.

As they did for programmes aimed at mothers, all four states strengthened national programmes aimed at child nutrition by, among other things, providing quality supplementary nutrition.

In West Bengal, the Keno Parbona? ('Why Can't We Do It?') programme has been implemented to improve infant and young child feeding practices. This initiative identifies 'positive deviants' within the community who exhibit good infant and young child feeding practices despite facing the same challenges as others. Their strategies and behaviours are then shared and promoted to motivate and inspire others. The programme follows a participatory learning approach, where community members actively engage in discussions, workshops, and demonstrations. West Bengal was also an early adaptor of the national Early Childhood Care and Education Policy (2013). The state launched its Shishu Aloy scheme in 2012 to upgrade Anganwadi centres into Shishu Aloy ('children's abode'), providing a vibrant and colourful atmosphere for children, specially trained teachers and activities based on a joyful curriculum, and supported by continuous monitoring to improve these services. It converted 4,204 Anganwadi centres, with plans to convert a further 19,418 across the state. This programme has been cited as the most cost-effective equaliser to break the vicious cycle of inequity through evidence-based interventions provided for all children and families, especially the most marginalised. As a result, by 2015 West Bengal showed

exemplary improvement in complementary feeding practices with approximately half of children (52%) benefitting from timely initiation of complementary feeding, children reported consuming a minimum acceptable diet (36%), and children 6 to 23 months of age consuming foods rich in iron (42%) and vitamins (70%).

Key takeaways

- Ensuring early initiation of and sustained breastfeeding, introducing nutritionally rich complementary foods, establishing healthy eating habits, and maintaining a diverse, balanced diet with adequate micronutrients are crucial for childhood development, growth, and immunity, preventing infections and stunting.

- Easy availability of empty-calorie food options, cultural practices, regional food preferences, and economic challenges in accessing nutritious food contribute to malnutrition in Indian children.

- Multipronged efforts through the National Health Mission and Integrated Child Development Scheme with focus on breast feeding, nutrition education (Infant and Young Child Feeding practices), and provision of supplementary nutrition, along with legislation against ccommercial infant formula have improved breastfeeding rates.

- Each of the Exemplar states identified vulnerable populations (Giri Gorumuddalu) and strengthened child supplementary feeding by adding fruits, seasonal vegetables, local produce, and eggs. The Andhra Pradesh & Telangana State improved its take-home ration of complementary food and scaled up production of this food under the brand name Balamrutham. Yet, there is further scope for improvement in complementary feeding practices.

- Engaging the community through positive deviance programme (Keno Parbo Na) and investments in early childhood care and education (Shishu Aloy) enabled West Bengal to improve child nutrition outcomes.



PART II

INDIRECT INTERVENTIONS THAT IMPACT NUTRITION

- Access to health services
- Household environment:
  Water, Sanitation, Hygiene and
  Clean cooking fuel
- Education
- Household Socio -economic Status
- Women's Status
- Physical infrastructure and connectivity


ROCKING

ACCESS TO HEALTHCARE





"2005 to 2015, it was during this period that we were able to improve our maternal healthcare, we were able to increase access to the mothers who were coming to the sub-centers, and other health institutions at the same time, it was during this period that we were able to provide very good services to the newborns too. So, I believe that all these factors came together to improve the overall health of the mothers and children. Availability of medicines, availability of good nutrition, coupled with good quality healthcare services and ICDS services were important factors that helped in improving the health of the young children in Punjab, because it was during this period that the rates of stunting were changing. I have also been involved with the immunization department for over twenty-five years now...I can say that immunization has also definitely played an important role in reducing childhood malnutrition "

- Senior Official,
Department of Health, Punjab

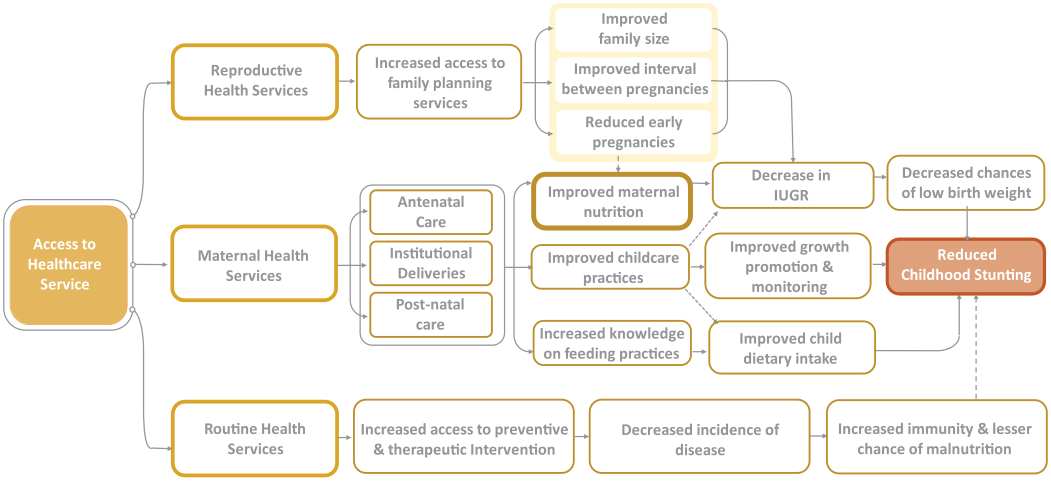
2.3 Access to health services

Why access to health services is important to stunting:

- Lack of access to health services—including preventive care in the form of **monitoring and promoting childhood growth, maternal healthcare, nutrition education, therapeutic interventions, and family planning services—can be a major contributor to childhood malnutrition**, and thus to childhood stunting.
- Barriers to healthcare can lead to **undetected health issues, inadequate nutrition, delayed or inadequate treatment of illnesses, lack of knowledge about appropriate feeding practices, and unplanned or closely spaced pregnancies.**



4. Causal Pathway 3: Access to Healthcare Services and Stunting



2.3.1 National-level context in a changing healthcare landscape

National Health Mission programmes see success.

The National Rural Health Mission was launched in 2005, followed by the National Urban Health Mission in 2013. Eventually these two were merged to become the National Health Mission in 2013. The National Health Mission had a broad vision of universal access to equitable, affordable, and quality healthcare services, while also addressing wider social determinants of health through intersectoral action. Further, to address specific health challenges, several schemes were introduced, including Janani Suraksha Yojana; Janani Shishu Suraksha Karyakram; Village Health, Nutrition, and Sanitation Committee; Weekly Iron and Folic Acid Supplementation; Mahila Arogya Samiti; Indira Gandhi Matritva Sahyog Yojana; Pradhan Mantrutva Sahyog Yojana; National Deworming Day; and Intensified Diarrhoea Control Fortnight.

These schemes encompassed direct and indirect nutrition interventions. They included antenatal care, institutional delivery, facility and home-based postnatal care, micronutrient supplementation, early detection and treatment of diseases (such as oral rehydration solution and zinc supplementation for diarrhoea), contraceptives, family planning, sanitary napkins, reproductive health education, child immunisation, infant and young child feeding, promotion of breastfeeding, school health services, growth monitoring, and nutrition promotion.

All of these efforts to improve the availability of preventive and curative healthcare services (including family planning, prenatal care, delivery assistance, and child healthcare) have seen measurable results. From 2005 to 2015, life expectancy at birth in India increased from 66.7 to 69.7 years. Between 1997 and 2016, maternal deaths per 100,000 live births dropped from 398 to 130. Infant mortality also decreased, from 72 infant deaths per 100,000 live births in 2005 to 33 in 2015.

2.3.2 State-level successes in healthcare

As in other sectors, the Exemplar states have supplemented these national efforts and surpassed national averages in several areas. It is important to acknowledge that these states had different starting points and different sociopolitical and economic contexts.

In Punjab, these aspects included the needs of marginalised populations, including scheduled castes in rural areas, and the burdens and barriers created by regional toxic patriarchy. Andhra Pradesh & Telangana State also contended with marginalised populations, including the rural poor, who required targeted interventions.

West Bengal used the historical role of Panchayati Raj institutions (traditional village-level government entities) as an advantage, but it faced challenges such as poor sanitation, high prevalence of infectious diseases like malaria, marginalised socioeconomic groups, and difficult-to-access regions facing armed conflict and natural disasters like cyclones and floods. Uttarakhand experienced geographical challenges due to difficult terrain. Although historically neglected by development efforts, Uttarakhand saw positive contributions from women's greater role in decision-making bodies and women's participation in the agricultural economy.

i. Health systems strengthening

Amidst these barriers and challenges, the Exemplar states implemented state-level initiatives that played a significant role in increasing access to and quality of healthcare. For example, Punjab launched the Punjab Health Systems Corporation in 1996 which created durable institutional architecture, aiding in the implementation of the National Health Mission. The Punjab Health Systems Corporation has been attributed with bolstering the quality and types of services provided at health facilities through securing better medical equipment and supervision of different health services being provided at the district and community levels.

In 2000, Uttarakhand (part of Uttar Pradesh at that time) initiated its own Health Systems Development Project (2000–2009) to enhance primary healthcare services, and it has embraced public–private partnerships since 2008 as an approach to address the growing demand for healthcare services in remote areas. West Bengal prioritised primary healthcare through its Health Sector Strategy (2004–2013) and the Health System Development Initiative (2005–2010). The Andhra Pradesh & Telangana State government launched the Andhra Pradesh First Referral Health System Project in 1996 to address high maternal and infant mortality rates. Meanwhile, in the realm of health system strengthening, Telangana established Basti Dawakhanas in 2018 offering free doctor consultations, medications, and diagnostics to the urban poor. These centers are strategically located in urban slums and each Basti Dawakhana serves a population of 5,000 to 10,000 residents. These centers act as sustainable platforms, fostering the convergence of other National Health Mission (NHM) programs. This integrated approach not only curtails Out-of-Pocket Expenditure but also alleviates the burden on the healthcare system.

ii. Social mobilization initiatives

The Exemplar states also demonstrated engaging with the community to promote health and improve access to the services.

This period also saw the introduction of accredited social health activists (female community-level volunteers) in villages, between 25 and 45 years of age, who serve as initial points of contact in addressing health-related needs. They supply medications, promote immunisation, nutrition, sanitation, and contraceptive use, and accompany women to healthcare centres, thus promoting the uptake of antenatal services, institutional deliveries, and family planning services.

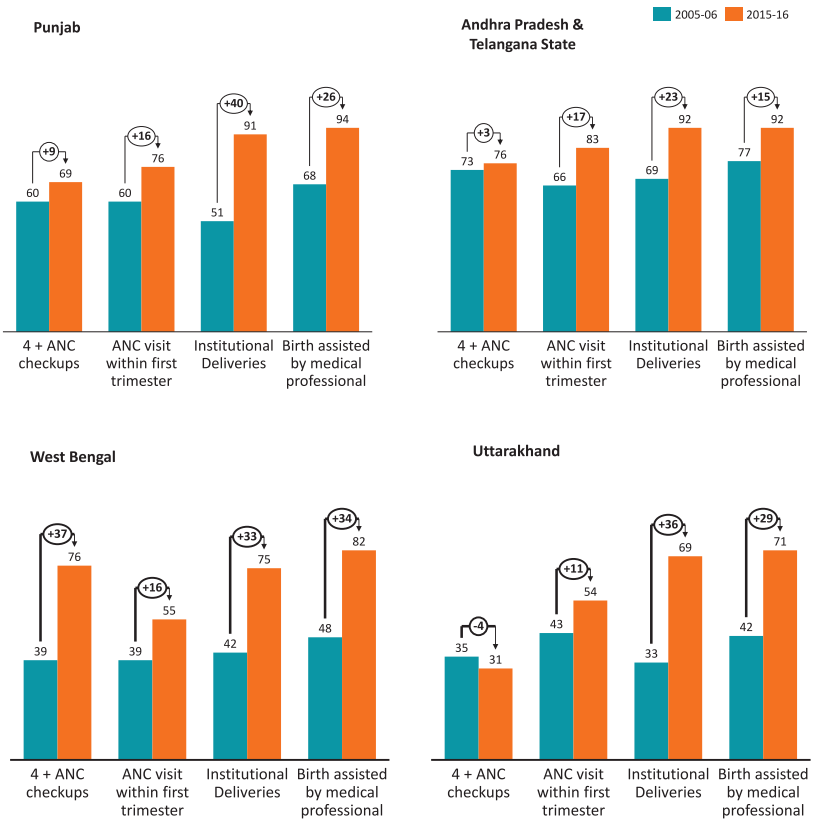
Even before the National Health Mission came in picture, the Community Healthcare Management Initiative in West Bengal—an initiative of the Panchayati Raj institutions—has successfully engaged local communities in promoting good health and preventing illness and has been replicated in other parts of the country. The initiative focused on the capacity development and sensitisation of government functionaries, elected representatives, and community members. This

Despite their own contextual challenges, the Exemplar states implemented initiatives that played a significant role in increasing access to quality healthcare services along with engaging with the community to promote health and improve access to services.

initiative included the development and execution of health and sanitation plans at the village area, aiming to raise awareness on crucial aspects such as maternal and child nutrition, antenatal care, disease prevention, immunization, and hygienic habits.Punjab also has the long-established institution of the Village Health, Nutrition and Sanitation Committee which engages the community in health and nutrition issues, raises awareness, conducts surveys, and addresses grievances related to health and nutrition.

Andhra Pradesh & Telangana State launched the Amma Kongu initiative in 2012. The scheme is multipronged and includes social and behaviour change communications. The decentralized system of the state with active Panchayati Raj institutions (traditional village-level entities) and empowered women's self-help groups enabled programs like these to impact health outcomes of all sections of society especially women, children, and vulnerable groups of population such as SC, and ST.

Figure 21. Increase in access to healthcare across Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

iii. Maternal and newborn healthcare-focused conditional cash transfers drove success

Incentives played a crucial role in improving health-related behaviours, exemplified by both national and state programmes. Janani Suraksha Yojana is a cash incentive scheme targeted at improving access to institutional delivery in the country. In India, there were 10 million beneficiaries of the scheme in 2013 (amounting to almost 40% of India's birth cohort). Janani Suraksha Yojana provides all pregnant women with free institutional delivery and free ambulance services and has improved the rate of institutional deliveries in all Exemplar states (see Figure 21). Punjab went a step further and implemented Mata Kaushalya Kalyan Yojna, a local version of the Janani Suraksha Yojana scheme, which offered additional incentives of INR 300-400(approximately US$3.60-$4.80) to women who delivered in government

hospitals. In 2015, the percentage of home births declined to 10%, from 49% in 2005. Similarly, to ensure health of mother and child, the KCR Kit programme was launched by the Government of Telangana in 2017 to avoid any wage loss during pregnancy and post-delivery mothers receive a kit containing 15 utility items and a wage compensation of INR 12,000 (INR 13,000 for female child) is paid to mothers- every year the number of beneficiaries have increased, encouraging more women to opt for institutional deliveries in public facilities.

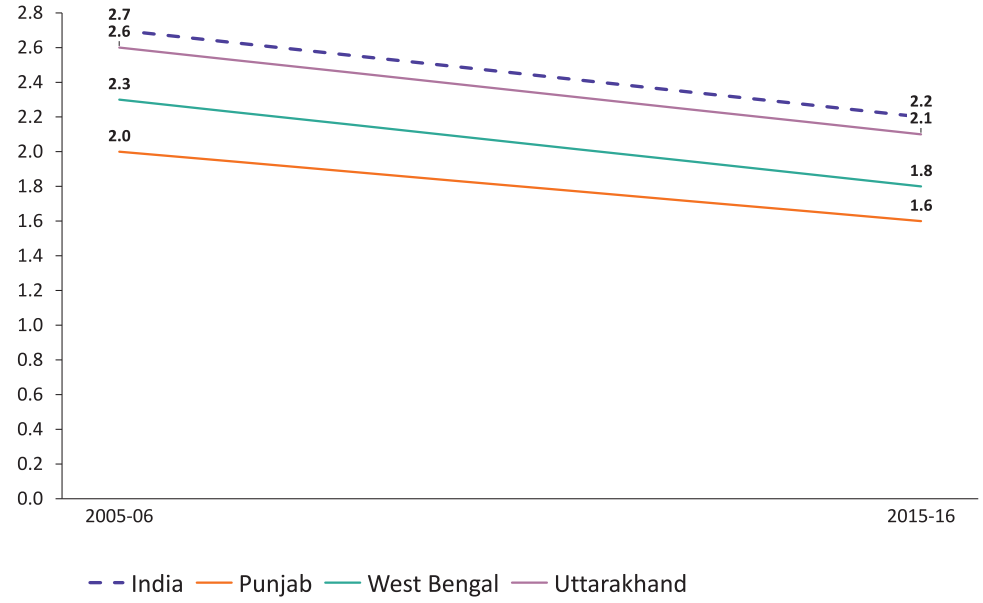
Another national maternity benefit incentive initiative, the Indira Gandhi Maternity Support Scheme, provided INR 4,000 (approximately US$48) across three instalments to compensate for some of the wage loss among women during pregnancy. Later, the Indira Gandhi Maternity Support Scheme was scaled up at the national level and renamed Pradhan Mantri Matru Vandana Yojana in 2017.

Furthermore, in Andhra Pradesh & Telangana State, the Arogyasri Health Insurance Scheme, launched in 2007, targets families living below the poverty line, offers comprehensive coverage for a limited number of diseases, and ensures cashless services for these diseases through a network of government and private service providers.

iv. Emphasis on family planning services

In Uttarakhand, the Innovations in Family Planning Services Project introduced a voucher scheme to prevent and manage unintended pregnancies, as well as provide safe motherhood services to families in need. This initiative focuses on accessing antenatal care, delivery, postnatal care, and family planning services at private institutions. The voucher system operates as a form of demand-side financing, utilising a public–private partnership model. Its purpose is to enhance the capacity of public health institutions, ensure quality care at private healthcare facilities, and complement the existing provisions of the Janani Suraksha Yojana. Financial incentives in the form of conditional cash transfers, vouchers, or one-off cash payments, especially the Janani Suraksha Yojana scheme, has resulted in increased utilisation of formal health services, particularly at the lower levels of the public health system.

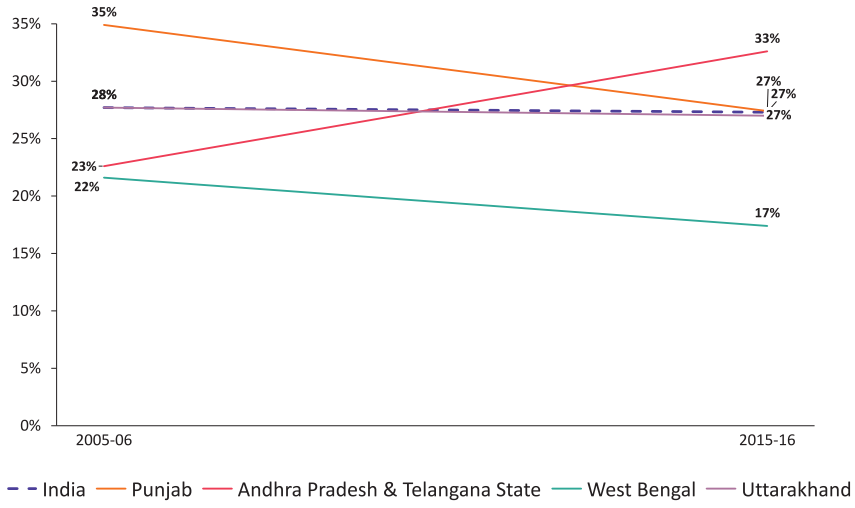
Figure 22. Total fertility rate in India and its Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

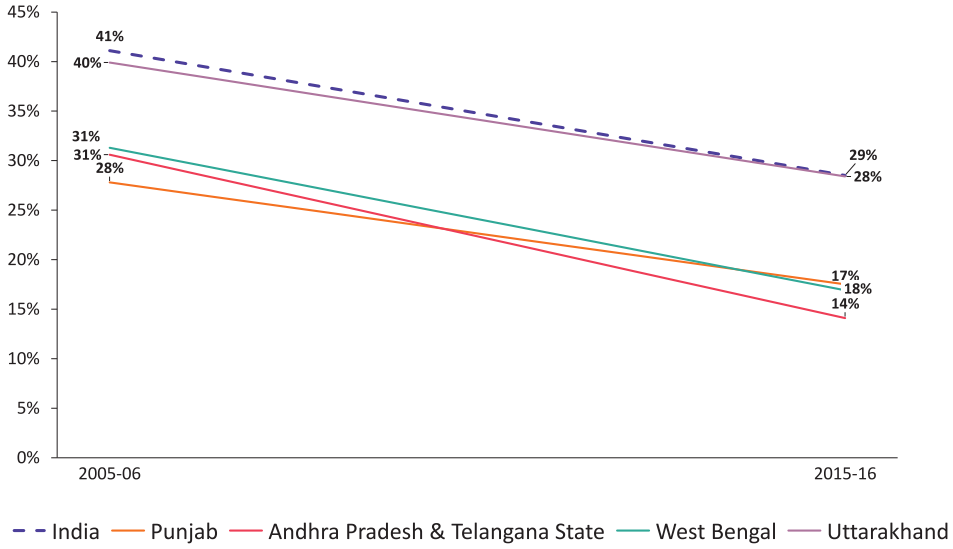
The traditional focus of family planning in India has been on limiting family size through permanent methods, with the government offering incentives for sterilisation after having two children. However, as India has already achieved replacement levels of 2.0 as of 2021—with states like, Andhra Pradesh & Telangana State, Punjab, Uttarakhand and West Bengal, and Uttarakhand reaching this milestone as early as 2015—there has been a need to shift the focus to birth spacing and prioritisation of adolescent sexual and reproductive health services. Efforts have shown promising results. For example, in 2002, the Uttarakhand government prioritised family planning services by implementing its Health and Population Policy and introducing Mobile Health Vans to address geographical challenges.

Figure 23. Percentage of short birth intervals (<2 years) in India and its Exemplar states



Sources: NFHS 3 (2005) and NFHS 4 (2015)

Figure 24 . Percentage of higher birth order (>2) in India and itsExemplar states



Sources: NFHS 3 (2005) and NFHS 4 (2015)

In surveying these efforts and their results, it becomes clear that through strategic financing to strengthen health systems, innovative incentive programmes, and community mobilisation, the four states promoted positive health behaviours, improved access to healthcare for underserved populations, and ultimately improved health outcomes for women and newborns. They did this through energetic implementation of national policies—and bolstering these policies with their own—to meet their own unique challenges.

Key takeaways

- Limited access to health services—encompassing preventive care, maternal healthcare, nutrition education, therapeutic interventions, and family planning—is a significant factor contributing to childhood malnutrition and stunting, with associated risks such as undetected health issues, insufficient nutrition, delayed treatment, inadequate knowledge of feeding practices, and unplanned pregnancies.

- With economic growth, private sector growth, and the National Health Mission launched in 2005, global impetus and shifting dynamics catalysed significant progress in health outcomes.

- The National Health Mission, which evolved from the National Rural Health Mission and the National Urban Health Mission, significantly enhanced access to comprehensive healthcare by implementing various schemes and interventions, leading to measurable improvements in life expectancy and maternal and infant mortality rates from 2005 to 2015.

- Exemplar states bolstered healthcare systems (Punjab Health Systems Corporation, Health Systems Development Project, First Referral Health Systems Project), collaborated with the private sector, involved the community (Amma Kongu, Community Healthcare Management Initiative), and promoted cash-transfer initiatives for enhanced usage of antenatal, delivery, and family planning services (Mata Kaushalya Scheme, Innovations in Family Planning Services Project).

- States saw better translation of behaviour change efforts into health promotive behaviour. In addition, family planning services are shifting from limiting family size towards improved birth spacing and prioritisation of adolescent sexual and reproductive health services.



HOUSEHOLD ENVIRONMENT





"Punjab's uniqueness is in its
Nigraani committees under the Swachh Bharat Mission,
which are instituted to prioritize the open defecation
problem in the community.
These committees have many women members and are in
charge of creating awareness among people for all ongoing
projects under the Swachh Bharat Mission.
They play a very important role in bringing about a
change in the areas they are responsible for.
Their role is to create awareness among the people of the
village and encourage them to adopt proper hygiene
practices. Other than that, we also equip them for testing
the quality of the water ."

- District Official
WASH Department, Punjab

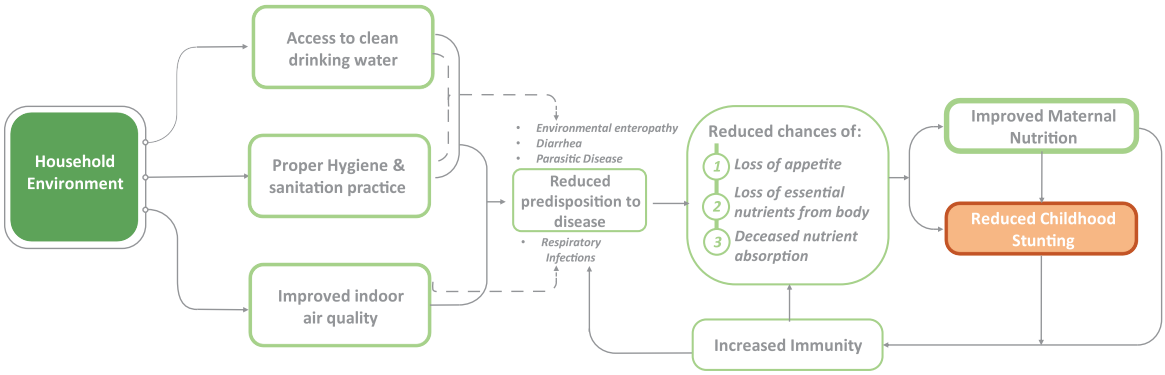
2.4 Household environment: water, sanitation, and hygiene, and clean cooking fuel

Why water, sanitation, and hygiene (WASH) and clean cooking fuel are important to stunting:



- Ensuring a healthy household environment **reduces a child's exposure to disease** which can be addressed through **WASH measures.**
- Access to clean drinking water, sanitation, and hygiene can reduce the prevalence of childhood malnutrition and stunting by preventing **diarrhoea, parasitic diseases, and environmental enteropathy**, which **negatively impact the body's ability to absorb nutrients** and **impede normal growth and cognitive development.**
- Maternal exposure to indoor air pollution during pregnancy is associated with **low birth weight.**
- **Children's prolonged exposure to air pollution,** including indoor air pollution through the use of solid cooking fuel that can release harmful pollutants and, **when coupled with poor ventilation, can pose significant developmental and health risks. (like repeated respiratory infections)**

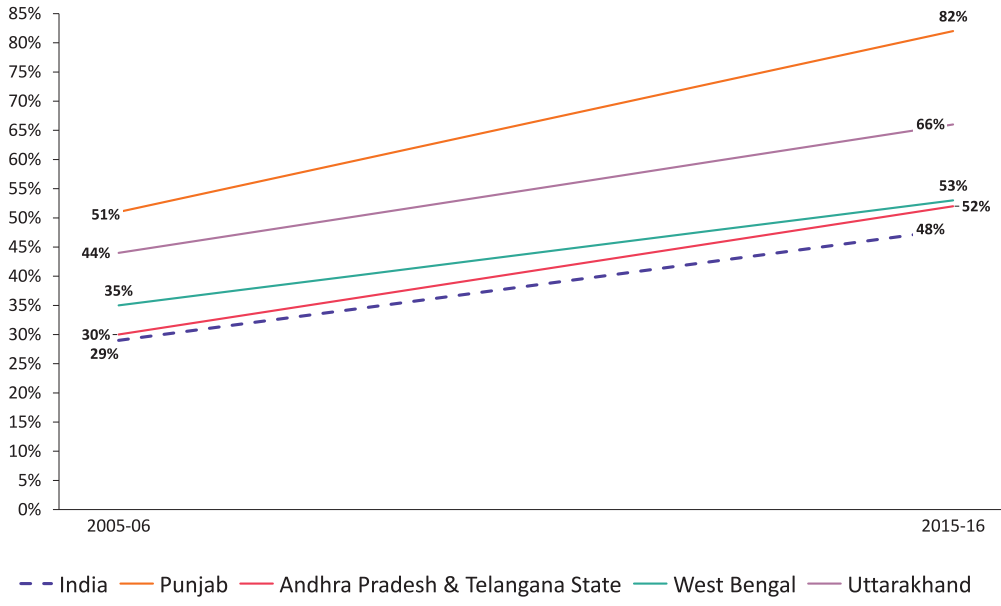
5. Causal Pathway 4: Household Environment and Stunting



2.4.1 WASH and the disproportionate impact on the vulnerable

India has a significant prevalence of open defecation, accounting for 90% of South Asia's open defecation rate, and half of the 1.2 billion people in the world affected by the practice. Understanding the sociocultural factors behind this issue, and the general WASH picture in India is crucial, and requires looking beyond poverty and the rural-urban divide. The caste system, based on the cultural idea of 'pure' and 'impure,' provides the basis of sanitation and hygienic practices and perpetuates stigma and the marginalisation of specific groups, such as the so-called 'untouchables' (Dalit) and women. Dalit communities face social exclusion, leading to inequalities in accessing safe, hygienic WASH facilities and household environments. The definition of 'household environment' for our purposes includes indoor air quality, domestic hygiene practices, level of access to clean water and sanitation facilities, and general healthiness of the living space.

Figure 25. Percentage of households with improved sanitation in India and its Exemplar states



Sources: NFHS 3 (2005) and NFHS 4 (2015)

Women, when forced to resort to risky practices such as open defecation, expose themselves to health risks and safety concerns. Defecating in the open leads to increased risk of abuse, rape, and other kinds of violent crimes of sexual nature.

Due to the absence of toilets and adequate cleaning facilities, women frequently find themselves compelled to adopt unhygienic menstrual practices leading to frequent skin and urinary tract infections. Consequently, this disproportionately elevates the likelihood of experiencing health issues.

In many communities, the burden of water collection also falls disproportionately on women who may have to walk long distances to access water sources, which is physically demanding, time-consuming, and exposes them to exhaustion and injuries. In most rural households, women have the additional responsibility of cooking and are disproportionately affected by indoor air pollution. Urban areas also

face challenges, especially as slums have concentrated poverty and overcrowding, resulting in poorly maintained sanitation facilities and hygienic practices.

2.4.2 National programmes and their impact on the Exemplar states

Several effective national programmes have made considerable progress in improving WASH-related targets and increasing the use of clean cooking fuel across the four Exemplar states.

In 1972, the Accelerated Rural Water Supply Programme was launched, with support from the World Bank, to provide safe drinking water to all rural habitations by 1989. State-level water supply and sanitation boards were set up to manage rural water supply schemes. While the programme helped increase access to safe drinking water, it faced several challenges, including inadequate funding, poor project management, and a lack of sustainability. Subsequently in 1991, the Accelerated Rural Water Supply Programme was replaced by the Swajaldhara programme, which promoted community participation in the management of rural water supply schemes.
In 2009, the Swajaldhara programme was replaced by the National Rural Drinking Water Programme, which, unlike the previous programmes, aims to ensure access within a reasonable distance of homes, and prioritises piped water supply to villages whose gram panchayat leaderships achieved areas free of open defecation. It also ensured safe drinking water provision to all government schools and Anganwadis (community health centres). The National Rural Drinking Water Programme supports local management of water sources and promotes transparency through online reporting mechanisms. In 2019, the programme was renamed the Jal Jeevan Mission.

In parallel to water supply facilities, India also launched the Central Rural Sanitation Programme in 1989 to provide toilets and other sanitation facilities to rural households, but progress was slow due to inadequate funding and lack of community participation. As a successor to the Central Rural Sanitation Programme, the Total Sanitation Campaign was introduced in 1999 to make rural areas free of open defecation through subsidised, low-cost pit latrines. By 2007, the campaign expanded exponentially, constructing nearly 3.5 million household toilets. Additionally, 1,700 women's complexes and 41,000 school toilets have been built.

In 2014, the Swachh Bharat Mission was launched to improve public health outcomes across the country. A significant milestone was achieved with the construction of 9.2 crore (92 million) toilets in 2019 since Swachh Bharat Mission's inception and 5.5 lakhs (0.55 million) villages were declared free of open defecation, although lack of household ownership and use of toilets in rural areas is a persistent challenge. The Government of India has also targeted behavioural changes by promoting cleanliness and good hygiene practices.

By 2015–2016, a high proportion of households (94%) in India had access to improved sources of drinking water. Access to improved sanitation has also seen major strides. Punjab leads the four Exemplar states in the percentage of households with improved sanitation, increasing from 51% in 2005 to 82% in 2015. Comparatively by 2015, Uttarakhand was at 66%, West Bengal at 53%, and Andhra Pradesh & Telangana State at 52% for improved sanitation at the household level. All states were above the national average of 49%.

2.4.3 State-level leadership and coordinated partnerships.

Various state-level initiatives have been implemented to enhance WASH-related targets in the Exemplar states. All four states have shown the importance of infrastructure development, community engagement, and behavioural change in creating a better household environment.

Punjab, for example, has a dedicated sanitation department dating back to 1956. Over the years, this department has evolved and transformed, eventually becoming the Department of Water Supply and Sanitation in 2004. An independent state-level department was not only able to respond to local conditions, but it could also do the kind of community engagement that is crucial to success in this sector in reaching the most vulnerable populations. The Punjab Rural Water Supply and Sanitation Project (2005–2015) was implemented in all 18 districts, where 88% of rural habitations in rural areas (and in each district) were reported to be fully covered and habitations with full coverage increased from 43% to 88%. The state's commitment is further exemplified through the Punjab State Rural Water Supply and Sanitation Policy of 2014, with an ambitious aim of covering 100% of rural households with piped and metered individual water supply connections 24/7 and access to safe sanitation facilities.

Punjab is not alone in going beyond the national flagship programmes. Andhra Pradesh & Telangana State and Uttarakhand have invited multilateral agencies to make additional investments and provide technical assistance, monitoring and evaluation expertise, and enhance community engagement. All these states have launched rural water and sanitation service projects with funds pooled not only from the World Bank and Government of India, but also from Panchayat Raj (village-level government) and the National Bank for Agriculture and Rural Development to increase rural communities' access to reliable, sustainable, and affordable rural water supply and sanitation services through progressive decentralisation, community participation, and enhanced accountability.

The Uttarakhand Rural Water Supply and Sanitation Project (2006–2015) benefited some half million rural residents. The Andhra Pradesh Rural Water Supply and Sanitation Project launched in 2009 to benefit a 2.1-million-person rural population that includes 400 tribal inhabitations in six districts. The Andhra Pradesh Municipal Development Project (2009–2018) was launched in a few selected urban local bodies, surpassing the target of 12,00,000 to reach 13,05,681 people (108% of the goal). This decentralised approach—through the active involvement of gram panchayats and local communities in planning, constructing, and maintaining WASH systems—has not only reduced costs but also ensured the sustainability of the services. Post-bifurcation, Telangana adopted a state flagship program, Mission Bhagiratha in 2016 by establishing a separate department Telangana Drinking Water Supply Corporation Limited with the vision of ensure safe and sustainable piped drinking water

The Exemplar states launched rural water and sanitation service projects with funds pooled not only from the Government of India, the World Bank and the National Bank for Agriculture and Rural Development to increase rural communities' access to reliable, sustainable, and affordable rural water supply and sanitation services through progressive decentralisation, community participation, and enhanced accountability.

supply in all the 32 districts of the state following the Government of India guidelines of the NRDWP program. This program have been successful in catering to the drinking water needs of about 45 lakh people of more than 5,000 habitations in both urban and rural areas of the state.

In West Bengal, WASH services are housed under the Public Health Engineering Department, established in 1987. The department functions through a decentralised system, where water supply and sanitation programmes are implemented through the State Urban Development Agency and the Panchayati Raj institutions. By 2000, the department covered a total population 128 million in the rural areas. Additionally, Nirmal Bangla, the state's counterpart of the national Nirmal Bharat Abhiyan, aimed to eliminate open defecation and promote improved sanitation and hygiene practices, with a focus on behaviour change and community participation, drawing financial support from the national

2.4.4 Clean cooking fuel



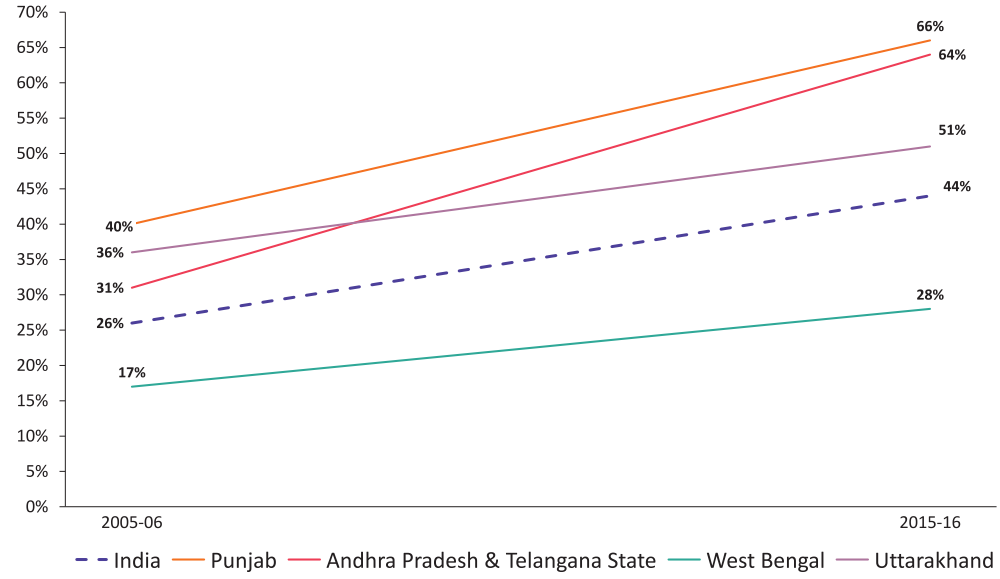
Although modern fuels are widely used in urban India, a large proportion of rural households still use biomass (e.g., firewood, dung, crop residue), resulting in poor indoor air quality, which disproportionately affects women and children.

Universal liquefied petroleum gas (LPG) and kerosene subsidies were implemented in 1991 to promote the use of clean cooking fuel by offering reduced prices for LPG through state-owned energy enterprises; however, consumption remained unequal between urban and rural areas.

In the late 1990s, southern state governments launched subsidised or free LPG distribution programmes for impoverished households, increasing access in those regions. This model gained political support and was adopted at the national level as the Rajiv Gandhi Gramin LPG Vitran scheme in 2009, significantly expanding LPG dealers in rural areas. However, clientelism i.e. access to or distribution of LPG influenced by personal connections or political affiliations emerged in LPG provision. Still, domestic LPG consumption experienced a growth of over 18% between 2005 and 2015, driven by growing LPG adoption in middle-class urban families. During this period, household usage of clean cooking fuel

increased from 26% to 44% at the national level. The four states also showed positive trends, with Andhra Pradesh & Telangana State reporting the most improvement, increasing from 31% to 64% (Figure 26). The Give up LPG subsidy campaign was launched in 2015 to increase accessibility of clean fuel among impoverished populations, encouraging those who could afford it to surrender their LPG subsidy to those living below the poverty line. In 2016, the government restructured the Rajiv Gandhi Gramin LPG Vitran scheme as the Pradhan Mantri Ujjwala Yojana with minor changes. LPG subsidies have now been linked with direct benefit transfer, making them more user-friendly.

Figure 26. Percentage of households using clean cooking fuel in India and its Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

Meanwhile, the increased accessibility to LPG connections continues to exponentially improve with the number of active domestic LPG consumers doubling from 14.52 crore in April 2014 to 31.36 crore as of March 2023, resulting in better air quality within households, schools, and healthcare facilities.

By focusing on improving water, sanitation, and hygiene conditions, and investing in WASH accessibility and infrastructure, the national government and the four Exemplar states have achieved significant improvements in services. Efforts to change people's behaviour through increased awareness and decentralised governance have also played a vital role. Additionally, the shift from traditional fuels to LPG connections has helped reduce indoor air pollution.

Key takeaways

- Maintaining a healthy household environment, achieved through water, sanitation, and hygiene (WASH) measures, is crucial for reducing a child's disease exposure and preventing diseases that hinder nutrient absorption and impede normal growth and cognitive development.

- Additionally, indoor air pollution—specifically maternal exposure to indoor air pollution during pregnancy and children's prolonged exposure to air pollution—poses developmental and health risks, including the potential for low birth weight and repeated respiratory infections.

- India's pervasive open defecation issue, rooted in sociocultural factors like the caste system, disproportionately affects marginalised groups, especially Dalits and women. Beyond hygiene, it poses serious health and safety risks for women.

- Exemplar states leveraged national programming focused on WASH by developing infrastructure and targeting behaviour change, and as a result the proportion of households with improved sanitation and water supply peaked above the national average.

- Subsidised provision of liquefied petroleum gas (LPG) contributed to most of the improvements in clean cooking fuel use.

- State-level leadership commitment and coordination of technical and financial partnerships to strengthen the WASH sector was evident.

- Due to its historical and sociocultural context of gender, poverty, and rural-urban divide, India has struggled with varied progress in its WASH and household environmental practices. Additionally, programmatic hurdles remain, including insufficient water testing facilities, ineffective monitoring, and low community engagement especially from marginalised groups.



EDUCATION





"These days, the perception of people about government schools and private schools is different and there is a need to change it. We have noticed that Private schools offer good ambience, smart uniforms, English speaking staff; so, despite of not being in a good financial condition, parents are ready to pay more to make sure their children get good education. So, in the government schools, sometimes, despite how qualified the staff is, they get overshadowed. We (Punjab) ensured that our government schools are smart and all that is required for quality education, which includes both factors; human resources, and physical infrastructure, is made available."

- Senior Official,
Department of School Education, Punjab

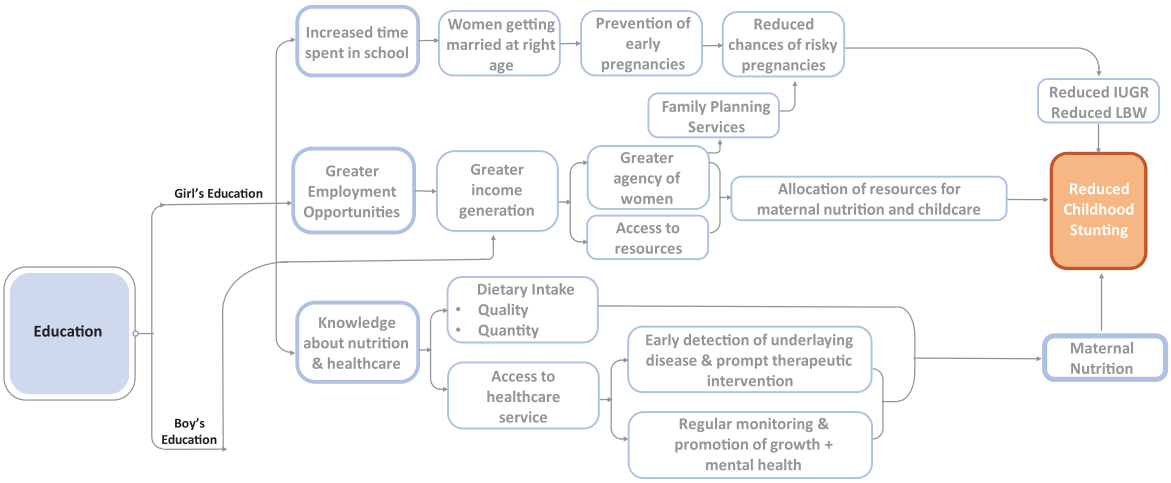
2.5 Education

Why education is important to stunting:

- **Maternal education is associated with improved childcare practices related to health and nutrition,** reduced odds of stunting, and better ability to access and benefit from interventions.
- Parental education is often a reflection of household status as **more educated parents are associated with higher rates of employment and income security.**
- Better educated women tend to be more informed, **marry at a later age, are more empowered to make family planning decisions, and are more likely to be employable.** They experience greater agency and make valuable contributions to household income and the allocation of resources towards children's health and nutritional needs.



6. Causal Pathway 5: Education and Stunting



2.5.1 Education's evolution within India and its Exemplar states

India's post-1990 liberalisation policies played a crucial role in driving the country's economic growth, generating a surge in demand for diverse services and necessitating a well-educated workforce. They also created new job opportunities and improved families' income and financial stability, bringing a renewed recognition of education as a vital tool in overcoming poverty. This shift encouraged families to prioritise and invest in their children's education, including that of their daughters. Moreover, the increased availability and accessibility of well-equipped schools and educational resources have facilitated parental decisions to send girls to school, resulting in higher enrolment rates.

This increased emphasis on education has also resulted in a growing presence of private schools. State-level stakeholders' interviews revealed a surge in the preference for private schools due to the perception that they offer higher quality education, superior infrastructure, and individualised attention to students. Punjab saw a greater rise in private school enrolment than the other states (government vs. private —62% vs 32% in 2005 and 54% vs 44% in 2020). Punjab is also distinguished from the other states because it favours learning English due to the state's strong emigration culture.

Andhra Pradesh & Telangana State and West Bengal, on the other hand, stand out for their relatively good public-school coverage. These states have a historical recognition of education as a crucial tool for social and economic development, leading them to prioritise investments in public education. West Bengal's illustrious legacy as a centre for intellectual and educational activities during the British colonial era has further bolstered its commitment to education.

However, this economic and educational progress unfolded against the backdrop of deeply ingrained gender norms and stereotypes that favoured boys' education and relegated girls to traditional gender roles, limiting their access to school. Patriarchal attitudes continue to perpetuate gender discrimination and practices like female infanticide, child marriage and the dowry system, and honour killings that persist in some communities. Access to education for women has great variations between and within states, and large differences in participation rates between sub-populations, with differences across castes, region, religion, and tribes.

2.5.2 National education programmes take on the challenges of geography, poverty, and inequity.

There have been numerous national programmes that have effectively taken on some of those specific challenges and contributed to improving educational outcomes in India. Success has followed when the government expanded access to marginalised and economically disadvantaged populations. Efforts have been made to enhance infrastructure and establish more schools, both public and private, closer to the communities they serve. Better access and better equipped schools make it easier for parents to prioritise their children's education, including more educational access for girls. As we have seen in other sectors, this targeting of the most vulnerable populations has been consistently effective.

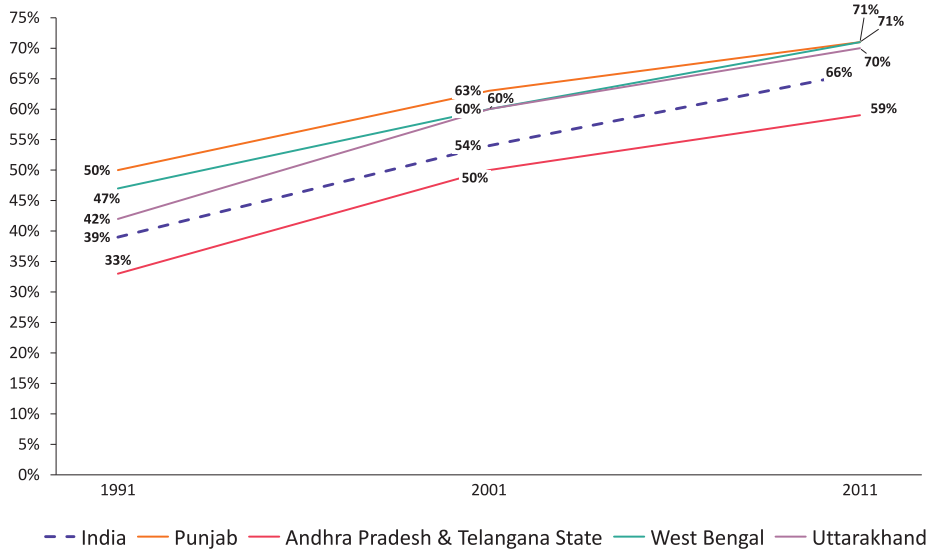
A prominent example is Sarva Siksha Abhiyan, a programme launched in 2001 that aims to universalise elementary education and is empowered by a constitutional mandate. This programme has been instrumental in ensuring that children 6 to 14 years of age receive free and compulsory education. This was achieved first by addressing barriers to enrolment and promoting inclusive learning environments, and second by focusing on effective learning processes specifically for young children. Sarva Siksha Abhiyan prioritised the education of marginalised groups, including girls, scheduled castes, scheduled tribes, minorities, disabled children, and children of migratory labourers. The programme also prioritised improving school infrastructure, such as classrooms, toilets, libraries, and other facilities necessary for a conducive learning environment. It gained further momentum through the 2009 Right to Education Act, which made education a fundamental right.

The gains of the Sarva Siksha Abhiyan programme in primary education provided scaffolding for the launch in 2009 of another national-level programme, the Rastriya Madhyamik Shiksha Abhiyan programme, or National Mission for Secondary Education, focused on access to secondary school. Despite this being a crucial developmental stage, students from the poorest households are the least likely to participate in secondary schooling. The Rashtriya Madhyamik Shiksha Abhiyan programme aims to rectify this with quality secondary education for all young people from 14 to 18 years of age, as well as improved infrastructure, enhanced teacher skills, and the promotion of vocational education. Girls' education and empowerment hold a significant place in the mission, with special provisions like hostels (equivalent to dorms) and residential schools, cash incentives, uniforms, books, and separate toilets for girls. Rashtriya Madhyamik Shiksha Abhiyan also focuses on vocational education and skill development to equip students with practical skills to increase their employability.

The National Curriculum Framework for School Education has served as a foundation for these programmes, and for the general effort to improve education and educational access in India. It sets the guidelines for standardised curriculums and teaching practices across schools in India. Introduced in 1986, with the latest version in 2005, the National Curriculum Framework for School Education incorporates global research on child development and learning and centres the socioeconomic, cultural, and linguistic diversity of students in India. The framework promotes child-centred education, holistic development, active learning, inclusivity, and technology integration to address diverse learning needs. It is also worth mentioning the 12th Five Year Plan (2012–2017), likewise aimed at diminishing the disparity between genders in education. This plan introduced incentives like scholarships and cash transfers to motivate girls to enrol in schools and successfully complete their education

Largely because of these national efforts, literacy rates in India improved across genders between 1991 and 2011, with a 27% improvement among females and about 11% for males. All four of the Exemplar states achieved female literacy rates around or above 60% by 2011, with Punjab in the lead, increasing from 50% to 71% between 2001 and 2011.During that same period, Uttarakhand increased from 42% to 70%, West Bengal from 47% to 71%, and Andhra Pradesh & Telangana State from 33% to 59% (Figure 27).

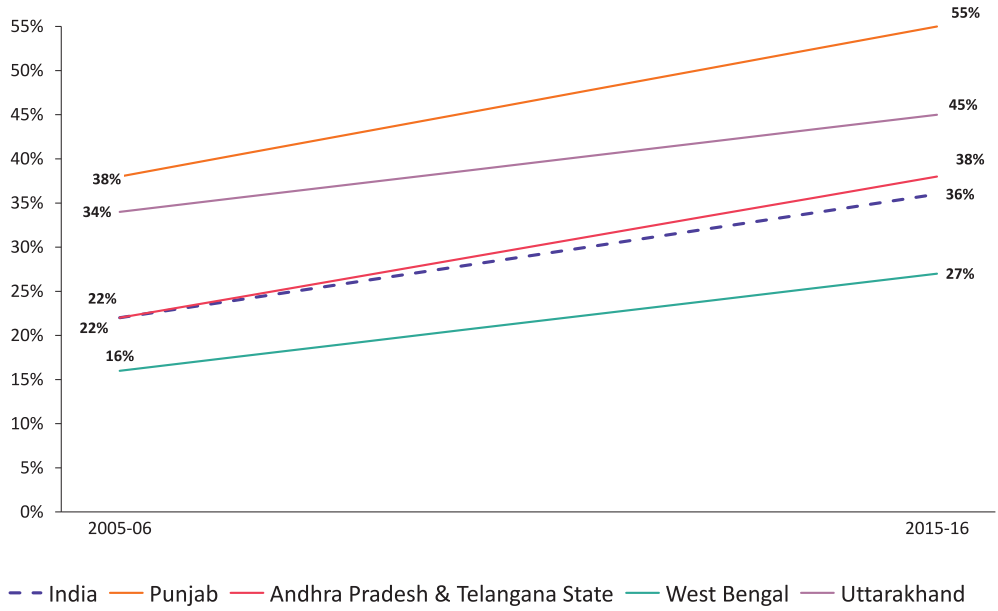
Figure 27. Female literacy rates in India and its Exemplar states.



Source: MOSPI (1991-2011)

Meanwhile, between 2005 and 2015, the national proportion of women with 10 or more years of education rose from 22% to 36%. Three of the four Exemplar states outperformed the national average, with Punjab in the lead, increasing from 38% to 55%, followed by Uttarakhand from 34% to 45%, Andhra Pradesh & Telangana State from 22% to 38%. While West Bengal fell below the national average in this metric, it still showed a nearly 11 percentage point increase, from 16% to 27% (Figure 28).

Figure 28. Percentage of women who completed at least 10 years of education in India and its Exemplar states.



Sources: NFHS 3 (2005) and NFHS 4 (2015)

2.5.3 State-level efforts also bear fruit.

The Sarva Siksha Abhiyan and Rashtriya Madhyamik Shiksha Abhiyan programmes have played a vital role in targeting underserved populations in all four states through tailored provisions and have been supplemented and enhanced by state-level initiatives implemented in the four Exemplar states. Political and bureaucratic leaders in these states deserve much of the credit for prioritising and investing in the education sector.

In comparison to all other states, Punjab has emerged as the top performer among states according to the National Achievement Survey 2021. Punjab has also emphasised outcome-based evaluations, initiating its own achievement survey over and above the National Achievement Survey, and has consistently improved its monitoring and evaluation efforts to help teachers and district officials overcome barriers effectively and in a timely manner. In pursuit of better outcomes, the state has also conducted enrolment drives and scholarships for secondary school students from underserved areas. Punjab made efforts to make education more engaging to its own populace by translating textbooks and teacher manuals into Punjabi, the native language of most of the state's population. State made provisions for special needs children, with more accessible buildings and incentives to enrol, such as scholarships and free uniform and school supplies. To address learning gaps, diagnostic and remedial education was introduced, with additional teaching hours allocated based on students' performance levels.

In West Bengal, enrolment among girls doubled in secondary schools between 2005 and 2015 (40% to 86%). The gross enrolment ratio has also seen improvement in gender equity, although not all girls who are enrolled complete their secondary schooling and retention continues to be a challenge. To address the problem of early dropout, West Bengal launched the Kanyashree Prakalpa initiative in 2013, which provides conditional cash transfers to discourage early dropout. This scheme was successful in reaching 8 million adolescent girls and providing incentives for their continued education. The state also launched the Bhartikaran Karmasuchi programme in 2008 to enrol out-of-school children and minorities, with a special focus on girls. Furthermore, West Bengal is among the few states in India that promoted early childhood care and education, through the Shishu Aloy initiative (2012) in 20 districts. This initiative focuses on facilitating a smooth transition to primary school by ensuring that children between 3 and 6 years of age are 'school ready'. Shishu Aloy has been recognised as a highly cost-effective intervention that effectively addresses inequity.

By improving the quality and accessibility of education, the Exemplar states were able to better meet the needs of marginalised and vulnerable populations. Their approaches especially improved educational outcomes for women, which decreased disparities and increased equity. Political and bureaucratic leaders in the Exemplar states deserve much of the credit for prioritising and investing in the education sector.

Similarly, Andhra Pradesh was an early leader in educational investments, with many of their actions even pre-dating the Sarva Siksha Abhiyan and Rashtriya Madhyamik Shiksha Abhiyan programmes. The Andhra Pradesh Intermediate Education Act was established in 1971 to promote higher education and protect students' rights. Later, with the launch of the national programmes, the state established residential schools and hostels for students especially catering to socially and educationally backward communities. These institutions provided high-quality education and nutritional support at a subsidised rate. As of 2015, there were 897 government-run 'backward class' (disadvantaged caste) student hostels, 205 of them specifically for girls, accommodating close to 100,000 students. Andhra Pradesh & Telangana State has also collaborated with multiple NGOs in strengthening teacher capacity, creating school libraries, promoting child rights initiatives, and providing support for children who migrate from coastal districts.

Some regions require attention to unique obstacles posed by their remote locations and limited resources. For example, Uttarakhand's challenging terrains continue to pose a significant obstacle to education. For the continuity of education in places where children reside, extra efforts have been taken by the state to overcome geographical barriers, prevent school closures, and ensure there is consistent staff to prevent interruptions to education.

In 2005, Uttarakhand launched the Muskaan Project, offering elementary education, health and nutritional support, and early childhood care to children 6 months to 6 years of age, whose parents worked as quarrying, brick kiln, and industrial labourers.

Similarly, the Pahal programme was launched in 2007 and provided school education to never-enrolled and dropout children belonging to vulnerable groups such as rag-pickers, scavengers, snake charmers, beggars, and orphans. Phase 2 of the Pahal programme launched in 2009. By 2013, PAHAL had established 20 schools and enrolled 1,353 students across four districts in Uttarakhand.

By improving the quality—and at least as important, accessibility—of education, the Exemplar states were able to better meet the needs of marginalised and vulnerable populations. Their approaches especially improved educational outcomes for women, which decreased disparities and increased equity.

Key takeaways

- Maternal education significantly influences child health and nutrition, as educated women tend to marry later, have fewer children, and contribute to household income, leading to improved childcare practices and reduced stunting. Additionally, maternal education enhances awareness, enabling better access to and benefits from health interventions for children.

- India's economic growth fostered a recognition of education as crucial for overcoming poverty. While there is a growing emphasis on education and a surge in private school enrolment, deeply rooted gender and social norms persist, posing challenges to girls' education and perpetuating disparities among vulnerable populations.

- National programmes (such as Sarva Shiksha Abhiyan and Madhyamik Shiksha Abhiyan) expanded access to marginalised and economically disadvantaged populations.

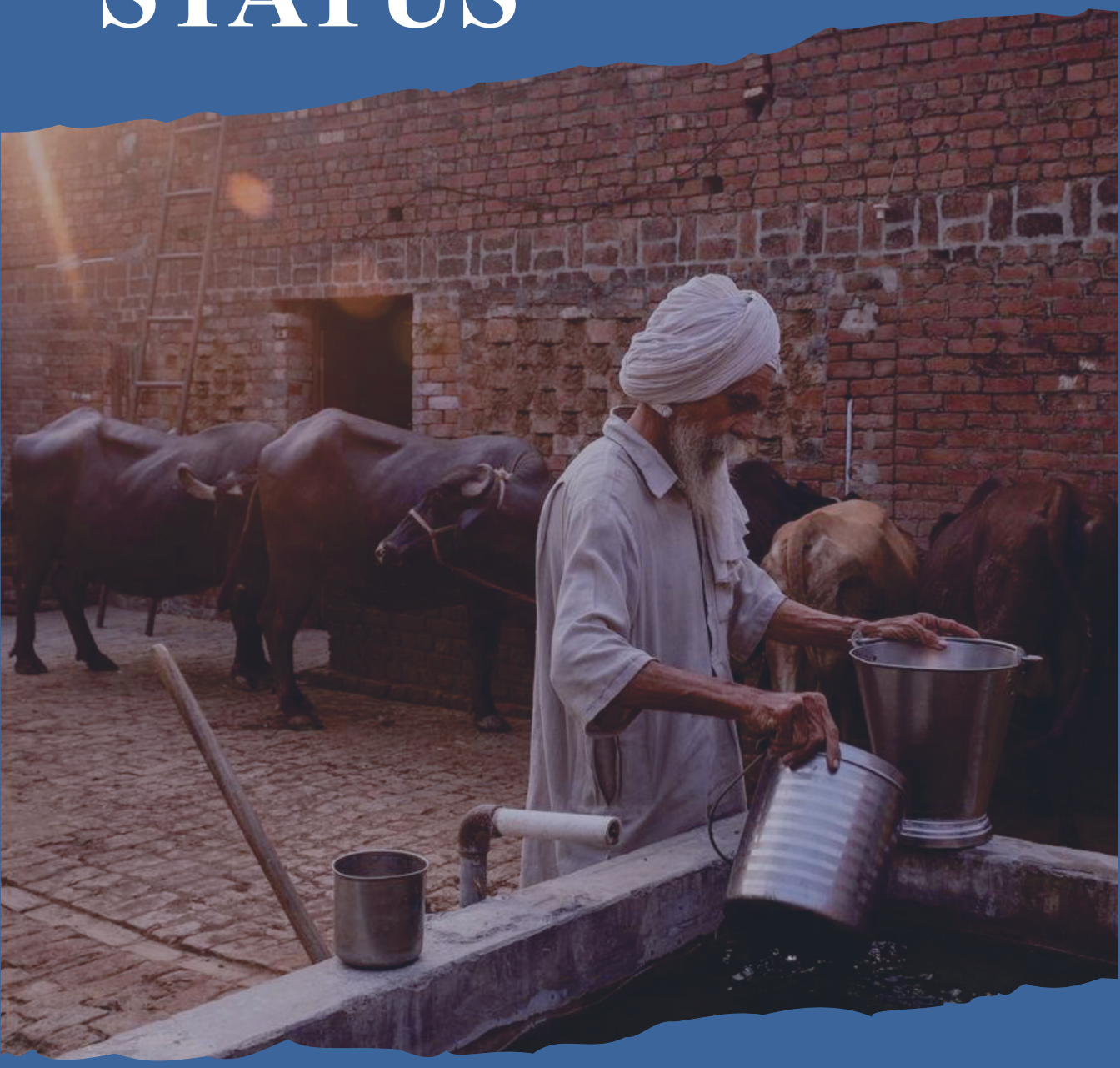
- Programmes also prioritised improvements to school infrastructure, such as classrooms, toilets, libraries, and other facilities necessary for a conducive learning environment.

- States multiplied their impact through outcome-based monitoring and by making learning more engaging (such as in Punjab), cash incentives for girls (through Kanyashree Prakalpa), investments in early childhood care and education (through Shishy Aloy), and special provisions for disadvantaged students (in Uttarakhand, through the Pahal programme and Muskan Project).

- Under the Sarva Siksha Abhiyan and Rashtriya Madhyamik Shiksha Abhiyan programmes, attention to a few remaining challenges is required for continued efforts. Challenges include staff shortages, lower quality of teacher training and learning standards of students, delays in fund allocation, and insufficient inspections of schools, and the need for better WASH facilities.



SOCIO - ECONOMIC STATUS





"Poverty has many facets: economic and social poverty being most important ones, thus, our interventions also have to be multidimensional, which is why we conceptualized this model (SERP). Our objective (SERP's) is to bring a holistic transformation of the children by providing them with a livelihood that stabilize and strengthen the families but also ensure that they do not slip back into the poverty. One can say that we have tried to conceptualize a poverty breaking model through this."

- Senior Official from SERP
Andhra Pradesh

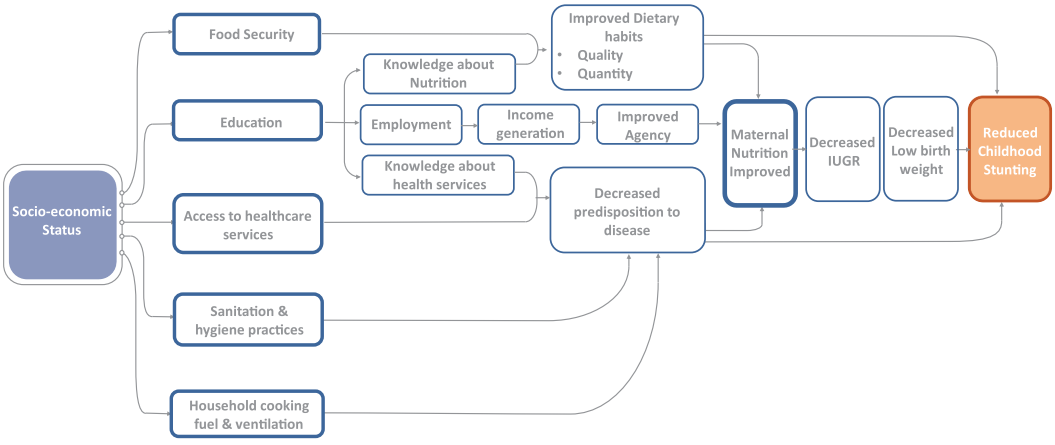
2.6 Household socioeconomic status

Why socioeconomic status is important to stunting:

- Low socioeconomic status can **restrict access to essential health services including preventive care, immunisations, and timely treatment of illnesses** which impede the early detection and management of childhood malnutrition.
- **Lack of money can lead to food insecurity and poor dietary intake,** contributing directly to malnutrition.
- Socioeconomic status can also **impact educational opportunities** as struggling families may be unable to invest in quality education, and/or lack knowledge about proper nutrition practices.
- Socioeconomic status **reflects the household environment such as sanitation, clean water, clean fuel, and proper hygiene practices**.
- A **mother's health and nutrition status** are also closely linked to household factors and can impact a child's well-being through intrauterine growth restrictions and inadequate breastfeeding practices which can further increase the risk of infections and malnutrition.



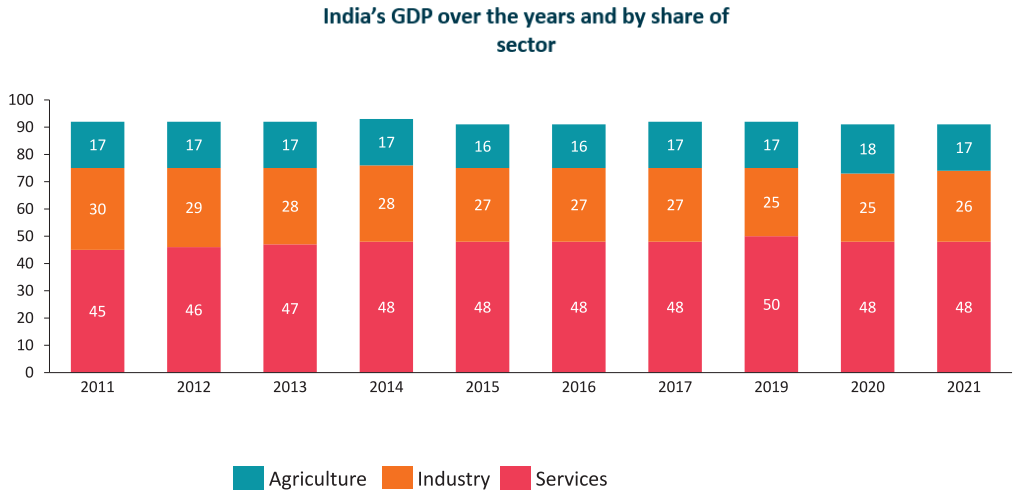
7. Causal Pathway 6: Socio - economic status and Stunting



2.6.1 India's economic context

India's economic landscape has undergone significant transformations over the past 50 years. Historically, agriculture played a vital role, employing a large portion of the workforce and comprising a huge portion of the GDP. However, after the Liberalization, Privatization, and Globalization reforms of the 1990s that opened up India to greater international trade and commerce, the focus shifted to liberalising the economy, attracting foreign investments, and promoting growth in non-agricultural sectors. This led to a relative decline in agriculture's contribution to the GDP and employment.

Figure 29. India's gross domestic product over the years and by share of sector



Source: World Bank (2011-2021)

Despite the growth in industries and services, income inequality persisted. Unequal resource access, gender discrimination, and corruption still plague the system and unemployment is still common. Scheduled castes and tribes have faced additional disadvantages.

All four Exemplar states also saw changes in the economic dynamic of traditional agriculture versus modern services and industries. Punjab capitalised on natural endowments and early investments in agriculture, supported by the minimum support price (a government market intervention to protect farmers from extreme price fluctuations), power and water subsidies, and international remittances from the Punjabi diaspora. Andhra Pradesh experienced growth in agriculture, industry, and services (especially information technology services), but faced issues such as water scarcity and rural unemployment. Uttarakhand, after its separation from Uttar Pradesh in 2000, underwent a major transition in economic growth, also shifting from agriculture to industries and services. Yet, given its prominent horticulture belt, the state's economy is predominantly agrarian, with a booming tourism industry. In 2013, Uttarakhand was granted special status, which brought tax concessions, greater contributions from the central government for centrally sponsored schemes, and other benefits. West Bengal's growth trajectory occurred later. Starting from the early 2000s, it made improvements in industrialisation and infrastructure with changes in governance, favourable policies, and sectoral shifts towards information technology and services.

2.6.2 Major national programmes and their impact on Exemplar states

To address persistent poverty, the Government of India launched targeted policies to stimulate economic growth and employment. Three programmes—Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Rashtriya Krishi Vikas Yojana, and the National Rural Livelihood Mission—played a substantial contribution in boosting the incomes of the most vulnerable populations in the four states. In 2005, the Government of India introduced MGNREGA, providing wage entitlement and promoting rural employment. MGNREGA guarantees at least 100 days of wage employment in a financial year for rural households in India. It aims to address rural poverty and provide a safety net for those facing a seasonal lack of agricultural work. The scheme also provides additional employment during droughts and natural calamities. It has provided employment to vulnerable groups, including 22% from scheduled castes, 25% from scheduled tribes, and 48% women.

The scheme was implemented across all districts in the selected states by 2008 and has had varying degrees of success. Andhra Pradesh and West Bengal were the first to implement the programme. In Andhra Pradesh by 2012, 26% of households availed themselves of 100 days of employment, whereas other states had lower rates: 9% in Uttarakhand, 3% in West Bengal, and 4% in Punjab.

Additionally, in Andhra Pradesh & Telangana State measures were taken to ensure better conditions for female workers, including assigning tasks by consensus, ensuring equal payment of wages, and allowing break times for lactating mothers. Thus, women constituted 58% of those who benefited from employment. MGNREGA promoted economic protection for the most vulnerable population based on the state-specific context. For example, many of those employed came from scheduled castes, including 76% in Punjab, 41% in Uttarakhand, and 36% in West Bengal. Punjab and Uttarakhand, however, suffered from low overall participation, with only 5% and 23% of districts participating in phase 1 of the programme compared to Andhra Pradesh & Telangana State and West Bengal, which had 59% and 53% of districts implementing the programme.

The Rashtriya Krishi Vikas Yojana programme was launched in 2007, aiming to achieve 4% annual growth in the agriculture sector. With an investment of INR 22,408.76 crores (approximately US$270 billion) during the 11th Five Year Plan, it facilitated the implementation of almost 6,000 projects, which included crop development, horticulture, forestry, and fisheries. The scheme resulted in an annual growth rate of 3.6% in agriculture and allied sectors. Under the auspices of this scheme, Andhra Pradesh & Telangana State focused on sericulture, organic farming, horticulture, and animal husbandry, showing outstanding

While implementing the national policies, state-level investments evolved towards capacity building, sustainability, and autonomy.

performance, with a growth rate of 4.4%. Punjab and Uttarakhand prioritised water conservation and natural resource management. West Bengal invested in crop development, fisheries, and horticulture. The scheme played a vital role in driving agricultural growth and addressing local needs in these states. To better decrease inequities in rural regions, several programmes were launched to target rural development. The Self-Employment for the Urban Poor programme was launched in 1991, followed by the Swarnjayanti Gram Swarozgar Yojana programme in 1999. This programme aimed to provide sustainable income-generating opportunities to rural households living below the poverty line by forming self-help groups and providing credit, infrastructure, and skill development. In 2011, the Swarnjayanti Gram Swarozgar Yojana programme was restructured and renamed the National Rural Livelihoods Mission, with a renewed focus on social mobilisation, empowerment, financial inclusion, and livelihood enhancement. It underwent further transformation in 2015 and was again given a new name: Deendayal Antayodaya Yojana – National Rural Livelihoods Mission, with a goal of reducing poverty by promoting sustainable livelihoods and enhancing the social and economic status of the rural poor. It emphasised convergence with other schemes and programmes to maximise benefits to the poor.

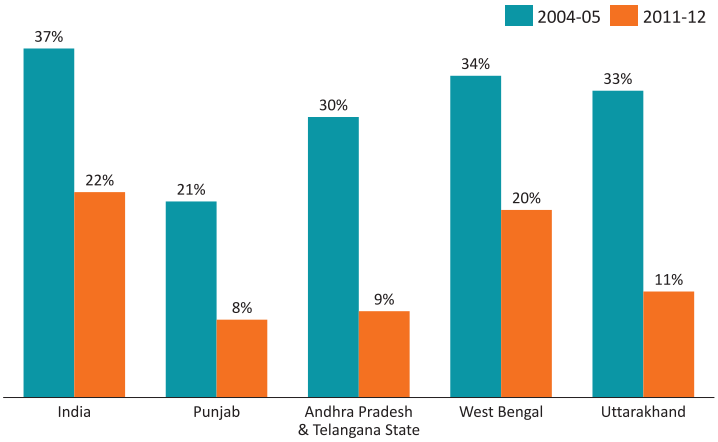
While implementing the national policies, state-level investments evolved towards capacity building, sustainability, and autonomy. Foreign investments have played a crucial role in India's development since the liberalisation era. Specifically, the World Bank has played a substantial role in supporting state-level programmes technically and financially. An example of this is the Velugu programme in Andhra Pradesh which aimed to support community-based investments and insurance services. Recent years have seen a shift towards targeted investments, emphasising country ownership, capacity building, and sustainability. One notable initiative is the Integrated Watershed Development Project in Uttarakhand, a collaboration between the Government of India, the Government of Uttarakhand, and the World Bank. Implemented from 1999 to 2005, the project aimed to increase farmers' income, promote sustainable land use, and conserve soil and water resources. Over 12,000 hectares of land were irrigated, leading to higher crop yields and increased farmer income. Several other projects focused on reducing soil erosion, developing community-managed forests, conserving water resources, and improving livelihoods in Uttarakhand. These initiatives have contributed to the state's overall wealth and the well-being of its people, demonstrating the positive impact of strategic donor investments in India's development journey. Similarly, donors like the Asian Development Bank, United States Agency for International Development, United Kingdom Department for International Development, and Japan International Cooperation Agency have provided financial and technical support to various sectors across India.

> “
>
> The government of India, amidst economic growth, has invested substantially in poverty alleviation schemes, embodying a compassionate model aimed at uplifting individuals from impoverished conditions, by fostering asset creation and income generation opportunities, all of which aid in ensuring access to and uptake of healthcare services.
>
> - Senior Official, SERP, Telangana

2.6.3 Economic progress to date

India is now the sixth largest economy globally. Over three decades (1981-2011), India achieved an average GDP growth rate of 6.3%, driven by the services, manufacturing, and agricultural sectors, along with foreign investments. Poverty has also decreased dramatically, with the population living below the poverty line dropping from 37% in 2005 to 22% in 2012 (Figure 30). By 2012, Punjab, Andhra Pradesh & Telangana State, and Uttarakhand had reduced their poverty rates to approximately 10%, while West Bengal had a ratio of 20%.

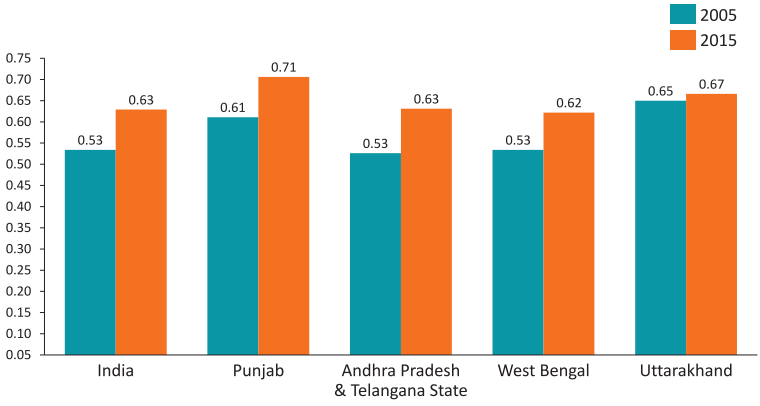
Figure 30.India's poverty rates in India and its Exemplar states



Source: NSSO (2004-2012)

These states also saw increases in their Human Development Index scores from 2005 to 2015 (see Figure 31).

Figure 31. Human Development Index scores in India and its Exemplars



Source: United Nations Development Programme (2005-2015)

Given that household economic status is such a critical determinant of childhood undernutrition, the progress made thus far is significant. The four Exemplar states have shown, in their implementation of national programmes and state-specific interventions, how overtly targeting the most vulnerable populations yields results beyond what economic growth alone can achieve. As India continues to evolve, it must strive for inclusive growth that benefits all segments of society. Along with promoting equal access to education and healthcare, implementing policies that ensure fair distribution of resources is a vital step towards reducing childhood stunting.

Key takeaways

- Low socioeconomic status restricts access to essential health services, contributes to food insecurity and poor dietary intake, impedes educational opportunities, and reflects the household environment, including sanitation, clean water, clean fuel, and hygiene practices. These factors, in turn, impact a child's well-being and increase the risk of infections and malnutrition.

- India's economic evolution, marked by a shift from agriculture to industries and services, has brought growth but also challenges, such as income inequality, gender discrimination, and regional disparities. Exemplar states show diverse economic trajectories, influenced by historical advantages, government interventions, and shifts in industries.

- National programmes, such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and the National Rural Livelihoods Mission, directly address the creation of livelihood and employment of the vulnerable, while the Rashtriya Krishi Vikas Yojana programme targets employment in agriculture and allied sectors through state-level projects.

- In the presence of women-focused poverty alleviation programmes, Andhra Pradesh and Telangana also had better working conditions for women and more inclusive planning enabled better participation of women (MGNREGA).

- Exemplar states boosted employment opportunities and improved household income through the effective implementation of national programmes. Additionally, Andhra Pradesh adopted measures like social audits for accountability and improved conditions for female workers. These states also leveraged foreign aid and investments made by multilateral institutions (e.g., World Bank, United States Agency for International Development) to augment national policies and programmes.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WOMEN'S STATUS



“The difference is evident because Uttarakhand's women are empowered. I think we have some unique benefits; the women in the state are aware about the current affairs, their culture, traditions as well as their own well-being. We have high women's representation in local governance bodies. The concept of *'Pradhan Pati'* is rare in the state. This could be because the men of the state are either in the army or out-migrate in search of jobs, leaving the women in charge of their own houses and the economic growth of the state.

We also have a gender-centric budget in which every department keeps aside a separate fund for the welfare of women...even our ration cards are in the name of women as they head the family!”

- Senior Official
ICDS, Uttarakhand

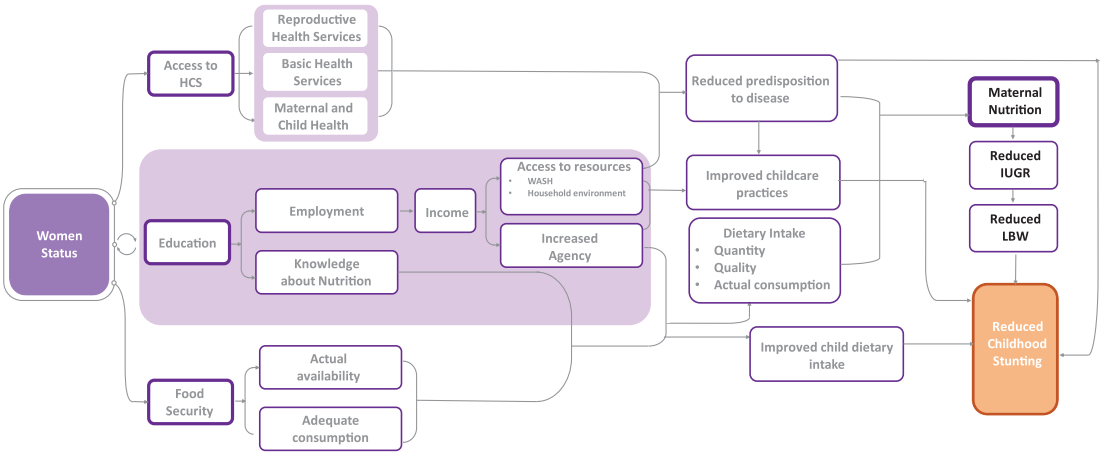
2.7 Women's status

Why women's status is important to stunting:

- **Stunting, a reflection of malnutrition, amplifies gender inequality** which impacts **women and girls' education, income, and well-being.**
- Gender inequalities—**limited decision-making power and restricted access to resources**—negatively impact women's ability to provide adequate nutrition to their children.
- **Discrimination against women** in education, employment, and healthcare limits their knowledge and resources for proper child feeding practices.
- **Gender norms and cultural practices may also lead to unequal food distribution** within households, with women and girls receiving smaller portions.
- **Early marriage, adolescent pregnancy, and lack of access to reproductive healthcare can increase the risk of frequent pregnancies and lead to poor maternal health and nutritional status**, resulting in adverse birth outcomes and increased vulnerability to malnutrition among children.



8. Causal Pathway 7: Women's Status and Stunting



2.7.1 Women's status in India

The status of women in India is shaped by many issues. Women often face limited access to formal education and employment opportunities, leading to economic disparities and reduced decision-making power. The patriarchal nature of society reinforces traditional gender roles, perpetuating inequalities and discrimination. Traditional preference for sons, and practices like *sati* (widows sacrificing their lives when their husbands die), dowry, and restrictions on women's free movement compound the challenges faced by women. Gender-based violence—including domestic violence, sexual harassment, and dowry-related crimes—remains a pressing issue. Child marriage and female infanticide also persist in certain regions. While progress has been made in women's rights and empowerment, there is still a need for comprehensive societal and systemic changes to address these challenges and create a more equitable and inclusive environment for women in India.

2.7.2 Global goals and national programmes

In an effort to create a more gender-equitable environment, India has endorsed Sustainable Development Goal 5, a global commitment to achieve gender equality and empower all women and girls. It envisions a world where women and girls have equal rights, opportunities, and access to resources. It seeks to eliminate gender-based discrimination and violence, promote women's participation in decision-making, and ensure their access to education, healthcare, and economic opportunities. In addition to endorsing this goal, India has taken multiple policy actions to promote equal opportunities and representation of women. The 73rd and 74th Amendments (1993) to the Indian Constitution have served as a breakthrough towards ensuring equal access and increased participation in political power structures for women. The constitution not only grants equality to women but also empowers the government to adopt measures of positive discrimination in favour of women. Within this framework, noteworthy laws, development policies, and programmes have been developed at the national level to advance women in different spheres. These efforts go back decades. To safeguard the rights of workers, including women, the Minimum Wages Act of 1948 sets a minimum wage that employers must pay to workers, irrespective of their gender. The Equal Remuneration Act (1976) prohibits discrimination in payment of wages based on gender and mandates equal pay for equal work. In the area of marriage, the Dowry Prohibition Act (1961) aims to eliminate the practice of dowry, which often leads to harassment and violence against women. The Prohibition of Child Marriage Act (2006) prohibits child marriages and sets a legal age for marriage. Additionally, laws like the Pre-Conception and Pre-Natal Diagnostic Techniques Act and the Medical Termination of Pregnancy Act seek to prevent gender-biased sex selection and ensure women's reproductive rights. Inheritance laws in India have also undergone reforms to promote gender equality. The Hindu Succession Act (1956) was amended in 2005 to grant equal inheritance rights to daughters, ensuring that they have the same rights and claims as sons. This amendment seeks to rectify the historical bias that disadvantaged women in matters of inheritance.

Furthermore, to combat sexual exploitation and violence against women, the Protection of Women from Domestic Violence Act (2005) offers protection and support to women facing domestic abuse. The Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act (2013) mandates measures to prevent and address workplace harassment. The Criminal Law (Amendment) Act (2013) introduced reforms in sexual assault laws and criminalised offences like rape, sexual harassment, and acid attacks.

These laws reflect India's commitment to achieving gender equality, preventing gender-based discrimination, and addressing societal practices that perpetuate gender disparities.

Additional national programmes and policies supporting women's empowerment include:

- The Department of Women and Child Development, initially established as a part of the Ministry of Human Resource Development in 1985, focuses on issues such as women's welfare, child development, nutrition, education, healthcare, and child protection.
- The National Commission for Women was set up as an act of Parliament in 1990 to safeguard rights and legal entitlements of women.
- The Beti Bachao, Beti Padhao campaign (launched in 2015) has played a vital role in promoting gender equality by focusing on combating female feticide, improving the declining child sex ratio, and promoting girls' education. It works to change societal attitudes and behaviours by raising awareness about the value of girls and the importance of their education. The campaign aims to sensitise communities, challenge gender biases, and ensure equal opportunities for girls.
- Mission Shakti (2021–2022), housed at the Department of Women and Child Development, aimed at strengthening interventions that not only improve women safety and empowerment but also tackle pervasive gender biases and discriminations.

The National Rural Livelihood Mission, established in 2011 and discussed earlier in the section on household socioeconomic status, also focuses on empowering women by giving them control over their lives and resources. Self-help groups once mobilised provide a collective platform for women, enhancing their bargaining power and decision-making abilities. Further, these offer financial services, knowledge, skills, and infrastructure, improving income and reducing poverty.

"

Observing the evolving societal roles of women, particularly those involved in Self-Help Groups (SHGs) within the state, we recognize substantial empowerment as they actively address community-related issues. Their participation in resolving matters alongside respected figures, such as higher officials, law enforcement personnel, and political leaders have enabled them to contribute to decision-making processes and negotiations. Empowering women reflects directly in decision-making within families too. They start prioritising the health of their children along with their own health too."

– Senior Official, SERP, Telangana.

2.7.3 State-specific programmes: Uttarakhand leads the way

In Uttarakhand, women have been empowered through their participation in movements like the Chipko movement and the struggle for the separation of Uttarakhand from Uttar Pradesh.

Women in Uttarakhand also actively engage in agriculture, and, due to domestic out-migration of men, many households are female-led, further highlighting the strength and resilience of women in the region.

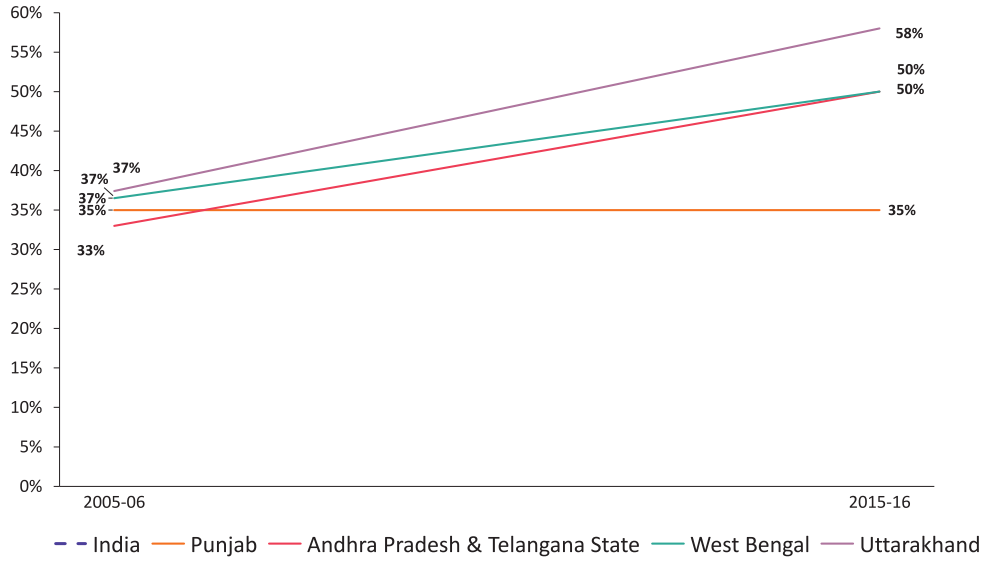
In Uttarakhand, Van Panchayats, or forest councils, and the Mahila Mangal Dal, or Women's Welfare Groups, played a significant role in bringing forth women's participation in civic life. Van Panchayats were first established in Uttarakhand in the 1930s as a response to the depletion of the region's forest resources to deforestation and soil erosion. These councils were initially comprised solely of male members and were seen to manage the forests and protect the livelihoods of local communities. However, over time, women became more involved in these councils, gaining formal recognition as managers of forest resources as they took on greater roles in decision-making processes related to natural resource management.

The example of active self-help groups in Uttarakhand and Andhra Pradesh are also noteworthy. In Uttarakhand, the establishment of Mahila Mangal Dals in the 1980s provided women with access to education, healthcare, and resources. These groups initially focused on basic services but evolved into platforms for women to collectively address issues and gain representation in decision-making bodies. This led to women having a greater voice in local governance and challenging traditional gender roles, promoting inclusivity. Additionally, the Uttarakhand Decentralized Watershed Development Project I (2004–2012) and the Sustainable Land, Water and Biodiversity Conservation Project (2009–2013) further empowered women. These projects formed numerous self-help groups, engaging in activities like natural resource management and organic farming, strengthening women's decision-making power and promoting sustainable practices.

Self-help groups in Andhra Pradesh, implemented through the state's programme, the Society for Elimination of Rural Poverty, have also been notable. The Andhra Pradesh(Velugu Phase I) and the Andhra Pradesh Rural Poverty Reduction Project (Velugu Phase II), in collaboration with the World Bank, focused on poverty reduction and empowering women. Through these, women's self-help groups were formed and supported at the village level, then federated at higher levels, allowing women to participate in decision-making processes. These initiatives also powered income-generating activities and increased household income. These projects ultimately benefited millions of female participants, and led to improved nutrition, investment in assets, and increased political participation. Additionally, access to formal banking financing empowered women to have a greater say in household decision-making. The collective actions of women through self-help groups also addressed various social issues and advocated for better infrastructure and services in their communities.

These shifts are reflected in Uttarakhand's remarkable improvement in increasing female representation in Panchayats (local government), from 37% in 2005 to 58% in 2015 (Figure). Beyond the original mandate from the Government of India for 33% of membership seats for women members, Uttarakhand and West Bengal have allocated 50% of seats to women. Additionally, Uttarakhand passed the Uttarakhand Public Services Bill in 2022 to extend further support by legally providing native women a 30% reservation in public service posts.

Figure 32. Percentage of female representatives in Panchayats (local administration) in India and its Exemplar states.



Source: Ministry of Panchayati Raj

i. Gender budgeting

Gender budgeting in India has evolved as a crucial initiative to promote gender equality and women's development. It integrates gender-related goals into fiscal policies and their administration while prioritising benefits to women and programmes related to women. Although gender budgeting was first adopted at the national level in 2000, Indian states implemented it at different times and with varying intensity.

Uttarakhand again stands out in this area. It adopted gender budgeting in 2007–2008 and implemented various measures such as issuing gender budget statements, establishing a gender budget cell, creating nodal departments, and conducting capacity-building workshops. These efforts resulted in increased spending on women-related goals in the state. In 2008–2009, the state designated INR 656.45 crores (US$79 million) to the gender budget spanning 20 departments. By 2009–2010, the allocation grew to INR 1205.04 crores (US$144 million) with the inclusion of an additional four departments. Each financial year sees a rise in the gender budget and in the current fiscal year. In 2023–2024, the allocation stands at INR 13,920 crores (US$1.7 billion), marking an enhancement of about INR 150 crores (US$18 million) from the previous year, 2022–2023.

In addition, various Uttarakhand government departments operationalised female empowerment through schemes and policies. The Women and Child Development Department ran programmes through self-help groups and NGOs, while education mainstreamed gender-focused initiatives. For example, in 2009, the state introduced targeted initiatives such as the Nanda Gaura Devi Kanyadhan Yojna to advance and promote the education of daughters in Uttarakhand. The scheme aims to curb female feticide and ensure economic and educational safeguards for female children. Additionally, to support female students from scheduled tribes and scheduled castes and populations living below the poverty line, under which they are eligible to receive INR 25,000 (US$300) for further studies upon completing their intermediate examination. The Social Welfare Board and Department also provided schemes, and the Dairy and Horticulture Departments offered training. The Rural Development Department prioritised women's economic self-reliance. Through gender budgeting and departmental initiatives, Uttarakhand is making progress towards gender equality and women's empowerment. Gender budget statements provided a platform to track the budget for women schemes, resulting in a significant increase between 2007 and 2014 in spending on women-related goals. States with gender budgeting efforts have made progress in gender equality in education, to say the least.

While these laws and agencies provide important safeguards, effective implementation and compliance is vital to ensure their impact on women's rights and empowerment in the workplace and at home. It is noteworthy that true empowerment encompasses

While laws and agencies provide important safeguards, effective implementation and compliance is vital to ensure their impact on women's rights and empowerment in the workplace and at home.

It is noteworthy that true empowerment encompasses more than just economic factors.

It involves providing women with equal opportunities, access to education, healthcare, decision-making power, and freedom from discrimination and violence.

more than just economic factors. It involves providing women with equal opportunities, access to education, healthcare, decision-making power, and freedom from discrimination and violence. Empowered women become active participants in society and create positive ripple effects on economic growth and overall development. Empowered women contribute to improved household welfare, better health and education outcomes for their children, and increased productivity and innovation. Thus, investing in women's empowerment is not only a matter of social justice but also a catalyst for sustainable economic development—and ultimately decreasing childhood stunting.

Key takeaways

- Gender inequalities, especially those seen in restricted decision-making and access to resources, impede the ability of women to provide sufficient nutrition to children. Discrimination in education, employment, and healthcare constrains women's knowledge and resources for their own care as well as proper child feeding.

- Societal patriarchy, entrenched gender roles, and issues like preference for sons, dowry practices, and gender-based violence compound inequalities. Limited access to education and jobs creates economic disparities and reduces women's decision-making power.

- Nationally, policies prioritise women-led development, ensuring representation in legislation and local governments, protecting against violence, and preserving reproductive and employment rights.

- Campaigns like Beti Bachao, Beti Padhao challenge social norms, while the National Rural Livelihood Mission empowers women through collective impact, granting control over lives and resources.

- In Andhra Pradesh & Telangana State, the Society for Elimination of Rural Poverty and the Mission for Elimination of Poverty in Municipal Areas, along with Uttarakhand's Mahila Mangal Dals, establish robust networks of women's self-help groups, benefitting millions with improved nutrition, better asset investment, and increased political participation.

- Uttarakhand, notably, adopts gender budgeting across departments, operationalizing empowerment through comprehensive schemes and policies.

- There is a need to continue strengthening gender representation in employment and higher decision-making bodies.


आशा
आशा

PHYSICAL INFRASTRUCTURE AND CONNECTIVITY





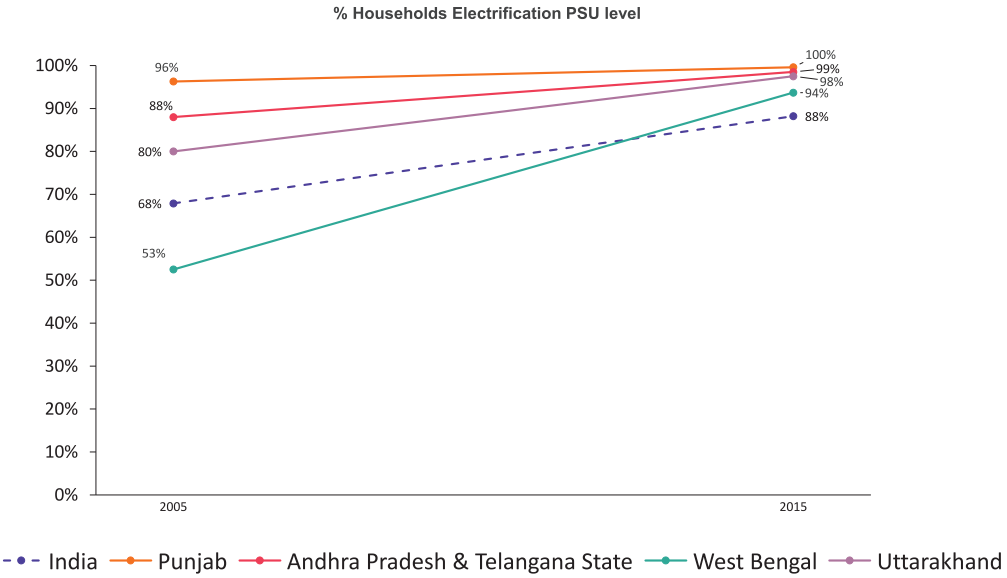
"In addition to government programs, extensive network of good quality healthcare institutions and well-trained health staff at the grassroots level, other socio economic factors also play a very important role in improving access to health and health systems. Whether it is good network of roads to facilitate transportation or good literacy and communication channels to enable awareness, they all are important to help improve health outcomes"

- Senior Official
Department of Health Services,
Punjab

Although we have tried to be exhaustive, there are various factors that impact nutrition and its drivers, both directly and indirectly, and cannot be measured or understood based on our current knowledge.

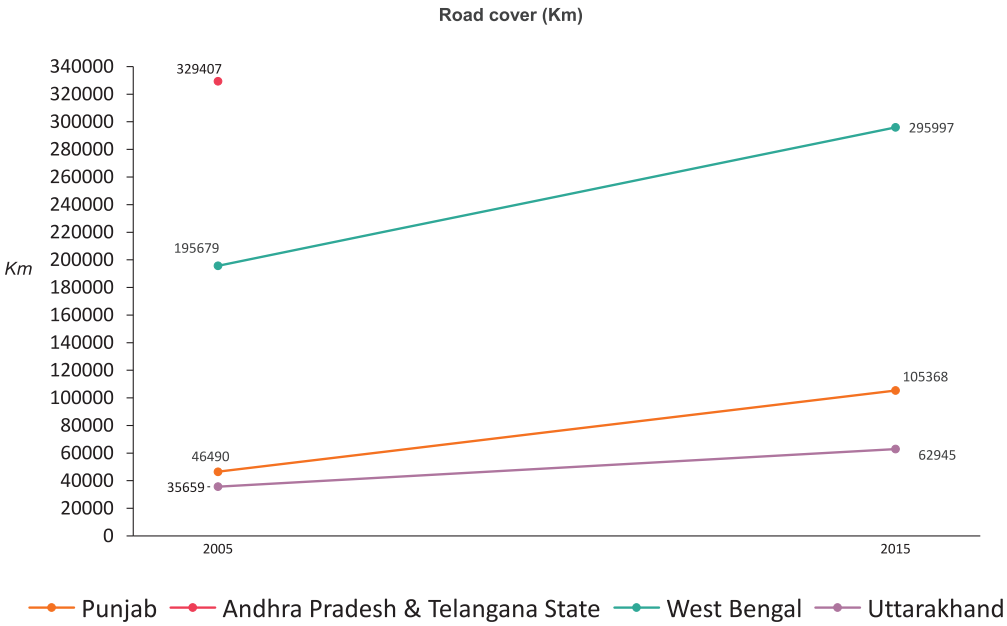
However, it is worth mentioning that this period also saw an improvement in investments in physical infrastructure, electrification, and connectivity across all states studied, Many interviewees credited the growth in these areas as contributing to social factors such as access to education and healthcare services (See figure 33- 35).

Figure 33. Household electrification village level in India and its Exemplar states.



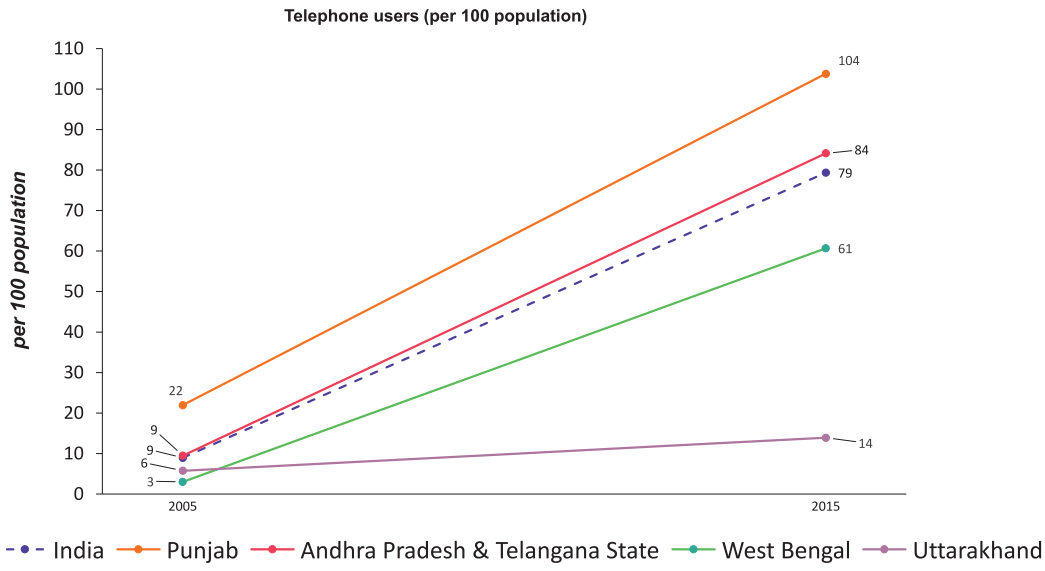
Sources: NFHS 3 (2005) and NFHS 4 (2015)

Figure 34. Total road length (in Km) across Exemplar states.



Sources: RBI Statistics Handbook (2016)

Figure 35. Telephone users (per 100 population) in India and its Exemplar states.



Sources: RBI Statistics Handbook (2016)

PART III

HOW THE EXEMPLAR STATES IMPLEMENTED STRATEGIES



“The CHCMI Program (West Bengal) was conceptualized based on the idea that Panchayats can mobilize resources quickly when it comes to (health related) disasters thus, they would hold strong for improving routine health outcomes. The main objective was to ensure Panchayat bodies were made in charge of going over and beyond the responsibilities of health. For this, we ensured: public dashboard templates with parameters for monitoring, regular fixed day meeting of ANM and ICDS supervisor with Gram Panchayat every Saturday of the month and identifying names of malnourished children and their families for intensified care. Panchayats also spent their own money to overcome the logistical issues that the communities faced, like arranging for travel of children whose parents are working, supplementing nutrition by local produce and soon.”

Senior Official,
Department of Panchayats
and Rural Development,
West Bengal

3. How the Exemplar states implemented strategies

An analysis of the Exemplar states' efforts and policies to reduce stunting reveals how the implementation strategies contributed to their success. To make a difference in performance, over and above the national average the Exemplar states did the same things differently. All that is laid out in the policies or guidelines, unless implemented effectively and efficiently on ground, is unlikely to bring about a sustainable change. In implementation lie the best practices which when adapted to other regions can accelerate progress in the performance of the programs, thus improve outcomes across all programmes. The states' implementation strategies can be characterised as follows: equity and prioritizing social inclusion, coordination, autonomy at the local level, accountability through technology and community ownership, and human resources and capacity building.

3.1 Equity and prioritising social inclusion

Policymaking can perpetuate structural imbalances and disadvantages based on gender, caste, geographical difficulties, and socioeconomic status—or they can do the opposite and promote equity. Where they have been most successful, each Exemplar state has pursued equitable outcomes in its policies and implementation. Perhaps most importantly with regard to stunting, they have made efforts above and beyond national imperatives to ensure gender equity and give women equal access to resources, opportunities, and decision-making power.

Examples of such policies include the following:

- Punjab launched the Ata Dal Scheme in 2007 to provide subsidised cereals and pulses to families living above the poverty line but who were still food insecure even before the National Food Security Act was introduced.
- Punjab established a special teaching cadre to tackle perennial shortages of staff in border areas.
- Public Distribution System Andhra Pradesh introduced Giri Gorumuddalu, a programme of specialised care and supervised feeding through nutrition rehabilitation centres for severely and moderately malnourished children in tribal and vulnerable communities, while residential schools in the state provided quality education and nutritional food to scheduled caste, scheduled tribe, and 'backward class' (disadvantaged caste) students from the fifth grade to the intermediate level.
- Uttarakhand established a three-month buffer stock of Public Distribution System rations for the winter months to ensure interrupted supply to remote hilly villages.
- West Bengal introduced Mobile Boat Dispensaries and Gram Panchayat Mobile Health Camps to deliver health services in remote and inaccessible islands of Sundarbans.

As highlighted previously in the section on women's status, Uttarakhand, Telangana State, and West Bengal have all demonstrated a strong commitment to prioritising gender and empower women. Uttarakhand specifically has emerged as a pioneer in gender mainstreaming, exemplified by its adoption of gender budgeting, fund allocation, and government seat reservation for women.

3.2 Coordination and impact from multiple actors

There is no single 'magic bullet' intervention sufficient to end childhood stunting. The key to effective programmatic outcomes is through the synergistic leadership of national, subnational, and civil society actors and international development agencies, across multiple nutrition relevant sectors (e.g., health, education, WASH) largely driven by political will.

To ensure effective implementation of policies, it is essential to display sustained political leadership. For example, the Janmabhoomi programme, implemented by Andhra Pradesh & Telangana State, has the Chief Minister monitor progress and participate in public meetings. Further, to enhance coordination from the state to grassroot level, the People Councils played a crucial role. These councils facilitated people's participation and served as a mechanism to address local issues spanning various sectors.

Moreover, it identified avenues for leveraging local resources and proposed micro-plans for their effective utilisation. The Chief Secretary of Andhra Pradesh & Telangana State has also established a convergent multisectoral mechanism that brings together Principal Secretaries from various departments to collaborate in the planning, implementation, and monitoring of nutrition-related initiatives.

In both Punjab and West Bengal, effective coordination among multiple departments is evident in their efforts to ensure health and nutritional outcomes. West Bengal's Community Healthcare Management Initiative, led by the Panchayati Raj Department, enabled coordination of multiple sectors such as Department of Health and Family Welfare, Department of Child and Women Development, self-help groups, and large non-organizations like CARE India and CINI at the village level to plan and implement National Rural Health Mission programmes. Similarly, in Punjab, the Department of School Education has set up service and monitoring committees at the district level. These committees, led by the District Magistrate, held regular meetings with line departments to ensure the provision of hygienic and nutritious food to schools as part of the Mid-Day Meal scheme.

To facilitate impactful interventions, all four states have strengthened their partnerships and coordination with academic institutions, civil society organisations, and international development agencies providing technical assistance and financial support. Uttarakhand adopted the public–private partnership approach by collaborating with the Asian Development Bank, World Bank, and other private actors to mitigate gaps in delivering health services in areas that are difficult to access. In the WASH sector, Punjab and Uttarakhand have received significant technical and financial assistance from the World Bank to carry out rural water supply services programmes to provide piped water, sanitation facilities, and waste management in rural areas.

3.3 Autonomy at the local level

For a country as heterogenous as India, delegation of decision-making powers at the local level is critical. The success of such decentralisation is contingent on effective reallocation of roles and responsibilities from the national government and subnational/state-level elected authorities to the community level, to ensure programme ownership and sustainability.

All four states realised the need for enhancing administrative capacities and governance mechanisms at the state level. This allows for efficient resource utilisation and fosters state-led development initiatives to identify and solve problems in a contextually suited way. For example, public–private partnerships have been deemed successful in filling human resource gaps in Uttarakhand, sector-level development projects in health and WASH had a deep impact in Punjab and Andhra Pradesh & Telangana State and financial incentives enabled girls to stay longer in schools in West Bengal. Such initiatives helped target vulnerable groups and communities inhabiting difficult terrains.

Through effective financing, states are better able to prioritise their needs and strengthen their systems. All four states have successfully leveraged funds from various sources, including central and state allocations, local fundraising, and international agencies. The Department of Education in Punjab, for example, utilised central funds to supplement utility needs through local resource mobilisation. Similarly, the departments of Women and Child Development, and Health, and Drinking Water and Sanitation in Adhra Pradesh & Telangana State, Uttarakhand and West Bengal mobilised additional resources from international agencies to support systems development.

To bring decision-making closer to the grassroots level, it is imperative to empower local authorities to make decisions. Andhra Pradesh has effectively implemented district-level decentralisation. The Women and Child Development Department developed Annual Programme Implementation Plans in consultation with district blocks, key stakeholders, and development partners. This allowed for a consultative budget approval process for a more targeted and context-specific intervention plan before submission to the Government of India, ensuring budgeting.

Engaging and empowering communities through education as well as in programme planning allows them to have a more direct influence on decisions that affect their lives. This involvement via education creates a sense of ownership which in turn lays the foundation for long-term sustainability.

Over the last decades, Punjab, Uttarakhand, and Andhra Pradesh & Telangana State have promoted participatory development, involving citizens in programme planning and implementation. The Gram Panchayat Water Supply and Sanitation programme in Punjab and the User Water Supply and Sanitation Committee in Uttarakhand engage locals in the planning and management of water and sanitation facilities. In Andhra Pradesh & Telangana State, the Society for Elimination of Rural Poverty model mobilises rural women into self-help groups using poverty alleviation strategies to create a multisectoral and sustainable initiative. Additionally, the Janmabhoomi programme in Andhra Pradesh & Telangana State engages the local community in identifying micro-plans and devising solutions to local problems. Further, to reduce corruption under the Mahatma Gandhi National Rural Employment Guarantee Act, literate wage seekers were trained as village Social Auditors.

3.4 Accountability through technology and community ownership

Effective governance is facilitated through transparency and accountability. The Indian governance system follows a rights-based approach, which is enforced through legal instruments like the Right of Children to Free and Compulsory Education Act, Right to Information Act, and the National Food Security Act to ensure accountability of government institutions. Moreover, maintaining clear and measurable targets requires committed leadership to monitor performance and quality outcomes. For instance, Andhra Pradesh & Telangana State's Performance Management System has indicators classified as input (measures of economy and efficiency), output (measures of effectiveness), and outcome (measures of quality and impact), numbering more than 200. These indicators are monitored monthly, quarterly, and annually by the Chief Minister, State Ministers, and Secretaries to the Government. Similarly, the Punjab State Achievement Survey conducts learning outcome-based reviews to track effectiveness of educational schemes and develop prioritisation plans.



A good monitoring and evaluation system is necessary to review progress and address any challenges promptly. In Andhra Pradesh & Telangana State, the Women and Child Development, Food and Civil Supplies, and Education departments conduct monthly meetings and field visits with State Ministers and high-level bureaucrats. The same is true of the Education and Food and Civil Supplies department in Punjab. For Rural Water Supply Services at the local level in Punjab, the Sarpanch (elected head of the local self-government at village level) conducts social audits to identify and resolve technical issues. In West Bengal, the Secretary Panchayat and officials of Rural Development undertake weekly field visits to monitor programme implementation. Monitoring through supportive supervision helps identify bottlenecks and address them in a timely manner to achieve the desired outcomes of the programme.

State governments have also been exploring ways to effectively utilise technology to enhance monitoring using data. Though the connection to childhood stunting might seem distant, an accountable government will be more responsive to its population's needs, including nutritional needs. The Department of Food and Civil Supplies in Andhra Pradesh & Telangana State and Punjab have implemented a management information portal, even prior to the national-level introduction of such a portal in the country. In pursuit of improving programme management, all four states have adopted various technological applications,

including robust cross-sectoral information systems, mobile-based applications, and end-to-end computerisation.

A robust grievance redressal mechanism is needed for any administration machinery to be accountable. Andhra Pradesh & Telangana State and Uttarakhand have developed a Chief Minister dashboard that prioritises social sector services, and an online portal for grievances pertaining to all departments that enables the authorities to have an up-to-date overview of grievances and their status. Notably, Punjab has also developed a specialised WASH portal, the Shikayat Nivaran Kendra (complaint resolution centre), which has achieved a high 99% resolution rate.

3.5 Human resources and capacity building

Any policy or programme is only as good as the people who implement it. And the foundation of any government body is human resources, an area in which the Exemplar states have excelled. To promote quality recruitment, Punjab, Andhra Pradesh & Telangana State, and West Bengal undertake a stringent selection process that includes state-specific tests and commissions to hire eligible candidates for teaching positions in government schools. Meanwhile, the Health Department in Uttarakhand implements a public–private partnership approach to recruit specialised health professionals and administrative staff to bridge gaps in human resources for effective service delivery.

All four Exemplar states have also initiated various strategies to ensure effective distribution of human resources and service delivery in their respective regions. In Andhra Pradesh & Telangana State, the Education Department has mandated compulsory posting and transfer of teachers at regular intervals to prevent stagnation and ensure equitable distribution. Uttarakhand has introduced a transfer policy that requires teachers to be posted in remote and challenging areas for a specific period of service, alongside employing educated locals to enhance continuous learning.

To motivate and retain employees, monetary incentives and allowances can be effective. The departments of Health and Women and Child Development in all four states recognise the importance of added honoraria, hard area allowances, and relaxations in the eligibility criteria for medical doctors applying for postgraduate admissions to medical colleges. At an individual state level, the Women and Child Development and the Health departments in West Bengal have implemented measures to incentivise personnel through additional remuneration, promotions, and employment exchange services. Also, an advance payment is made to the cook-cum-helper as an incentive. In Uttarakhand, a non-monetary incentive was the renaming of the cook-cum-helper position to Bhojan Mata ('mother who gives food'), a term which carries greater respect and recognition.

The Exemplar states have also deployed capacity-building strategies to enhance competence, effectiveness, and efficiency among their workforce. In the Tehri, Haridwar, and Dehradun districts of Uttarakhand, on-site and mobile training initiatives were implemented for auxiliary nurse midwives to strengthen their skills. Under the Society for Elimination of Rural Poverty model, self-help groups in Andhra Pradesh & Telangana State were provided with mobile-bookkeeping training. Self-help groups were also trained in information and communications technology to process accounts using mobile handsets. By 2014, over 8 lakhs self-help groups have been regularly uploading data into a central database from one crore household in Andhra Pradesh & Telangana State.

The Exemplar states have demonstrated how sustained, straightforward actions can have a substantial impact on nutritional outcomes when implemented effectively. By utilising existing resources, leveraging multisectoral collaboration, integrating policies and programmes, targeting evidence-based interventions, engaging communities, and maintaining accountability, states have achieved significant improvements in nutrition without requiring extensive additional investments. This approach highlights the importance of optimising existing resources and systems to drive positive change at scale.

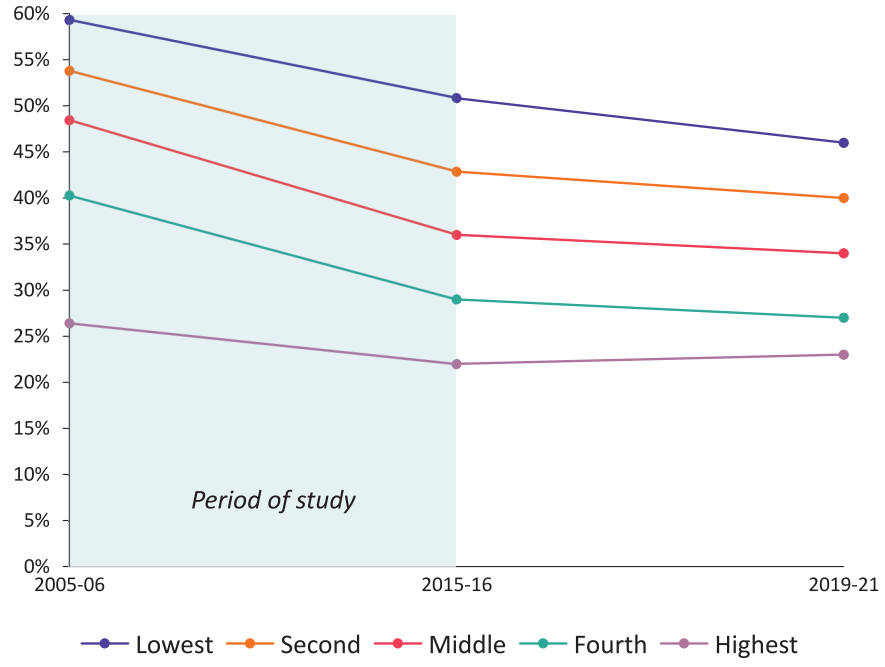
4. Remaining challenges

To continue making progress in reducing stunting and improving other indicators of malnutrition, we need to identify gaps and challenges. These are challenges that face all four Exemplar states to differing degrees, as well as India as a whole.

4.1 Opportunities for economic equality

The impact of economic inequality on nutrition security is profound, particularly for poor households. The gap in stunting prevalence between the richest and poorest quintiles has declined from 33% in 2005 (with the lowest wealth quintile at 59% and the highest at 26%) to 23% in 2021 (lowest 46%, highest 23%), but disparities persist. Limited access to nutritionally diverse food among the poor contributes to higher rates of malnutrition, especially among women and children. Poor nutrition exacerbates the cycle of poverty, as malnourished individuals are more susceptible to illness and face challenges in reaching their full potential in education and economic opportunities.

Figure 36. Stunting prevalence across wealth quintiles in India

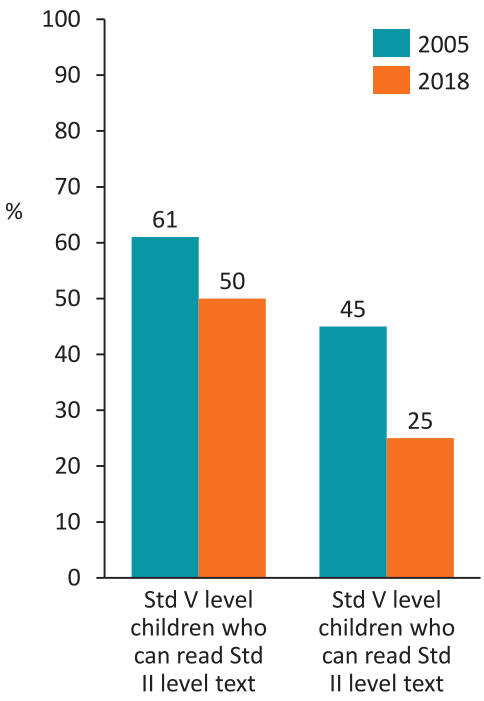


Sources: NFHS 3 (2005), NFHS 4 (2015), and NFHS 5 (2020)

Addressing economic inequality requires a multifaceted approach that includes targeted policies and interventions. Investments in improving sanitation infrastructure and promoting access to clean cooking fuel are crucial steps towards reducing health disparities and breaking the cycle of poverty. Furthermore, ensuring equitable access to nutritious food and strengthening social safety nets can help alleviate the burden of malnutrition among vulnerable populations.

These inequities are also seen in education through overall learning outcomes that have consistently worsened over the past few decades (see Figure 37). While the states have taken to heart the central government's commitment to targeting the most vulnerable and least served segments of the population, education outcomes have varied.

Figure 37. Percentage of children's reading and math skills in India in 2005 and 2018



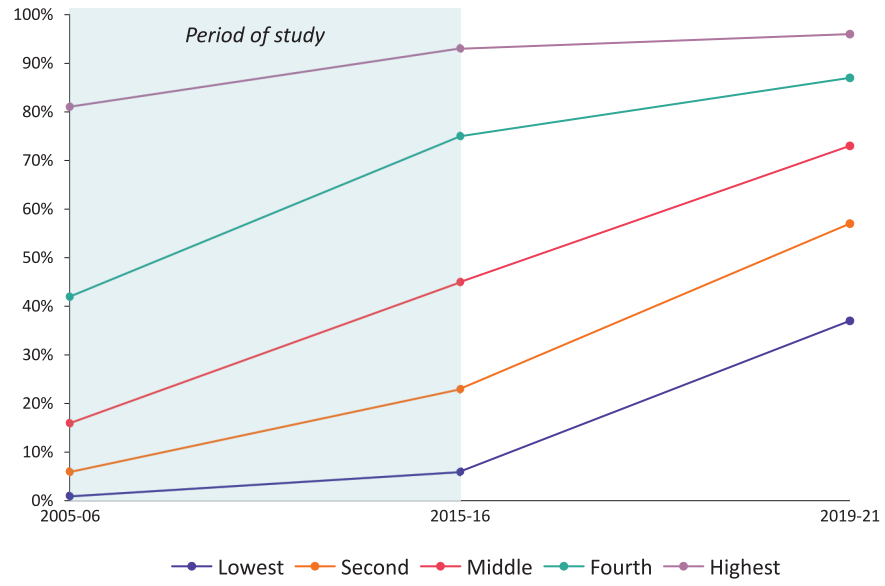
Source: ASER (2005-2018)

By addressing underlying economic disparities and providing equal opportunities for all, India can strive towards a more inclusive and sustainable society. Efforts to combat economic inequality are essential for fostering social justice, increasing access to education, promoting public health, and eventually eliminating childhood stunting.

4.1.1 Avenue for improved WASH conditions

A considerable number of households (30%) still lack access to proper sanitation infrastructure in India, posing significant health risks, particularly for women and children. All Exemplar states confront issues arising from rapid urban expansion and the proliferation of slums, which contribute to overcrowding, inadequate infrastructure, and poor sanitation practices, and greater risk of waterborne diseases. West Bengal has a larger gap to cover with its current coverage at 68% (lower than national average). These challenges impact the impoverished populations as reflected in Figure 38.

Figure 38. Households with an improved sanitation facility across wealth quantiles in India prevalence across wealth quintiles in India



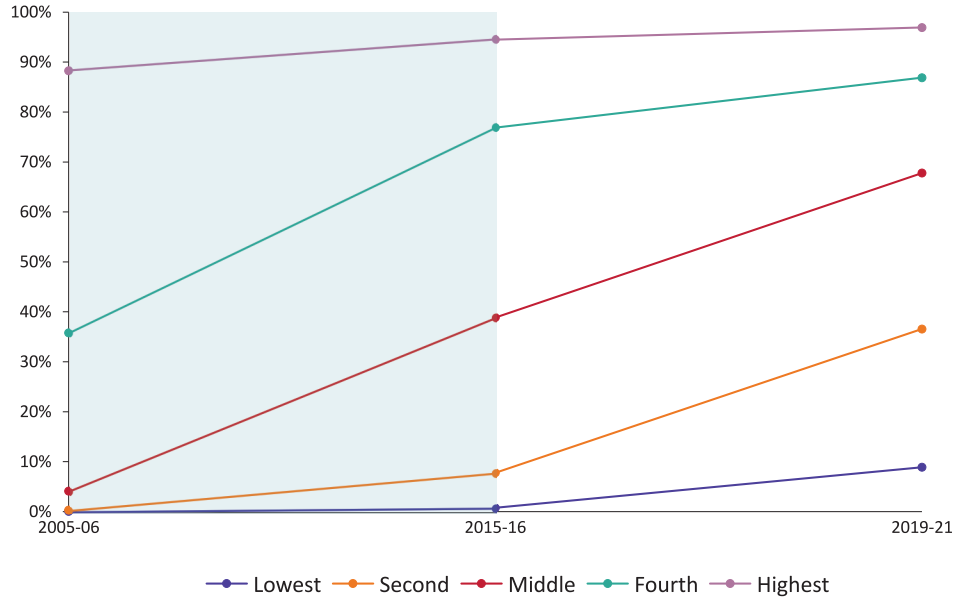
Sources: NFHS 3 (2005), NFHS 4 (2015), and NFHS 5 (2020)

The absence of clean and functional toilets compels individuals to resort to open defecation, compromising their dignity and exposing them to diarrheal diseases, helminthic infections, and environmental enteropathy. This perpetuates a vicious cycle, as the burden of these maladies falls on the economically disadvantaged households that are least likely to have access to healthcare services.

4.1.2 Improving access to clean cooking fuel

Access to clean cooking fuel is another area that highlights the persistent economic inequality in India, with only 58.6% households having access in 2021 and 90% of the lowest wealth quintile still using solid fuel for cooking. A significant portion of the population, especially those in low-income households, still relies on traditional biomass fuels such as wood, dung, and crop residues for cooking. These fuels release harmful smoke and pollutants, leading to indoor air pollution, respiratory problems, and other health issues, particularly affecting women and children who spend more time near cooking areas.

Figure 39. Households using clean fuel for cooking across wealth quintiles in India

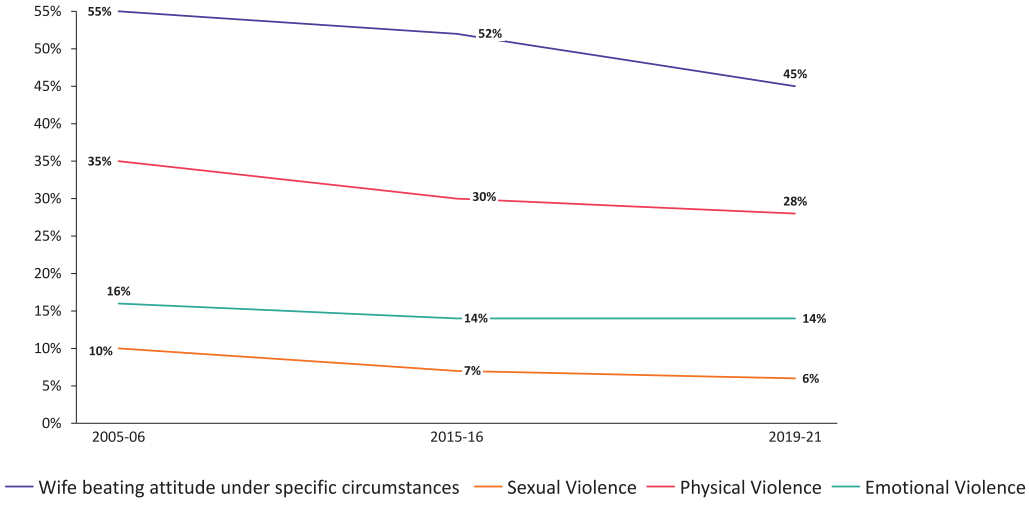


Sources: NFHS 3 (2005), NFHS 4 (2015), and NFHS 5 (2020)

4.2 Gender inequity

As we have seen, the welfare and empowerment of women is inextricably tied to the nutritional health of children—we simply cannot achieve the latter without the former. It is therefore very concerning to see a decline in women's employment, with the percentage dropping from 43% in 2005 to 32.5% in 2021. Representation of women in decision-making bodies beyond the local level also remains dismally low. Women currently make up only 13% of Members of Parliament in India.

Figure 40. Gender role attitudes justified and prevalence of physical, emotional and sexual violence in India

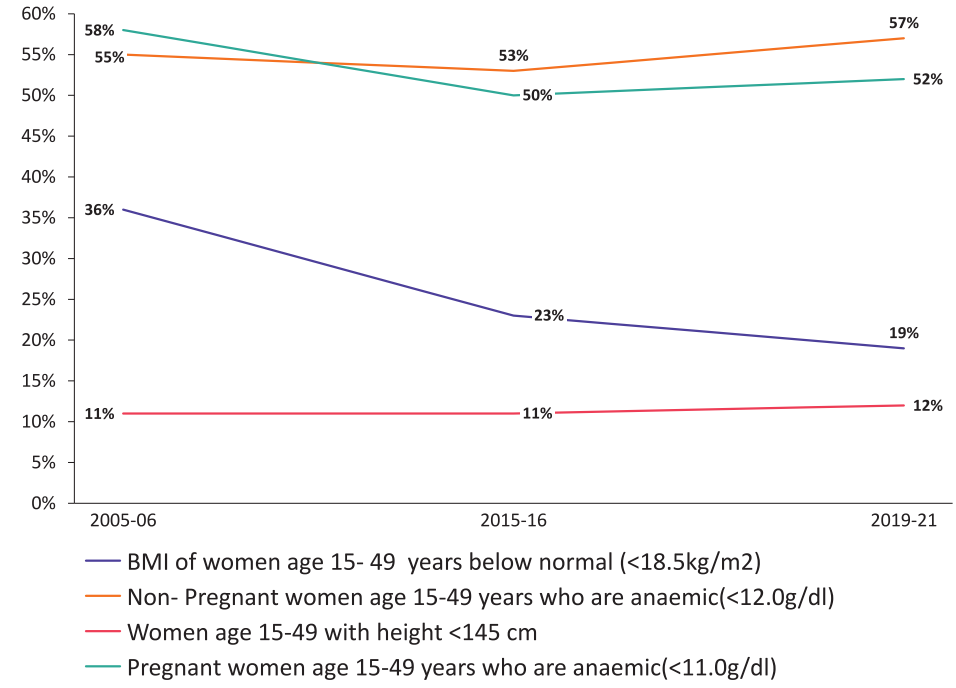


Sources: NFHS 3 (2005), NFHS 4 (2015), and NFHS 5 (2020)

Sex-ratios indicate gender-based discrimination in a given state. For example, in Punjab, the sex ratio was 895 females per 1,000 males in 2020. Domestic violence in India has also seen minimal decreases from 2005 to 2020, with physical and sexual violence reducing by 7% and 4% respectively.

Imbalances are seen across nutrition indicators as well. For example, the proportion of underweight women of reproductive age (between 15 and 49 years) in Exemplar states remains high at 15% in 2021. Anaemia prevalence among women of reproductive age is also alarmingly high at 59%. The height of women—another key nutrition indicator—is also influenced by a lifetime of insults to their health and dignity that have been passed on through generations. Persistent low birth weight in India (18% in 2021) is closely associated with these markers of maternal nutrition, and it acts as a determinant for early childhood undernutrition and stunting.

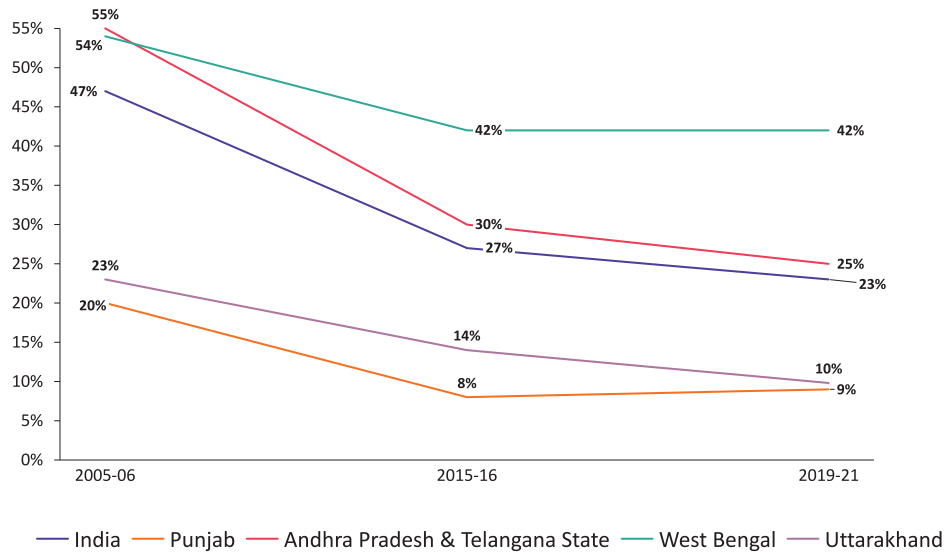
Figure 41. Maternal nutrition in India



Sources: NFHS 3 (2005), NFHS 4 (2015), and NFHS 5 (2020)

Access to family planning services, especially methods to space births, is another area that requires improvement. Currently, the percentage of women with a birth interval of less than 2 years is high (27.3%). Adolescent girls face even grimmer challenges, with high rates of teenage marriage and pregnancy and limited policies or programming to address these concerns. In West Bengal, for instance, the prevalence of child marriage was 42% in 2020, surpassing the national average of 23%. Gender discrimination is also reflected in the percentage of women completing secondary education, which remained low in 2020 (41%), indicating the need to prioritise girls' education and create equal opportunities for their academic advancement and later employment.

Figure 42. Prevalence of child marriage (% of females from 20-24 that were married before 18)



Sources: NFHS 3 (2005) and NFHS 4 (2015)

While India has made significant strides in reducing gender gaps, sustained efforts are essential to maintain progress and address areas where limited improvement has been observed. By promoting gender equality across all dimensions—from employment and education to safety, nutrition, and reproductive health—we can create a more inclusive and equitable society for all.

4.3 Enhancing governing effectiveness

4.3.1 Fund distribution

Ensuring optimal utilisation of funds is crucial for successful policy implementation. Challenges have been observed in the allocation and utilisation of funds for some of the key programmes that have proven effective against stunting. Delays in fund allocation and increased account prices in the Mid-Day Meal scheme, for example, could potentially affect the quality of food provided. Inadequate fund allocation and utilisation have been reported in the National Health Mission in certain states. Big problems don't often need big solutions. Timely devolution of funds to the states is essential for the smooth implementation of large-scale schemes such as the secondary education reform programme, Rashtriya Madhyamik Shiksha Abhiyan.

4.3.2 Staffing support and capacity building

The programmes discussed have also been subject to vacancies, inadequate staffing, and heavy workloads, which have impacted their effectiveness. Improvements are needed in the training and capacity building of not only frontline workers, but also officers at the district and block levels. Addressing the shortage of frontline and technical professionals is also vital for improving the quality and coverage of services.

4.3.3 Coordination and accountability

For a problem as complex and multisectoral as stunting, coordination plays a significant role. We have observed examples of establishing a strong supra-sectoral system led by the Chief Secretary, facilitating effective communication and comprehensive policy solutions. However, this practice is often dependent on individual will and has not become systematic. A systematic solution, demonstrated by some of the exemplars is coordination through Panchayats at village level, which would require dedicated capacity building and scaling up.

Furthermore, challenges exist in implementing monitoring and evaluation mechanisms within and across departments. These challenges include inadequate prioritisation, lack of technical expertise, and incomplete or inaccurate information systems. A responsive grievance redressal system is vital for identifying issues, tracking complaints, and monitoring the performance of large-scale social sector programmes.

4.4 Community ownership

Active community participation and ownership are essential to the success of government schemes. However, some programmes lack community engagement and monitoring. Collaboration between the government and communities can help improve knowledge, participation, and awareness of entitlements.

5. Conclusion and way forward

Childhood stunting is influenced by a complex web of factors including inadequate maternal nutrition, socio-economic status, and limited access to healthcare and sanitation. Despite India's commendable progress in reducing stunting – a testament to the favourable policy and programmatic environment that has been established in the maternal and nutrition space – sustained and intensified efforts are imperative to achieve the global nutrition targets.

This study identifies childhood stunting as a systems-level problem, with multiple factors and facets informing the system. Progress can be sustained by focusing on continuing and expanding the delivery of a comprehensive multisectoral approach with concordance between top-down policies and bottom-up implementation strategies – encompassing health, education, WASH, women empowerment, and food security. The study also highlights the strengthening of capacities at the village, district and state levels and empowering communities to take ownership of these initiatives as equally important.

The findings from this study suggest an intensified focus on gender mainstreaming to make sure that initiatives across all sectors and departments address the unique needs of women and girls to assist in heading towards more equitable outcomes. To help India effectively reach the objective of fulfilling global nutrition targets, it is also crucial to prioritize disaggregated monitoring of outcomes across all socio-economic groups, at all levels (village, district and state) to identify discrepancies and customize interventions to meet the needs of vulnerable groups.

Additionally, shifting focus to mother's preconception health is imperative. Enhancing mother's nutritional resilience before pregnancy, improving adolescent health and promoting family planning emerge as strategies to break the intergenerational cycle of undernutrition, ensuring children begin life on a healthier trajectory. Evidence also supports effectiveness of direct health interventions, like nutritional assessment, balanced protein energy supplementation, lipid nutrient supplements, micronutrient supplementation, when provided pre-conceptionally and during pregnancy.

In conclusion, India's journey towards a stunting-free future requires a multifaceted approach that addresses the complex determinants of malnutrition. By building upon existing strengths, strengthening local capacities, and embracing innovative solutions, India can achieve its nutrition goals and ensure the well-being of its most vulnerable citizens. Synergistic efforts across various sectors using local autonomy, and community involvement have been and could continue being instrumental in driving change. By reducing gaps in outcomes based on socio-economic status and amplifying services across life cycle for women, India can accelerate progress towards reducing childhood stunting and ensuring the well-being of its most vulnerable populations.



VII. ANNEXURES

ANNEX A: Glossary

Term	*Definition*
Accountability	The responsibility and answerability of individuals, or institutions for the outcomes and impacts of their decisions, actions, and policies, particularly concerning the public interest.
Autonomy	The ability of individuals or communities to make independent decisions and exercise self-governance in various aspects of their lives.
Balanced diet	A diet that provides essential nutrients in appropriate proportions to maintain optimal health.
Body mass index	BMI serves as a quantitative indicator of body composition, assisting in the assessment of weight status and associated health risks.
Caste system	A social hierarchy that influences individuals' social roles and relationships based on their birth. It has profound implications for social interactions and opportunities.
Community engagement	Community engagement entails the active participation and involvement of individuals within a community in collective decision-making processes, fostering a sense of shared identity and responsibility.
Decentralisation	The transfer of authority from central entities to local levels, impacting power dynamics and resource distribution within societies.
Direct causes	Immediate factors influencing an individual's nutritional status, such as dietary choices and physical activity.
Determinants	A broad array of factors influencing dietary choices, food access, and nutritional outcomes.
Empowerment	The process of enhancing individuals' or communities' capacity to participate in decision-making processes, exercise control over their lives, and achieve socio-economic and political advancement.
Electrification	The establishment and expansion of electrical infrastructure to enable the generation, distribution, and utilization of electrical power.
Equity	The promotion of fairness and justice in the distribution of resources, opportunities, and outcomes, aiming to address social and economic disparities within a society.
Exclusive breast-feeding	The practice of feeding an infant breast milk only, without the introduction of any other liquids or solid foods. It is recommended for the first six months of an infant's life.
Five Year Plans	India's Five-Year Plans are comprehensive economic development blueprints that outline the country's priorities and strategies for every five years. These plans aim to achieve targeted growth rates, alleviate poverty, and enhance overall economic and social development.
Food Security	A concept addressing the availability, accessibility, and affordability of a nutritionally adequate and culturally appropriate diet for all members of a society.
Governance	The process of decision-making, policy formulation, and implementation by institutions, emphasizing transparency, accountability, and inclusivity for effective societal management.
Grievance redressal	Structured and systematic process of addressing and resolving complaints or grievances raised by citizens against government actions, decisions, or services.
Human Development Index	A composite statistical measure used to assess and compare the average achievements in key dimensions of human development across different countries.

Health system	Encompassing all organizations, institutions, resources, and people involved in the provision of health services, with a focus on accessibility, quality, and responsiveness.
High-income country	A high-income country is a classification based on a nation's gross national income (GNI) per capita, indicating a high standard of living and economic development.
Home-based neonatal care	Healthcare services provided to newborns in their homes, focusing on postnatal care, monitoring, and support.
Household environment	Household environment refers to the conditions and surroundings within a household, encompassing factors like hygiene, sanitation, and safety.
Household income	Household income is the total earnings of all members of a household, including wages, salaries, and other sources of income.
Human resource strengthening	Human resource strengthening involves initiatives and strategies to enhance the capacity, skills, and performance of healthcare personnel.
IMR	The Infant Mortality Rate (IMR) is the number of deaths of infants under one year of age per 1,000 live births in a given population.
Indirect causes	Underlying and distal factors influencing an individual's nutritional status, such as access to health services, food security at household level, household environment, socio-economic status.
Inequality	Disparities in the distribution of resources, opportunities, and privileges among individuals or groups within a society, often analyzed from a sociological standpoint.
Institutional delivery	Childbirth occurring in a healthcare facility, such as a hospital or clinic, with skilled medical professionals attending.
Literacy	The ability to read and write representing a foundational skill for accessing information and participating in various aspects of life.
Low-income country	A nation characterized by a relatively low gross national income (GNI) per capita.
Malnutrition	Malnutrition is a condition resulting from an imbalance between the intake of nutrients and the body's requirements, leading to adverse health effects.
Marginal	Individuals or groups existing on the periphery of mainstream society often experiencing social, economic, or political exclusion.
Maternal anemia	A health condition characterized by a deficiency of red blood cells or hemoglobin in pregnant women. It can result in reduced oxygen-carrying capacity in the blood, potentially affecting the health of both the mother and the developing fetus.
MMR	A health indicator that measures the number of maternal deaths per 100,000 live births in a given time period. It reflects the risk of maternal death associated with childbirth and pregnancy-related complications.
Mixed methods case-study design	A research approach that combines both qualitative and quantitative methods within a case study framework. It involves collecting and analyzing both numerical data (quantitative) and narrative or contextual information (qualitative) to provide a comprehensive understanding of a particular case or phenomenon.
Multi-sectoral coordination	Collaboration and communication among various sectors or areas to address complex issues comprehensively, combining efforts from different fields.
Program	A structured set of activities designed to achieve specific objectives or outcomes within a defined timeframe.

Policy	A set of principles, guidelines, or rules formulated and adopted by an organization, government, or authority to guide decision-making and action.
Qualitative methods	Research approaches that focus on understanding human behavior, experiences, and social phenomena through non-numeric data, such as interviews, observations, or content analysis.
Quantitative methods	Research approaches that rely on numerical data and statistical analysis to understand patterns, relationships, and trends.
Scheduled Caste	Specific groups identified in the Constitution of India as historically disadvantaged and subject to social discrimination, eligible for affirmative action programs.
Scheduled Tribe	Indigenous communities in India recognized by the Constitution as marginalized and eligible for special protections and privileges.
Scheme	A systematic plan, program, or initiative designed to achieve specific objectives, often implemented by governments or organizations.
Sector reform	Intentional and structured changes or improvements in a specific area or domain, often with the goal of enhancing efficiency, effectiveness, and sustainability.
System reform	Comprehensive changes and improvements in an entire system, often with the aim of enhancing its functionality, responsiveness, and outcomes.
Sex	Biological and physiological attributes that distinguish individuals as male or female.
Socio-economic status	Sociological construct reflecting an individual's or group's social standing, determined by a combination of economic, educational, and occupational factors.
Social inclusion	A sociological principle advocating for the active participation and acceptance of all individuals in society, irrespective of their background, emphasizing equal opportunities.
Social mobilization	A process involving collective actions, efforts, and campaigns to bring about social change or address issues of public concern through community engagement.
Stature	An individual's or population's height, often used as a measure of physical stature or size.
Ownership	The sense of belonging, control, and autonomy individuals or communities have over resources, decisions, or initiatives within their societal context.
Total Fertility Rate	A demographic indicator that represents the average number of children a woman would give birth to during her reproductive years, considering the prevailing fertility rates.
Underweight	A nutritional status indicator that signifies a weight below the standard or expected weight for a particular age, height, or gender. It is often used to assess malnutrition.
Vulnerable	Individuals or groups are at heightened risk of harm, exploitation, or discrimination due to various factors, often requiring targeted social interventions.
Wealth asset index	A composite measure used to assess the economic status of households. It considers various assets and possessions owned by a household, providing an indication of its relative wealth.
Women's status	The social, economic, and political standing of women in a given society. It encompasses factors such as education, employment opportunities, decision-making power, and overall equality within the community.

ANNEX B: Bibliography

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