FOOD AND NUTRITIONAL SECURITY AMONG SCHEDULED CASTES AND SCHEDULED TRIBES: EVIDENCES FROM THREE INDIAN STATES

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Research Teami	
Acknowledgementii	
Disclaimer	
List of Tables	i
List of Figures	i
Abbreviationsxi	i
Executive Summaryxiv	I
Chapter 1: Introduction1	
1.1 Statement of the Issue1	
1.2 Food Insecurity, Malnutrition, and Disadvantaged Sections2	
1.3 Brief Review of Literature	
1.4 Literature Gap5	
1.5 Research Questions	
1.6 Research Objectives	
1.7 Data and Methodology6	
1.7.1 Sources of Data7	
1.7.2 Sample Design7	
1.7.3 Total Sample Size and Caste Category Wise Sample Households8	
1.8 Definition of Variables Used in the Study	
1.9 Women Dietary Diversity Score (WDDS)11	
1.10 Methods	
1.11 Scheme of Chapterization	
1.12 References	
Chapter 2: Nutritional Status of Children	
2.1 Nutritional Status of Children	
2.1.1 All India	
2.1.2 Himachal Pradesh	
2.1.3 Rajasthan	
2.1.4 Odisha25	
2.2 Nutritional Programs, Targets and Achievements	

2.3 Socio-Economic Indicators and Nutritional Status of Children	
2.3.1 Himachal Pradesh	
2.3.2 Rajasthan	41
2.3.3 Odisha	46
2.4 Determinants of Nutritional Status of Children	51
2.4.1 Himachal Pradesh	51
2.4.2 Rajasthan	57
2.4.3 Odisha	65
2.5 Discussion	71
2.6 Summary	72
Chapter 3: Food Security and Nutritional Status among SC and ST in Himachal Pr	adesh74
3.1 Food Security among SC and ST in Himachal Pradesh	74
3.2 Dietary Diversity among SC and ST at Household Level in Himachal Prades	h82
3.3 Dietary Diversity among SC and ST Women in Himachal Pradesh	83
3.4 Nutritional Status of Children in Himachal Pradesh	85
3.5 Determinants of Nutritional Status	
3.6 Summary	
Chapter 4: Food Security and Nutritional Status among SC and ST in Rajasthan	
4.1 Food Security among SC and ST in Rajasthan	
4.2 Dietary Diversity among SC and ST at Household Level in Rajasthan	95
4.3 Dietary Diversity among SC and ST Women in Rajasthan	97
4.4 Nutritional Status of Children in Rajasthan	
4.5 Determinants of Nutritional Status in Rajasthan	101
4.6 Summary	
Chapter 5: Food Security and Nutritional Status among SC and ST in Odisha	103
5.1 Food Security among SC and ST in Odisha	
5.2 Dietary Diversity among SC and ST at Household Level in Odisha	109
5.3 Dietary Diversity among SC and ST Women in Odisha	111
5.4 Nutritional Status of Children in Odisha	112
5.5 Determinants of Nutritional Status in Odisha	114
5.6 Summary	116

Chapter 6: Conclusion117
Chapter 7: Policy Implications118
Appendix 1: Interview Schedule121
Appendix 2: Sample Selection Procedure133
Appendix 3: Food Insecurity Experience Scale139
Appendix 4: Nutritional status of children (Under five years) in Himachal Pradesh (Frequency Table)
Appendix 5: Nutritional status of children (Under five years) in Rajasthan (Frequency Table).141
Appendix 6: Nutritional status of children (Under five years) in Odisha (Frequency Table)142
Appendix 7: Memories from Himachal Pradesh143
Appendix 8: Memories from Rajasthan155
Appendix 9: Memories from Odisha164

List of Tables

Tables	Title	Page Number	
Table 1.1	State, District, Block, and Village-wise Distribution of Sample Households	9	
Table 2.1	Nutritional Status of Children (under 5 years) in India	20	
Table 2.2	Nutritional Status of Children (under 5 years) in Himachal Pradesh	21	
Table 2.3	Nutritional Status of Children (under 5 years) in Rajasthan	23	
Table 2.4	Nutritional Status of Children (under 5 years) in Odisha	26	
Table 2.5	Nutritional targets for children under 5 years (in percentage)	29	
Table 2.6	Programs to check malnutrition in states of Himachal Pradesh, Odisha and Rajasthan	29	
Table 2.7	Cofactors of Stunting, 2015-16 and 2019-21	36	
Table 2.8	Cofactors of Wasting, 2015-16 and 2019-21	37	
Table 2.9	Cofactors of Underweight, 2015-16 and 2019-21	39	
Table 2.10	Cofactors of Anaemia, 2015-16 and 2019-21	40	
Table 2.11	Cofactors of Stunting, 2015-16 and 2019-21	41	
Table 2.12	Cofactors of Wasting, 2015-16 and 2019-21	42	
Table 2.13	Cofactors of Underweight, 2015-16 and 2019-21	44	
Table 2.14	Cofactors of Anaemia, 2015-16 and 2019-21	45	
Table 2.15	Cofactors of Stunting, 2015-16 and 2019-21	46	
Table 2.16	Cofactors of Wasting, 2015-16 and 2019-21	47	

Table 2.17	Cofactors of Underweight, 2015-16 and 2021	49
Table 2.18	Cofactors of Anaemia, 2015-16 and 2019-21	50
Table 2.19	Determinants of Stunting among under five children in Himachal Pradesh	52
Table 2.20	Determinants of Wasting among under five children in Himachal Pradesh	53
Table 2.21	Determinants of Underweight among under five children in Himachal Pradesh	55
Table 2.22	Determinants of Anaemia among under five children in Himachal Pradesh	56
Table 2.23	Determinants of Stunting among under five children in Rajasthan	59
Table 2.24	Determinants of Wasting among under five children in Rajasthan	60
Table 2.25	Determinants of Underweight among under five children in Rajasthan	63
Table 2.26	Determinants of Anaemia among under five children in Rajasthan	64
Table 2.27	Determinants of Stunting among under five children in Odisha	66
Table 2.28	Determinants of Wasting among under five children in Odisha	67
Table 2.29	Determinants of Underweight among under five children in Odisha	69
Table 2.30	Determinants of Anaemia among under five children in Odisha	70
Table 3.1	Social group wise Status of Food insecurity among households in Himachal Pradesh (in percent)	75
Table 3.1A	Responses to Individual Questions of FIES Scale and COVID-19 as their main reason in Himachal Pradesh	76
Table 3.1B	Average total monthly consumption of major cereals and pulses and their major sources in Himachal Pradesh	77

Table 3.2	Status of Food insecurity among ST and Other households in Chamba district of Himachal Pradesh by occupation, level of education and MPCE (in Percent)					
Table 3.3	Status of Food insecurity among SC and Other households in Sirmour district of Himachal Pradesh by occupation, level of education and MPCE (in Percent)	79				
Table 3.4	Status of Food insecurity among SC&SC and Other households in Himachal Pradesh by occupation, level of education and MPCE (in Percent)	80				
Table 3.5	District-wise share of dietary diversity among households by social groups in Himachal Pradesh	82				
Table 3.6	Share of Dietary diversity among SC&ST and Other households in Himachal Pradesh by occupation, level of education and MPCE (in Percent)	83				
Table 3.7	District wise Dietary diversity rate of women in Himachal Pradesh	84				
Table 3.8	Dietary diversity rate of ST&SC and Other caste women by occupation, level of education and MPCE Quintile in Himachal Pradesh	85				
Table 3.9	District-wise Status of Nutritional insecurity of children in Himachal Pradesh	85				
Table 3.10	Nutritional Status of children (under five years) in Himachal Pradesh	86				
Table 3.11	Determinants of Nutritional Status in Himachal Pradesh	87				
Table 4.1	Social group wise Status of Food insecurity among households in Rajasthan (in percent)	90				
Table 4.1A	Responses to Individual Questions of FIES Scale and COVID-19 as their main reason in Rajasthan	91				
Table 4.1B	Average total monthly consumption of major cereals and pulses and their major sources in Rajasthan	92				
Table 4.2	Status of Food insecurity among ST and Other households in Banswara district of Rajasthan by occupation, level of education and MPCE (in Percent)	93				

Table 4.3	Status of Food insecurity among SC and Other households in Hanumangrah district of Rajasthan by occupation, level of education and MPCE (in Percent)	94
Table 4.4	Status of Food insecurity among SC&SC and Other households in Rajasthan by occupation, level of education and MPCE (in Percent)	95
Table 4.5	District-wise share of dietary diversity among households by social groups in Rajasthan	96
Table 4.6	Share of Dietary diversity among SC&ST and Other households in Rajasthan by occupation, level of education and MPCE (in Percent)	96
Table 4.7	District wise Dietary diversity rate of women in Rajasthan	98
Table 4.8	Dietary diversity rate of ST&SCT and Other caste women by occupation, level of education and MPCE Quintile in Rajasthan	98
Table 4.9	District-wise Status of Nutritional insecurity of children in Rajasthan	99
Table 4.10	Nutritional status of children (under five years) in Rajasthan	100
Table 4.11	Determinants of Nutritional Status in Rajasthan	101
Table 5.1	Social group wise Status of Food insecurity among households in Odisha (in percent)	104
Table 5.1A	Responses to Individual Questions of FIES Scale and COVID-19 as their main reason in Odisha	104
Table 5.1B	Average total monthly consumption of major cereals and pulses and their major sources in Odisha	105
Table 5.2	Status of Food insecurity among ST and Other households in Sonepur district of Odisha by occupation, level of education and MPCE (in Percent)	107
Table 5.3	Status of Food insecurity among SC and Other households in Gajapati district of Odisha by occupation, level of education and MPCE (in Percent)	108
Table 5.4	Status of Food insecurity among SC&SC and Other households in Odisha by occupation, level of education and MPCE (in Percent)	109

Table 5.5	District-wise share of dietary diversity among households by social groups in Odisha	110
Table 5.6	Share of Dietary diversity among SC&ST and Other households in Odisha by occupation, level of education and MPCE (in Percent)	110
Table 5.7	District wise Dietary diversity rate of women in Odisha	111
Table 5.8	Dietary diversity rate of ST&SCT and Other caste women by occupation, level of education and MPCE Quintile in Odisha	112
Table 5.9	District-wise Status of Nutritional insecurity of children in Odisha	113
Table 5.10	Nutritional status of children (Under five years) in Odisha	113
Table 5.11	Determinants of Nutritional Status in Odisha	115

List of Figures

Number	Title	Page Number
3.1	District-Wise status of Food insecurity among households in Himachal Pradesh (in Percent)	74
4.1	District-Wise status of Food insecurity among households in Rajasthan (in Percent)	89
5.1	District-Wise status of Food insecurity among households in Odisha (in Percent)	103

List of Abbreviations

BMI	Body Mass Index
BPL	Below Poverty Line
DHS	Demographic and Health Surveys
FAO	Food and Agricultural Organization
FIES	Food Insecurity Experience Scale
GHI	Global Hunger Index
GOI	Government of India
IFAD	International Fund for Agricultural Development
MOHFW	Ministry of Health and Family Welfare
NFHS	National Family Health Survey
NHRC	National Human Rights Commission
NSSO	National Sample Survey office
OBC	Other Backward Castes
SC	Scheduled Castes
SD	Standard Deviation
SDG	Sustainable Development Goals
ST	Scheduled Tribes
UN	United Nations
UNICEF	United Nations International Children Emergency Fund
WDDS	Women Dietary Diversity Score
WFP	World Food Programme
WHO	World Health Organisation

Executive Summary

Food and nutritional insecurity at the household and intra-household level and malnutrition among children under five still need major policy focus for its glaring extent at the all-India level as well as at the state level. Uncomfortable levels of hunger or food insecurity coupled with high rates of malnutrition affects the overall productivity of the labour force which ultimately has a negative effect on economic growth and development. Further, high levels of food and nutritional insecurity puts the disadvantage sections of the society, the scheduled castes (SCs) and scheduled tribes (STs), at higher economic and health risks. Given the paramount importance of food and nutritional insecurity on the very life of people in general and SCs and STs in particular, the present report examines various aspects of these issues in three selected states, namely, Odisha, Rajasthan, and Himachal Pradesh; and India. To be precise, we have covered issues such as extent of food and nutritional insecurity, status of SCs and STs in the extent of food and nutritional insecurity, determinants of food and nutritional insecurity, dietary diversity among at the household level and among women, nutritional security of children under five, and relationship between food security, nutritional security, and dietary diversity. The present study is based on both primary ad secondary data. For secondary data, we have relied on unit level data of NFHS-3 (2005-060, NFHS-4 (2015-16), and recently published NFHS-5 (2019-21). The national family health survey (NFHS) is conducted by Indian Institute of Population Sciences under the aegis of the Ministry of Health and Family Welfare (MOHFW), Government of India. Our primary data were collected through a large-scale survey of SC, ST, and other households selected through multistage sampling method from Odisha, Rajasthan, and Himachal Pradesh. Total number of sample households for our study is 1000 out of which 400 households are from Odisha, 400 households are from Rajasthan, and the rest 200 households are from Himachal Pradesh. In our study, food security at the household level was measured by Food Insecurity Experience Scale (FIES) of FAO (2014). The extent of nutritional insecurity among under-5 children in each state is assessed by the percentage of children under separate indicators such as stunting, wasting, underweight, and anaemia. Intrahousehold consumption data with a recall period of 7 days was collected to calculate individual family member's dietary diversity score, in general and WDDS for women members. Logit regression models are used to examine the determinants of both food and nutritional insecurity.

There are two parts to the summary and findings of the report. One is the set of findings from the analysis of NFHS data from 2005-06 to 2019-21, covering a period of fifteen years. Second the set of findings from the analysis of primary data pertaining to the three sample states. First, we present the set of findings from the analysis of NFHS data.

At the all-India level, during 2015-16 and 2019-21, while the extent of stunting and underweight among children under five have experienced a significant decline, situation with regard to both wasting and anaemia has remained the same without any significant improvement. Higher incidences of malnutrition are found among the SCs and STs followed by OBCs. For example, in comparison the other castes, incidence of stunting was nearly 10 percentage points higher among SCs and STs than in 2019-21; and the incidence of underweight was higher by 13.2 percentage points among STs and 9.8 percentage points among SC in 2019-21. In Himachal Pradesh, we find lower incidences of malnutrition among children under than at all-India level. The state experienced a reduction in the prevalence of stunting, wasting, underweight and anaemia from 2005-06 to 2015-16; then taking a departure from the previous trend, there was an increase in incidence of stunting, wasting, underweight and anaemia among children in 2019-21. Comparatively, the prevalence of stunting, wasting and underweight were significantly higher among SCs and OBCs in the state. In Rajasthan, the nutritional status of children under five years (barring the case of anaemia) shows significant improvement over the studied period. The state, where incidences of malnutrition are higher in comparison to Himachal Pradesh, had a lower incidence of malnutrition than all India in 2005-06 and 2019-21. A significant share of improvement in nutritional status in the state came from a reduction in incidences of stunting, wasting and underweight among children from the deprived sections such as SCs and STs. The nutritional status of children in Odisha showed continuous improvement since 2005-06. In Odisha, the incidence of stunting decreased by 3.1 percentage points between 2005-06 and 2019-21; incidence of wasting came down from 19.5 percent in 2005-06 to 18.1 percent in 2019-21; parentage of underweight children decreased from 41 percent to 29.7 percent; but incidence of anaemia which had declined from 65.2 percent in 2005-06 to 44.6 percent in 2015-16, went up to 65.4 percent in 2019-21.

There seems to be some convergence, in the study period, among various socio-economic categories in terms of incidence of malnutrition in all three states. Although, the difference in

incidences of malnutrition has narrowed down across gender, caste groups, age groups, regions, and mother's education; the absolute extent of gap among various groups remained significant in Himachal Pradesh, Rajasthan, and Odisha.

In reference to the targets of reduction in anaemia among children under 5 years set under the Poshan Abhiyaan, all three states have performed badly in lowering the incidence of anaemia. More specifically, Odisha and Rajasthan performed worse than all India in terms of achieving the target. Himachal Pradesh is doing much better in this front. However, Rajasthan and Odisha have performed better in so far as achieving the set targets of reducing the incidence of stunting, wasting and underweight under the Poshan Abhiyaan. Himachal Pradesh, barring incidence of anaemia, was the worst performer of all inn reducing the level of malnutrition among under five children under the Poshan Abhiyaan.

Regression analysis suggests that factors such as wealth, caste, sanitation, mother's education, mother's health (BMI and height), and age of the child are influencing the incidence of stunting, wasting, underweight and anaemia. The coefficients for improved toilet (proxy for sanitation facilities) were significant only in the case of anaemia; wealth seems to be playing an important role in lowering incidence of malnutrition; and more important roles are being played by mother's education and health in combating malnutrition. Thus, our analysis shows caste, wealth of the household, and mother's characteristics (age, education, BMI and height) being important determinants of stunting, wasting, underweight and anaemia in the three states.

Now we turn to the findings from the analysis of primary data.

In Himachal Pradesh (HP), we selected district Sirmaur and district Chamba to represent SC households and ST households, respectively. Results from primary data analysis shows that extent of food extent of food security, in comparison to district Chamba, is higher in Sirmaur; meaning SCs in HP are having higher extent of food security than the STs at the household level. If the Other caste is included for the comparison, then it is found that taking the two districts together, only about 73 percent of the ST and SC households are food secure as compared to about 83 percent for the households belonging to other castes. While the other caste group in Chamba is more food secured as compared to all other categories in both the districts, it is the ST households in Chamba that constitute the least food secured group. In both the districts, it is the self-employed

category and others that have the higher share of food secured households relative to all other occupational categories. And extent of food insecurity is more than 48 percent and more than 33 percent for the households in the occupational categories of non-farm labour and agricultural labour, respectively in both the districts. Although, the ST and SC households fall largely in the category of high dietary diversity, these households are comparatively having lower dietary diversity as compared to other caste households. And the share of SC households in high dietary diversity is smaller in comparison to ST households. While all women (100 per cent) belonging to other caste have high dietary diversity, 97 percent of ST women (Chamba) and 92 percent of SC women (Sirmour) have high dietary diversity. The under five children belonging to other caste in both the districts are not facing any kin. However, compared to the SC district, the ST district has a larger share of stunted children. And, compared to the ST district, the SC district has a larger share of wasting, and underweight children. Overall, the SC children have a lower nutritional status as compared to ST children, particularly for wasting and underweight. Mother's education and wealth have positive impact on incidence of stunting, wasting and underweight in HP. Access to improved toilet and drinking water shows a positive impact on incidence of stunting, wasting and underweight. Although, the ST and SC households fall largely in the category of high dietary diversity, the percentage of these households in high dietary diversity is lower in comparison to other caste households. In so far as dietary diversity among women is concerned, all the women belonging to other castes have high dietary diversity, 97 percent of ST women (Chamba) and 92 percent of SC women (Sirmour) have high dietary diversity. When it comes to nutritional status of under-five children in Himachal Pradesh, the children belonging to other caste in both the districts are non-stunted, non-wasted, and non-underweight. But the ST district, in comparison to SC district, has a larger share of children who are stunted. However, the SC district has a larger share of wasting, and underweight children as compared to that of the ST district. Our analysis of covariates of under-five children's malnutrition shows that the children in older age group were less likely to be stunted, wasted or underweight. Mother's education and wealth has positive impact on incidence of stunting, wasting and underweight. Access to improved toilet and drinking water shows a positive impact on incidence of stunting, wasting and underweight. However, these relationships could not be confirmed from the regression analysis as the models were statistically insignificant.

Extent of food insecurity is very high in both the study districts of Rajasthan. To be precise, among the STs in Banswara, over 99 percent of the households are severely food insecure as compared to about 33 percent for the other caste. The corresponding shares for the SC households in Hanumangarh stand at nearly 66 percent and 48 percent respectively. Further analysis by taking ST and SC households together shows that the self-employed category has the lowest share (50 percent) of severely food insecure households and these households with businessman as main occupation are 100 per cent food secure households. For SC and ST households, the share of households having food security shows gradual increase with improvement in the level of education and income. The analysis suggests that COVID-19 pandemic is the major reason for the high food insecurity in Rajasthan. Since households also depend on their own produce and purchases from market for their dietary needs, the economic shocks caused by the pandemic increased the vulnerability. Lack of frequency in connectivity to the nearest market in Bansawara may also be playing a role by increasing their cost of acquiring food. In Rajasthan, most of the ST and SC households (66 percent) have medium dietary diversity, whereas most of the other caste households (80 percent) have high dietary diversity. Analysis of dietary diversity at the household level suggest that, for both Banswara and Hanumangarh districts, the share of households having high dietary diversity is larger for the other caste as compared to the corresponding shares among the STs and SCs. Half of the ST and SC households in the lowest dietary category of ST and SC households belong to the other labour occupation and the remaining half are the cultivators and unemployed households. Women in Rajasthan are performing much better on dietary diversity as not more than 1 per cent of women irrespective of their castes are falling under low dietary diversity. But in comparison to other caste, performance of ST women in the Banswara district is not better. Similarly, performance on dietary diversity parameter of SC women is not poorer in comparison to other caste women in the Hanumangarh district. In Rajasthan, women working as agricultural labour are doing relatively better on dietary diversity front as working in agricultural sector may have given them increasing access to diverse food. There is high incidence of stunting, wasting and underweight among under-five children belonging to SC and ST in comparison to that among other castes. SC & ST had 62.4 percent incidence of stunting compared to 22.22 percent for other castes. Incidence of wasting and underweight were also higher in Banswara. Incidence of stunting was higher among female in Banswara (67.5 percent compared to 55 percent in case of male) but lower in Hanumangarh (36.84 percent compared to 62.5 percent in case of male).

Incidence of underweight had the same pattern. But this trend got reversed for wasting. Among the determinants of malnutrition among under-five children, food insecurity seems to be increasing incidence of stunting, wasting and underweight. Mother's education and health (long height) had positive effect on nutritional status of children. Access to safe drinking water is associated with lowering of the incidence of malnutrition.

Extent of food security is much higher in Odisha as more than 83 per cent of households surveyed in both Sonepur (ST district) and Gajapati (SC district) are food secure. And the percentage of food insecure households were merely 5.5 percent. ST households experienced higher food security than Other castes in Sonepur district. In Gajapati, the food security was only slightly higher among Other castes (85 percent) than SC (82.5 percent). Overall, SC and ST households together are doing better in terms of food security in Odisha and had much lower share of households under severe food insecure than Other castes. For ST households in Odisha, food security is found to be higher among self-employed, cultivators and agricultural labour. In comparison, domestic help category was severely food insecure followed by non-agricultural labour and unemployed. The share of food secure housheolds among SC in the state was the lowest for domestic help, agricultural labour and other category of workers. For Other caste groups, the food security was lowest among cultivators followed by other non-farm labour. At the household level in Odisha, dietary diversity is low especially among SCs. Among the SCs, the high dietary diversity was found among just 37 percent of the households compared to 62.5 percent of other castes. In Sonepur, 61.9 percent of ST households had high dietary diversity compared to 95 percent for other castes. This trend at the household level is also observed for women. The dietary diversity is much higher among other castes women when compared to SC and ST women. When it comes to nutritional status of under-five of children, the share of stunted was high among ST, followed by SC and Other castes. Children of the other castes have just 12.5 percent incidence of stunting. Wasting was found to be highest among SC followed by other castes in Gajapati, whereas the surveyed households of the other castes in Sonepur had zero incidence of wasting. Incidence of wasting among SC was 10.53 percent. Incidence of underweight children was highest among ST, followed by SC with 38.46 percent. Other castes in Sonepur had zero incidence of underweight. Despite high food security at the household level, Odisha witnessed a high incidence of stunting, wasting and underweight. Therefore, Odisha which has achieved a lot in recent times on food security front may now have initiate and implement policies to tackle nutritional security.

Our logit regression results show a significant effect of food security, living in joint family, access to improved drinking water, and family size on stunting. However, these variables do not have significant coefficient for wasting and underweight.

Awareness about necessity of dietary diversity and policy steps to ensure dietary diversity will not only help in improving food security but also can check malnutrition. Mother's education is a significant determinant of malnourishment among children. Therefore, government and policy makers may try to check malnourishment by improving education of mothers. Policy focus on supplying adequate facilities to expected mother and mothers after delivery of child should not be lifted in any manner. Since wealth plays an important role as various quintiles of wealth are found to be significant determinants of malnourishment and quintile 1, in particular, has higher incidences of malnutrition; government and policy makers can tackle the problem of malnutrition by improving upon the wealth inequality situation. Although the recent Government policies have improved the sanitation facilities and access to safe drinking water, there is still lot to be done. Further improvement in these two fronts will be highly useful in improving nutritional status, in general, and among SCs and STs in particular.

Chapter 1: Introduction

1.1 Statement of the Issue

One of the most severe challenges that mankind has been facing since long back are hunger or food insecurity and nutritional insecurity of adults including women in the reproductive age and children under five years of age. The United Nations (UN) has set a target of zero hunger by 2030 under sustainable development goals (SDGs). Total population in the world facing hunger in the year 2021 stood between 702 and 828 million, which in percentage terms amounts to 8.9 and 10.5 per cent of the world population (FAO et al., 2022). And around 29.3 per cent (which amounts to roughly 2.3 billion) of world population were moderately or severely food insecure in the same year. Region-wise, in 2021, highest number of people facing hunger (one in 5 people) lived in Africa, followed by Asia (one in 10 people). India is also facing the challenge of hunger and malnutrition. As per global hunger index (GHI), level of hunger in India was serious in 2021 with a score of 27.5 and a rank of 101 out of 116 countries. Therefore, the World in general and India in particular have not been able to check the level of food insecurity and it has remained one of the important issues, to be solved, before the academia and policy makers.

Furthermore, prevalence of nutritional insecurity among children under 5 years of age evident from higher rates of low-birth-weight, stunting, wasting, and overweight or obese poses serious threat to the wellbeing of our future generation. If not checked, the affected children would have higher probability of lower physical and cognitive development, dying from common infections, getting affected from non-communicable diseases, poor nutrient absorption, and prolonged illness. It is also argued that if a mother or women in the reproductive age suffers from malnourishment then it kicks starts a cycle, whereby the mother gives birth to a malnourished child due to the higher probability of deficient nutrition in the child taking birth from a malnourished mother, and then this malnourished child, if not attended to by focused policy measures, will again be a malnourished mother and the cycle goes on (Correa et al., 2017; Sekhar et al., 2017). Prevalence of anaemia in the world and India among women in the reproductive age stood at 29.9 per cent and 53 per cent, respectively in 2019 which adversely may affect female morbidity, mortality, pregnancy and new-born outcomes.

Adult obesity in the world has shown an increasing trend in recent times. In India, in the year 2019-21, number of undernourished people stood at 224.3 million, number of stunted children stood at 36.1 million, and number of overweight children stood at 2.2 million. And the percentage of obesity in India's adult population has increased to over 4 per cent in recent times which suggest that, besides food insecurity, India is facing serious nutritional insecurity issues.

Uncomfortable levels of hunger or food insecurity coupled with high rates of malnutrition not only leaves an unhealthy labour force but also affects economic growth and development. It is often argued that these two problems limit the availability of human capital which is a key factor of economic growth. And it forces the government of the country having high levels of food and nutritional insecurity to invest more resources in the short run to provide social safety nets, conditional cash transfers, and providing rations at highly subsidised rate, and invest less on other productive activities. Therefore, that presence of food and nutritional insecurity hinders sustainable economic growth and development in any county, issue of food and nutritional insecurity particularly among socially disadvantaged sections of the society has remained one of the most important issues for academia and policy makers.

1.2 Food Insecurity, Malnutrition, and Disadvantaged Sections

Leibenstein (1957) through his efficiency wage hypothesis stated that workers in developing countries, due to low levels of nutrition, are physically incapable of doing hard manual labour. As a result, their productivity is low and they get low wages. This keeps their purchasing power at a low level which in turn gives them low levels of nutrition. This vicious cycle of deprivation continues and as these workers have low capability of improving their both physical and human capital, they will be trapped in what is called poverty-nutrition trap. Furthermore, Poverty is causally related to malnutrition as it affects households' consumption expenditure, dietary intake, method of cooking, access to clean water, access to medical care, and access to sanitary facilities. Analysing the consumption expenditure data, Borooah et al. (2014) found that Poverty among Scheduled castes (SC) and Scheduled tribes (ST) in India are comparatively higher than high-caste Hindu households. UNDP (United Nations Development Programme), in 2021, found that five out of six multidimensional poor people in India are from disadvantaged sections of the society, that is SCs or STs. It was also found in the report that poverty level was highest among ST (50.6%), followed by SC (33.3%), and OBC (27.2%). Combining the poverty-nutrition trap and higher poverty rate it would not be

wrong to expect higher levels of nutritional insecurity among SCs and STs in India. Pradhan et al. (2022), decomposed the Multidimensional Poverty Index (MPI) across its dimensions and indicators for all the social groups in India and found that STs are the most disadvantaged subgroup in India with remarkably high values of poverty headcount, poverty intensity and MPI, followed by SCs and OBCs; and others category is the most privileged category with low values of poverty headcount, poverty intensity and MPI. They found that states located in the central and eastern regions of India have the higher headcount, poverty intensity and MPI for all the social groups. Therefore, higher levels of food and nutritional insecurity puts the disadvantage sections of the society at higher economic and health risks compared to other sections belonging to upper caste. For instance, Bora et al. (2019) found in case of India that children belonging to the SC population experience higher mortality rates than children belonging to the non-SC/ST population from 1992 to 2016. Their analysis of district level mortality rates and regression analysis showed that children belonging to SCs experience the highest likelihood of dying before their fifth birthday. Sahu et al. (2015), analysing the national family health survey data of India, found that under-five mortality had declined in among rural Scheduled Tribes during 1992-2006 period. However, there was a significant poor-rich gap in mortality in India in the study period, that is poor children were have a high mortality rate compared rich children. Similarly, Ram et al. (2017) using data from two national surveys, found that children from the three lower caste groups (Dalits, Adivasis, and Other Backward Classes) were significantly more likely than forward-caste children to die young in India. In yet another study, Subramanian et al. (2006), using NFHS data of 26 states, investigated the contributions of gender, caste, and standard of living to inequalities in mortality across the life course in India. They found the mortality burden, across the life course in India, to be disproportionately falling on economically disadvantaged and lowercaste groups. Substantial caste differentials were observed at the beginning and end stages of life in India. The SCs and STs in India experience comparatively lower socioeconomic development indicators (GoI, 2012). More often than not, SCs and STs enjoy unwanted indicators like high poverty rate and inequality, lower literacy rate, low life expectancy, high child and adult mortality rates, higher maternal deaths, and lower rates antenatal and health care utilisation (Parikh, 1997; Borooah, 2005; Mitra & Singh, 2008; Van De Poel & Speybroek, 2009; Baru et al., 2010; Subramanian et al., 2006). The factors responsible for the presence of these negative attributes among children, women, and adults from SCs and STs are, inter alia, high rates of poverty, lower access to health care in, poor conditions of living without basic facilities, and poor diet due to lower purchasing power. Various country level

studies have established the fact that malnutrition is higher for poor and disadvantaged section of population.

1.3 Brief Review of Literature

There is a plethora of literature on food and nutritional insecurity at the world level and various country level including India. We have attempted here to present brief review of literature on different aspects of food and nutritional insecurity in India. First, association between poverty and malnutrition has been studied by many researchers (Panda et al., 2020; He et al., 2018; Spears et al., 2013; Ngure et al., 2014; Krasevec et al., 2017; Cumming & Cairneross, 2016; Varadharajan et al., 2013). Panda et al. (2020) found that undernutrition among children from poor households those excluded from Public Distribution System (PDS) is highest. They calculated those children from the excluded poor (poor with no access to PDS) households were 43% more likely to be stunted in India and 37% higher likelihood to be underweight in India. Among the states, Uttar Pradesh, Bihar, Jharkhand and Madhya Pradesh had a significantly higher likely of stunted children in excluded poor households. Varadharajan et al. (2013), in case of India, found coexistence between poverty and undernutrition. They also stated that poor dietary quality is associated with poor childhood growth, as well as significant micronutrient deficiencies. Food security was particularly vulnerable to changes in the economic scenario and to inequities in wealth distribution. Second, studies on the issue of double burden of malnutrition among women (Kamal et al., 2015; Kulkarni et al., 2017; Sengupta et al., 2014) revealed that India has one of the highest rates of underweight burden, with signs of rising obesity. Third, a number of studies on malnutrition among children (Atalah, 2014; Pal et al., 2017; Mondal et al., 2015; Singh et al., 2014) acknowledged that although it is less likely that children are to suffer from undernutrition, the prevalence of overweight and obesity have been accelerating among those residing in urban and sub-urban regions in India. Four, analysis of dual burden of malnutrition among women and children (Varghese & Aryeh, 2019; Kumar et al., 2021) revealed that prevalence of stunting and anaemia continue to remain high in many regions in India. And prevalence of overweight and obesity have increased in all age and socioeconomic groups. Dual burdens of anemia, stunting, and underweight are prevalent in India, in particular. Five, literature on individual specific issues such as childhood anaemia (Chandan & Kirby, 2021; Balgir, 2005; Suubramaiam & Girish, 2015) pointed out that anaemia is highly prevalent in all strata of populations in India, with established evidence of intergenerational anaemia. Balgir (2005) conducted a study on the pattern of spectrum of hemoglobinopathies in the state of Orissa and found that the heterogeneous population is harbouring almost all major hemoglobinopathies in general castes, scheduled castes and tribes, belonging to Coastal and South-Western regions of Orissa. Six, anaemia is a global health problem and women in reproductive age are amongst the most affected population (Tahkur et al., 2014; Correa et al., 2017; Dairo & Lawoyin, 2004; Elmardi et al., 2020; Mahajan et al., 2004). Anaemic women in the reproductive age birth weight and maternal mortality. Seven, undernutrition among under five children in India is a major public health problem. The child mortality rate due to undernutrition is still high in both urban and rural areas; and prevalence of wasting, stunting and underweight were more seen in an urban slum than a rural area in India (Murarkar et al., 2020).

1.4 Literature Gap

The review of above literatures revealed that not many studies have attempted to study food and nutritional insecurity among both women and children under 5 simultaneously using latest data set (NFHS-5). Recent release of NFHS-5 data set gives us an opportunity to examine the above-mentioned issues for policy formulations. Not many literatures have used primary survey data to examine food and nutritional security at the household level and individual level. Further, association of caste with these issues have not been broadly looked at one go. Analyses of secondary data on malnutrition among women and children have not been properly supplemented by the use and analysis of primary data in any major study. Examination of food and nutritional insecurity issues at all India level and a simultaneous supplementary study for its developed and underdeveloped states are not done till date. Last but not the least, study of these issues in three states governed by three different political parties is a rarity in the literature on food and nutritional security. Or study intends to fill these gaps in the literature. Following are the specific research questions framed for our study.

1.5 Research Questions

- 1. What is the extent of food insecurity at the household level and among women?
- 2. What is the extent of nutritional insecurity in sample states?
- 3. Which are the social and economic factors that determine food insecurity?
- 4. Which are the social and economic factors which explain the differences in the extent of nutritional insecurity?
- 5. Is there any difference in the experience of SC & ST households and general category households in so far as food and nutritional insecurities are concerned?
- 6. What is the highlighting point that comes out when we compare the food and nutritional insecurity and its determinants in selected underdeveloped states and developed state?
- 7. Are gender and occupation explaining the differences in the extent of both food and nutritional insecurity?
- 8. What is the extent of dietary diversity among women and among SC, ST, and ST households?
- 9. What is the association between dietary diversity and nutritional insecurity among women and children?

1.6 Research Objectives

- To measure the extent of food and nutritional insecurity in the selected states
- To document the differences in food and nutritional insecurity status of SC, ST, & general category households
- To find out the determinants of food insecurity
- To analyse the factors determining nutritional insecurity
- To examine the problems and challenges with the current programmes in place to check food and nutritional insecurity
- To provide policy suggestions to eradicate food and nutritional insecurity in the sample districts.

1.7 Data and Methodology

1.7.1 Sources of Data

The report has used both primary and secondary data. Secondary data used in the study mainly pertains to various rounds of national family health survey (NFHS) conducted by Indian Institute of Population Sciences under the aegis of the Ministry of Health and Family Welfare (MOHFW), Government of India. In particular, we have studied selected nutritional indicators of women and children, household level and individual level determinants of nutritional indicators, and other health indicators by analysing survey data from NFHS-3 (2005-060, NFHS-4 (2015-16), and recently published NFHS-5 (2019-21). These data sets have been downloaded from the website of Demographic and Health Surveys (DHS) Programme with their due approval. Besides, other secondary sources of data used in the study are National Sample Survey office (NSSO), Census of India, and Economic Survey of India. However, analyses of secondary data have been supplemented by use of survey data collected through a pre-tested schedule (given in *Appendix 1*) by trained and qualified field investigators. The survey was conducted in three states, namely, Odisha, Rajasthan, and Himachal Pradesh after scientific selection of sample households from scheduled caste, scheduled tribe, and other categories. Following is the sample design of the study.

1.7.2 Sample Design

Multistage sampling method was used to select the sample for our study. In the first stage, three states of India were selected purposively. Our aim was to select three such states of India whose economy is primarily agrarian, existence of sizeable percentage of SC and ST population, and prevailing signs of food and nutritional insecurity among women and children. On these criteria, we selected Odisha (an underdeveloped Eastern state), Rajasthan (an underdeveloped Northern state and the largest state of India in terms of area), and Himachal Pradesh (a developed Himalayan state) as our sample states. Our sample states are currently governed by three different political parties (Odisha, Rajasthan, and Himachal Pradesh have Biju Janata Dal government, Congress government, and Bharatiya Janata Party government, respectively). It would be thus important to know the approach of three different parties to tackle food and nutritional insecurity challenge in their respective states. With a developed agricultural sector, Himachal Pradesh is known for its crop diversification towards commercial cash crops and seasonal vegetables. However, agricultural sector of both Odisha and Rajasthan is neither developed nor commercial. Selection of these states also enabled us

to provide a comparative picture of extent and factors of food and nutritional insecurity on the basis of development status of their agricultural sector.

In the second stage, two districts, one for SC households and the other for ST households, from each of the three selected states were chosen on the basis of two criteria. First, an index was developed using such development indicators as literacy rate, infant mortality rate, and poverty rate to rank the districts in terms of development status. Then we filtered out worst performing districts (also called underdeveloped districts) and among the worst performing districts we selected the SC district (ST district) which has at least 25 per cent of SC population (ST population). Detailed methodology of the development index used for our purpose and the index scores of all the districts of three states are given in *Appendix-2*.

In the third stage, one block from the each of the selected districts was chosen. Here one block which had the highest percentage of SC households was chosen and in similar vein one block which had the highest percentage of ST households was chosen of ST district was selected. Block level share of SC & ST population were taken from census, 2011.

In the fourth stage, villages from each of the selected blocks were selected on the basis on share of SC population and ST population. And in the final stage of sample selection, household units were selected randomly.

Field survey in Odisha was conducted during December-January,2021-22; the same in Rajasthan was done during January-February, 2022; in Himachal Pradesh it was done in the months of March-April of 2022 after the end of its severe winter season.

1.7.3 Total Sample Size and Caste Category Wise Sample Households

Total number of sample households for our study is 1000 out of which 400 households are from Odisha, 400 households are from Rajasthan, and the rest 200 households are from Himachal Pradesh. Less number of households from Himachal Pradesh is selected as it has much lower population in comparison to Odisha and Rajasthan. Half of the total households from each state are from SC district and the other half from ST district. To make a better comparison of SC, ST, and other category of households, it is ensured that 20 per cent of sample households from both SC district and ST district are from other categories. That means 80 per cent of total sample households from SC district in case of all three states are from SC category and 80 per cent of total sample households from ST district in case of all three states of all three states are from ST category.

Following table gives state, district, and category-wise number of households selected in the sample.

			ock Village	Number of Households				
States	District	Block		SC	ST	Other Caste	Total	
	Calanati	D	Ramagiri	5	0	35	40	
	Gajapati	Ramagırı	Tabarsingh	35	0	0	35	
			Pendragumma	20	0	0	20	
			Panasadiha	40	0	5	45	
			Poipani	35	0	0	35	
ha			Sialiloti	25	0	0	25	
disl	Total Samples in Gajapati District				200			
Ő	Samanun	Dintro	Bhandar	0	22	19	41	
	Sonepur	Біпка	Chulimal	0	46	4	50	
			Kulpada	0	29	2	31	
			Seledi	0	63	15	78	
	Total Samples in Sonepur District					200		
	Total Sample in (Odisha				400		
	Hanumangarh	Tibbi	Masani	160	0	40	200	
	Total Samples in Hanumangarh			200				
an		Kushalgar	Ghatiya	0	61	0	61	
sth	Banswara		Aghoriya	0	68	0	68	
aja			Bhoori Ghati	0	31	0	31	
R			Sajjangarh	0	0	40	40	
	Total Samples in Banswara			200				
	Total Sample in Rajasthan					400		
		Rajgarh	Phagu	40	0	9	49	
	Sirmaur Rajg		Dhang	7	0	6	13	
			Dahor	14	0	2	16	
sh			Koti	6	0	1	7	
ide			Ser	13	0	2	15	
Pra	Total Samples in	Sirmaur		100				
ıal			Phindpaar	0	20	2	22	
acł	Chamba Pang		Findroo	0	22	7	29	
Hima		Pangi	Parmaar	0	4	3	7	
			Seri	0	16	1	17	
			Guwari	0	18	7	25	
	Total Samples in	Chamba				100		
	Total Sample in Himachal Pradesh			I	200			
Total Samples in these three states			400	400	200	1000		

Table 1.1 State, District, Block, and Village-wise Distribution of Sample Households

1.8 Definition of Variables Used in the Study

The definitions of variables used in the study to analyse food security, nutritional security, and dietary diversity at the household level and individual level are primarily in sync with the definitions of Food and Agricultural Organisation (FAO). Food security at the household level was measured by Food Insecurity Experience Scale (FIES) which was introduced by FAO in 2014.

The household is categorised as food secure when all the members of it have adequate access, in the recall period, to food in both quality and quantity. The household is categorised as moderately food insecure when one or more members of it have faced uncertainties, in the recall period, about their ability to obtain food, and had been forced to compromise on the quality and/or quantity of the food they consume. The household is categorised as severely food insecure when one or more members of it, in the recall period, had run out of food and, at worst, gone a day (or days) without eating. Details about FIES scale construction and its categories are given in Appendix-3.

Nutritional status of children under 5 years of age is examined percentage of children falling in the category of stunting, wasting, underweight, overweight or obese. Following are the definitions used for each of these nutritional indicators.

Stunting:

Children whose height-for-age z-score is below minus 3 (-3.0) standard deviations (SD) below the mean on the WHO child growth standards are categorised as severely stunted. Children whose height-for-age z-score is below minus 2 (-2.0) standard deviations (SD) below the mean on the WHO child growth standards are categorised as moderately stunted.

Wasting:

Children whose weight-for-height z-score is below minus 3 (-3.0) standard deviations (SD) below the mean on the WHO child growth Standards are categorised as severely wasted. And Children whose weight-for-height z-score is below minus 2 (-2.0) standard deviations (SD) below the mean on the WHO child growth standards are categorised as moderately wasted.

Underweight:

Children whose weight-for-height z-score is below minus 3 (-3.0) standard deviations (SD) below the mean on the WHO child growth are categorised as severely underweight. And Children whose weight-for-age z-score is below minus 2 (-2.0) standard deviations (SD) below the mean on the WHO child growth are categorised as moderately underweight.

Overweight or Obese:

Children whose weight-for-height z-score is below plus 2 (2.0) standard deviations (SD) below the mean on the WHO child growth are categorised as overweight.

1.9 Women Dietary Diversity Score (WDDS)

Intra-household consumption data with a recall period of 7 days was collected to calculate individual family member's dietary diversity score, in general and WDDS for women members, in particular for the purpose of analysis of household's food access and food consumption. Individual consumption items on which data were collected through the schedule were further categorised in to 9 food groups. Individuals who consumed any items from less than or equal to 3 food groups (Cereals; Green leafy vegetables; and Vitamin A rich fruits) were placed under lowest dietary diversity category. Similarly, Individuals who consumed any items from 4 or 5 food groups (Cereals; Green leafy vegetables; Vitamin A rich fruits; and Oil) were placed under medium dietary diversity category. And finally, Individuals who consumed any items from more than or equal to 6 food groups (Cereals; Sigreen leafy vegetables; Vitamin A rich fruits; Oil; Other vegetables; Fish; and Legumes, Nuts, and seeds) were placed under high dietary diversity category. Following table gives the 9 food groups and their respective food items.

1.10 Methods

The extent of nutritional insecurity among under-5 children in each state is assessed by the percentage of children under separate indicators such as stunting, wasting, underweight, and anaemia. Various cofactors of each of the above nutritional indicators have been analysed by constructing a two-way table in which row variables are various cofactors and column variables are nutritional indicators of under-5 children. Chi-square test has been applied to find out the statistical significance of association between selected cofactors (such as sex of the child, age groups, social groups, place of residence, mother's education, wealth quintile,

method of cooking, toilet type, ownership of agricultural land, and possession of BPL card) and stunting, wasting, underweight, and anaemia. Further, determinants of each of these nutritional indicators of under-5 children in each state have been examined by calculating separate logit regression models for the years 2005-06, 2015-16, and 2019-21. Monthly per capita consumption expenditure (MPCE) is calculated from the data collected in the section-2 table of the schedule where household level quantity consumed data is collected for different items in the last 30 days from the date of survey. Total quantity consumed of different items are multiplied by their market price to arrive at item-wise total value of consumption. Then by adding these total values, we got total household consumption expenditure. Division of total household consumption expenditure by household size gives the MPCE. In some cases/questions in our schedule respondents had opted to not give any response which are treated as missing values in our analysis. The missing values are excluded from the concerned calculations and therefore, its influence is none on average values, frequencies, and other statistical measures.

1.11 Scheme of Chapterization

The report consists of 7 chapters, including this introduction chapter. Analysis of secondary data pertaining to nutritional status of children; nutritional programs, targets and achievements; socio-Economic indicators and nutritional status of children; and determinants of nutritional status of children has been done in Chapter 2. These analysis covers all India and our sample states. Chapter 3 to 5 presents the results from the analysis of survey data on food security and nutritional status among SC and ST. To be exact, food security and nutritional status among SC and ST in Himachal Pradesh are dealt with in Chapter 3; Chapter-4 presents nutritional status among SC and ST in Rajasthan; and nutritional status among SC and ST in Odisha are given in Chapter-5. While chapter-6 gives the conclusion of the report, last chapter discusses some important policy implications of the study.

1.12 References

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Chapter 2: Nutritional Status of Children

Nutritional status of children under 5 years is one the important indicators of development. Since nutritional deficiencies among children continue to affect them even in adulthood, higher malnutrition among children not only represent a lower development level but also has adverse implications for the future. National Family Health Survey (NFHS) provides detailed data on nutritional status of children allowing us to examine progress over time. We use the third (NFHS-3), fourth (NFHS-4) and fifth (NFHS-5) rounds of the survey for our analysis. These surveys were conducted during 2005-06, 2015-16 to 2019-21, thus, covering nearly 15 years. The analysis includes studying changes in nutritional levels and examining cofactors and determinants of nutritional levels in the states of Himachal Pradesh, Rajasthan and Odisha. The chapter includes a discussion of all India nutritional status of children for comparison. While the focus of the study is to analyse the determinants for the caste groups, other socio-economic indicators are taken as controls.

2.1 Nutritional Status of Children

2.1.1 All India

The data shows an improvement in nutritional status of children from 2005-06 to 2019-21 (Table 2.1). However, there is a noteworthy difference among various indicators of malnutrition. Improvement is steady and much higher in case of stunting and underweight compared to wasting and anaemia. Stunting among children reduced from 48 percent in 2005-06 to 35.5 percent in 2019-21. Incidence of underweight declined from 42.5 percent to 32.1 percent during the same period. In both cases, there was more than a 10 percentage points decline in the incidence. In comparison, the incidence of wasting and anaemia observed a decline of merely 0.5 and 1.4 percentage points during this period. If we consider period between 2015-16 and 2019-21, both wasting and anaemia show deterioration of the situation. In the case of anaemia, the incidence went up from 58.5 percent to 68.1 percent, an increase of nearly 10 percentage points. This reversing of the trend is a worrying sign.

	5	Stunting	5	· ·	Wasting	[Un	derweig	ght	A	Anaemia	à
Background Variables	NFH S-3	NFH S-4	NF HS- 5									
Male	48.1	38.9	36.2	20.5	21.9	20.0	41.9	36.1	32.9	69.0	58.4	68.0
Female	48.0	37.9	34.6	19.1	20.1	18.5	43.1	35.3	31.2	69.9	58.7	68.1
Age Group of Child												
0 to 5 Months	20.4	20.1	24.4	30.3	31.9	27.0	29.5	26.7	28.6	NE	NE	NE
6 to 11 Months	28.7	23.0	24.7	29.1	27.7	23.2	35.6	28.8	26.3	80.6	68.5	77.7
12 to 23 Months	52.4	42.6	39.8	22.8	22.0	19.7	43.1	35.1	31.1	83.0	70.6	79.7
24 to 35 Months	55.9	42.7	38.1	16.7	19.1	18.7	44.9	37.6	33.7	74.6	62.3	71.4
36 to 56 Months	52.3	41.6	37.3	15.6	17.8	16.7	45.2	38.6	34.2	58.0	48.6	58.6
				So	cial Gro	oups						
Scheduled Caste	53.9	42.8	39.2	21.2	21.2	19.7	48.0	39.1	35.1	72.3	60.6	70.3
Scheduled Tribe	53.6	43.8	40.9	27.7	27.4	23.2	54.7	45.3	39.5	76.9	63.3	73.9
Other Backward Caste	48.9	38.7	34.8	20.0	20.5	18.9	43.1	35.5	31.2	70.2	58.6	66.1
Other Caste	40.4	30.7	29.6	16.2	19.1	17.1	33.3	28.7	26.3	64.0	54.8	66.5
				Place	e of Res	idence						
Urban	39.6	31.0	30.1	16.9	20.0	18.5	32.7	29.1	27.3	63.0	56.0	64.8
Rural	50.7	41.2	37.3	20.7	21.4	19.5	45.6	38.3	33.8	71.5	59.5	69.2
				Moth	er's Edu	ucation						
Illiterate	57.2	50.8	46.3	22.7	22.7	21.5	52.0	46.8	42.1	74.5	64.9	72.7
Primary	48.5	43.5	41.6	19.8	21.4	19.9	42.5	40.2	37.1	69.3	60.6	70.4
Secondary	38.0	32.8	33.3	16.4	20.6	18.9	32.0	31.0	30.2	64.3	55.7	67.4
Higher Secondamy &	10.4	20.0	22.0	12.0	17.0	16.9	15.0	18.0	20.0	52.7	40.6	61.7
above	19.4	20.9	23.0	13.0	17.9	10.8	13.8	10.9	20.9	55.7	49.0	01./
Total	48.0	38.4	35.5	19.8	21.0	19.3	42.5	35.7	32.1	69.5	58.5	68.1

Table 2.1 Nutritional Status of Children (under 5 years) in India

Note: 1. NE- not estimated. Anaemia is estimated for 6 months to 59 months; 2. NFHS-3, NFHS-4 and NFHS-5 were conducted in 2005-06, 2015-16 and 2019-21, respectively Source: Authors estimation using NFHS 3,4 and 5 data

The results show a much higher incidence of malnutrition among SC and ST followed by OBC in all years. Incidence of stunting was nearly 10 percentage points higher among SC and ST than Other castes in 2019-21. Similarly, the incidence of underweight was higher by 13.2 percentage points among ST and 9.8 percentage points among SC in 2019-21. While the difference was relatively smaller for wasting and anaemia, it remained stable over years. One silver lining is that there is an improvement in nutritional levels across caste groups. Stunting among SC and ST declined from more than 53 percent in 2005-06 to around 40 percent in 2019-21. During the same period, the incidence of underweight among SC and ST came down by 12.9 and 15.2 percentage points. Both SC and ST show small but continuous improvement in terms of lowering the incidence of wasting.

2.1.2 Himachal Pradesh

Data on the nutritional status of children (under 5 years) show a lower incidence of malnutrition in Himachal Pradesh compared to all India figures (Table 2.2). The reduction in the incidence of malnutrition was also higher for Himachal Pradesh than all India. Himachal Pradesh experienced a reduction in the prevalence of stunting, wasting, underweight and anaemia in Himachal Pradesh from 2005-06 to 2015-16. However, the situation deteriorated thereafter. Data show an increase in incidence of stunting, wasting and underweight fell by more than 12 percentage points between 2005-06 and 2015-16, the same increased by nearly four percentage points in 2019-21. Similarly, the share of children with anaemia had shown an improvement of one percentage point in 2015-16 and further increased by two percentage points by 2019-21.

Deelegnound	S	Stunting	5	· ·	Wasting	Ş	I	J nderw	eight		Anaen	nia
Variables	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH
	S-3	S-4	S-5	S-3	S-4	S-5	S-3	S-4	S-5	S-3	S-4	S-5
	1				Gende	er						
Male	41.1	27.7	33.1	18.9	13.9	17.7	37.3	21.8	26.2	53.3	51.9	54.5
Female	35.9	24.7	28.2	19.7	13.5	17.0	35.7	20.6	24.7	56.2	55.7	55.9
Age Group of Child												
0 to 5 Months	19.6	9.9	27.9	20.6	24.5	26.1	16.2	17.1	27.6	NE	NE	NE
6 to 11 Months	18.3	12.2	24.7	30.4	19.5	11.7	34.8	17.0	19.1	61.0	57.8	73.6
12 to 23 Months	37.6	28.2	34.0	16.6	12.5	17.0	30.4	18.7	22.6	68.6	64.9	68.3
24 to 35 Months	44.9	25.3	26.5	16.7	12.7	16.5	35.9	21.1	22.5	56.3	60.4	55.9
36 to 56 Months	45.1	31.9	33.4	18.8	11.6	18.1	44.5	24.2	29.8	46.1	44.1	42.6
Social Group												
Scheduled Caste	51.0	33.8	32.5	20.1	15.8	16.2	45.4	25.5	26.6	53.1	55.2	54.1
Scheduled Tribe	37.7	22.3	31.3	8.5	15.0	15.0	29.2	20.3	20.3	63.7	67.0	60.9
Other Backward Caste	51.8	22.3	31.6	24.6	15.2	24.5	55.1	20.1	34.1	64.0	45.3	60.1
Other Caste	29.4	23.9	29.5	18.5	12.0	16.2	28.0	19.6	22.9	51.9	53.7	53.6
				Plac	e of Re	sidence						
Rural	39.8	26.7	31.3	19.7	13.3	17.6	37.8	21.5	25.6	55.6	53.3	54.9
Urban	27.1	21.4	27.0	15.3	19.1	16.2	23.6	17.1	24.6	45.7	58.7	56.9
				Moth	ner's Ed	ucation	1					
Illiterate	57.8	33.9	48.7	20.1	18.9	11.3	55.1	30.7	35.5	55.0	58.6	51.7
Primary	50.2	29.3	35.9	24.4	11.3	25.5	44.3	23.4	31.7	63.2	57.4	53.7
Secondary	34.9	28.5	32.9	19.4	14.1	18.3	33.4	22.5	27.4	54.5	53.8	56.4
Higher Secondary and above	12.5	15.2	21.9	12.1	13.1	14.0	16.1	14.0	17.8	44.1	50.4	53.2

Table 2.2 Nutritional Status of Children (under 5 years) in Himachal Pradesh

Total	38.4	26.2	30.8	19.5	13.9	17.4	36.6	21.3	25.5	54.9	53.7	55.2

Note: 1. NE- not estimated. Anaemia is estimated for 6 months to 59 months; 2. NFHS-3, NFHS-4 and NFHS-5 were conducted in 2005-06, 2015-16 and 2019-21, respectively Source: Authors estimation using unit level data of NFHS 3, 4 and 5.

The trends at the disaggregate level mostly conform to the aggregate movements. The period from 2005-06 to 2015-16 witnessed a decline in incidence of stunting, wasting, underweight and anaemia across all socio-economic categories whereas the latter period saw an increase of incidence in all indicators of malnutrition. Also, there is some narrowing down in the gap among various socio-economic categories. For example, there was a gap of more than 21 percentage points between SC and Others caste groups in 2005-06 which narrowed down to three percentage points. A similar tendency could be found for other indicators of malnutrition too. Nonetheless, there are significant differences in the incidence of malnutrition across socio-economic categories.

The prevalence of stunting, wasting and underweight were significantly higher among SC and OBC. Mother's education has a strong association with the reduction of malnutrition across all categories. Urban areas are largely doing better in terms of share of children with stunting and underweight. Likelihood of stunting and wasting seems to be increasing with age too. The results for wasting and anaemia did not show any clear association with age and the area of residence.

Also, some of the groups suggest deterioration in their condition over the period under consideration. Children in the age group 0 to 5 months witnessed a rise in incidence of wasting in 20015-16 and 2019-21. Children belonging to Scheduled Tribe (ST) and with higher secondary and above educated mothers too saw an increase in incidence of wasting in 2015-16 and remained constant in 2019-21. Urban areas witnessed an increased incidence of wasting and anaemia in 2015-16. However, the trend reversed in 2019-21. Urban areas saw a reduction in incidence of wasting and anaemia whereas rural areas witnessed a rise in the incidence.

2.1.3 Rajasthan

Rajasthan, despite lagging in many growth and development indicators, is doing surprisingly better in terms of nutritional status of children than all India (Table 2.3). While it is behind Himachal Pradesh, it had a lower incidence of malnutrition than all India in 2005-06 and 2019-21. A major reason for the better performance is the lower incidence of malnutrition

among SC and ST in Rajasthan compared to all India. Nonetheless, it was performing worse in 2015-16, even though SC and ST in Rajasthan continue to do better. The nutritional status of children under five years (barring the case of anaemia) shows significant improvement over the studied period (Table 2.3). The incidence of stunting reduced from 44.1 percent in 2005-06 to 39.2 percent in 2015-16 which came further down to 31.8 percent in 2019-21. Similarly, the incidence of wasting came down from 20.5 percent in 2005-06 to 16.8 percent in 2019-21. During the same period, the incidence of underweight declined from 40.2 percent to 27.6 percent. However, anaemia shows a rising trend in the recent survey. While the percentage of children with anaemia was reduced from 70.3 to 60.4 percent between 2005-06 and 2015-16, it again went up to 71.5 percent in 2019-21. Deterioration of the situation in terms of higher incidences of anaemia is visible in all age groups. In the age group of 36 to 56 months, the incidence of anaemia is even more than those observed in 2005-06. The rise in the incidence of anaemia was also observed among male and female children and across caste groups.

Background		Stunting	g		Wasting	3	U	nderwei	ight		Anaemia		
Variables	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	
	S-3	S-4	S-5	S-3	S-4	S-5	S-3	S-4	S-5	S-3	S-4	S-5	
Male	44.3	40.6	33.4	20.8	24.2	18.1	40.3	38.2	29.5	69.9	60.3	70.8	
Female	43.1	37.4	30.0	20.1	21.6	15.3	39.5	35.0	25.5	69.3	60.3	72.2	
				By Ag	e Grouj	p of Chi	ild						
0 to 5 Months	17.2	22.6	30.3	24.5	30.8	21.8	21.2	28.0	32.4	NA	NA	NA	
6 to 11 Months	23.0	24.8	22.7	26.5	27.6	17.0	29.7	30.6	23.5	80.7	64.9	78.4	
12 to 23 Months	49.4	42.7	32.8	23.8	22.5	17.9	41.7	33.7	25.0	81.8	70.3	80.0	
24 to 35 Months	50.5	41.6	30.6	18.5	21.9	17.0	43.1	39.4	26.5	75.4	64.8	74.6	
36 to 56 Months	49.1	43.1	34.2	17.4	21.0	14.7	44.6	40.1	28.8	58.9	52.2	64.8	
				By	Social (Groups							
Scheduled Caste	48.6	43.3	33.7	21.9	22.4	17.7	45.2	39.3	30.2	70.6	58.6	72.3	
Scheduled Tribe	48.6	49.3	35.4	27.6	31.3	18.7	46.6	52.1	31.9	73.7	74.0	75.5	
Other Backward Caste	42.5	36.2	31.1	16.2	21.2	16.0	36.5	33.0	25.6	68.8	57.6	69.8	
Other Caste	36.9	31.7	27.7	23.8	20.7	15.4	37.1	28.8	25.3	67.2	56.3	71.2	
				By Pl	ace of F	Residen	ce		· · · · · ·				
Urban	33.9	33.0	28.3	20.8	21.6	18.3	30.1	30.7	25.4	62.9	55.7	68.4	
Rural	46.3	40.8	32.6	20.3	23.4	16.4	42.5	38.3	28.1	71.4	61.6	72.2	
				By Mo	ther's l	Educati	on						
Illiterate	49.6	46.0	35.5	21.4	26.8	17.2	46.4	44.8	30.4	71.7	63.5	73.1	
Primary	36.0	40.3	35.2	19.8	21.7	17.6	29.3	37.6	32.4	72.1	60.4	72.0	
Secondary	31.9	33.7	30.7	18.0	20.3	16.6	25.5	30.0	26.5	67.6	58.6	70.9	
Higher													
Secondary and	14.8	23.7	23.1	13.5	17.6	15.5	17.5	19.8	19.2	47.0	51.2	68.7	
above													
Total	44.1	39.2	31.8	20.5	23.1	16.8	40.2	36.7	27.6	70.3	60.4	71.5	

Table 2.3 Nutritional Status of Children (under 5 years) in Rajasthan

Note: 1. NE- not estimated. Anaemia is estimated for 6 months to 59 months; 2. NFHS-3, NFHS-4 and NFHS-5 were conducted in 2005-06, 2015-16 and 2019-21, respectively

Source: Authors estimation using unit level data of NFHS 3, 4 and 5.

A significant share of improvement in nutritional status came from a reduction in incidences of stunting, wasting and underweight among children from the deprived sections. Children belonging to SC experienced a nearly 15 percentage point drop in incidences of stunting from 2005-06 to 2019-20. During the same period, stunting of children declined by 13 percentage points among ST, 11 percentage points among OBC, and nine percent among other caste groups. A similar trend is observable for underweight as well. While the incidence of wasting witnessed an increase among SC, ST and OBC in 2015-16, it saw a substantial improvement in 2019-21. Similarly, male and female children and children residing in urban and rural areas saw a decline in incidences of stunting, wasting and underweight during the studied period.

However, one surprising trend witnessed was for the children with educated mothers. Mothers with higher secondary or above degree witnessed a rise in the incidence of stunting, wasting and underweight during the studied period. Stunting among children with higher secondary or above educated mother increased from 14.8 percent in 2005-06 to 24.1 percent in 2019-20. Incidence of wasting and underweight in this group increased by nearly two percentage points in this group and the percentage of children with anaemia by nearly 22 percentage points.

Despite the improvement among all sections, the pattern of malnutrition remained the same over the years. The incidence of stunting, wasting, underweight and anaemia remained high among SC and ST categories. In 2019-21, the incidences of stunting among SC and ST were 33.7 percent and 35.4 percent, respectively. The comparable number for other caste groups was 27.7 percent. Incidence of underweight among SC and ST was higher by five and six percentage points compared to the children from the affluent caste groups. Incidence of wasting was also higher among SC and ST by two and three percentage points than the other castes. Among all caste groups, ST children had the worst outcome in all indicators during the studied period.

Mother's education is strongly associated with better nutrition status of the children. There is a clear pattern of lowering of incidence of stunting, wasting, underweight and anaemia among children with an increase in educational attainments of mothers. Children of illiterate mothers had the highest incidence of malnutrition. This pattern is observed in each of the studied period. Mothers with higher secondary and above education, despite the worsening nutritional status of their children, continue to do better than the less educated mothers. Similar to the pattern observed for Himachal Pradesh, female children seem to be doing better barring the incidence of anaemia. The problem of stunting, wasting and underweight is also less prevalent among younger children.

Nonetheless, there seems to be a narrowing down of the difference in the incidences of malnutrition among various groups. For example, the difference in incidence of stunting between the ST and Others caste group came down from 11.7 percentage points in 2005-06 to 7.7 percentage points in 2019-21. The difference in incidence of wasting and underweight between the two case groups decreased from 3.8 to 3.3 percentage points and 9.5 to 6.6 percentage points, respectively. The narrowing of gap in malnutrition is also observed when the incidence of malnutrition is examined by the mother's education or age group of children. The narrowing of the difference is a positive sign and could be the result of schemes of the government and non-government agencies to solve the problem of malnutrition among children. Even though the narrowing of the gap among socio-economic groups in terms of incidence of malnutrition is a positive sign, the gap has remained significant. Also, an increase in incidence of anaemia in all categories and a worsening of incidence of malnutrition for some categories (such as children of higher secondary and above educated mothers) raise concern regarding the sustainability of these improvements.

2.1.4 Odisha

Odisha has also performed better than all India on all indicators of malnutrition in all years under study (Table 2.4). Odisha had lowered level of malnutrition in 2015-16 too. However, Odisha's better performance is large due to a relatively lower incidence of malnutrition among affluent sections. SC and ST in Odisha had a higher incidence of malnutrition compared to all India. A higher incidence of malnutrition among SC and ST despite having an overall lower incidence compared to all India means a larger gap between deprived and affluent sections in Odisha.

The nutritional status of children in Odisha showed continuous improvement since 2005-06 (Table 2.4). Incidence of stunting was lower by 11 percentage points in 2015-16 compared to the level in 2005-06. The incidence of stunting further decreased by 3.1 percentage points in 2019-21. Incidence of wasting came down from 19.5 percent in 2005-06 to 18.1 percent in 2019-21. During the same period, the share of underweight children decreased from 41 percent to 29.7 percent. However, incidence of anaemia showed a trend similar to the one found in Himachal Pradesh and Rajasthan. Incidence of anaemia reduced from 65.2 percent in 2005-06 to 44.6 percent in 2015-16 but it again went up to 65.4 percent in 2019-21. It is a

matter of concern that three states showed an increased incidence of anaemia despite improvement in other indicators of malnutrition.

		Stunting	σ		Wasting	τ	U	nderwei	ight		Anaemi	ล
Background	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH	NFH
Variables	S-3	S-4	S-5	S-3	S-4	S-5	S-3	S-4	S-5	S-3	S-4	S-5
			F	By Geno	ler Gro	up of C	hild					
Male	43.6	34.2	30.1	20.6	21.4	18.4	39.4	34.8	28.0	63.5	44.0	64.8
Female	46.4	34.0	32.0	18.5	19.2	17.7	41.9	34.0	31.5	66.6	45.1	66.0
By Age Group of Child												
0 to 5 Months	25.9	25.7	23.7	28.3	30.5	27.5	35.9	29.0	28.3	NE	NE	NE
6 to 11 Months	31.6	20.4	23.4	25.6	28.6	21.5	33.3	27.9	22.3	82.1	61.7	77.9
12 to 23 Months	50.6	38.6	37.4	24.6	21.3	19.4	41.3	33.9	30.5	79.7	53.9	74.6
24 to 35 Months	52.8	36.1	34.8	19.6	18.9	16.7	42.4	34.7	30.0	64.6	44.3	69.6
36 to 56 Months	46.1	35.8	29.8	13.5	16.8	15.1	42.4	37.0	31.3	54.1	36.5	56.0
By Social Groups												
Scheduled Caste	49.6	37.3	33.8	20.1	20.1	21.7	44.4	35.3	33.2	63.2	46.5	68.6
Scheduled Tribe	57.1	45.5	42.9	27.3	27.8	22.7	54.0	48.5	42.1	80.6	58.4	73.2
Other Backward Caste	42.0	29.9	25.0	17.6	18.6	13.8	38.6	29.7	22.6	57.3	40.8	61.3
Other Caste	32.3	20.4	16.8	14.0	12.9	13.3	26.6	20.0	16.4	59.1	27.9	53.9
				By Pl	ace of F	Residen	ce					
Urban	34.9	27.2	24.9	13.4	17.0	14.9	29.7	26.2	21.5	53.9	38.1	57.4
Rural	46.5	35.3	32.0	20.5	20.9	18.6	42.3	35.8	31.0	66.6	45.7	66.6
				By Mo	ther's l	Educati	on					
Illiterate	57.3	47.1	47.7	23.0	26.7	21.6	50.6	48.2	45.5	71.3	57.2	72.4
Primary	48.3	37.2	35.6	21.1	21.5	20.5	43.7	39.6	35.5	65.7	45.6	70.0
Secondary	28.9	27.9	26.4	14.2	17.4	17.0	28.6	27.3	25.2	57.1	38.6	63.0
Higher												
Secondary and above	9.2	16.7	14.6	12.8	13.8	13.3	7.0	15.1	13.0	46.7	30.8	54.8
Total	45.1	34.1	31.0	19.5	20.4	18.1	41.0	34.3	29.7	65.2	44.6	65.4

Table 2.4 Nutritional Status of Children (under 5 years) in Odisha

Note: 1. NE- not estimated. Anaemia is estimated for 6 months to 59 months; 2. NFHS-3, NFHS-4 and NFHS-5 were conducted in 2005-06, 2015-16 and 2019-21, respectively

Source: Authors estimation using unit level data of NFHS 3, 4 and 5.

Incidence of malnutrition in Odisha also shows a relationship with socio-economic indicators. Female children had a higher prevalence of stunting, underweight and anaemia, but had a lower incidence of wasting. The children in the older age group experienced an increased incidence of stunting and underweight. However, the pattern reversed for wasting and anaemia with the younger group more likely to be affected by the two. Similar to Rajasthan, ST children had the highest incidence of stunting, wasting, underweight and anaemia followed by the children belonging to SC and OBC households. Education of the mother is playing an important role in the incidence of malnutrition in Odisha too. Incidence of stunting among children of mother with higher secondary and above education was less by 33.1 percentage points than children of illiterate mothers in 2019-21. The similar difference in the

case of wasting, underweight and anaemia was 8.3 percentage points, 32.5 percentage points and 17.6 percentage points, respectively.

Similar to the situation in Himachal Pradesh and Rajasthan, there seems to be some convergence among various socio-economic categories in terms of incidence of malnutrition. The difference in incidence of malnutrition has narrowed down across gender, caste groups, age groups, regions, and mother's education. However, the gap among various groups remained significant. For example, the difference in incidence of stunting between ST and Other caste groups was 16.1 percentage points in 2019-21. Though it was less than the difference of 24.8 percentage points in 2005-06, it is still high. In fact, incidence of stunting among ST children (42.9 percent) in 2019-21 was higher than the incidence of stunting among the affluent caste group (32.3 percent) in 2015-16. It shows that children of the affluent castes enjoyed much better nutritional status in 2005-06 than ST or SC had 15 years latter (during 2019-21).

2.2 Nutritional Programs, Targets and Achievements

All three states have various schemes aiming to improve nutritional level among children and mothers. Table 2.6 provides brief details of various programs, their objectives and target population. The majority of the programs are sponsored by the state governments and the central government, either wholly or on a cost-sharing basis. These programs aim to bring down malnutritional levels to zero by 2030 and achieve internationally agreed targets of nutrition by 2025. One of the significant programs to end malnutrition among children is Poshan Abhiyaan with clear targets to be achieved. Since Poshan Abhiyaan is implemented in all states under study, its targets can be used to check and compare the progress of the states. The malnutrition level in 2016 in a state is the baseline for evaluating progress under the Poshan Abhiyaan.

Table 2.5 gives the targets of Poshan Abhiyaan in terms of reduction in malnutrition among children under 5 years. All three states have performed badly in lowering the incidence of anaemia. Odisha and Rajasthan performed worse than all India in terms of achieving the target. While India is off the targeted incidence of anaemia by 21.6 percentage points. It is 32.8 and 23.1 percent for Odisha and Rajasthan, respectively. the performance at all India level is All states are far from achieving the targets. Himachal Pradesh with a difference of 13.5 percentage points is doing much better. However, Rajasthan and Odisha have performed

better in reducing the incidence of stunting, wasting and underweight. Rajasthan with the smallest difference in actual and targets is the best performer of the three. The difference between actual and target stunting and wasting level is merely 0.6 and 1.7 percentage points in Rajasthan compared to 5.1 and 6.3 percentage points for all India. While India is behind by 4.4 percentage points from the targeted reduction of underweight children, Rajasthan exceeded it by 1.1 percentage points. Odisha did better with a difference of 4.9, 5.7 and 3.4 percentage points in achieving stunting, wasting and underweight targets. Himachal Pradesh, barring incidence of anaemia, was the worst performer of all. It had a difference of 10.6, 9.5 and 10.2 percentage points between the actual and target percentage of stunting, wasting and underweight in the year of NFHS-5. The difference in stunting and underweight percentage was more than double in Himachal Pradesh compared to the difference for all-India. The difference in wasting percentage was also 50 percent higher in Himachal Pradesh than a comparable all-India figure.

 Table 2.5 Nutritional targets for children under 5 years (in percentage)

	Target Reduction under Poshan	Nutritio 5 yea	Nutritional Targets for NFHS- 5 year (Baseline 2016) #Actual Nutritional Status in NFHS-5Differ (Actual-								rence ·Target)		
Malnutrition Indicator	Abhiyaan (reduction per annum)	Himachal Pradesh	Rajasthan	Odisha	All India	Himachal Pradesh	Rajasthan	Odisha	All India	Himachal Pradesh	Rajasthan	Odisha	All India
Stunting	2 p.p.	20.2	31.2	26.1	30.4	30.8	31.8	31	35.5	10.6	0.6	4.9	5.1
Wasting	2 p.p.	7.9	15.1	12.4	13	17.4	16.8	18.1	19.3	9.5	1.7	5.7	6.3
Underweight	2 p.p.	15.3	28.7	26.3	27.7	25.5	27.6	29.7	32.1	10.2	-1.1	3.4	4.4
Anaemia	3 p.p.	43.7	48.4	32.6	46.5	55.2	71.5	65.4	68.1	11.5	23.1	32.8	21.6

Note: p.p.-percentage point; # NFHS-5 was done in two phases. First phase was finished before the pandemic where the second phase was completed after the lockdown. Since Himachal Pradesh was surveyed in the first phase and Rajasthan and Odisha in the second phase, the target reduction was calculated assuming 3 years from baseline for Himachal Pradesh and 4 years for Rajasthan and Odisha.

Source: NITI Aayog

Table 2.6 Programs to check malnutrition in states of Himachal Pradesh, Odisha and Rajasthan

Sr. No.	Program	Objectives	Target population	Sponsored by
Himachal P	radesh			
1.	Mukhyamantri Bal Suposhan Yojna	• To provide support to the mother and child, pre- and post-delivery in order to reduce malnutrition.	 4 lakh Children aged 6months to 6 years. 5 lakh children aged 6 years to 10 years. 3 lakhs plus adolescent girls. Lactating mothers. 	• State government
2.	Integrated Child Development Services (ICDS)	 To help children's proper physical, psychological and social development To reduce school drop outs, mortality, morbidity 	 Children aged 0-6 months Pregnant women Lactating mothers 	 Centre government Cooperative for Assistance and Relief everywhere (CARE) UNICEF

		and malnutrition	World Food Programme (WFP)
3.	National Nutrition Policy- 1993	 To make wholesome, nutritious and safe food available to improve health and nutritional status of children Children aged 0-6 years 	• 45% Center, 5% State (90:10 center-state contribution) and 50% IBRD
4.	Mid-day Meal Scheme -1995(renamed PM Poshan shakti mission from 2021- 22 to 2025-26)	 To increase nutrition of economically weaker section children To improve enrolment rate To eliminate classroom hunger Pre-school children Classes 1-8 studying in government schools 	• 90:10 center: state contribution
5.	 National Food Security Act- 2013 NFSA covers Antyodaya Anna Yojna TPDS PM Gareeb Kalyan Anna Yojna Priority Households 	 To provide quality food in adequate quantity at affordable prices To provide food and nutritional security 30.27 lakh beneficiaries Against 36.82 lakh set by the Central government 	• Central government
6.	National Health Mission -2013	 Reduction in IMR and MMR Access to universal health services Prevention of communicable and non- communicable diseases Access to primary health centers. 	Central government
7.	Indira Gandhi Matritva Sahyog Yojna- 2010	 Provide care during pregnancy, delivery, and lactation. Provide wage compensations to women during and after Provide age 19 years for the first two live births. 	• Central government

		•	pregnancy. Encourage feeding practices and breastfeeding.		
8.	Pradhan Mantri Matru Vandana Yojna	•	Provide compensation to pregnant and lactating mothers who had to face a wage-loss.	Pregnant and lactating mothers	• Central government
9.	 Poshan 2.0 Includes Anganwadi services The scheme for adolescent girls Poshan Abhiyan National Creche scheme 	•	To develop practices that nurture wellbeing, health, immunity to diseases and malnutrition	 To reduce stunting in children 0-6 years old by 2% per annum To prevent undernutrition in children 0-6years by 2% per annum To reduce anaemia among children 6-59 months by 3% per year 	• 60:40 Center- State contribution
20.	 Anemia mukt Bharat Abhiyan Includes National Iron Plus Initiative Weekly Iron Supplementation Programme 	•	To reduce anaemia by 3% points per year among women, adolescents and children	 Children 6-59months Children 5-9 years Adolescents 10-19 years Women of reproductive age (20-24 years) Pregnant women Lactating women 	• Central government
Odisha					
	National Nutrition Policy	•	To make wholesome, nutritious and safe food available to improve health and nutritional status of children	Children aged 0-6 years	• 30% center, 20% state government (60:40 center state contribution) and 50% IBRD
2.	Integrated Child Development Services (ICDS)	•	To help children's proper physical, psychological and social development To reduce school drop	Children aged 0-6 monthsPregnant womenLactating mothers	 Centre government Cooperative for Assistance and Relief everywhere (CARE)

		ou an	its, mortality, morbidity id malnutrition			 UNICEF World Food Programme (WFP)
3.	Mid-day Meal Scheme (renamed PM Poshan shakti mission from 2021-22 to 2025-26)	 To eco sec To To hu 	o increase nutrition of onomically weaker ction children o improve enrolment rate o eliminate classroom inger	•	Pre-school children Classes 1-8 studying in government schools	• 60:40 Center: State contribution
4.	 National Food Security Act- 2013 NFSA covers Antyodaya Anna Yojna TPDS PM Gareeb Kalyan Anna Yojna Priority Households 	 To add aff To nu 	o provide quality food in lequate quantity at fordable prices o provide food and attritional security	•	Up to 75% rural and 50% urban population is entitled to receive subsidized grains	• Central government
5.	National Health Mission -2013	 Re MI Accser Processor condense Accser condense Accser condense condense<td>eduction in IMR and MR ccess to universal health rvices evention of ommunicable and non- ommunicable diseases ccess to primary health nters.</td><td></td><td></td><td>• Central government</td>	eduction in IMR and MR ccess to universal health rvices evention of ommunicable and non- ommunicable diseases ccess to primary health nters.			• Central government
6.	Indira Gandhi Matritva Sahyog Yojna- 2010	 Proproved Proved Proved<td>ovide care during egnancy, delivery, and ctation. ovide wage ompensations to women uring and after egnancy. ncourage feeding actices and eastfeeding.</td><td>•</td><td>Pregnant and lactating mothers above the age 19 years for the first two live births.</td><td>• Central government</td>	ovide care during egnancy, delivery, and ctation. ovide wage ompensations to women uring and after egnancy. ncourage feeding actices and eastfeeding.	•	Pregnant and lactating mothers above the age 19 years for the first two live births.	• Central government

7.	Pradhan Mantri Matru Vandana Yojna	•	Provide compensation to pregnant and lactating mothers who had to face a wage-loss.	Pregnant and lactating mothers Central government
8.	 Poshan 2.0 Includes Anganwadi services The scheme for adolescent girls Poshan Abhiyan National Creche scheme 	•	To develop practices that nurture wellbeing, health, immunity to diseases and malnutrition	 To reduce stunting in children0-6 years old by 2% per annum To prevent undernutrition in children 0-6years by 2% per annum To reduce anaemia among children 6-59 months by 3% per year 60:40 Center- State contribution
9.	Anemia mukt Bharat Abhiyan Includes • National Iron Plus Initiative Weekly Iron Supplementation Programme	•	To reduce anaemia by 3% points per year among women, adolescents and children	 Children 6-59months Children 5-9 years Adolescents 10-19 years Women of reproductive age (20-24 years) Pregnant women Lactating women
10.	Millets Mission	•	Inclusion of millets in ICDS, MDM and PDS	142 blocks and 19 tribal- populated districts State government
11.	Iron Plus Initiative	•	To increase iron intake To prevent anaemia	 Children aged 6-29 months Children 6-10 in government schools Children 10-19 Women in reproductive age Pregnant and lactating mothers
Kajasthan				
1.	Integrated Child Development Services (ICDS)	•	To help children's proper physical, psychological and social development To reduce school drop outs, mortality, morbidity	 Children aged 0-6 months Pregnant women Lactating mothers Cooperative for Assistance and Relief everywhere (CARE) UNICEF

		and malnutrition		World Food Programme (WFP)
2.	National Nutrition Policy	• To make wholesome, nutritious and safe food available to improve health and nutritional status of children	Children aged 0-6 years	• 30% Center, 20% State government (60:40 Center- State contribution) and 50% IBRD
3.	Mid-day Meal Scheme (renamed PM Poshan shakti mission from 2021-22 to 2025-26)	 To increase nutrition of economically weaker section children To improve enrolment rate To eliminate classroom hunger 	 Pre-school children Classes 1-8 studying in government schools 	• 60:40 Center- State contribution
4.	 National Food Security Act- 2013 NFSA covers Antyodaya Anna Yojna TPDS Annapurna PM Gareeb Kalyan Anna Yojna Priority Households 	 To provide quality food in adequate quantity at affordable prices To provide food and nutritional security 	• Up to 75% rural and 50% urban population is entitled to receive subsidized grains	• Central government
5.	National Health Mission -2013	 Reduction in IMR and MMR Access to universal health services Prevention of communicable and non- communicable diseases Access to primary health centres. 		• Central government
6.	Indira Gandhi Matritva Sahyog Yojna- 2010	 Provide care during pregnancy, delivery, and lactation. Provide wage compensations to women 	Pregnant and lactating mothers above the age 19 years for the first two live births.	• Central government

		•	during and after pregnancy. Encourage feeding practices and breastfeeding.			
7.	Pradhan Mantri Matru Vandana Yojna	•	Provide compensation to pregnant and lactating mothers who had to face a wage-loss.	•	• Pregnant and lactating mothers	• Central government
8.	 Poshan 2.0 Includes Anganwadi services The scheme for adolescent girls Poshan Abhiyan National Creche scheme 	•	To develop practices that nurture wellbeing, health, immunity to diseases and malnutrition		 To reduce stunting in children0-6 years old by 2% per annum To prevent undernutrition in children 0-6years by 2% per annum To reduce anaemia among children 6-59 months by 3% per year 	• 60:40 Center- State contribution
9.	 Anemia Mukt Bharat Abhiyan Includes National Iron Plus Initiative Weekly Iron Supplementation Programme 	•	To reduce anaemia by 3% points per year among women, adolescents and children		 Children 6-59months Children 5-9 years Adolescents 10-19 years Women of reproductive age (20-24 years) Pregnant women Lactating women 	• Central government

2.3 Socio-Economic Indicators and Nutritional Status of Children

2.3.1 Himachal Pradesh

The association between socio-economic indicators and the nutritional status of children is shown by chi-square test too. The Chi-square test shows that stunting is significantly associated with gender, age of the child, caste, education of the mother, wealth of the household, type of fuel for cooking, type of toilet, availability of clean drinking water, size of agricultural land and holding of Below Poverty Line (BPL) card with stunting in 2015-16 (Table 2.7). The situation has changed a little in 2019-21 with caste and land size turning insignificant. It could be because of a considerable jump in the incidences of stunting among ST, OBC and Other caste groups while SC witnessed a slight decline in the incidence (see Table 3.1 for incidences of stunting). Nonetheless, children in older age-group, SC, children of less educated mothers, poor, use of solid fuel, lack of modern toilet, lack of access to clean drinking water, small farm size and belonging to a BPL household continue to be associated with higher incidences of stunting (Table 2.2). The place of residence is not associated with stunting at a 10 percent significance level.

		2015-	16		2019-21								
Indicators	Stunted	Non-Stunted	Total	Chi-square	Stunted	Non-Stunted	Total	Chi- square					
			Sex of	the Child									
Male	54.73	50.8	51.83	2.96	57.72	52.05	53.8	4.32					
Female	45.27	49.2	48.17	(0.085)	42.28	47.95	46.2	(0.034)					
Age groups													
0 to 5 Months	2.6	8.49	6.94		7.46	8.61	8.25						
6 to 11 Months	4.84	12.37	10.39	(0.05	9.12	12.39	11.38	0.72					
12 to 23 Months	22.27	20.22	20.75	68.95	23.65	20.45	21.44	9.73					
24 to 35 Months	18.66	19.68	19.41	(0.00)	15.53	19.2	18.07	(0.04)					
36 to 56 Months	51.63	39.24	42.5		44.23	39.36	40.86						
Social Groups													
SC	35.81	25.11	27.93		31.36	29.03	29.75	4.71 (0.19)					
ST	4.01	4.99	4.73	31.02	6.19	6.04	6.09						
OBC	13	16.18	15.34	(0.00)	15.16	14.64	14.8						
Other Caste	47.18	53.72	51.99		47.29	50.29	49.36						
		-	Place of	residence		-							
Rural	94.19	92.4	92.87	2.34	89.75	87.67	88.31	0.96					
Urban	5.81	7.6	7.13	(0.13)	10.25	12.33	11.69	(0.33)					
		Mo	others lev	el of education									
Illiterate	5.62	3.89	4.34		6.9	3.23	4.36						
Primary	8.68	7.43	7.76	25.65	8.96	7.13	7.69	22.00					
Secondary	74.44	66.32	68.45	(0.00)	65.04	59.28	61.05	(0.00)					
Higher Secondary and above	11.27	22.36	19.46	(0.00)	19.11	30.36	26.89	(0.00)					
		Wea	alth Quint	tile (Household	l)								
Poorest	2.5	1.44	1.72	58.04	5.75	3.26	4.03	42.02					

Table 2.7 Cofactors of Stunting, 2015-16 and 2019-21

Poorer	15.14	8.12	9.97	(0.00)	18.81	12.05	14.13	(0.00)
Middle	27.26	20.64	22.38		26.24	22.73	23.81	
Richer	37.37	36.76	36.92		29.8	29.2	29.39	
Richest	17.72	33.04	29.01		19.39	32.76	28.64	
	Type of fue	el used for cooki	ng					
Clean Fuel	22.28	30.52	28.35		38.48	46.83	44.26	
Solid Fuel	77.71	69.4	71.59	27.42	61.43	53.13	55.69	5.005
Not Cooked & Other	0.01	0.08	0.06	(0.00)	0.09	0.04	0.06	(0.08)
	Ту	pe of toilet						
Improved toilet	75.52	83.16	81.15	14.15	83.2	87.86	86.42	3.64
Not improved toilet	24.48	16.84	18.85	(0.00)	16.8	12.14	13.58	(0.05)
	Source of	f drinking water						
Improved water	31.11	39.36	37.2	8 83	94.78	96.07	95.67	3 07
Not improved water	68.89	60.64	62.8	(0.003)	5.22	3.93	4.33	(0.04)
		Ha	ving Agri	cultural Land				
Small Farm	94.5	90.82	91.77		95.99	93.11	94.01	
Semi Medium Farm	5.15	6.27	5.98	8.56	3.4	4.55	4.19	4.72
Medium Farm	0.21	2.33	1.78	(0.04)	0.29	1.33	1	(0.19)
Large Farm	0.14	0.58	0.47		0.31	1.02	0.8	
			Holding	BPL card				
Yes	27.24	23.14	24.22	5.2	23.58	16.76	18.86	10.71
No	72.25	76.54	75.41	(0.07)	76.42	83.07	81.02	(0,00)
Don't Know	0.51	0.32	0.37	(0.07)	0	0.18	0.12	(0.00)

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent Source: Authors estimation using NFHS 4 and 5 data

Table 2.8 Cofactors of Wasting, 2015-16 and 2019-21

		201	5-16			2019-21	1						
Indicators	Wasted	Not- wasted	Total	Chi-square	Wasted	Not-wasted	Total	Chi- square					
			Sex of	the Child		·							
Male	52.42	51.74	51.83	0.06	54.76	53.44	53.67	0.09					
Female	47.58	48.26	48.17 (0.81)		45.24	46.56	46.33	(0.76)					
Age groups													
0 to 5 Months	12.41	6.07	6.94		11.21	6.68	7.47						
6 to 11 Months	14.75	9.7	10.39	27.76	7.86	12.54	11.73	12 42					
12 to 23 Months	18.91	21.05	20.75	27.70	21.48	22.11	22	(0.01)					
24 to 35 Months	17.96	19.64	19.41	(0.00)	17.26	18.43	18.23						
36 to 56 Months	35.97	43.54	42.5		42.18	40.24	40.58						
Social Groups													
SC	32.27	27.24	27.93		27.5	29.89	29.47						
ST	5.16	4.66	4.73	10.51	5.38	6.42	6.24	10.12					
OBC	17.01	15.08	15.34	(0.015)	21	13.64	14.92	(0.02)					
Other Caste	45.56	53.02	51.99		46.12	50.05	49.37						
			Place of	residence									
Rural	90.06	93.32	92.87	1.27	89.11	88.1	88.28	0.13					
Urban	9.94	6.68	7.13	(0.26)	10.89	11.9	11.72	(0.72)					
		Мо	thers lev	el of educatio	n								
Illiterate	5.91	4.09	4.34	2 79	2.86	4.71	4.39	5 5 2					
Primary	6.31	7.99	7.76	3.78	11.06	6.8	7.54	3.32					
Secondary	69.45	68.29	68.45	(0.29)	64.29	60.22	60.92	(0.14)					

Higher Secondary	18 33	19.64	19.46		21 79	28.27	27.15						
and above	10.55	17.04	17.40		21.79	20.27	27.15						
		Wea	lth Quint	ile (Househo	ld)								
Poorest	1.56	1.74	1.72		3.24	4.1	3.95						
Poorer	13.8	9.36	9.97	6.20	14.89	13.82	14.01	5 2 5					
Middle	20.77	22.63	22.38	(0.30)	27.23	22.79	23.56	(0.25)					
Richer	38.56	36.66	36.92	(0.10)	29.67	29.34	29.4						
Richest	25.31	29.6	29.01		24.96	29.94	29.08						
		Туре	e of fuel u	sed for cooki	ng								
Clean Fuel	28.92	28.26	28.35		44.81	44.38	44.45						
Solid Fuel	70.86	71.70	71.59	4.21	55.19	55.55	55.49	0.48					
Not Cooked & Other	0.22	0.03	0.06	(0.12)	0	0.07	0.06	(0.79)					
Type of toilet													
Improved toilet	79.12	81.47	81.15	3 03	82.82	87.66	86.82	Q 21					
Not improved toilet	20.88	18.53	18.85	(0.05)	17.18	12.34	13.18	(0.00)					
		So	urce of d	rinking water	r								
Improved water	39.29	36.86	37.2	0.05	95.72	95.59	95.61	0.72					
Not improved water	60.71	63.14	62.8	(0.82)	4.28	4.41	4.39	(039)					
		Hay	ving Agri	icultural Lan	d								
Small Farm	89.2	92.17	91.77		94.78	94.05	94.17						
Semi Medium Farm	9.34	5.47	5.98	2.73	4.49	4	4.08	1.91					
Medium Farm	1.46	1.83	1.78	(0.43)	0.32	1.06	0.94	(0.39)					
Large Farm	0	0.54	0.47		0.41	0.89	0.81						
			Holding	BPL card									
Yes	28.06	23.6	24.22	6.21	18.48	19.09	18.98	1 20					
No	71.28	76.07	75.41	(0.04)	81.3	80.84	80.92	(0.53)					
Don't Know	0.66	0.33	0.37	(0.04)	0.22	0.07	0.1						

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent Source: Authors estimation using NFHS 4 and 5 data

Incidences of wasting show similar associations with some differences (Table 2.8). In the case of wasting of children, mother's education, wealth of the household, cooking fuel and source of drinking water had no significant association in 2015-16 and 2019-21. Incidences of underweight were different from stunting of children in not having a significant association with the sex of children and farm size of the household in 2015-15 (Table 2.9). By 2019-21, the source of drinking water and holding of BPL card also turned insignificant.

Indicators Under Weight Not under weight Total Chi- square Under Weight Not under weight Total Chi- square Male 53.3 51.4 51.8 1.29 55.2 53.2 53.7 0.002 Female 46.7 48.6 48.2 (0.25) 44.9 46.8 46.3 (0.96) Version of the Child 0 to 5 Months 5.6 7.3 6.9 9.3 8.4 8.6 (0.96) 12 to 23 Months 18.3 21.4 20.8 (0.001) 18.42 (0.001) 15.8 18.7 18.0 36 to 56 Months 48.6 40.9 42.5 30.8 29.1 29.6 (0.00) Secial Group SC 33.4 26.5 27.9 30.8 29.1 29.6 19.92 OBC 14.4 15.6 15.3 (0.005) 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 52.0 <t< th=""></t<>													
Sex of the Child Male 53.3 51.4 51.8 1.29 55.2 53.2 53.7 0.002 Female 46.7 48.6 48.2 (0.25) 44.9 46.8 46.3 (0.96)													
Male 53.3 51.4 51.8 1.29 55.2 53.2 53.7 0.002 Female 46.7 48.6 48.2 (0.25) 44.9 46.8 46.3 (0.96) 0 to 5 Months 5.6 7.3 6.9 9.3 8.4 8.6 6 6 to 11 Months 8.3 11.0 10.4 18.42 (0.01) 18.8 12.8 11.8 12 to 23 Months 18.3 21.4 20.8 (0.001) 18.42 (0.01) 15.8 18.7 18.0 24 to 35 Months 19.3 19.5 19.4 20.1 21.3 13.55 (0.00) 36 to 56 Months 48.6 40.9 42.5 30.8 29.1 29.6 13.55 SC 33.4 26.5 27.9 30.8 29.1 29.6 19.92 OBC 14.4 15.6 15.3 (0.005) 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 <t< th=""></t<>													
Female 46.7 48.6 48.2 (0.25) 44.9 46.8 46.3 (0.96) 0 to 5 Months 5.6 7.3 6.9 9.3 8.4 8.6 8.6 6 to 11 Months 8.3 11.0 10.4 18.42 (0.001) 18.42 10.01 18.42 (0.001) 18.42 18.9 22.1 21.3 13.55 (0.00) 24 to 35 Months 19.3 19.5 19.4 (0.001) 15.8 18.7 18.0 13.55 (0.00) 36 to 56 Months 48.6 40.9 42.5 30.8 29.1 29.6 29.6 SC 33.4 26.5 27.9 30.8 29.1 29.6 29.6 ST 4.5 4.8 4.7 12.69 4.9 6.6 6.2 19.92 0.000 OBC 14.4 15.6 15.3 10.05 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 52.0 44.5 </th													
Age groups 0 to 5 Months 5.6 7.3 6.9 9.3 8.4 8.6 14.8 6 to 11 Months 8.3 11.0 10.4 18.42 18.42 10.01 15.8 12.8 11.8 13.55 14.55 14.55 14.55 15.35													
0 to 5 Months 5.6 7.3 6.9 9.3 8.4 8.6 6 to 11 Months 8.3 11.0 10.4 18.42 18.8 12.8 11.8 13.55 12 to 23 Months 18.3 21.4 20.8 18.42 (0.001) 15.8 18.9 22.1 21.3 13.55 (0.00) 24 to 35 Months 19.3 19.5 19.4 15.8 18.7 18.0 13.55 (0.00) 36 to 56 Months 48.6 40.9 42.5 47.2 38.0 40.4 15.5 (0.00) 15.8 18.7 18.0 13.55 (0.00) 10.00 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10.0 11.8 11.5 11.5 11.5 11.5 11.5 10.0 10.0 10.0 10.0 10.0 10.4 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0													
6 to 11 wonths 8.5 11.0 10.4 18.42 8.8 12.8 11.8 13.55 12 to 23 Months 18.3 21.4 20.8 18.42 (0.001) 18.9 22.1 21.3 13.55 (0.00) 24 to 35 Months 19.3 19.5 19.4 18.42 (0.001) 15.8 18.7 18.0 13.55 (0.00) 36 to 56 Months 48.6 40.9 42.5 30.8 29.1 29.6 19.92 (0.00) SC 33.4 26.5 27.9 30.8 29.1 29.6 19.92 (0.00) ST 4.5 4.8 4.7 12.69 30.8 29.1 29.6 19.92 (0.00) 19.8 13.1 14.8 (0.00) (0.00) OBC 14.4 15.6 15.3 19.0 10.05 19.8 13.1 14.8 (0.00) (0.00) 44.5 51.2 49.5 (0.00) Other Caste 47.7 53.2 52.0													
12 to 25 Months 18.3 21.4 20.8 (0.001) 18.9 22.1 21.3 (0.00) 24 to 35 Months 19.3 19.5 19.4 (0.001) 15.8 18.7 18.0 (0.00) 36 to 56 Months 48.6 40.9 42.5 (0.001) 15.8 18.7 18.0 (0.00) Social Groups Social Groups ST 4.5 4.8 4.7 12.69 30.8 29.1 29.6 19.92 OBC 14.4 15.6 15.3 0.005 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 52.0 92.9 0.43 88.7 88.2 88.3 0.32													
24 to 35 Months 19.3 19.3 19.4 13.8 18.7 18.0 36 to 56 Months 48.6 40.9 42.5 47.2 38.0 40.4 Social Groups SC 33.4 26.5 27.9 30.8 29.1 29.6 19.92 ST 4.5 4.8 4.7 12.69 4.9 6.6 6.2 19.92 OBC 14.4 15.6 15.3 60.005 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 52.0 0.43 88.7 88.2 88.3 0.32													
So to 50 Months 44.0 40.9 42.3 44.2 38.0 40.4 Social Groups SC 33.4 26.5 27.9 30.8 29.1 29.6 19.92 ST 4.5 4.8 4.7 12.69 4.9 6.6 6.2 19.92 OBC 14.4 15.6 15.3 (0.005) 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 52.0 0.43 88.7 88.2 88.3 0.32													
SC 33.4 26.5 27.9 30.8 29.1 29.6 19.92 ST 4.5 4.8 4.7 12.69 4.9 6.6 6.2 19.92 OBC 14.4 15.6 15.3 (0.005) 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 52.0 0.43 88.7 88.2 88.3 0.32													
SC 35.4 20.5 27.9 30.6 29.1 29.6 12.6 1													
OBC 14.4 15.6 15.3 12.09 4.9 0.0 0.2 19.92 OBC 14.4 15.6 15.3 (0.005) 19.8 13.1 14.8 (0.00) Other Caste 47.7 53.2 52.0 0 44.5 51.2 49.5 Place of residence Rural 94.3 92.5 92.9 0.43 88.7 88.2 88.3 0.32													
Other Caste 47.7 53.2 52.0 19.5 19.6 19.1 14.5 (0.00) Other Caste 47.7 53.2 52.0 44.5 51.2 49.5 Place of residence Rural 94.3 92.5 92.9 0.43 88.7 88.2 88.3 0.32													
Place of residence Place of second control Place of second control Place of contro Place of contro Pla													
Rural 94.3 92.5 92.9 0.43 88.7 88.2 88.3 0.32													
Urban 5.7 7.5 7.1 (0.51) 11.3 11.8 11.7 (0.57)													
Mothers level of education													
Illiterate 6.3 3.8 4.3 6.1 3.8 4.4													
Primary 8.5 7.6 7.8 22.18 9.6 7.1 7.7 40.22													
Secondary 72.4 67.4 68.5 22.18 65.5 59.4 60.9 40.32 (0.00)													
Higher Secondary and above 12.8 21.3 19.5 18.7 29.7 26.9													
Wealth Quintile (Household)													
Poorest 2.5 1.5 1.7 5.2 3.7 4.1													
Poorer 14.8 8.7 10.0 20.2 16.6 13.2 14.1 18.17													
Middle 25.6 21.5 22.4 50.3 27.1 22.5 23.6 16.17 (0 00) (0 00)													
Richer 39.6 36.2 36.9 (0.00) 28.3 29.8 29.4													
Richest 17.6 32.1 29.0 22.8 30.8 28.8													
Type of fuel used for cooking													
Clean Fuel 21.8 30.1 28.4 39.8 45.7 44.2 5 20													
Solid Fuel 78.2 69.8 71.6 10.72 60.1 54.2 55.7 (0.07)													
Not Cooked & Other 0.01 0.1 0.1 0.04 0.1													
Type of toilet													
Improved toilet 74.9 82.8 81.2 14.20 84.1 87.6 86.7 3.60 Nuclear 14.20 <t< th=""></t<>													
Not improved tollet 25.1 17.2 18.9 (0.00) 15.9 12.4 13.3 (0.05)													
Source of drinking water													
Improved water 33.2 38.3 37.2 2.72 94.9 96.0 95.7 (0.93) Not improved water (6.8) (1.7) (2.8) (0.00) 5.2 4.0 4.2 (0.23)													
Not improved water 66.8 61.7 62.8 (0.09) 5.2 4.0 4.3 (0.35)													
Small Farm 02.0 01.4 01.9 02.0 04.0 02.0													
Similar Farm 50.0 91.4 91.0 95.9 94.0 93.9 Semi Medium Farm 60 60 60 216 51 20 42 1.0													
Medium Farm 0.7 2.1 1.8 (0.54) 0.0 1.1 1.1 (0.65)													
Large Farm 0.4 0.5 0.5 0.9 1.1 1.1 (0.03)													
Uning RPI card													
Yes 27.9 23.2 24.2 19.7 18.6 18.9													
No. 70.9 76.6 75.4 13.06 80.1 81.3 81.0 2.21													
Don't Know 1.1 0.2 0.4 (0.001) 0.3 0.1 0.3													

Table 2.9 Cofactors of Underweight, 2015-16 and 2019-21

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent Source: Authors estimation using NFHS 4 and 5 data

		2015-16						2019-21				
	Severe	Moderate	Mild	Not	Total	Chi-	Severe	Moderate	Mild	Not	Total	Chi-
				Anaemic		square				Anaemic		square
		Sex of the	he Child	1								
Male	47.1	51.8	48.5	53.9	51.9	2.36	51.8	50.7	56.2	54.8	54.0	2.82
Female	52.9	48.3	51.5	46.1	48.1	(0.5)	48.2	49.3	43.8	45.3	46.0	(0.42)
6 to 11	14.1	10.7	10.6	9.1	Age 10.0	groups	32.3	16.8	16.0	7.5	12.8	
Months 12 to 23	41.4	31.6	21.4	17.4	22.9		29.3	32.8	24.7	16.5	23.3	
Months 24 to 35	16.7	25.2	22.7	18.0	21.1		22.6	22.3	17.3	19.3	19.6	158.59 (0.00)
Months	27.0	22.5	45.2	55 4	46.0		15.9	28.0	42.0	56.7	11.2	(0.00)
Months	21.9	52.5	45.5	55.4	40.0		15.8	28.0	42.0	50.7	44.5	
	25.0	21.6	210	26.5	Socia	l Groups	40.5	20.1	22.0	20.0	20.2	
SC	25.9	31.6	24.9	26.5	27.5		43.5	32.1	23.9	29.9	29.2	
	11.1	5./	4.5	3.1	4.3	241.90	0./	/.1	0./	5.4	0.3	115.08
OBC Other Ceste	8.Z	50.8	14.4	52.0	52.1	(0.00)	20.7	17.7	14.5	51.0	14.0	(0.00)
Other Caste	34.7	50.8	30.5	32.8	Diaco o	frasidan	39.7	45.1	54.9	51.8	30.0	
Rural	89.4	92.5	91.0	93.3	92.5		94.9	88.8	85.3	88.2	87.7	2.91
Urban	10.6	7.5	9.0	6.7	7.6	(0.22)	5.2	11.3	14.7	11.8	12.3	(0.41)
	1	I		Mo	thers lev	vel of edu	cation	1	1	1		
Illiterate	9.9	4.3	4.4	3.8	4.2		6.5	4.2	3.5	4.6	4.2	
Primary	10.6	8.5	8.3	7.3	8.0		5.1	7.4	8.5	8.3	8.0	
Secondary	71.6	70.8	67.7	69.2	69.4	7.61	67.2	65.5	59.1	59.4	61.1	5.53
Higher	8.0	16.4	19.6	19.8	18.5	(0.57)	21.3	22.9	28.9	27.8	26.6	(0.78)
Secondary												
and above Wealth Quintile (Household)												
Poorest	3.3	2.5	1.7	1.2	1.7		2.3	4.6	3.1	4.5	4.1	
Poorer	16.6	9.4	10.4	10.4	10.3		13.8	19.0	12.5	12.6	14.3	
Middle	25.9	23.2	20.2	23.3	22.6	47.64	24.2	20.1	28.6	23.3	23.8	52.01
Richer	41.5	37.4	38.5	35.4	36.9	(0.00)	34.2	29.3	23.5	32.9	29.5	(0.00)
Richest	12.7	27.5	29.2	29.8	28.6		25.5	27.0	32.4	26.8	28.3	
				Туре	e of fuel	used for c	cooking					
Clean Fuel	21.3	32.5	30.1	25.4	28.4		46.6	41.9	47.7	43.8	44.4	
Solid Fuel	78.7	67.3	69.9	74.6	71.6	22.99	53.4	58.1	52.3	56.1	55.6	13.12
Not Cooked	0.0	0.2	0.0	0.0	0.1	(0.001)	0.0	0.0	0.0	0.1	0.1	(0.04)
a other					Type	of toilet						
Improved toilet	70.8	79.2	78.3	84.1	81.0		82.8	88.1	88.2	85.1	86.7	
Not	29.2	20.8	21.8	15.9	19.0	62.85 (0.00)	17.2	12.0	11.8	14.9	13.4	12.66 (0.00)
improved toilet												
	-			So	urce of o	drinking v	water					
Improved water	29.6	36.9	37.3	36.8	36.8	4.24	97.5	95.1	96.5	95.5	95.7	5 17
Not improved	70.4	63.1	62.7	63.2	63.3	4.24 (0.24)	2.5	4.9	3.5	4.5	4.3	(0.14)
water												
	0 - 1		0.6	Hav	ving Ag	ricultural	Land		0.5.1		0.5 5	
Small Farm	95.1	91.5	91.3	92.3	91.9		85.0	93.2	95.6	93.8	93.9	
Semi Medium Form	4.8	7.0	5.5	5.6	5.9	1.88	3.7	5.3	3.5	4.5	4.5	23.89
Medium Farm	0.1	1.4	2.2	1.6	1.6	(0.77)	3.7	1.3	0.0	0.9	0.9	(0.00)

Table 2.10 Cofactors of Anaemia, 2015-16 and 2019-21

Large Farm	0.0	0.2	1.0	0.5	0.5		7.6	0.2	0.9	0.8	0.8			
	Holding BPL card													
Yes	36.9	30.7	20.4	21.3	24.1	20.44	30.7	21.3	16.5	18.2	18.9	16.00		
No	63.1	69.1	79.1	78.5	75.6	30.44	69.3	78.5	83.3	81.7	81.0	(0.01)		
Don't Know	0.1	0.3	0.5	0.2	0.3	(0.00)	0.0	0.2	0.2	0.1	0.1	(0.01)		

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent Source: Authors estimation using NFHS 4 and 5 data

In the case of anaemia, children in older age-group, SC, belonging to a poor household, use of solid fuel, lack of modern toilet, and belonging to a BPL family are have a significantly higher incidence of anaemia in 2015-16 and 2019-21 (Table 2.10). Having agricultural land is significant in 2019-21. Other variables including sex of the children, mother's education and access to clean water show no significant association with the cases of anaemia among children.

2.3.2 Rajasthan

Incidence of stunting show an association with gender, age group of children, social group, place of residence, mother's education, wealth Quintile, type of fuel used for cooking, type of toilet, having agricultural land, and belonging to a BPL family (Table 2.11). The association between stunting and these socio-economic variables was found significant in 2015-16 and 2019-21. Incidence of stunting was significantly higher among children belonging to SC and ST households. Households belonging to the higher wealth quintile or owning more agricultural land had a lower incidence of stunting. Access to improved toilet facility has been associated with a lower incidence of stunting. However, access to improved water supply did not show a significant relationship.

		201	5-16		2019-21					
Indicators	Stunted	Non- Stunted	Total	Chi-square	Stunted	Non-Stunted	Total	Chi-square		
Sex of the Child										
Male	54.41	51.07	52.38	10.94	55.49	51.65	52.87	17.05		
Female	45.59	48.93	47.62	(0.001)	44.51	48.35	47.13	(0.00)		
Age groups										
0 to 5 Months	5.09	11.19	8.81		11.18	11.97	11.72			
6 to 11 Months	6.17	12.02	9.73	246.22	6.18	9.79	8.64	(2.79)		
12 to 23 Months	21.58	18.62	19.78	346.22	18.76	17.88	18.16	62.78		
24 to 35 Months	21.68	19.52	20.37	(0.00)	19.66	20.74	20.4	(0.00)		
36 to 56 Months	45.48	38.65	41.32	-	44.22	39.62	41.08			
	· · · · · · · · · · · · · · · · · · ·	S	ocial Gro	ups						
SC	23.36	19.59	21.06	204.24	25.72	23.66	24.32	20.79		
ST	20.36	13.45	16.15	204.24	15.92	13.55	14.3	29.78		
OBC	42.98	48.59	46.4	(0.00)	45.26	46.82	46.32	(0.00)		

Other Caste	13.3	18.37	16.39		13.1	15.97	15.06				
		Pla	ace of resid	lence							
Rural	82.12	76.67	78.8	73.79	82.51	79.31	80.33	15.99			
Urban	17.88	23.33	21.2	(0.00)	17.49	20.69	19.67	(0.00)			
		Mother	rs level of e	education							
Illiterate	49.49	37.47	42.17		31.67	26.82	28.36				
Primary	18.51	17.67	18	304.85	18.89	16.2	17.05	83.07			
Secondary	26.61	33.72	30.94	(0.00)	39.48	41.5	40.86	(0.00)			
Higher Secondary and above	5.38	11.15	8.89		9.96	15.47	13.72				
Wealth Quintile (Household)											
Poorest	26.18	16.7	20.41		17.61	13.18	14.59				
Poorer	27.67	23.04	24.85	200.07	25.51	20.57	22.14	151 57			
Middle	21.1	21.69	21.46	390.07	23.45	22.14	22.56	131.37			
Richer	14.43	19.98	17.81	(0.00)	19.71	22.99	21.95	(0.00)			
Richest	10.61	18.59	15.47		13.72	21.12	18.77				
Type of fuel used for cooking											
Clean Fuel	20.74	28.96	25.74	122.09	31.6	36.95	35.25	22.01			
Solid Fuel	79.26	71.04	74.26	(0.00)	68.4	63.03	64.74	52.91			
Not Cooked & O	ther			(0.00)	0	0.02	0.01	(0.00)			
		r	Гуре of toi	let							
Improved toilet	36.58	48.77	44	200.71	69.6	73.9	72.53	28.97			
Not improved toilet	63.42	51.23	56	(0.00)	30.4	26.1	27.47	(0.00)			
		Source	e of drinki	ng water							
Improved water	49.55	49.02	49.23	0.22	96.36	96.54	96.48	0.32			
Not improved water	50.45	50.98	50.77	(0.63)	3.64	3.46	3.52	(0.57)			
		Having	g Agricultu	ral Land							
Small Farm	71.68	64.37	67.21		69.95	66.97	67.92				
Semi Medium Farm	14.44	17.61	16.38	55.81	16.15	17.38	16.99	17.77			
Medium Farm	10.53	13.3	12.22	(0.00)	11.41	13.11	12.57	(0.00)			
Large Farm	3.34	4.72	4.19		2.49	2.54	2.52				
Holding BPL card											
Yes	24.42	20.52	22.04	20.55	25.98	22.45	23.57	11.80			
No	75.51	79.31	77.82	(0.00)	73.89	77.42	76.3	(0.003)			
Don't Know	0.07	0.17	0.13	(0.00)	0.13	0.12	0.13	(0.003)			

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent.

Source: Authors estimation using NFHS 4 and 5 data.

Table 2.12 Cofactors of Wasting, 2015-16 and 2019-21

Indiantons		2015	5-16		2019-21						
Indicators	Wasted	Not-wasted	Total	Chi-square	Wasted	Not-wasted	Total	Chi-square			
Sex of the Child											
Male	55.1	51.6	52.4	14.13	57.0	52.1	52.9	15.14			
Female	44.9	48.4	47.6	(0.00)	43.0	47.9	47.1	(0.00)			
Age groups											
0 to 5 Months	11.8	7.9	8.8		14.7	10.6	11.3				
6 to 11 Months	11.7	9.2	9.7	01 72	8.8	8.7	8.7	45.16 (0.00)			
12 to 23 Months	19.4	19.9	19.8	(0, 00)	19.6	18.1	18.4				
24 to 35 Months	19.4	20.7	20.4	(0.00)	20.7	20.4	20.5				
36 to 56 Months	37.7	42.4	41.3		36.2	42.2	41.2				
		So	cial Gro	oups							
SC	20.5	21.2	21.1		25.7	23.9	24.2				
ST	22.0	14.4	16.2	120.54	16.2	14.1	14.4	15.57			
OBC	42.7	47.5	46.4	(0.00)	44.4	46.7	46.3	(0.00)			
Other Caste	14.8	16.9	16.4		13.8	15.3	15.0	. /			

Place of residence												
Rural	80.1	78.4	78.8	4.19	78.8	81.0	80.6	2.46				
Urban	19.9	21.6	21.2	(0.04)	21.2	19.0	19.4	(0.12)				
Mothers level of education												
Illiterate	49.1	40.1	42.2		29.3	28.5	28.6					
Primary	16.9	18.3	18.0	2.11	17.8	16.7	16.9	8.39				
Secondary	27.3	32.1	30.9	(0.00)	40.4	41.0	40.9	(0.04)				
Higher Secondary and above	6.8	9.5	8.9		12.5	13.8	13.6					
Wealth Quintile (Household)												
Poorest	26.2	18.7	20.4		15.9	14.5	14.7					
Poorer	27.2	24.2	24.9	126.07	22.4	22.2	22.3	11.69				
Middle	20.1	21.9	21.5	120.97	22.5	22.5	22.5	11.08				
Richer	14.6	18.8	17.8	(0.00)	21.5	22.0	21.9	(0.02)				
Richest	12.0	16.5	15.5		17.8	18.7	18.6					
Type of fuel used for cooking												
Clean Fuel	22.0	26.9	25.7	675	35.6	35.0	35.1	1.42				
Solid Fuel	78.0) 73.1 74.3		0.73	64.3	65.0	64.9	1.42				
Not Cooked & Other				(0.00)	0.0	0.0	0.0	(0.49)				
		ſ	ype of to	ilet								
Improved toilet	38.3	45.7	44.0	50.86	71.4	72.7	72.5	3.67				
Not improved toilet	61.7	54.3	56.0	(0.00)	28.6	27.3	27.5	(0.05)				
		Source	of drink	ing water								
Improved water	47.3	49.8	49.2	5.72	95.8	96.7	96.5	1.68				
Not improved water	52.7	50.2	50.8	(0.02)	4.2	3.4	3.5	(0.19)				
		Having	Agricult	ural Land								
Small Farm	71.0	66.1	67.2		72.8	67.2	68.0					
Semi Medium Farm	15.0	16.8	16.4	14.53	14.5	17.5	17.0	10.85				
Medium Farm	10.9	12.6	12.2	(0.002)	10.7	12.9	12.5	(0.01)				
Large Farm	3.1	4.5	4.2		2.0	2.5	2.4					
		Hol	ding BPI	_ card								
Yes	24.6	21.3	22.0	0.92	25.3	23.4	23.8	7.60				
No	75.2	78.6	77.8	9.83 (0.007)	74.6	76.4	76.1	/.09				
Don't Know	0.2	0.1	0.1	(0.007)	0.1	0.2	0.1	(0.02)				

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent.

Source: Authors estimation using NFHS 4 and 5 data.

Incidence of wasting (Table 2.12) and underweight (Table 2.13) show a similar association with socio-economic variables with access to improved drinking water also turning significant in 2015-16. Nonetheless, the association of wasting with the place of residence, type of fuel used for cooking and source of drinking water became insignificant during 2019-21. In the case of underweight, the source of drinking water and ownership of agricultural land turned insignificant in 2019-21. In 2015-16, the incidence of anaemia only differed from stunting in having no association with gender of the child (Table 2.14). In 2019-21, its association with belonging to BPL household and mother's education became insignificant.

		2015-16		2019-21							
Indicators	Under	Not under	T (1	Chi-	Under	Not under	T 4 1	Chi-			
	Weight	weight	Total	square	Weight	weight	Total	square			
		Sex of	the Chil	d							
Male	54.54	51.12	52.38	12.05	56.48	51.6	52.95	28.55			
Female	45.46	48.88	47.62	(0.001)	43.52	48.4	47.05	(0.00)			
Age groups											
0 to 5 Months	6.71	10.02	8.81		14.54	11.59	12.41				
6 to 11 Months	8.1	10.68	9.73	00 70	7.53	9.33	8.84	24 80			
12 to 23 Months	18.15	20.72	19.78	(0, 00)	16.5	18.85	18.2	(0, 00)			
24 to 35 Months	21.86	19.5	20.37	(0.00)	19.33	20.47	20.16	(0.00)			
36 to 56 Months	45.18	39.08	41.32		42.09	39.75	40.4				
		Social	Groups								
SC	22.52	20.22	21.06		26.78	23.62	24.49				
ST	22.92	12.22	16.15	344.29	16.47	13.41	14.26	51.02			
OBC	41.72	49.11	46.4	(0.00)	42.93	47.44	46.2	(0.00)			
Other Caste	12.85	18.45	16.39		13.81	15.53	15.05				
		Place of	' residen	ce							
Rural	82.29	76.77	78.8	67.05	81.93	79.8	80.39	11.68			
Urban	17.71	23.23	21.2	(0.00)	18.07	20.2	19.61	(0.00)			
		Mothers lev	el of edu	cation			a a (=)				
Illiterate	51.5	36.76	42.17		31.36	27.37	28.47	100.10			
Primary	18.45	17.74	18	395.96	19.95	15.85	16.98	103.16			
Secondary	25.26	34.23	30.94	(0.00)	39.17	41.52	40.87	(0.00)			
Higher Secondary and above	4.79	11.27	8.89		9.52	15.25	13.67				
	29.2	Wealth Quint	tile (Hou	isehold)	17.02	12.2	14.50				
Poorest	28.3	15.83	20.41	-	17.93	13.3	14.58				
Poorer	28.66	22.64	24.85	577.44	24.93	21.27	22.28	149.39			
Middle	20.06	22.27	21.46	(0.00)	23.84	22.1	22.58	(0.00)			
Richer	13.12	20.53	17.81		19.62	22.71	21.80				
Kicnest	9.86	18.72	15.4/	.	13.68	20.62	18./1				
Clean Evol	10.71	1 ype of fuel u	sed for	COOKING	22.56	26.22	25 21				
Solid Evol	80.20	29.23	74.26	164.49	67.44	62.76	64 79	20.43			
Not Cooked & Other	80.29	70.75	74.20	(0.00)	07.44	0.02	04.78	(0.00)			
Not Cooked & Other		Type	of toilet		0	0.02	0.01				
Improved toilet	35 58	48 89		249.68	69.07	73.89	72 56	37.88			
Not improved toilet	64 42	51.11	56	(0.00)	30.93	26.11	27.44	(0.00)			
	01112	Source of d	rinking	water	50.55	20.11	27.11	(0.00)			
Improved water	48.01	49.93	49.23	3 51	96.09	96.56	96.43	0.34			
Not improved water	51.99	50.07	50.77	(0.06)	3.91	3.44	3.57	(0.56)			
	01.77	Having Agr	icultura	Land	0.01	0	0.07	(0.00)			
Small Farm	72.84	63.89	67.21		68.83	67.27	67.7				
Semi Medium Farm	14	17.78	16.38	67.69	16.61	17.15	17	5.47			
Medium Farm	10.12	13.46	12.22	(0.00)	12.09	13	12.75	(0.14)			
Large Farm	3.03	4.87	4.19		2.47	2.58	2.55				
		Holding	BPL ca	rd							
Yes	26.26	19.6	22.04	EE 00	26.36	22.46	23.54	10.22			
No	73.66	80.24	77.82	55.88 (0.00)	73.57	77.38	76.33	18.33			
Don't Know	0.09	0.16	0.13	(0.00)	0.07	0.15	0.13	(0.00)			

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent.

Source: Authors estimation using NFHS 4 and 5 data.

			201	5-16					201	9-21		
Indicators	0	N 1 /	NC11	Not	T (1	Chi-	0	N 1 /	1011	Not	TT (1	Chi-
	Severe	Moderate	Mild	Anaemic	Iotal	square	Severe	Moderate	Mild	Anaemic	Total	square
				Sex	of the C	hild						
Male	51.5	53.3	52.3	52.9	52.8	1.31	52.0	52.2	52.7	54.1	52.9	2.31
Female	48.5	46.7	47.7	47.1	47.2	(0.73)	48.0	47.8	47.3	46.0	47.1	(0.51)
				A	ge group	DS						
0 to 5 Months												
6 to 11 Months	14.2	11.2	10.1	8.9	10.0	80.57	11.4	11.3	9.3	7.2	9.5	
12 to 23 Months	30.9	29.1	21.4	16.5	22.0	(0.00)	36.0	26.1	18.3	14.4	20.6	436.33
24 to 35 Months	27.7	24.9	23.1	20.0	22.5	(0.00)	24.9	25.3	22.7	20.6	23.2	(0.00)
36 to 56 Months	27.3	34.8	45.4	54.7	45.4		27.8	37.4	49.7	57.8	46.8	
	1	1		Soc	ial Grou	ıps	1	1	1			
SC	17.0	20.8	20.2	21.8	21.0		29.3	24.7	24.2	23.6	24.3	
ST	25.2	23.4	15.6	10.6	16.2	301.30	9.1	16.0	14.3	12.2	14.3	32.77
OBC	40.1	42.8	46.6	49.6	46.5	(0.00)	52.9	43.9	46.1	48.8	46.2	(0.00)
Other Caste	17.7	13.1	17.7	18.0	16.4		8.8	15.5	15.3	15.4	15.2	
				Place	of resid	lence						
Rural	81.9	81.8	78.6	76.3	78.8	37.08	76.8	82.7	79.6	78.2	80.3	33.59
Urban	18.1	18.2	21.4	23.7	21.2	(0.00)	23.2	17.3	20.4	21.8	19.7	(0.00)
	10.0	1= 0		Mothers l	evel of e	education						
Illiterate	49.9	47.9	41.8	39.6	43.0		33.0	30.2	29.0	27.4	29.1	
Primary	15.0	17.9	18.3	18.0	18.0	116.57	15.1	18.1	16.9	17.0	17.3	10.79
Secondary	29.4	28.6	30.4	31.8	30.4	(0.00)	39.3	38.8	41.5	41.0	40.2	(0.29)
Higher Secondary and	5.7	5.6	9.5	10.7	8.7		12.6	12.9	12.7	14.6	13.3	()
above				Waalth Oa		 	<u> </u>					
Deenest	267	276	10.7	wealth Qu		iousenoia)	166	127	12.5	110	
Poorest	20.7	27.0	24.4	13.9	20.8		22.5	24.2	21.1	21.1	14.0	
Middle	15.9	20.2	24.4	25.5	24.0	280.42	23.5	24.2	21.1	21.1	22.4	82.27
Dichor	11.5	15.2	17.7	22.1	17.8	(0.00)	17.2	22.4	23.9	20.5	22.5	(0.00)
Dichost	10.6	10.8	16.4	18.4	17.0		17.2	16.0	10.0	23.3	18.7	
Kichest	10.0	10.8	10.4	Type of fue	15.4 Jused f	or cooking	12.0	10.0	19.9	21.4	10.7	
Clean Fuel	22.4	21.9	25.8	28.8	25 7	UI COUKIN	30.4	32.9	35.6	38.1	35.2	
Solid Fuel	77.6	78.1	74.3	71.2	74.3	56.11	69.6	67.1	64.3	61.9	64.8	34.04
Not Cooked & Oth	- //.0	70.1	77.5	/1.2	74.5	(0.00)	0.0	0.0	04.5	0.0	0.0	(0.00)
				Tv	ne of toi	let	0.0	0.0	0.1	0.0	0.0	
Improved toilet	31.5	36.5	45.1	497	44.0	176.04	66.3	69.6	74.2	74 3	723	40.32
Not improved toilet	68.5	63.6	54.9	50.3	56.0	(0,00)	33.7	30.4	25.8	25.7	27.7	(0.00)
	00.5	05.0	51.5	Source of	f drinki	ng water	55.1	50.1	23.0	23.1	21.1	(0.00)
Improved water	48.3	50.0	48.7	48.3	48.9	1.48	96.0	96.0	96.2	97.1	96.4	4.11
Not improved water	51.7	50.0	51.3	51.7	51.1	(0.69)	4.0	4.0	3.8	2.9	3.6	(0.25)
	0117	2010	0110	Having A	gricultu	ral Land			210	,	210	(0.20)
Small Farm	67.4	71.7	66.1	62.5	66.5		73.0	70.2	66.3	66.1	67.9	
Semi Medium Farm	17.0	14.8	17.4	17.9	16.8	62.05	16.0	15.4	18.1	17.9	16.9	23.46
Medium Farm	13.1	10.1	12.3	14.8	12.6	(0.00)	10.1	12.0	13.3	12.9	12.6	(0.00)
Large Farm	2.5	3.5	4.3	4.7	4.2		0.9	2.5	2.3	3.1	2.6	. ,
				Holdi	ng BPL	card						
Yes	28.2	25.7	21.0	19.4	22.0	52.76	22.3	24.8	23.3	21.9	23.5	(21
No	71.8	74.2	78.9	80.5	77.9	52.76	77.7	75.0	76.6	78.0	76.4	0.31
Don't Know	0.0	0.2	0.1	0.1	0.1	(0.00)	0.0	0.1	0.1	0.1	0.1	(0.39)

Table 2.14 Cofactors of Anaemia, 2015-16 and 2019-21

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent. Source: Authors estimation using NFHS 4 and 5 data.

Overall, the caste, income and wealth of the household are associated with better nutritional status. Mother's education seems to have a positive impact on the nutritional status of the

children. Improved toilet facility is one variable which is associated with lower incidence of stunting, wasting, underweight and anaemia. Since better sanitation plays an important role in lowering the likelihood of sickness, the better nutritional status of children of households with improved toilet may be attributed to better sanitation. One positive trend seems to be an increase in the share of households with improved toilets from 44 percent in 2015-16 to 72.53 percent in 2019-21. The increased use of improved toilets may have contributed to the improvement in the nutritional status of children during this period.

2.3.3 Odisha

Stunting of the children is associated with age of the child, social group, place of residence, mother's level of education, wealth of the household, type of fuel used, type of toilet, source of drinking water and belonging to a BPL household in 2015-16 and 2019-21 (Table 2.15). As discussed in the previous section, younger children are less likely to be stunted. Stunting is found to be significantly higher among ST and SC. Richer households had a lower incidence of stunting. Similar to Himachal Pradesh and Rajasthan, access to an improved toilet was found to be associated with a lowering of incidence of stunting. Improved drinking water seems to be playing an important role in determining incidence of stunting in Odisha. Nonetheless, size of agricultural land, and sex of the child do not show a significant relationship with stunting among children.

		201	5-16		2019-21						
Indicators	Stunted	Non-	Total	Chi-	Stunte	Non-	Total	Chi-			
	Stufficu	Stunted	Total	square	d	Stunted	Total	square			
			f the Child								
Male	51.51	51.28	51.36	1.35	51.05	53.33	52.62	0.84			
Female	48.49	48.72	48.64	(0.25)	48.95	46.67	47.38	(0.36)			
Age groups											
0 to 5 Months	5.86	8.77	7.78		7.84	11.33	10.25				
6 to 11 Months	5.83	11.79	9.75	157 12	7.18	10.59	9.54	70.20			
12 to 23 Months	22.44	18.47	19.83	137.43	23.03	17.32	19.09	(0.00)			
24 to 35 Months	22.34	20.5	21.13	(0.00)	22.74	19.16	20.27				
36 to 56 Months	43.53	40.48	41.52		39.21	41.59	40.85				
			Socia	al Groups							
SC	24.42	21.44	22.46		24.41	21.55	22.44				
ST	37.04	23.2	27.95	284.27	41.44	24.84	29.99	263.69			
OBC	28.52	34.89	32.71	(0.00)	25.55	34.49	31.72	(0.00)			
Other Caste	10.02	20.47	16.89		8.61	19.11	15.85				
			Place of	of residence							
Rural	88.45	83.96	85.5	52.30	89	85.07	86.29	16.91			
Urban	11.55	16.04	14.5	(0.00)	11	14.93	13.71	(0.00)			
		Ν	lothers le	vel of educat	tion						

	1			1				
Illiterate	38.99	22.62	28.2		31.69	15.6	20.59	
Primary	15.8	13.81	14.49		15.48	12.56	13.47	
Secondary	42.66	56.97	52.1	345.05	48.81	61.24	57.39	310.08
Higher				(0.00)				(0.00)
Secondary and	2.55	6.59	5.21		4.02	10.6	8.56	
above								
		W	ealth Qui	ntile (Housel	hold)			
Poorest	50.43	33.25	39.12		52.16	30.94	37.52	
Poorer	27.37	25.83	26.36	120 57	25.27	24.3	24.6	270.06
Middle	13.83	21.63	18.97	428.37	12.96	20.6	18.23	3/9.96
Richer	6.25	13.3	10.89	(0.00)	7.09	15.15	12.65	(0.00)
Richest	2.11	5.98	4.66		2.52	9.01	7	
		Ту	pe of fuel	used for coo	oking			
Clean Fuel	11.01	21.42	17.87		21.24	36.39	31.69	
Solid Fuel	88.87	78.46	82.01	184.69	78.75	63.53	68.25	139.15
Not Cooked & Other	0.12	0.12	0.12	(0.00)	0.02	0.08	0.06	(0.00)
			Тур	e of toilet				
Improved toilet	16.76	28.55	24.52	174 44	43.77	58.63	54.02	114 52
Not improved toilet	83.24	71.45	75.48	(0.00)	56.23	41.37	45.98	(0.00)
		5	Source of	drinking wa	ter			
Improved water	72.25	70.68	71.21	4 20	88.76	91.2	90.44	4.01
Not improved water	27.75	29.32	28.79	(0.04)	11.24	8.8	9.56	(0.04)
		H	[aving Ag	ricultural La	and			
Small Farm	88.17	85.2	86.26		87.08	87.9	87.64	
Semi Medium Farm	6.62	8.14	7.6	0.65	8.63	7.52	7.87	1.93
Medium Farm	3.11	3.56	3.4	(0.88)	2.68	2.94	2.86	(0.58)
Large Farm	2.1	3.09	2.73		1.62	1.64	1.63	
8			Holdin	g BPL card				
Yes	45.07	36.89	39.68	40.21	52.7	45.05	47.43	3 33.24
No	54.9	63.05	60.27	49.31	47.28	54.93	52.56	
Don't Know	0.03	0.06	0.05	(0.00)	0.02	0.02	0.02	(0.00)

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent. Source: Authors estimation using NFHS 4 and 5 data.

Table 2.16 Cofactors of Wasting, 2015-16 and 2019-21

		2015-	-16		2019-21					
Indicators	Wasted	Not-wasted	Total	Chi- square	Wasted	Not-wasted	Total	Chi- square		
		e Child								
Male	54.1	50.7	51.4	7.80	53.7	52.5	52.7	0.75		
Female	45.9	49.3	48.6	(0.005)	46.3	47.6	47.3	(0.38)		
Age groups										
0 to 5 Months	11.7	6.8	7.8		14.8	8.6	9.7			
6 to 11 Months	13.7	8.8	9.8	101.40	11.3	9.1	9.5	10.52		
12 to 23 Months	20.8	19.6	19.8	(0.00)	20.8	19.0	19.3	48.33		
24 to 35 Months	19.7	21.5	21.1	(0.00)	18.8	20.7	20.3	(0.00)		
36 to 56 Months	34.2	43.4	41.5		34.4	42.7	41.2			
		S	Social G	roups						
SC	22.0	22.6	22.5	128.97	26.9	21.5	22.5	66.17		
ST	37.8	25.4	28.0	(0.00)	37.1	28.0	29.7	(0.00)		

OBC	29.7	33.5	32.7		24.4	33.7	32.0			
Other Caste	10.6	18.5	16.9		11.7	16.8	15.9			
		P	lace of re	esidence						
Rural	87.9	84.9	85.5	6.01	88.6	85.6	86.2	3.45		
Urban	12.1	15.1	14.5	(0.014)	11.4	14.4	13.8	(0.06)		
		Mothe	ers level o	of education				. , ,		
Illiterate	36.8	26.0	28.2		24.4	19.5	20.4			
Primary	15.2	14.3	14.5	06.22	15.4	13.2	13.6	25.57		
Secondary	44.4	54.1	52.1	96.22	53.9	58.2	57.4	25.57		
Higher Secondary and above	3.5	5.7	5.2	(0.00)	6.3	9.1	8.6	(0.00)		
)								
Poorest	47.7	36.9	39.1		47.2	34.9	37.1			
Poorer	25.9	26.5	26.4	04.00	24.4	24.9	24.8	70.00		
Middle	15.8	19.8	19.0	84.23	15.0	19.1	18.4	/0.08		
Richer	7.8	11.7	10.9	(0.00)	9.7	13.5	12.8	(0.00)		
Richest	2.8	5.1	4.7		3.7	7.7	7.0			
Type of fuel used for cooking										
Clean Fuel	13.5	19.0	17.9	22.45	24.4	33.6	31.9	22.12		
Solid Fuel	86.4	80.9	82.0	32.43	75.6	66.4	68.0	32.13		
Not Cooked & Other	0.1	0.1	0.1	(0.00)	0.1	0.1	0.1	(0.00)		
			Type of	toilet						
Improved toilet	19.0	25.9	24.5	36.16	46.2	55.8	54.1	23.81		
Not improved toilet	81.0	74.1	75.5	(0.00)	53.8	44.2	45.9	(0.00)		
		Sourc	e of drir	iking water						
Improved water	73.9	70.5	71.2	10.53	90.0	90.6	90.5	0.04		
Not improved water	26.1	29.5	28.8	(0.001)	10.0	9.4	9.5	(0.84)		
		Havin	g Agricu	ltural Land						
Small Farm	85.4	86.5	86.3		88.9	87.4	87.7			
Semi Medium Farm	9.0	7.2	7.6	2.71	7.1	7.9	7.8	3.35		
Medium Farm	2.9	3.6	3.4	(0.44)	2.3	3.0	2.9	(0.34)		
Large Farm	2.8	2.7	2.7		1.7	1.7	1.7			
		H	olding B	PL card						
Yes	42.9	38.9	39.7	10.38	53.8	45.8	47.2	16 70		
No	57.1	61.1	60.3	(0.006)	46.2	54.2	52.8	(0, 00)		
Don't Know	0.0	0.1	0.1	(0.000)	0.0	0.0	0.0	(0.00)		

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent. Source: Authors estimation using NFHS 4 and 5 data.

Incidence of wasting, underweight and anaemia showed similar associations with socioeconomic variables with a minor difference. Incidence of wasting had a significant association with gender in 2015-16 but turns insignificant by 2019-21 (Table 2.16). The source of drinking water does not show a significant association with wasting either. For the rest of the variables, wasting shows a significant association similar to stunting. The association between gender and incidence of underweight was insignificant in 2015-16 but turned significant in 2019-21 (Table 2.17). The source of drinking water again found a significant association for underweight children in 2019-21. Incidence of anaemia differ from stunting in terms of insufficient association with the source of drinking water (similar to the case with wasting and underweight) in 2019-21 and size of agricultural holding being significant in 2015-16 (Table 2.18). Overall, caste, wealth of the household, age of the child, sanitation, and mother's level of education consistently show association with the nutritional status of children.

Indicators Under Weight Not under weight Total square Square Weight Not under weight Not under weight Total weight Schi- square Male 51.88 51.09 51.36 1.59 49.77 53.95 52.71 7.94 Female 48.12 48.91 48.64 (0.21) 50.23 46.05 47.29 (0.00) Female 6.55 8.42 7.78 50.23 10.07 10.76 10.55 25.23 (0.00) 21.23 21.03 21.13 30.85 41.52 22.34 (0.00) 20.21 19.96 20.04 (0.00) SC 22.91 22.22 22.46 24.94 21.32 22.4 25.4 ST 39.22 21.99 27.95 84.14 25.6 18.83 15.81 Other Caste 9.77 20.64 16.32 41.45 0.00 9.91 15.24 13.66 0.00 Ithreat 8.897 83.67 85.5 49.03 9.0			2015-16				2019-21						
Number of the Constraint of the sector of the Constraint of	Indicators	Under	Not under		Chi-	Under	Not under		Chi-				
Sex of the C-hild Sex of the C-hild Sec of the C-hild		Weight	weight	Total	square	Weight	weight	Total	square				
Male 51.88 51.09 51.36 1.59 49.77 53.95 52.71 7.94 Female 48.12 48.91 48.64 (0.21) 50.23 46.05 47.29 (0.00) Ot o S Months 6.55 8.42 7.78 50.23 40.05 7.25 10.07 10.76 10.55 6 to 11 Months 7.91 10.72 9.75 52.33 7.25 10.07 10.76 2.52.3 2 to 33 Months 21.32 21.03 21.13 60.01 42.8 39.65 40.57 SC 22.91 22.22 22.46 42.8 39.65 40.57 OBC 28.09 35.14 32.71 0.00 24.11 35.16 31.87 0.00 OHE 28.09 35.14 32.71 0.00 90.09 84.76 86.34 27.75 ODE 28.09 35.14 32.71 0.00 90.09 84.76 86.34 27.75 Urban 11.03 </th <th></th> <th>6</th> <th>Se</th> <th>x of the (</th> <th>Child</th> <th>6</th> <th>8</th> <th></th> <th>1</th>		6	Se	x of the (Child	6	8		1				
Female 48.12 48.91 48.64 (0.21) 50.23 46.05 47.29 (0.00) 46.05 47.29 (0.00) 0 to 5 Months 7.91 10.72 9.75 (0.01) 10.76 10.55 7.25 10.67 9.66 25.23 (0.00) 36 to 56 Months 44.7 39.85 41.52 (0.00) 24.28 39.63 40.57 SC 22.21 22.22 22.46 24.94 21.32 22.4 24.94 21.32 22.4 ST 39.22 21.99 27.95 441.40 42.36 24.68 29.92 281.31 OBC 28.97 36.67 85.5 49.03 90.09 84.76 86.34 27.75 Other Caste 97.7 20.64 16.33 14.54 0.00 9.11 15.24 13.64 12.84 27	Male	51.88	51.09	51.36	1.59	49.77	53.95	52.71	7.94				
Age groups Ion S Solution	Female	48.12	48.91	48.64	(0.21)	50.23	46.05	47.29	(0.00)				
0 to 5 Months 6.55 8.42 7.78 10.72 9.78 7.25 10.07 10.76 10.55 25.23 12 to 23 Months 21.32 21.03 21.13 0.00 21.99 9.983 (0.00) 24.28 39.63 40.57 36 to 56 Months 44.7 39.85 41.52 22.48 24.28 39.63 40.57 ST 39.22 21.99 27.95 341.40 42.26 24.68 29.92 281.31 OBC 28.09 35.14 32.71 (0.00) 24.11 35.16 31.87 20.00 Other Caste 9.77 20.64 16.89 86.69 18.83 15.81 Place of restores Rural 88.97 83.67 85.5 49.03 90.09 84.76 86.34 27.75 Urban 11.03 16.33 14.5 (0.00) 31.34 15.86 20.46 (0.00) 24.11 56.66 (0.00) 37.78 296.69		Age groups											
6 to 11 Months7.9110.729.755.337.2510.679.669.25.33(0.00)12 to 23 Months13.5219.9919.839.33(0.00)19.6811.89819.189.06(0.00)36 to 56 Months44.739.8541.5222.0119.9620.0442.839.6340.57Social Cross22.9122.2222.4639.6341.5224.4421.3224.4325.33(0.00)Sol to 56 Months44.739.8541.5224.4442.2624.6829.92281.31OBC29.0122.2222.4431.4442.2624.6829.92281.31OBC29.0720.6431.71(0.00)24.1135.1631.87(0.00)Other Caste9.7720.6485.549.0390.0984.7686.3427.75Mother Caste9.7720.6485.749.0390.0984.7686.3427.75Other Caste9.7720.6421.2228.6911.8213.8629.66Mother Caste39.622.2528.2131.3415.8620.4629.66.9Other Caste39.622.5228.2131.3415.8620.4629.66.9Mighter Secondary41.3857.6925.1231.3415.8620.4629.66.9Mighter Secondary23	0 to 5 Months	6.55	8.42	7.78		10.07	10.76	10.55					
12 to 23 Months 19.52 19.99 19.83 52.33 19.68 18.98 19.18 20.23 24 to 35 Months 21.32 21.03 21.13 (0.00) 20.21 19.96 20.04 (0.00) 36 to 56 Months 24.73 39.82 41.52 22.81 39.63 40.57 SC 22.91 22.22 22.46 24.94 21.32 22.41 31.81 (0.00) OBC 28.09 35.14 32.71 (0.00) 24.11 35.16 31.87 (0.00) OBC 28.09 35.14 32.71 (0.00) 24.11 35.16 31.87 (0.00) Other Caste 9.77 20.64 16.89 8.69 18.83 15.81 (0.00) Urban 11.03 16.33 14.49 (0.00) 9.91 15.24 13.66 (0.00) Secondary 41.38 57.69 52.1 (0.00) 3.77 10.65 8.61 Higher Secondary 50.77 <th>6 to 11 Months</th> <th>7.91</th> <th>10.72</th> <th>9.75</th> <th>50.00</th> <th>7.25</th> <th>10.67</th> <th>9.66</th> <th>25.22</th>	6 to 11 Months	7.91	10.72	9.75	50.00	7.25	10.67	9.66	25.22				
24 to 35 Months21.3221.0321.13(0.00)20.2119.9620.04(0.00)36 to 56 Months44.739.8541.5220.4442.839.6340.57SC22.9122.2222.46341.4042.2624.9421.3222.4ST39.2221.9927.95341.4042.2624.6829.9228.131OBC28.0935.1432.71(0.00)86.918.8315.81(0.00)Other Caste9.7720.6416.8990.0984.7686.3427.75(0.00)Urban11.0316.3314.55(0.00)9.9115.2413.66(0.00)Urban11.0316.3314.49(0.00)9.9115.2413.66(0.00)Pimary16.7213.3314.49(1.62612.4613.5929.69(0.00)Secondary41.3857.6952.1(0.00)3.7710.658.6141.80(0.00)Poorest50.7733.0139.1253.2830.9537.5824.0624.5924.0641.82(0.00)Richer60.8813.4210.8912.613.5814.89(0.00)10.2413.5841.82(0.00)Richer50.3735.1531.5824.0624.5918.2412.620.9918.2411.82(0.00)Richer60.8313.4210.8925.8824.0624.5918.821	12 to 23 Months	19.52	19.99	19.83	52.33	19.68	18.98	19.18	25.23				
36 to 56 Months44.739.8541.5242.839.6340.57Social StructureSC22.9122.2222.4621.3222.428.131OBC28.0935.1432.71(0.00)24.1135.1631.87(0.00)Other Caste9.7720.6416.89(0.00)24.1135.1631.87(0.00)Other Caste9.7720.6416.8549.0390.0984.7686.342.75Urban11.0316.3314.55(0.00)9.9115.2413.66(0.00)Secondary16.7223.3314.55(0.00)9.9115.8620.46Primary16.7223.3314.5131.3415.8620.46(0.00)Becondary41.3857.6952.1(0.00)3.7710.658.61Porest50.7733.0139.1243.7425.9824.0624.6341.82Middle12.9722.1218.97(0.00)6.3715.2412.6141.82Middle12.9723.1317.8721.623.9824.0624.6341.82Not Coked & Other0.3121.8317.8721.9942.5985.9454.09(0.00)Clean Fuel10.3121.8317.8721.9943.6463.1331.8515.87Soid Fuel0.3277.1271.2173.2689.9299.3390.4414.90	24 to 35 Months	21.32	21.03	21.13	(0.00)	20.21	19.96	20.04	(0.00)				
Social GroupsSecial GroupsSC2.2.212.4.942.1.3.22.4.942.1.3.22.4.942.1.3.22.4.942.1.3.22.4.942.1.3.22.4.942.1.3.22.4.942.1.3.22.4.942.1.3.22.4.942.1.3.22.4.942.2.42.1.3.13.4.4.2.62.4.6.82.3.1.3.13.4.9.73.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.978.8.972.2.2.22.2.22.2.22.2.22.2.1.22.1.6.12.1.6.12.1.6.12.1.6.12.1.6.12.1.6.12.1.6.12.1.6.12.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.22.2.1.2 </th <th>36 to 56 Months</th> <th>44.7</th> <th>39.85</th> <th>41.52</th> <th></th> <th>42.8</th> <th>39.63</th> <th>40.57</th> <th></th>	36 to 56 Months	44.7	39.85	41.52		42.8	39.63	40.57					
SC22.9122.2222.4624.9421.3222.42ST39.2221.9927.95341.4042.2624.6829.92281.31Other Caste9.7720.6416.8924.1135.1631.87(0.00)Other Caste9.7720.6416.898.6918.8315.81(0.00)88.9783.6785.549.0390.0984.7686.3427.75Rural88.9783.6785.549.0390.0984.7686.3427.75Brinary16.7213.3314.4941.3857.6952.116.2612.4613.5620.66Primary16.7213.3314.4941.3857.6952.141.3315.8620.46296.69Becondary41.3857.6952.163.2830.9537.58296.6920.0984.768.6134.92Middle12.9722.1212.6349.4215.2411.636.254.94.215.8620.66411.82Niddle16.316.254.661.769.176.9741.8220.6915.2413.5841.8220.69Not Cooked & Other0.180.080.1221.9936.5131.5845.9720.6922.6620.0924.1625.9624.16Not Cooked & Other0.180.080.1221.9921.9923.1524.1524.1624.1624.1624.16 <th></th> <th></th> <th>Se</th> <th>ocial Gro</th> <th>oups</th> <th></th> <th></th> <th></th> <th></th>			Se	ocial Gro	oups								
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	SC	22.91	22.22	22.46		24.94	21.32	22.4					
OBC 28.09 35.14 32.71 (0.00) 24.11 35.16 31.87 (0.00) Other Caste 9.77 20.64 16.89 80.01 18.80 18.81 15.81 (0.00) Rural 88.97 83.67 85.5 49.03 90.09 84.76 86.34 27.75 Urban 11.03 16.33 14.5 (0.00) 9.91 15.24 13.66 (0.00) Mither Secondary 16.72 13.33 14.49 41.390 31.34 15.86 20.46 16.26 12.46 13.59 (0.00) Secondary 41.38 57.69 52.1 41.390 31.34 15.86 20.46 (0.00) 3.77 10.65 8.61 Higher Secondary 2.3 6.73 5.21 49.42 41.82 25.98 24.06 24.63 Middle 12.97 22.12 18.97 49.42 25.98 24.06 24.63 Richer 6.08 13.42 1	ST	39.22	21.99	27.95	341.40	42.26	24.68	29.92	281.31				
Other Caste9.7720.6416.898.6918.8315.81Pice of residenceRural88.9783.6785.549.0390.0984.7686.3427.75Rural11.0316.3314.5(0.00)9.9115.2413.66(0.00)Mothers Ver lor EducationMothers Ver lor EducationMothers Ver lor EducationPrimary16.7213.3314.4941.39048.6461.0357.35(0.00)Becondary41.3857.6952.1(0.00)3.7710.658.61(0.00)Higher Secondary and above2.36.735.2153.2830.9537.58296.69Middle12.9722.1218.97(0.00)48.7680.9537.5841.82Poorest50.7733.0139.1253.2830.9537.5841.82Richer6.0813.4210.89494.212.6620.5918.2241.82Richer1.636.254.6410.769.176.9741.82Solid Fuel99.5178.0882.01(0.00)21.2413.9926.5131.58158.97Solid Fuel89.5178.0882.01(0.00)57.4141.0645.91(0.00)Not Cooked & Other0.180.080.1217.9942.5958.9454.09(2.69Not Cooked & Other0.180.080.12<	OBC	28.09	35.14	32.71	(0.00)	24.11	35.16	31.87	(0.00)				
Place of residence Rural 88.97 83.67 85.5 49.03 90.09 84.76 86.34 27.75 Urban 11.03 16.33 14.5 (0.00) 9.91 15.24 13.66 (0.00) Illiterate 39.6 22.25 28.2 28.2 31.34 15.86 20.46 Primary 16.72 13.33 14.49 413.90 6.62 16.26 12.46 13.59 296.69 Secondary 41.38 57.69 52.1 413.90 46.62 10.65 8.61 Width 2.3 6.73 5.21 90.00 37.7 10.65 8.61 Poorest 50.77 33.01 39.12 43.28 30.95 37.58 296.69 Middle 12.97 22.12 18.97 60.07 13.61 91.9 36.51 31.58 60.07 15.24 12.61 90.79 91.7 6.97 Richer 1.63 6.25 4.60	Other Caste	9.77	20.64	16.89		8.69	18.83	15.81					
Rural 88.97 83.67 85.5 49.03 90.09 84.76 86.34 27.75 Urban 11.03 16.33 14.5 (0.00) 9.91 15.24 13.66 (0.00) Illiterate 39.6 22.25 28.2 31.34 15.86 20.46 13.59 Primary 16.72 13.33 14.49 41.39 48.64 61.03 57.35 296.69 Secondary 41.38 57.69 52.1 0.00 3.77 10.65 8.61 296.69 Midper Secondary 2.3 6.73 5.21 0.00 3.77 10.65 8.61 0.00 Poorest 50.77 33.01 39.12 494.2 0.00 12.6 20.99 18.22 (0.00) Richer 1.63 6.25 4.60 12.6 20.99 18.22 (0.00) Richer 1.63 6.25 4.60 12.6 20.51 31.58 15.87 (0.00) 0.00 0.0			Pla	ce of res	idence								
Urban 11.03 16.33 14.5 (0.00) 9.91 15.24 13.66 (0.00) Mothers level of education Illiterate 39.6 22.25 28.2 31.34 15.86 20.46 35.97 Secondary 41.38 57.69 52.1 41.390 48.64 61.03 57.35 296.69 Higher Secondary and above 2.3 6.73 5.21 41.390 37.71 10.65 8.61 Poorest 50.77 33.01 39.12 53.28 30.95 37.58 296.69 Middle 12.97 22.12 18.97 494.2 6.37 15.24 12.61 411.82 Richer 6.08 13.42 10.89 25.98 24.06 24.63 411.82 Richer 0.63 13.42 10.89 21.99 36.51 31.58 158.97 Solid Fuel 89.51 78.08 82.01 0.00 57.41 41.06 45.91 (0.00)	Rural	88.97	83.67	85.5	49.03	90.09	84.76	86.34	27.75				
Mothers level of education Illicrate 39.6 22.25 28.2 31.34 15.86 20.46 35.9 Primary 16.72 13.33 14.49 16.66 12.46 13.59 296.69 Secondary 41.38 57.69 52.1 (0.00) 48.64 61.03 57.35 296.69 Higher Secondary and above 2.3 6.73 5.21 (0.00) 3.77 10.65 8.61 Poorest 50.77 33.01 39.12 53.28 30.95 37.58 41.38 Poorer 28.55 25.21 26.63 494.2 53.28 30.95 37.58 41.38 Richer 6.08 13.42 10.89 51.24 12.61 13.54 15.89 Richest 1.63 6.25 4.66 17.6 9.17 6.91 6.08 15.89 Solid Fuel 10.31 21.83 17.87 21.390 80.08 63.41 68.36 158.97 <th< th=""><th>Urban</th><th>11.03</th><th>16.33</th><th>14.5</th><th>(0.00)</th><th>9.91</th><th>15.24</th><th>13.66</th><th>(0.00)</th></th<>	Urban	11.03	16.33	14.5	(0.00)	9.91	15.24	13.66	(0.00)				
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$			Mothers	s level of	education	n							
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Illiterate	39.6	22.25	28.2		31.34	15.86	20.46					
Secondary and above 41.38 57.69 52.1 41.09 (0.00) 48.64 61.03 57.35 2000 Higher Secondary and above 2.3 6.73 5.21 0.00) 3.77 10.65 8.61 Poorest 50.77 33.01 39.12 48.64 61.03 57.35 (0.00) Poorest 50.77 33.01 39.12 494.2 53.28 30.95 37.58 411.82 Poorest 6.08 13.42 10.89 494.2 6.37 15.24 12.61 411.82 Richest 1.63 6.25 4.66 17.67 9.17 6.97 Solid Fuel 89.51 78.08 82.01 0.00 0.02 0.08 0.01 Solid Fuel 89.51 78.08 82.01 0.00 0.02 0.08 0.06 Not Cooked & Other 0.18 0.08 0.12 88.08 63.41 68.36 0.00 Improved toilet 16.22 28.88 24.52 <th< th=""><th>Primary</th><th>16.72</th><th>13.33</th><th>14.49</th><th>413 90</th><th>16.26</th><th>12.46</th><th>13.59</th><th>296 69</th></th<>	Primary	16.72	13.33	14.49	413 90	16.26	12.46	13.59	296 69				
Higher Secondary and above 2.3 6.73 5.21 (6.00) 3.77 10.65 8.61 Poores 50.77 33.01 39.12 53.28 30.95 37.58 44.63 Poorer 28.55 25.21 26.36 494.2 53.28 24.06 24.63 411.82 Middle 12.97 22.12 18.97 (0.00) 6.37 15.24 12.61 (0.00) Richer 6.08 13.42 10.89 (0.00) 6.37 15.24 12.61 (0.00) Solid Fuel 16.3 6.25 4.66 1.76 9.17 6.97 Solid Fuel 10.31 21.83 17.87 213.90 80.08 63.41 68.36 (0.00) Not Cooked & Other 0.18 0.08 0.12 0.00 80.08 63.41 68.36 (0.00) Not improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 126.69 Not improved water	Secondary	41.38	57.69	52.1	(0.00)	48.64	61.03	57.35	(0.00)				
and above Lio Orice <	Higher Secondary	23	6 73	5 21	(0.00)	3 77	10.65	8 61	()				
Wealth Quintile (Household) Poorest 50.77 33.01 39.12 49.22 53.28 30.95 37.58 411.82 Poorer 28.55 25.21 26.36 494.2 (0.00) 12.6 20.59 18.22 411.82 Middle 12.97 22.12 18.97 (0.00) 12.6 20.59 18.22 (0.00) Richer 6.08 13.42 10.89 (0.00) 16.37 15.24 12.61 Richest 1.63 6.25 4.66 17.6 9.17 6.91 (0.00) Solid Fuel 10.31 21.83 17.87 213.90 80.08 63.41 68.36 (0.00) Not Cooked & Other 0.18 0.08 0.12 19.9 36.51 31.58 158.97 Solid Fuel 89.51 78.08 82.01 (0.00) 0.02 0.08 0.02 Not cooked & Other 0.08 0.12 179.90 42.59 58.94 54.09 126.69 <th>and above</th> <th>2.5</th> <th>0175</th> <th>0.21</th> <th></th> <th>5.77</th> <th>10.02</th> <th>0.01</th> <th></th>	and above	2.5	0175	0.21		5.77	10.02	0.01					
Poorest 50.77 33.01 39.12 53.28 30.95 37.58 Poorer 28.55 25.21 26.36 494.2 (0.00) 12.6 20.59 18.22 411.82 Middle 12.97 22.12 18.97 (0.00) 12.6 20.59 18.22 (0.00) Richer 6.08 13.42 10.89 (0.00) 6.37 15.24 12.61 (0.00) Kichest 1.63 6.25 4.66 7 9.17 6.97 (0.00) Clean Fuel 10.31 21.83 17.87 213.90 19.9 36.51 31.58 158.97 Solid Fuel 89.51 78.08 82.01 (0.00) 80.08 63.41 68.36 (0.00) Not Cooked & Other 0.18 0.08 0.12 71.90 42.59 58.94 54.09 126.69 Not improved toilet 16.22 28.88 24.52 179.90 57.41 41.06 45.91 (0.00)	_		Wealth Q	Quintile (Househol	d)							
Poorer 28.55 25.21 26.36 494.2 25.98 24.06 24.63 411.82 Middle 12.97 22.12 18.97 (0.00) 12.6 20.59 18.22 (0.00) Richer 6.08 13.42 10.89 (0.00) 6.37 15.24 12.61 (0.00) Richest 1.63 6.25 4.66 (0.00) 16.37 15.24 12.61 (0.00) Clean Fuel 10.31 21.83 17.87 213.90 (0.00) 36.51 31.58 158.97 Solid Fuel 89.51 78.08 82.01 (0.00) 20.02 0.08 0.06 Not Cooked & Other 0.18 0.08 0.12 179.90 42.59 58.94 54.09 126.69 Not improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 (0.00) Mot improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44	Poorest	50.77	33.01	39.12		53.28	30.95	37.58					
Middle 12.97 22.12 18.97 (0.00) 12.6 20.59 18.22 (0.00) Richer 6.08 13.42 10.89 (0.00) 6.37 15.24 12.61 (0.00) Richest 1.63 6.25 4.66 1.76 9.17 6.97 6.97 Clean Fuel 10.31 21.83 17.87 213.90 19.9 36.51 31.58 158.97 (0.00) Solid Fuel 89.51 78.08 82.01 (0.00) 0.02 0.08 0.06 (0.00) Not Cooked & Other 0.18 0.08 0.12 179.90 42.59 58.94 54.09 126.69 Not improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 126.69 Not improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07	Poorer	28.55	25.21	26.36	494.2	25.98	24.06	24.63	411.82				
Richer 6.08 13.42 10.89 (1.9) (6.37) 15.24 12.61 (1.76) Richest 1.63 6.25 4.66 1.76 9.17 6.97 Clean Fuel 10.31 21.83 17.87 213.90 19.9 36.51 31.58 158.97 Solid Fuel 89.51 78.08 82.01 (0.00) 0.02 0.08 0.06 (0.00) Not Cooked & Other 0.18 0.08 0.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Not improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 126.69 Not improved toilet 83.78 71.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Not improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07	Middle	12.97	22.12	18.97	(0.00)	12.6	20.59	18.22	(0.00)				
Richest 1.63 6.25 4.66 1.76 9.17 6.97 Type of fuel used for cooking Type of fuel used for cooking Clean Fuel 10.31 21.83 17.87 213.90 19.9 36.51 31.58 158.97 Solid Fuel 89.51 78.08 82.01 (0.00) 40.08 63.41 68.36 158.97 Not Cooked & Other 0.18 0.08 0.12 213.90 80.08 63.41 68.36 158.97 Improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 126.69 Not improved toilet 83.78 71.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Mot improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Mot improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Small Farm 88.18 85.21 <th< th=""><th>Richer</th><th>6.08</th><th>13.42</th><th>10.89</th><th></th><th>6.37</th><th>15.24</th><th>12.61</th><th></th></th<>	Richer	6.08	13.42	10.89		6.37	15.24	12.61					
Clean Fuel 10.31 21.83 17.87 213.90 19.9 36.51 31.58 158.97 Solid Fuel 89.51 78.08 82.01 213.90 80.08 63.41 68.36 158.97 Not Cooked & Other 0.18 0.08 0.12 213.90 80.08 63.41 68.36 158.97 Improved toilet 0.18 0.08 0.12 179.90 42.59 58.94 54.09 126.69 Not improved toilet 83.78 71.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Mot improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Small Farm 88.18 85.21 86.26 23.22 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.	Richest	1.63	6.25	4.66	<u> </u>	1.76	9.17	6.97					
Clean Fuel10.3121.8317.87 78.08213.90 82.0119.936.5131.58 31.58158.97 (0.00)Solid Fuel89.5178.0882.01(0.00)80.0863.4168.36 (0.00)10.0210.080.06Not Cooked & Other0.180.080.12(0.00)80.0863.4168.36 (0.00)158.97 (0.00)Type of toiletImproved toilet16.2228.8824.52179.9042.5958.9454.09126.69 (0.00)Not improved toilet83.7871.1275.48 (0.00)(0.00)57.4141.0645.91 (0.00)(0.00)Source of drinking waterImproved water73.2970.1271.21 (1.21)13.2689.2690.9390.44 (0.22)1.49 (0.22)Mot improved water26.7129.8828.79 (0.00)(0.00)10.749.07 (0.02)9.56 (0.22)(0.22)Having Agricultural Land88.1885.2186.26 (2.32)88.7687.4387.83 (7.13)5.72 (0.13)Medium Farm7.167.847.6 (3.97)2.053.142.81 (0.13)(0.13)		10.21	Type of f	uel used	for cooki	ng	26.51	21.50					
Solid Fuel 89.51 78.08 82.01 (0.00) 80.08 63.41 68.36 (0.00) Not Cooked & Other 0.18 0.08 0.12 (0.00) 0.02 0.08 0.06 (0.00) Improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 126.69 Not improved toilet 83.78 71.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Source of drinking water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Having Agricultural Land 54.04 7.6 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Clean Fuel	10.31	21.83	1/.8/	213.90	19.9	36.51	31.58	158.97				
Not Cooked & Other 0.18 0.08 0.12 0.02 0.08 0.06 0.06 Improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 126.69 Not improved toilet 83.78 71.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Source of drinking water Improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Having Agricultural Land Small Farm 88.18 85.21 86.26 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Solid Fuel	89.51	/8.08	82.01	(0.00)	80.08	63.41	68.36	(0.00)				
Improved toilet 16.22 28.88 24.52 179.90 42.59 58.94 54.09 126.69 Not improved toilet 83.78 71.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Source of drink water Improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Having Agricultural Land Small Farm 88.18 85.21 86.26 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Not Cooked & Other	0.18	0.08	0.12	- 1 - 4	0.02	0.08	0.06					
Improved toilet 16.22 28.88 24.32 179.90 42.39 38.94 34.09 126.69 Not improved toilet 83.78 71.12 75.48 (0.00) 57.41 41.06 45.91 (0.00) Source of drinking water Improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Having Agricultural Land Small Farm 88.18 85.21 86.26 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Improved toilet	16.22	20.00	ype of to	170.00	12 50	59.04	54.00	126.60				
Not improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Having Agricultural Land Small Farm 88.18 85.21 86.26 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Not improved toilet	10.22 92.79	20.00	24.32	1/9.90	42.39		45.01	120.09				
Source of drinking water Improved water 73.29 70.12 71.21 13.26 89.26 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Having Agricultural Land Small Farm 88.18 85.21 86.26 88.76 87.43 87.83 5.72 Semi Medium Farm 7.16 7.84 7.6 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Not improved tonet	03./0	/1.12	of drink	(0.00)	57.41	41.00	43.91	(0.00)				
Improved water 73.25 70.12 71.21 13.20 89.20 90.93 90.44 1.49 Not improved water 26.71 29.88 28.79 (0.00) 10.74 9.07 9.56 (0.22) Having Agricultural Land Small Farm 88.18 85.21 86.26 88.76 87.43 87.83 Semi Medium Farm 7.16 7.84 7.6 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Improved water	73 20	70.12	71 21	12 26	80.26	00.03	00.44	1.40				
Not improved water 20.71 23.88 28.79 (0.00) 10.74 9.07 9.30 (0.22) Having Agricultural Land Small Farm 88.18 85.21 86.26 88.76 87.43 87.83 5.72 Semi Medium Farm 7.16 7.84 7.6 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Not improved water	75.29	20.88	28 70	(0.00)	10.74	90.93	90.44	(0.22)				
Small Farm 88.18 85.21 86.26 88.76 87.43 87.83 Semi Medium Farm 7.16 7.84 7.6 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Not improved water	20.71	29.00 Hoving	20.79	(0.00)	10.74	9.07	9.30	(0.22)				
Semi Medium Farm 7.16 7.84 7.6 2.32 7.04 8 7.71 5.72 Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Small Farm	88.18	85.21	86.26	ulai Laill	88 76	87.43	87.83					
Medium Farm 2.37 3.97 3.4 (0.51) 2.05 3.14 2.81 (0.13)	Semi Medium Farm	7 16	7 84	7.6	2 32	7 04	8	7 71	5 72				
1.1.1 2.57 5.77 5.77 (0.51) 2.05 5.17 2.01 (0.15)	Medium Farm	2 37	3.97	3.4	(0.51)	2.05	3 14	2.81	(0.13)				
Large Farm 2.3 2.97 2.73 2.14 1.42 1.64	Large Farm	2.37	2.97	2 73	(0.51)	2.05	1 42	1 64	(0.15)				
Holding RPL card	1.41 5v 1 41 III	2.3	Hol	ding RP	L card	2.17	1.72	1.07					
Yes 45.35 36.71 39.68 57.45 55.07 44.2 47.43 53.08	Yes	45.35	36.71	39.68	57.45	55.07	44.2	47.43	53.08				
No 54.62 63.23 60.27 (0.00) 44.91 55.78 52.55 (0.00)	No	54.62	63.23	60.27	(0.00)	44.91	55.78	52.55	(0.00)				

Table 2.17 Cofactors of Underweight, 2015-16 and 2021

Don't Know	0.03	0.06	0.05		0.02	0.02	0.02			
Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, 0.01$										
0.05- significant at 5 percent, $p \le 0.01$ - significant at 1 percent.										

Source: Authors estimation using NFHS 4 and 5 data.

Indicators			2	015-16					20	19-21		
	Seve	Moder	Mil	Not	Total	Chi-	Seve	Moder	Mild	Not	Tota	Chi-
	re	ate	d	Anaemic		square	re	ate		Anaemi	1	square
										с		
			Sex o	of the Child								
Male	48.4	53.1	49.1	51.9	51.4	3.17	53.6	51.6	53.4	53.8	53.0	2.56
Female	51.6	46.9	50.9	48.1	48.6	(0.37)	46.5	48.4	46.6	46.2	47.0	(0.46)
			Ag	e groups		100.01						
0 to 5 Mon	ths	164	11.0	()	10.1	402.21	10.0	150	0.7	6 7	10.6	2 (2 02
6 to 11 Martha	20.1	16.4	11.8	6.9	10.1	(0.00)	19.8	15.2	9.7	6.7	10.6	363.83
	24.0	20.2	22.0	19.0	21.7		25.2	201	10.0	15.6	21.2	(0.00)
12 10 25 Months	54.0	50.2	22.0	18.0	21./		55.5	20.4	19.9	13.0	21.5	
24 to 35	17.6	22.0	23.7	23.2	23.0		28.3	21.6	26.3	19.8	22.5	
Months	17.0	22.0	23.1	23.2	23.0		20.5	21.0	20.5	17.0	22.5	
36 to 56	27.5	31.4	41.6	51.9	45.3		16.6	34.9	44.1	57.9	45.6	
Months	27.0	0111		0119			10.0	0 115		0,10		
			Soci	al Groups								
SC	17.6	22.3	24.9	22.2	22.9	440.9	34.6	23.8	22.7	20.3	22.4	138.49
ST	33.2	41.9	32.7	21.3	28.2	(0.00)	37.2	37.4	30.5	23.6	30.4	(0.00)
OBC	38.3	28.9	29.8	35.1	32.6		20.3	27.6	32.6	35.7	31.9	
Other Caste	10.9	7.0	12.6	21.5	16.4		7.9	11.2	14.3	20.4	15.3	
					Place of	f residenc	e					
Rural	95.4	89.2	86.4	84.0	85.7	12.78	93.3	90.1	86.4	83.7	86.7	30.49
Urban	4.6	10.8	13.6	16.0	14.3	(0.005	6.7	9.9	13.6	16.3	13.3	(0.00)
)						
				Mot	thers lev	el of educ	ation			1 6 9		
Illiterate	40.2	41.6	33.7	22.4	29.0	298.56	21.0	24.5	22.4	16.8	21.1	77.84
Primary	12.9	15.1	14.9	14.4	14.7	(0.00)	20.6	15.4	14.3	12.1	13.9	(0.00)
Secondary	45.6	40.7	47.1	56.9	51.3		54.1	54.4	56.1	61.1	57.2	
Higher	1.3	2.6	4.2	6.3	5.0		4.3	5.7	1.3	10.1	1.1	
secondary												
				Wea	th Quin	tile (Hous	ehold)					
Poorest	42.8	50.2	43 5	34 5	39.8	244.2	54.3	457	37.9	31.3	383	113 37
Poorer	25.7	27.0	27.0	26.1	26.5	(0.00)	18.1	24.5	25.1	24.9	24.8	(0.00)
Middle	22.1	14.3	17.4	20.3	18.4	()	21.6	16.1	18.2	20.1	18.2	()
Richer	9.5	6.1	8.1	13.5	10.7		4.8	9.6	12.9	14.2	12.2	
Richest	0.0	2.4	4.0	5.7	4.6		1.3	4.2	6.0	9.5	6.6	
				Туре	of fuel	used for c	ooking					
Clean Fuel	11.8	12.5	15.6	20.5	17.7	55.47	22.4	25.1	31.0	36.8	31.0	52.58
Solid Fuel	88.2	87.1	84.3	79.4	82.2	(0.00)	77.6	74.9	69.0	63.1	69.0	(0.00)
Not Cooked	0.0	0.3	0.1	0.0	0.1		0.0	0.0	0.0	0.1	0.0	
& Other												
			1		Туре	of toilet						
Improved	24.5	17.1	20.5	28.2	24.2	105.47	36.9	48.0	53.5	59.3	53.5	40.77
toilet	75.5	00.0	70.5	71.0	75.0	(0.00)	(2.1	50.1	46.5	40.7	46.5	(0.00)
INOT	/5.5	82.9	/9.5	/1.8	/5.8		63.1	52.1	46.5	40.7	46.5	
improvea												
ionci				Sat	irce of d	lrinking v	ater					
Improved	63.4	74 5	71.0	70.5	71 3	7.39	88.0	893	91.0	90.1	90.1	3.72
water	55.7	, 1.2	, 1.0	10.5	, 1.3	(0.06)	00.0	57.5	21.0	20.1	20.1	(0.29)
Not	36.6	25.5	29.0	29.5	28.7	(3.00)	12.0	10.7	9.0	9.9	9.9	()
improved	2 0.0		_,				- 2.0	2 3 . ,				

Table 2.18 Cofactors of Anaemia, 2015-16 and 2019-21

water												
Having Agricultural Land												
Small Farm	95.2	90.3	87.2	84.0	86.3	20.25	76.9	88.1	88.2	87.5	87.8	13.59
Semi	0.0	5.5	7.7	8.8	7.7	(0.02)	17.9	7.7	7.7	7.6	7.8	(0.14)
Medium												
Farm												
Medium	0.0	2.7	2.4	4.0	3.3		0.0	2.9	2.6	3.2	2.9	
Farm												
Large Farm	4.8	1.5	2.6	3.2	2.7		5.2	1.3	1.5	1.7	1.5	
Holding BPL card												
Yes	33.5	44.6	42.9	36.9	39.8	43.55	54.9	51.8	46.4	44.3	47.5	17.35
No	66.5	55.4	57.0	63.0	60.1	(0.00)	45.1	48.2	53.6	55.7	52.5	(0.01)
Don't Know	0.0	0.0	0.1	0.1	0.1		0.0	0.0	0.1	0.0	0.0	

Note: 1. The figures in parentheses are p-values. 2. $0.05 - significant at 10 percent, <math>0.01 - significant at 5 percent, <math>p \le 0.01$ - significant at 1 percent. Source: Authors estimation using NFHS 4 and 5 data.

2.4 Determinants of Nutritional Status of Children

2.4.1 Himachal Pradesh

We have used logistic regression to identify the determinants of malnutrition among children (under five years) in Himachal Pradesh. The regression is done on unit-level data from three NFHS rounds, NFHS-3, NFHS-4 and NFHS-5. These rounds correspond to three time periods 2005-06, 2015-16 and 2019-21, respectively. The results show caste to be a determinant of stunting among children (Table 2.19). Nonetheless, caste seems to be becoming less important in determining stunting. Belonging to an SC household increased likelihood of stunted by 14.2 percent at the mean (marginal effect at mean) in 2005-06. The same figure was five percent in 2015-16. In 2019-21, the likelihood of stunting among SC not only came down to 1.7 percent but also the coefficient was insignificant. The coefficient for the OBC category was significant only for 2005-06. While the caste became less important, the wealth of the household has become more important after 2005-06. The coefficients for stunting show a significantly higher incidence of stunting among less wealthy households. Belonging to the poorest group of households (lowest quintile) increased the likelihood of stunting by 12.4 percent compared to the richest group. Improved sanitation and drinking water do not have a significant effect on stunting. Mother's education has positive coefficients, but they are significant only in 2005-06. However, mother's height had a significant and large impact in all of the studied periods. Children of mothers having short stature had a 19.8 percent higher probability of being stunted in 2015-16, 23.6 percent in 2015-16 and 18.4 percent in 2019-21.

Male children are also more likely to be stunted. Being a male child increases the likelihood of stunting by 4.3 percent in 2019-21. Belonging to the older age group significantly
increases the likelihood of being stunted. In 2015-16, the children in the age group of 0 to 5 months and 6 to 11 months had 22.4 and 18.7 percent lower probability of being stunted compared to the reference category of 36 to 59 months old, respectively. Nonetheless, age groups do not show a significant effect on stunting in 2019-21 as none of the coefficients is significant at the 10 percent level. Birth order again shows a significant effect in all years with the later children having a significantly higher probability of stunting.

Table 2.19 Determin	ants of Stunting	among under	five children	in Himacha	al Pradesh
	6	, 0			

Variables (Den Vari		2005-06			2015-16		2019-21		
Stunting)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect
Household Characteristics									
Rural (Ref Urban)	0.34	1.54	0.066	-0.04	-0.16	-0.007	-0.01	-0.07	-0.003
Social Group (Ref Other Ca	ste)						·	-	
Scheduled Caste	0.7	3.45***	0.142	0.26	2.28**	0.048	0.08	0.72	0.017
Scheduled Tribe	0.27	0.69	0.053	-0.15	-0.82	-0.026	-0.01	-0.07	-0.002
Other Backward Caste	0.81	3.59***	0.165	-0.14	-0.82	-0.023	0.14	0.94	0.03
Religion (Ref None of the al	bove)								
Hindu	0	0.01	0.001	0.06	0.25	0.011	0.31	1.49	0.061
Muslim	-0.26	-0.34	-0.049	0.03	0.09	0.006	0.46	1.34	0.093
Christian	0	0***	0	0.23	0.15	0.042	0.05	0.04	0.009
Wealth (Ref Richest)	-								
Poorest	0.7	0.98	0.143	0.97	2.57***	0.18	0.61	2.46**	0.124
Poorer	0.36	0.89	0.073	0.72	3.59***	0.128	0.64	3.72***	0.131
Middle	0.11	0.4	0.023	0.58	3.71***	0.1	0.56	3.7***	0.112
Richer	-0.02	-0.1	-0.004	0.31	2.25**	0.05	0.41	2.92***	0.08
Unimproved (Ref Improved) Water	0.07	0.26	0.014	-0.41	-1.86*	-0.066	0.19	1.03	0.041
Unimproved (Ref Improved) Sanitation	-0.15	-0.67	-0.028	-0.05	-0.35	-0.008	-0.04	-0.23	-0.008
Mothers Characteristics									
Mother's Age	-0.04	-1.64	-0.008	-0.03	-2.26**	-0.006	-0.01	-0.96	-0.002
Mother's Education (Ref Hig	gher education	1)							
Illiterate	1.2	2.95***	0.233	0.05	0.17	0.008	0.37	1.45	0.08
Primary	1.1	2.75***	0.211	-0.17	-0.78	-0.028	0.01	0.07	0.003
Secondary	0.66	2.01**	0.119	0.13	0.84	0.022	0.04	0.28	0.007
Mother's Body Mass Index (Ref Normal)								
Thin (<18.5 kg/m2)	0.02	0.09	0.003	0.18	1.38	0.033	0.24	1.84*	0.052
Overweight (>=25 kg/m2)	0.1	0.32	0.019	-0.17	-1.24	-0.028	-0.19	-1.53	-0.039
Obese (>=30 kg/m2)	0.81	1.13	0.165	-0.22	-0.83	-0.037	-0.07	-0.32	-0.014
Mothers Height (Ref Long Stature)	0	0***	0	0	0***	0	0	0***	0
Short Stature	0.96	3.12***	0.198	1.14	5.33***	0.236	0.81	4.54***	0.184
Children's Characteristics	Under 5 Yea	rs)							
Male (Ref Female)	0.23	1.45	0.045	0.19	1.94*	0.033	0.21	2.28**	0.043
Age group (Ref >=36month	s)								
0 to 5 Months	-1.46	- 3.84***	-0.245	-1.61	- 5.88***	-0.224	-0.14	-0.82	-0.029
6 to 11 Months	-1.19	- 3.39***	-0.211	-1.21	- 5.93***	-0.187	-0.25	-1.55	-0.051
12 to 23 Months	-0.14	-0.67	-0.03	-0.15	-1.19	-0.029	0.15	1.25	0.033
24 to 35 Months	0.17	0.84	0.036	-0.37	-2.8***	-0.07	-0.17	-1.27	-0.034
Birth Month	-0.03	-1.29	-0.006	0	0.3	0.001	-0.02	-1.27	-0.003
Birth Order	0.23	2.63***	0.045	0.17	3.01***	0.031	0.14	2.43**	0.028

Constant	-1.04	-1.11		-0.87	-1.59	 -1.46	- 3.06***		
Number of Observation		847			2484		2388		
LR chi2(28)		142.47			203.92		109.42		
Prob > chi2		0			0	0			
Pseudo R2	0.13				0.07				
Log likelihood		-483.4			-1313.25		-1444.39		

Source: Author's estimation using NFHS 3, 4 and 5 data.

Note: *, **and *** imply statistical significance at 10%, 5% and 1% level, respectively.

The results of logit regression for incidence of wasting are given in Table 2.20. The result shows a minor effect of caste. Belonging to SC and OBC was increasing the likelihood of wasted by 3.8 and 5.5 percent compared to other caste group (reference category) in 2005-06, respectively. In 2019-21, the coefficient for SC turned insignificant. Nonetheless, children from OBC households witnessed 8.3 percent higher chances of being wasted than the reference category. Household wealth does not show any significant relation with the incidence of wasting in any of the periods under the study. Mother's education does not seem to play an important role in determining the likelihood of wasting. The age group of child did have a significant effect for the age groups 0 to 5 months and 6 to 11 months; however, the coefficients show a higher likelihood of wasting among younger age groups. Mother's body mass does seem to be playing a role in determining the likelihood of wasting by 3.8 and 9.9. percent, respectively.

Variables (Den Vari		2005-06			2015-16			2019-21	
Wasting)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect
Household Characteristics									
Rural (Ref Urban)	-0.02	-0.09	-0.003	-0.51	-2.06**	-0.071	-0.06	-0.26	-0.008
Social Group (Ref Other Caste)									
Scheduled Caste	-0.15	-0.61	-0.021	0.32	2.25**	0.038	-0.03	-0.23	-0.004
Scheduled Tribe	-1.08	-1.69*	-0.116	0.29	1.38	0.034	0.01	0.04	0.001
Other Backward Caste	0.21	0.8	0.033	0.45	2.39**	0.055	0.55	3.15***	0.083
Religion (Ref None of the above)								
Hindu	0.69	0.91	0.083	-0.05	-0.19	-0.006	0.37	1.37	0.044
Muslim	0.7	0.71	0.083	-0.05	-0.12	-0.007	-0.17	-0.36	-0.017
Christian	0	0***	0	1.3	0.86	0.234	1.19	0.94	0.183
Wealth (Ref Richest)									
Poorest	-0.36	-0.41	-0.044	-0.06	-0.12	-0.006	0.19	0.61	0.025
Poorer	0.11	0.22	0.015	0.26	1.05	0.031	0.03	0.15	0.004
Middle	0.26	0.75	0.037	0.06	0.31	0.007	0.3	1.57	0.039
Richer	0.2	0.74	0.029	0.21	1.34	0.025	0.21	1.18	0.026
Unimproved Water	-0.11	-0.35	-0.015	0.07	0.29	0.009	-0.24	-0.92	-0.029
Unimproved Sanitation	0.01	0.04	0.001	0.11	0.64	0.013	0.28	1.4	0.04
Mothers Characteristics									
Mother's Age	0	-0.01	0	0	-0.1	0	0.03	1.82*	0.004

Table 2.20 Determinants of Wasting among under five children in Himachal Pradesh

Mother's Education (Ref Higher education)												
Illiterate	-0.1	-0.22	-0.014	0.08	0.23	0.01	-0.15	-0.42	-0.017			
Primary	0.14	0.33	0.021	-0.11	-0.41	-0.013	0.5	1.97**	0.072			
Secondary	0.03	0.1	0.005	-0.05	-0.32	-0.007	0.1	0.61	0.012			
Mother's Body Mass Index (Ref 1	Normal)											
Thin (<18.5 kg/m2)	0.83	4.26***	0.132	0.28	1.78*	0.037	-0.11	-0.63	-0.015			
Overweight (>=25 kg/m2)	-0.32	-0.78	-0.036	-0.09	-0.55	-0.01	-0.3	-1.86*	-0.038			
Obese (>=30 kg/m2)	0	0***	0	-0.52	-1.49	-0.052	-0.97	- 2.81***	-0.099			
Mothers Height (Ref Long Stature)	0	0***	0	0	0***	0	0	0***	0			
Short Stature	0.48	1.47	0.077	0.22	0.83	0.029	0.35	1.55	0.051			
Children's Characteristics (Und	er 5 Years)											
Male (Ref Female)	-0.04	-0.2	-0.005	0.02	0.18	0.003	-0.03	-0.29	-0.004			
Age group (Ref >=36months)												
0 to 5 Months	0.49	1.34	0.076	0.86	4.12***	0.119	0.63	3.14***	0.098			
6 to 11 Months	0.78	2.51**	0.13	0.59	3.09***	0.076	-0.16	-0.76	-0.019			
12 to 23 Months	-0.2	-0.74	-0.025	0.11	0.64	0.011	-0.1	-0.61	-0.012			
24 to 35 Months	0.21	0.86	0.031	0.3	1.82*	0.034	0.05	0.3	0.006			
Birth Month	-0.01	-0.27	-0.001	-0.02	-1.31	-0.003	0	-0.19	0			
Birth Order	0.15	1.5	0.022	0.06	0.8	0.007	0	-0.01	0			
Constant	-2.94	-2.49**		-1.73	- 2.77***		-2.96	- 4.96***				
Number of Observation		838			2484			2338				
LR chi2(27)		46.65			53.23			55.9				
Prob > chi2	0.01				0		0					
Pseudo R2	0.06				0.03		0.03					
Log likelihood		-383.81			-997.73		-998.2					

Source: Author's estimation using NFHS 3, 4 & 5 data.

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels respectively.

The likelihood of being underweight is affected by mother's education, body mass index (BMI) and height the most (Table 2.21). The likelihood of a child being underweight increases by 13.3 percent if the mother is illiterate in comparison to a mother with higher education (the reference point) in 2019-21. Mothers having primary and secondary education too face a 9.8 percent and 5.1 percent higher chance of their child being underweight in the same year. A child of a thin mother has a 7.6 percent higher chance of being underweight than a normal BMI, whereas the children of overweight and obese mothers reduce the chance of being underweight by 3.2 and 6.5 percent, respectively. Children in the younger age group have a lower probability of being underweight. However, the coefficients turned insignificant in 2019-21. The coefficient for caste is only significant for the OBC category. Also, the effect of caste seems to have reduced over time. Belonging to the OBC category increased the chances of being underweight by 22.8 percent in 2005-06. This percentage dropped to 9.1 percent in 2019-21.

Variahles (Den Var		2005-06		2015-16			2019-21		
Variables (Dep. Var: Underweight)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect
Household Characteristics				-			-		
Rural (Ref Urban)	0.23	1.04	0.045	-0.16	-0.67	-0.026	-0.01	-0.05	-0.002
Social Group (Ref Other Cas	ste)			-			-		
Scheduled Caste	0.5	2.47**	0.1	0.25	2.03**	0.04	0.15	1.24	0.026
Scheduled Tribe	-0.08	-0.2	-0.015	-0.1	-0.5	-0.015	-0.26	-1.48	-0.042
Other Backward Caste	1.08	4.78***	0.228	0.04	0.21	0.006	0.48	3.07***	0.091
Religion (Ref None of the at	pove)			-			-		
Hindu	0.36	0.66	0.068	0.03	0.13	0.005	0.23	1.01	0.039
Muslim	0.27	0.35	0.05	-0.2	-0.46	-0.029	-0.36	-0.89	-0.052
Christian	0	0***	0	0	0***	0	0.62	0.49	0.113
Wealth (Ref Richest)									
Poorest	-0.16	-0.23	-0.031	0.53	1.36	0.085	0.27	1.05	0.048
Poorer	0.31	0.77	0.062	0.33	1.53	0.05	0.21	1.13	0.036
Middle	0.16	0.54	0.031	0.26	1.54	0.039	0.28	1.72*	0.048
Richer	-0.04	-0.17	-0.008	0.3	2.07**	0.045	0.09	0.57	0.014
Unimproved (Ref	-0.02	-0.08	-0.004	-0.11	-0.48	-0.016	0.03	0.13	0.005
Improved) Water									
Unimproved (Ref Improved) Sanitation	0.06	0.27	0.012	0.18	1.28	0.029	0.08	0.47	0.014
Mother's Characteristics				1			I		
Mother's Age	-0.02	-0.92	-0.005	0	-0.12	0	0.02	1.52	0.003
Mother's Education (Ref His	wher education)	0.005	Ŭ	0.12	v	0.02	1.02	0.005
Illiterate	0.75	1.9*	0.151	0.14	0.49	0.023	0.72	2.72***	0.133
Primary	0.52	1.33	0.101	0.13	0.17	0.021	0.55	2 53**	0.098
Secondary	0.25	0.78	0.046	-0.02	-0.15	-0.004	0.3	2.35	0.051
Mother's Body Mass Index (Ref Normal)	0.70	0.010	0.02	0.12	0.001	0.5	2.10	0.001
Thin ($<18.5 \text{ kg/m}^2$)	0.43	2.52**	0.088	0.67	5.1***	0.124	0.4	2.93***	0.076
Overweight ($\geq 25 \text{ kg/m}^2$)	-0.73	-2.01**	-0.124	-0.34	-231**	-0.049	-0.19	-1.4	-0.032
Obese ($\geq=30$ kg/m ²)	0	0***	0	-0.73	-227**	-0.092	-0.41	-1.69*	-0.065
Mothers Height (Ref Long S	tature)	0	0	0175	,	0.072	0111	1109	01000
Short Stature	1.04	3.4***	0.219	0.79	3.66***	0.148	0.74	4.02***	0.15
Children's Characteristics									
Male (Ref Female)	0.01	0.03	0.001	0.11	1.09	0.018	0	0	0
Age group (Ref >=36months	5)							-	-
0 to 5 Months	-1.3	- 3.49***	-0.223	-0.64	- 2.75***	-0.097	0.14	0.82	0.027
6 to 11 Months	-0.08	-0.28	-0.017	-0.54	- 2.87***	-0.085	-0.26	-1.52	-0.046
12 to 23 Months	-0.54	-2.4**	-0.105	-0.44	- 3.12***	-0.07	-0.33	-2.43**	-0.057
24 to 35 Months	-0.15	-0.7	-0.03	-0.32	-2.29**	-0.053	-0.22	-1.59	-0.039
Birth Month	-0.05	-2.02**	-0.009	0	-0.22	-0.001	-0.03	-1.8*	-0.004
Birth Order	0.12	1.39	0.024	0.13	2.21**	0.021	0.08	1.41	0.015
Constant	-1.14	-1.2		-1.6	- 2.79***		-2.31	- 4.49***	
Number of Observation		838			2482			2429	
LR chi2(26)		120.44			129.12			116.05	
Prob > chi2		0			0			0	
Pseudo R2		0.11			0.05			0.04	
Log likelihood		-479.63			-1212.11			-1292.01	

Table 2.21 Determinants of Underweight among under five children in Himachal Pradesh

Source: Author's estimation using NFHS 3, 4 & 5 data.

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels, respectively.

Table 2.22 shows the determinants of anaemia among children in Himachal Pradesh. The results suggest a significant effect of sanitation, caste, mother's education, mother's height and age group of the child. The probability of anaemia increases if the child belongs to ST (by 16 percent) or OBC category (by 8 percent) in 2019-21. Children of less educated mother experience higher chances of anaemia. The coefficient for the unimproved toilet was found to be positive and significant in the case of anaemia. Not having improved toilet increases the likelihood of being anaemic by 14 percent in 2005-06 and seven percent in 2015-16. The coefficient was found to be insignificant for the period 2019-21.

Surprisingly, the short stature of the mother seems to lower the likelihood of anaemia among children (by 11 percent in 2015-16 and 13 percent in 2019-21). The result is opposite of what was observed for stunting, wasting and underweight. Belonging to the younger age group increases the risk of being anaemic too. Children in the age group 6 to 11 months and 12 to 23 months had 26 percent higher chances of being anaemic than the reference group (36 to 59 months). The same was observed in Table 2.5 while examining the cofactors of anaemia. Table 2.22 Determinants of Anaemia among under five children in Himachal Pradesh

Variables (Den		2005-06			2015-16		2019-21		
Var: Anaemia)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect
Household Character	ristics								
Sector (Ref Urban)	0.03	0.17	0.01	0.05	0.24	0.01	-0.03	-0.14	-0.01
Social Group (Ref Ot	her Caste)								
Scheduled Caste	-0.01	-0.03	0	0.13	1.18	0.03	-0.07	-0.6	-0.02
Scheduled Tribe	0.09	0.23	0.02	1.07	5.57***	0.22	0.79	4.69***	0.16
Other Backward Caste	0.26	1.14	0.06	-0.1	-0.66	-0.02	0.35	2.28**	0.08
Religion (Ref None o	f the above)								
Hindu	-0.08	-0.17	-0.02	-1.13	- 3.92***	-0.22	-1.06	- 4.21***	-0.2
Muslim	-0.23	-0.33	-0.05	-1.11	- 2.61***	-0.22	-1.33	-3.6***	-0.27
Wealth (Ref Richest)									
Poorest	-0.62	-0.72	-0.14	0.5	1.2	0.11	-0.1	-0.36	-0.02
Poorer	0.24	0.58	0.05	0.04	0.2	0.01	0.09	0.53	0.02
Middle	-0.2	-0.69	-0.05	-0.07	-0.52	-0.02	0.05	0.33	0.01
Richer	0	-0.02	0	0.02	0.14	0	-0.27	-1.97**	-0.06
Unimproved (Ref Improved) Water	-0.49	-1.82*	-0.11	-0.15	-0.79	-0.03	-0.21	-1.05	-0.05
Unimproved (Ref									
Improved)	0.6	2.79***	0.14	0.33	2.42**	0.07	0.24	1.35	0.05
Sanitation									
Mother's Characteris	stics			-			·		
Mother's Age	0.02	0.97	0.01	0	0.05	0	-0.01	-0.43	0
Mother's Education (I	Ref Higher ed	ucation)							
Illiterate	0.1	0.25	0.02	0.3	1.09	0.07	0.48	1.77*	0.1
Primary	0.2	0.54	0.05	0.11	0.56	0.03	0.18	0.84	0.04
Secondary	0.3	1.06	0.07	0.14	1.09	0.03	0.32	2.53**	0.07
Mother's Body Mass	Index (Ref No	ormal)							

Thin (<18.5 kg/m2)	0.31	1.82*	0.07	0.12	0.93	0.03	0.12	0.88	0.03
Overweight (>=25 kg/m2)	-0.2	-0.68	-0.05	-0.01	-0.05	0	0.18	1.44	0.04
Obese (>=30 kg/m2)	2.08	1.9*	0.37	-0.07	-0.3	-0.02	0.25	1.16	0.05
Mothers Height (Ref	Long Stature)							
Short Stature	0.05	0.17	0.01	-0.49	-2.19**	-0.11	-0.57	- 2.98***	-0.13
Children's Character	ristics								
Male (Ref Female)	-0.11	-0.7	-0.02	-0.12	-1.31	-0.03	0.03	0.27	0.01
Age group (Ref >=36	months)								
6 to 11 Months	0.99	3.41***	0.23	0.67	4.19***	0.15	1.21	7.54***	0.26
12 to 23 Months	1.06	4.89***	0.24	0.82	6.85***	0.18	1.19	9.43***	0.26
24 to 35 Months	0.56	2.81***	0.13	0.63	5.24***	0.14	0.61	4.98***	0.14
Birth Month	-0.04	-1.51	-0.01	0	0.37	0	-0.01	-0.49	0
Birth Order	0.11	1.26	0.02	0.05	0.94	0.01	-0.02	-0.39	-0.01
Constant	-1.47	-1.62		0.58	1.13		0.74	1.47	
Number of Observation		759			2236			2186	
LR chi2(26)		73.35			205.97			260.35	
Prob > chi2		0			0			0	
Pseudo R2		0.07			0.07			0.09	
Log likelihood		-488.21			-1418.75			-1347.12	

Source: Author's estimation using NFHS 3, 4 and 5data.

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels respectively. Anaemia is not estimated for 0 to 5 months children.

2.4.2 Rajasthan

The results of logit regression show a significant effect of caste, wealth of the household, mother's age, mother's education, mother's BMI, mother's height, sex of the child, age group of the child and birth order on the likelihood of stunting (Table 2.23). In 2019-21, SC and ST were more likely to be stunted (by 4.9 percent and 6.8 percent, respectively) in 2015-16. However, the coefficients for caste groups were insignificant in 2005-06 and 2019-21. The coefficients of wealth quintiles were significant in each period under study. In 2019-21, the child belonging to the poorest quintile household had 12.4 percent higher chances of being stunted than the richest quintile. The same figure for the poor was 9.1 percent.

Mother's age had a negative and significant coefficient in 2005-06 and 2015-16, suggesting that children of older mothers are less likely to be stunted. The coefficient was negative in 2019-21 too, but it was not significant. Mother's education had a positive effect on the chance of being stunted with stunting more likely among children of less educated mothers. In 2015-16, children of illiterate and primary educated mothers had a 7.5 and 7.1 percent higher chance of stunting than their mothers with higher education. However, mother's education did not show a significant effect on stunting in 2019-21. In contrast, mother's BMI and height had significant coefficients in 2019-21. While the thinness and short stature of the mother increased the child's likelihood of being stunted by 5.3 and 14.3 percent, respectively

in 2019-21, having overweight or obese mothers reduced the risk of being stunted by 5.7 and 6.8 percent, respectively. Similar to the results found for Himachal Pradesh, children in the younger age group were less likely to be stunted in all periods. Also, male children were 3.6 percent more likely to be stunted in 2019-21.

Table 2.23 Determinants of Stunting among under five children in Rajasthan

Variables (Den Vari		2005-06		2015-16			2019-21		
Variables (Dep. Var: Stunting)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect
Household Characteristics	5								
Rural (Ref Urban)	-0.18	-1.03	-0.039	-0.02	-0.4	-0.004	-0.09	-1.42	-0.019
Social Group (Ref Other C	aste)								
Scheduled Caste	0.07	0.35	0.015	0.22	3.58***	0.049	0.08	1.12	0.016
Scheduled Tribe	-0.12	-0.54	-0.025	0.3	4.48***	0.068	0.03	0.37	0.006
Other Backward Caste	-0.07	-0.46	-0.016	0.05	0.91	0.011	0.01	0.11	0.001
Religion (Ref None of the	above)								
Hindu	-0.69	-1.19	-0.149	0.23	1.41	0.049	0.48	2.41**	0.092
Muslim	-0.62	-1.04	-0.134	0.38	2.24**	0.083	0.61	2.96***	0.121
Christian	0.58	0.49	0.113	-0.64	-0.54	-0.12	0	0***	0
Wealth (Ref Richest)									
Poorest	0.78	3***	0.168	0.44	4.84***	0.098	0.59	6.27***	0.124
Poorer	0.67	2.58***	0.143	0.32	3.96***	0.071	0.44	5.45***	0.091
Middle	0.54	2.23**	0.114	0.22	3.06***	0.049	0.33	4.3***	0.066
Richer	0.51	2.35**	0.109	0.04	0.53	0.008	0.17	2.36**	0.033
Unimproved Water (Ref Improved Water)	0.09	0.63	0.019	-0.02	-0.34	-0.005	-0.08	-0.83	-0.017
Unimproved Sanitation (Ref Improved Sanitation)	0.3	1.5	0.064	0.07	1.42	0.015	-0.07	-1.4	-0.015
Mothers Characteristics									
Mother's Age	-0.04	- 2.81***	-0.009	-0.03	-5.64***	-0.007	-0.01	-1.2	-0.001
Mother's Education (Ref H	igher education	on)							
Illiterate	0.96	2.33**	0.198	0.34	3.96***	0.075	0.1	1.24	0.021
Primary	0.57	1.35	0.113	0.33	3.74***	0.071	0.13	1.56	0.027
Secondary	0.6	1.52	0.12	0.2	2.45**	0.042	0.06	0.82	0.012
Mother's Body Mass Index	(Ref Normal)							
Thin (<18.5 kg/m2)	-0.07	-0.62	-0.015	0.27	6.96***	0.062	0.24	5.06***	0.053
Overweight (>=25	0.01	0.04	0.002	0.00	1.2	0.02	0.29	-	0.057
kg/m2)	0.01	0.04	0.003	-0.09	-1.5	-0.02	-0.28	3.46***	-0.057
Obese (>=30 kg/m2)	-1.9	-1.71*	-0.321	-0.25	-1.76*	-0.054	-0.34	-2**	-0.068
Mothers Height (Ref Long	Stature)								
Short Stature	0.61	2.61***	0.131	0.76	9.4***	0.176	0.62	6.48***	0.143
Children's Characteristics	(Under 5 Ye	ars)							
Male (Ref Female)	0.07	0.71	0.016	0.12	3.32***	0.026	0.15	4.04***	0.033
Age group (Ref >=36mont	hs)								
0 to 5 Months	-1.68	- 7.47***	-0.33	-0.99	-13.3***	-0.204	-0.17	-2.5**	-0.036
6 to 11 Months	-1.4	- 6.51***	-0.289	-0.9	- 13.11***	-0.189	-0.61	- 7.75***	-0.12
12 to 23 Months	-0.02	-0.16	-0.005	0	0.1	0.001	-0.02	-0.41	-0.005
24 to 35 Months	0.02	0.12	0.004	-0.1	-2.12**	-0.023	-0.1	-1.91*	-0.022
Birth Month	-0.07	- 4.06***	-0.014	-0.01	-1.05	-0.001	-0.04	- 6.21***	-0.007
Birth Order	0.1	2.47**	0.021	0.1	5.84***	0.022	0.07	3.65***	0.015
Constant	0.46	0.62		-0.73	-3.21***		-1.33	- 4.99***	
Number of Observation		1698			14720			12921	
LR chi2(28)		226.42			1022.05			383.32	
Prob > chi2		0			0			0	
Pseudo R2		0.1			0.05			0.02	
Log likelihood		-1049.72			-9318.58			-7941.89	

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels respectively.

Source: Author's estimation using NFHS 3 & 4 data.

The likelihood of wasting among children was influenced by region, caste, wealth, mother's characteristics (age, education, BMI and height), religion, and sex and age group of the child (Table 2.23). In the case of wasting, the region shows a significant effect on the probability of wasting. A child from a rural area was nearly 3.4 percent less likely to be wasted than a child from an urban area. The coefficient for ST is positive and significant in 2015-16 and 2019-21. Belonging to the ST category increased the probability of wasted by 2.9 percent. The effect of wealth was only significant in 2015-16 when a child from the poorest household was 5.8 percent more likely to be wasted. The coefficients for wealth quintile, though positive, were insignificant for other periods. Access to an improved toilet did not show a significant effect on wasting in Rajasthan too. Contrary to our expectations and results for stunting, wasting was found to increase with the mother's age. Nonetheless, the effect of age is very small. One year increase in the mother's age increases the probability of wasted by merely 0.2 percent in 2019-21. Similar to our result for stunting, the probability of wasting increases if the mother is thin (by 1.8 percent in 2019-21) and decreases if she is overweight (by 4.2 percent in 2019-21). The short stature of the mother increased the chances of wasting in 2005-06. The coefficient was, however, insignificant in 2015-16 and 2019-21. Though the coefficients for the age group were significant in all years, they show opposite results than those found for stunting. The likelihood of wasting was higher among the younger age groups with the youngest age group (0 to 5 months) having 7.8 percent more likely to be wasted than the oldest group (36 to 59 months). The order of birth was significant in 2015-16 with the later-born child increasing the likelihood of wasting by 0.6 percent.

Variables (Den Vari		2005-06			2015-16		2019-21		
Wasting)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect
Household Characteristi	cs								
Rural (Ref Urban)	-0.15	-0.74	-0.025	-0.23	- 4.07***	-0.042	-0.22	- 3.08***	-0.034
Social Group (Ref Other	Caste)								
Scheduled Caste	-0.21	-1.01	-0.037	-0.09	-1.31	-0.016	0.13	1.62	0.02
Scheduled Tribe	0.03	0.14	0.006	0.29	3.85***	0.054	0.19	2.1**	0.029
Other Backward Caste	-0.52	- 2.89***	-0.083	-0.07	-1.14	-0.012	-0.04	-0.59	-0.006
Religion (Ref None of the	e above)								
Hindu	0.21	0.32	0.031	-0.03	-0.17	-0.005	-0.34	-1.77*	-0.054
Muslim	0.56	0.81	0.09	-0.03	-0.18	-0.006	-0.03	-0.14	-0.005
Christian	0.79	0.59	0.136	0.91	0.98	0.194	0	0***	0
Wealth (Ref Richest)									
Poorest	0.17	0.56	0.028	0.32	3.19***	0.058	0.16	1.41	0.023
Poorer	-0.02	-0.08	-0.004	0.24	2.58***	0.041	0.13	1.33	0.019
Middle	-0.06	-0.2	-0.009	0.14	1.72*	0.024	0.15	1.62	0.021
Richer	-0.12	-0.47	-0.018	-0.01	-0.19	-0.002	0.04	0.46	0.005

Table 2.24 Determinants of Wasting among under five children in Rajasthan

Unimproved Water (Ref Improved Water)	-0.03	-0.2	-0.005	0.08	1.06	0.014	0.07	0.57	0.01	
Unimproved Sanitation (Ref Improved Sanitation)	-0.08	-0.34	-0.013	0.01	0.17	0.002	0.02	0.25	0.002	
Mothers Characteristics										
Mother's Age	0.04	2.18**	0.006	0.02	2.74***	0.003	0.01	1.74*	0.002	
Mother's Education (Ref	Higher educa	tion)								
Illiterate	0.9	2.07**	0.114	0.32	3.35***	0.055	0.16	1.58	0.022	
Primary	0.8	1.8*	0.099	0.2	2.06**	0.033	0.19	1.9*	0.027	
Secondary	0.73	1.78*	0.088	0.15	1.65*	0.024	0.11	1.26	0.015	
Mother's Body Mass Inde	x (Ref Norm	al)								
Thin (<18.5 kg/m2)	0.02	0.13	0.003	0.23	5.37***	0.043	0.12	2.04**	0.018	
Overweight (>=25 kg/m2)	-0.63	-1.48	-0.084	-0.31	-3.6***	-0.049	-0.33	- 3.11***	-0.042	
Obese (>=30 kg/m2)	0	0***	0	-0.5	- 2.83***	-0.075	-0.31	-1.48	-0.04	
Mothers Height (Ref Lon	g Stature)									
Short Stature	0.5	2.08**	0.089	0.09	1.01	0.016	0.1	0.84	0.015	
Children's Characteristic	cs (Under 5 Y	'ears)								
Male (Ref Female)	0.09	0.7	0.014	0.14	3.59***	0.025	0.19	4.03***	0.027	
Age group (Ref >=36mor	nths)									
0 to 5 Months	0.49	2.27**	0.079	0.59	8.25***	0.112	0.5	6.48***	0.078	
6 to 11 Months	0.65	2.99***	0.109	0.45	6.58***	0.083	0.27	3.02***	0.038	
12 to 23 Months	0.47	2.8***	0.076	0.11	1.98**	0.019	0.23	3.46***	0.033	
24 to 35 Months	0.05	0.27	0.007	0.11	1.94*	0.018	0.14	2.07**	0.019	
Birth Month	0.02	0.97	0.003	-0.01	-0.92	-0.001	0.01	1.63	0.002	
Birth Order	-0.06	-1.23	-0.009	-0.03	-1.81*	-0.006	-0.01	-0.58	-0.002	
Constant	-3.23	- 3.74***		-1.93	- 7.72***		-1.95	- 6.68***		
Number of Observation		1690			14720			12671		
LR chi2(27)	53.55				355.95		141.65			
Prob > chi2	0			0			0			
Pseudo R2	0.03				0.02		0.01			
Log likelihood	-835.27				-7901.73		-5872.1			

Note: *, ** and *** imply statistical significance at 10%, 5% and 1% levels respectively.

Source: Author's estimation using NFHS 3 & 4 data.

Likelihood of being underweight is found to be higher in urban areas with the rural area lowering the chances of being underweight by 2.3 percent (Table 2.25). The coefficients for SC and ST groups were only significant in 2015-16. While the coefficient for OBC was significant in 2005-06 and 2019-21, the coefficient has a negative sign denoting a decline in the likelihood of being underweight. Wealth registers significant effect across the years. Belonging to a poorer household increases the likelihood of underweight. A child from the poorest quintile had 10.2 percent higher chances of being underweight than the richest quintile in 2019-21. Children belonging to the poorer quintile increased the probability of underweight by 7.4 percent in the same year. Mother's education also matters in the case of underweight among children. Children of illiterate and primary school-educated mothers, respectively, were 4.8 and 6.6 percent more likely to be underweight than the children of mothers with higher education in 2019-21. Similar to the case of stunting and wasting, the chances of underweight was higher among children of thin mothers (7.3 percent in 2019-21) and lower among children of overweight (6.1 percent in 2019-21) and obese mothers (10.7 percent in 2019-21). The age groups do not follow any particular pattern. Children belonging to the 0 to 5 age group had a higher likelihood of being underweight but the rest of the age groups were less likely to be underweight than the oldest group (36 to 59 months). Male children were more likely to be underweight. In 2019-21, a male child were 4.1 percent more likely to be underweight. Birth order is found to be increasing the likelihood of being underweight. However, the effect is smaller. A child had 0.7 percent more likely to be underweight than his/her older sibling.

Table 2.25 Determinants of Underweight among under five children in Rajasthan

		2005-06			2015-16		2019-21		
Variables (Dep. Var: Underweight)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect
Household Characteristic	25								
Rural (Ref Urban)	0.007	0	0.001	-0.19	-3.66***	-0.041	-0.12	-1.84*	-0.023
Social Group (Ref Other G	Caste)								
Scheduled Caste	-0.09	-0.49	-0.021	0.11	1.68*	0.023	0.07	0.97	0.014
Scheduled Tribe	-0.32	-1.5	-0.07	0.47	6.9***	0.106	0.03	0.36	0.006
Other Backward Caste	-0.32	-1.98**	-0.069	0.02	0.44	0.005	-0.13	-2.11**	-0.026
Religion (Ref None of the	above)								
Hindu	-0.13	-0.22	-0.028	0.18	1.08	0.038	0.04	0.21	0.008
Muslim	-0.14	-0.24	-0.031	0.28	1.61	0.06	0.28	1.43	0.057
Christian	0.96	0.83	0.212	0.55	0.56	0.12	0	0***	0
Wealth (Ref Richest)									
Poorest	0.94	3.6***	0.208	0.62	6.75***	0.136	0.52	5.4***	0.102
Poorer	0.61	2.34**	0.131	0.48	5.76***	0.103	0.39	4.62***	0.074
Middle	0.37	1.52	0.077	0.27	3.63***	0.058	0.35	4.47***	0.066
Richer	0.39	1.79*	0.082	0.04	0.59	0.009	0.17	2.31**	0.031
Unimproved (Ref	0	0.02	0.001	0.04	0.65	0.01	0.11	1.15	0.022
Improved) Water	0	-0.02	-0.001	0.04	0.65	0.01	-0.11	-1.15	-0.022
Unimproved (Ref Improved) Sanitation	-0.04	-0.2	-0.009	0.03	0.58	0.006	-0.02	-0.36	-0.004
Mother's Characteristics									
Mother's Age	0.02	1.7*	0.005	-0.01	-1.21	-0.001	0	0.79	0.001
Mother's Education (Ref H	Higher educat	ion)							
Illiterate	1.1	2.81***	0.222	0.47	5.26***	0.1	0.25	2.99***	0.048
Primary	0.7	1.75*	0.134	0.42	4.65***	0.088	0.33	3.95***	0.066
Secondary	0.51	1.37	0.094	0.25	3.04***	0.052	0.15	1.97**	0.028
Mother's Body Mass Inde	x (Ref Norma	l)						11	
Thin (<18.5 kg/m2)	0.07	0.62	0.015	0.49	12.36***	0.11	0.35	7.2***	0.073
Overweight (>=25 kg/m2)	0.1	0.34	0.023	-0.27	-3.61***	-0.055	-0.34	- 3 89***	-0.061
Obese (>=30 kg/m ²)	0	0***	#VALUE!	-0.26	-1 76*	-0.053	-0.63	-3 3***	-0.107
Mothers Height (Ref Long	y Stature)	0	WTHEOE.	0.20	1.70	0.000	0.05	5.5	0.107
Short Stature	0.74	3.23***	0.165	0.74	9.18***	0.17	0.57	5.93***	0.125
Children's Characteristic	s (Under 5 Y	ears)							
Male (Ref Female)	0.09	0.81	0.019	0.12	3.37***	0.026	0.21	5.22***	0.041
Age group (Ref >=36mon	ths)								
0 to 5 Months	-1.07	- 5.02***	-0.217	-0.47	-6.66***	-0.1	0.21	3.24***	0.044
6 to 11 Months	-0.62	- 3.07***	-0.134	-0.41	-6.18***	-0.087	-0.24	- 3.04***	-0.045
12 to 23 Months	-0.06	-0.44	-0.014	-0.24	-4.81***	-0.052	-0.11	-1.95*	-0.022
24 to 35 Months	-0.03	-0.2	-0.007	-0.03	-0.63	-0.007	-0.02	-0.33	-0.004
Birth Month	-0.03	-1.7*	-0.006	-0.01	-1.24	-0.001	-0.02	- 3.53***	-0.004
Birth Order	-0.03	-0.76	-0.007	0.03	1.87*	0.007	0.03	1.67*	0.007
Constant	-1.8	-2.43**		-1.34	-5.74***		-1.55	- 5.95***	
Number of Observation		1690			14720			13173	
LR chi2(29)		157.18			1093.38			390.47	
Prob > chi2		0			0			0	
Pseudo R2		0.07			0.06			0.02	
Log likelihood		-1059.2			-9169.81			-7695.17	

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels respectively.

Source: Author's estimation using NFHS 3 & 4 data.

The regression results for anaemia were differ considerably from 2015-16 to 2019-21 (Table 2.26). In 2015-16, the results show a significant effect of caste (ST), region, wealth, improved toilet, mother's characteristics (age, education and BMI), religion, and age group of the child. Belonging to a rural area lowered the chances of anaemia by 1.9 percent. Children belonging to the ST category were 11.5 percent more likely to be anaemic. Children from the poorest and the poorer quintiles had 6.5 and 4.4 percent higher chances of having anaemia. Not having access to an improved toilet increase the probability of anaemia by 4.2 percent in 2015-16. Children of less educated mothers also had more than four percent higher chances of anaemia in 2015-16.

In comparison, the coefficients for caste, region, improved toilet, and wealth (barring the coefficient for the middle-income quintile), religion were insignificant in 2019-21. Mother's age and education too came out to be insignificant in 2019-21. Nonetheless, thinness (BMI<18.5) was significant in 2019-21. Children of thin mothers had four percent higher chances of being anaemic. Children of mothers having shorter height were six percent more likely to be anaemic in 2019-21. Age group of the child had an effect similar to the one found for Himachal Pradesh. Children belonging to the younger groups were more likely to be anaemic. Children the age of 6 to 11 months and 12 to 23 months were 12 and 16 percent more likely to be anaemic in 2019-21. The coefficient of birth order was significant in 2019-21 only with each successive child having one percent higher chance of being anaemic.

Variables (Der Ver		2005-06			2015-16			2019-21	Marginal Effect 0.01		
Anaemia)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect		
Household Characteristics	5										
Rural (Ref Urban)	0.17	0.91	0.034	-0.08	-1.65*	-0.019	0.06	0.94	0.01		
Social Group (Ref Other Caste)											
Scheduled Caste	0.04	0.19	0.007	-0.01	-0.23	-0.003	-0.03	-0.41	-0.01		
Scheduled Tribe	0.14	0.58	0.026	0.53	7.37***	0.115	0.03	0.36	0.01		
Other Backward Caste	-0.1	-0.6	-0.02	0	0.03	0	-0.09	-1.43	-0.02		
Religion (Ref None of the	above)										
Hindu	0.52	0.9	0.107	0.26	1.8*	0.061	-0.05	-0.29	-0.01		
Muslim	0.7	1.17	0.141	0.28	1.75*	0.064	-0.12	-0.6	-0.02		
Christian	-0.06	-0.05	-0.014	-0.38	-0.4	-0.089	0	0	0		
Wealth (Ref Richest)							·				
Poorest	0.05	0.18	0.01	0.28	3.11***	0.065	0.1	0.95	0.02		
Poorer	0.11	0.4	0.022	0.19	2.36**	0.044	0.12	1.34	0.02		
Middle	0.49	1.85*	0.09	0.15	2.03**	0.034	0.19	2.34**	0.04		
Richer	0.14	0.64	0.028	0.08	1.22	0.019	0.02	0.22	0.003		
Unimproved (Ref Improved) water	-0.24	-1.54	-0.047	0.06	0.8	0.013	0.07	0.61	0.01		

Table 2.26 Determinants of Anaemia among under five children in Rajasthan

Unimproved (Ref Improved) Sanitation	0.03	0.12	0.005	0.18	3.69***	0.042	0.05	0.86	0.01		
Mother's Characteristics											
Age	-0.02	-1.22	-0.004	0.01	1.7*	0.002	0	-0.53	-0.001		
Level of Education (Ref Hi	Higher education)										
Illiterate	0.83	2.36**	0.174	0.18	2.24**	0.043	0.05	0.55	0.01		
Primary	0.67	1.84*	0.144	0.23	2.76***	0.053	0	-0.01	0		
Secondary	0.6	1.87*	0.13	0.2	2.7***	0.046	0.03	0.35	0.01		
Body Mass Index (Ref Nor	rmal)										
Thin (<18.5 kg/m2)	0.21	1.74*	0.04	0.2	4.84***	0.045	0.22	3.87***	0.04		
Overweight (>=25 kg/m2)	-0.09	-0.31	-0.018	0.08	1.14	0.018	-0.12	-1.52	-0.03		
Obese (>=30 kg/m2)	-1.29	-1.59	-0.282	0.15	1.14	0.034	-0.07	-0.41	-0.01		
Short Height (Ref Long Height)	-0.26	-1.08	-0.051	0.12	1.34	0.026	0.31	2.5**	0.06		
Children's Characteristics	1										
Male	0.02	0.17	0.004	0.03	0.81	0.007	-0.05	-1.2	-0.01		
Age group (Ref >=36 mon	ths)										
6 to 11 Months	1.1	4.85***	0.217	0.6	9.33***	0.14	0.62	7.57***	0.12		
12 to 23 Months	1.2	7.25***	0.231	0.83	16.7***	0.188	0.82	13.34***	0.16		
24 to 35 Months	0.85	5.57***	0.176	0.56	11.91***	0.131	0.47	8.56***	0.1		
Birth Month	0.02	1.06	0.004	0	0.08	0	-0.01	-1.06	-0.001		
Birth Order	0.02	0.55	0.005	-0.01	-0.29	-0.001	0.04	1.83*	0.01		
Constant	-0.89	-1.18		-0.95	-4.33***		0.58	2.2**			
Number of Observation		1574			13691			11369			
LR chi2(26)		136.84***		672.62***				333.57***			
Pseudo R2	0.07				0.04			0.02			
Log likelihood		-890.35			-8825.98			-6588.32			

Source: Author's estimation using NFHS 3 & 4 data.

Note: 1. *, **and *** imply statistical significance at 10%, 5% and 1% levels respectively; 2. Anaemia is not estimated for 0 to 5 months children.

2.4.3 Odisha

The likelihood of stunting among children in Odisha is significantly affected by the region, caste, wealth, mother's characteristics (age, education, BMI and height), child's age group, birth month and birth order (Table 2.27). Similar to Rajasthan, the likelihood of a child being stunted is 5.1 percent lower in rural areas of Odisha in 2019-21. In the same year, belonging to the SC, ST and OBC household increases the probability of being stunted by 8.8, 10.7 and 6.6 percent, respectively. Wealth was an important determinant of stunting in the periods. Children from the poorest and the poorer quintiles were 16.9 and 12.2 percent more likely to be stunted in 2019-21. Even children from the middle quintile were 8.1 percent more likely to be stunted compared to the richest quintile. Mother's education was significant with children of the less educated mother much more likely to be stunted. In 2019-21, children of illiterate and primary educated mothers were 10.6 and 6.8 percent more likely to be stunted. Low BMI of mothers resulted in a higher likelihood of stunting (by 3.6 percent) among children, whereas the stunting among children of overweight and obese mothers is found to be 7 and 8.2 percent less than children of mothers with normal BMI. The height of the mother was one

of the most important determinants of stunting. Children of mothers with short stature were 15.5 percent more likely to be stunted. The coefficients for the age group suggest an inverted U shape relation between age and stunting in Odisha. While the youngest age groups were less likely to be stunted, the middle age groups had a higher likelihood of being stunted. The patter was found in all periods under study. Though the significant coefficient for the birth month shows a higher probability of stunting among children who were born pre-mature, the effect is small (0.6 percent in 2019-21). The order of birth increased the likelihood of stunting with each successive birth having two percent higher chance of being stunted.

Table 2.27 Determinants of Stunting among under five children in Odisha

We tables (Dec. We se		2005-06			2015-16			2019-21	
Variables (Dep. Var: Stunting)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal E <u>ff</u> ect	coefficient	z-value	Marginal Effect
Household Characteristics									
Rural (Ref Urban)	-0.26	-1.54	-0.052	-0.04	-0.58	-0.009	-0.25	-2.58***	-0.051
Social Group (Ref Other Cas	te)								
Scheduled Caste	0.12	0.62	0.023	0.5	5.56***	0.098	0.46	4.32***	0.088
Scheduled Tribe	0.17	0.9	0.034	0.59	6.6***	0.118	0.55	5.16***	0.107
Other Backward Caste	0.17	1.03	0.034	0.39	4.67***	0.076	0.35	3.51***	0.066
Religion (Ref None of the above)									
Hindu	-1.81	-0.94	-0.335	-0.3	-0.64	-0.064	0.83	1.51	0.144
Muslim	-0.73	-0.37	-0.122	0.34	0.66	0.075	0.41	0.61	0.064
Christian	-1.85	-0.94	-0.343	-0.62	-1.28	-0.127	0.77	1.38	0.132
Wealth (Ref Richest)									
Poorest	1.61	4.23***	0.323	0.71	4.17***	0.141	0.89	4.87***	0.169
Poorer	1.07	2.9***	0.204	0.59	3.59***	0.115	0.67	3.77***	0.122
Middle	1.05	3.04***	0.2	0.32	2**	0.059	0.46	2.63***	0.081
Richer	0.48	1.41	0.082	0.18	1.12	0.033	0.31	1.74*	0.053
Unimproved Water (Ref Improved Water)	-0.06	-0.43	-0.012	-0.11	-1.54	-0.022	0.01	0.07	0.001
Unimproved Sanitation (Ref Improved Sanitation)	0.12	0.54	0.025	0.07	1.09	0.015	0.09	1.58	0.018
Mother's Characteristics									
Mother's Age	-0.02	-1.41	-0.004	-0.02	-3.26***	-0.004	-0.01	-1.77*	-0.002
Mother's Education (Ref Hig	her education)							
Illiterate	1.23	2.49**	0.238	0.27	1.83*	0.057	0.53	3.52***	0.106
Primary	1.08	2.19**	0.205	0.15	0.98	0.03	0.35	2.34**	0.068
Secondary	0.82	1.74*	0.152	0	-0.02	-0.001	0.2	1.54	0.039
Mother's Body Mass Index (I	Ref Normal)								
Thin (<18.5 kg/m2)	0.07	0.62	0.015	0.29	5.72***	0.062	0.17	2.84***	0.036
Overweight (>=25 kg/m2)	-0.41	-0.96	-0.081	-0.33	-3.58***	-0.064	-0.36	-4.14***	-0.07
Obese (>=30 kg/m2)	0.27	0.36	0.055	-0.87	-4.06***	-0.153	-0.43	-2.43**	-0.082
Mothers Height (Ref Long St	tature)								
Short Stature	0.92	5.17***	0.188	0.75	12.07***	0.163	0.72	10.53***	0.155
Children's Characteristics									
Male (Ref Female)	-0.17	-1.45	-0.034	0.05	1.16	0.011	0.01	0.11	0.001
Age group (Ref >=36months)								
0 to 5 Months	-0.89	- 3.74***	-0.173	-0.68	-7.05***	-0.132	-0.41	-4.14***	-0.077
6 to 11 Months	-0.84	- 3.88***	-0.164	-0.91	-9.88***	-0.168	-0.44	-4.35***	-0.082
12 to 23 Months	0.28	1.76*	0.059	0.1	1.62	0.021	0.32	4.54***	0.067
24 to 35 Months	0.24	1.51	0.05	0.02	0.27	0.004	0.18	2.65***	0.037
Birth Month	-0.05	-	-0.01	-0.01	-1.42	-0.002	-0.03	-3.68***	-0.006

		2.95***												
Birth Order	0.13	2.49**	0.026	0.11	4.81***	0.023	0.1	3.51***	0.02					
Constant	-0.04	-0.02		-1.13	-2.15**		-2.53	-4.2***						
Number of Observation	1504				9482			7664						
LR chi2(28)	295.95			980.27				770.74						
Prob > chi2	0			0			0							
Pseudo R2	0.14			0.08				0.08						
Log likelihood	-882.48			-882.48		-5648.52			-5648.52			-4486.84		

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels, respectively. Source: Author's estimation using NFHS 3, 4 and 5 data.

The likelihood of wasting is influenced by caste, mother's BMI and height and child's age group only (Table 2.28). SC and ST children had a significantly higher likelihood of being wasted. In 2019-21, SC and ST children had a 4.6 and 4.7 percent higher probability to be wasted than the children in others caste group. Wealth did not show any significant effect except for the poorest quintile in 2019-21 when children from the poorest quintile households were 6.2 percent more likely to be wasted. Children of low-BMI mothers were 7.1 percent more likely to be wasted in 2019-21. On the other hand, children of overweight mothers had 4.5 percent fewer chances of being wasted. The height of the mother was only significant in 2019-21. The results show that the children of shorter mothers were a 2.9 percent higher probability of being wasted in 2019-21. Belonging to the younger age group is found to increase the probability of being wasted with the youngest group having a 10.3 percent higher chance of being wasted. Birth month and birth order do not show a significant effect on the likelihood of wasting.

Variables (Don Vari		2005-06			2015-16		2019-21			
Wasting)	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal Effect	
Household Characteristics										
Rural (Ref Urban)	0.18	0.9	0.026	-0.14	-1.71*	-0.023	-0.1	-0.88	-0.015	
Social Group (Ref Other Caste)										
Scheduled Caste	0.19	0.81	0.026	0.26	2.6***	0.039	0.32	2.66***	0.046	
Scheduled Tribe	0.49	2.22**	0.075	0.57	5.76***	0.092	0.32	2.66***	0.047	
Other Backward Caste	0.01	0.05	0.001	0.28	2.96***	0.041	0.04	0.37	0.006	
Religion (Ref None of the a	bove)									
Hindu	-1.64	-1.47	-0.324	0.35	0.62	0.053	0.12	0.21	0.017	
Muslim	-2.25	-1.65*	-0.398	0.71	1.17	0.117	0.05	0.07	0.006	
Christian	-1.02	-0.86	-0.218	0.18	0.32	0.026	0.07	0.12	0.01	
Wealth (Ref Richest)										
Poorest	0.23	0.48	0.031	0.16	0.88	0.026	0.44	2.2**	0.062	
Poorer	0.21	0.44	0.028	0.18	1.01	0.029	0.21	1.09	0.028	
Middle	0.2	0.45	0.027	0.12	0.72	0.019	0.18	0.94	0.024	
Richer	0.43	1.01	0.062	0.09	0.51	0.013	0.17	0.9	0.022	
Unimproved Water (Ref Improved Water)	-0.1	-0.57	-0.014	-0.21	- 2.66***	-0.034	-0.05	-0.53	-0.008	
Unimproved Sanitation (Ref Improved Sanitation)	0.35	1.22	0.048	0.08	1.03	0.012	-0.03	-0.4	-0.004	

Table 2.28 Determinants of Wasting among under five children in Odisha

Mother's Characteristics											
Mother's Age	-0.03	-1.81*	-0.005	-0.01	-1.02	-0.001	0.01	0.86	0.001		
Mother's Education (Ref Hi	gher educatio	n)									
Illiterate	-0.29	-0.58	-0.045	0.21	1.26	0.034	-0.17	-1.02	-0.024		
Primary	-0.04	-0.07	-0.006	0.09	0.53	0.014	-0.01	-0.05	-0.001		
Secondary	-0.47	-1.01	-0.07	0.07	0.49	0.012	0.02	0.16	0.004		
Mother's Body Mass Index (Ref Normal)											
Thin (<18.5 kg/m2)	0.38	2.74***	0.058	0.52	9.48***	0.093	0.43	6.3***	0.071		
Overweight (>=25 kg/m2)	-1.79	-1.73*	-0.135	-0.27	-2.55**	-0.039	-0.35	- 3.27***	-0.045		
Obese (>=30 kg/m2)	0	0***	#VALUE!	-0.68	- 2.77***	-0.085	-0.32	-1.54	-0.042		
Mothers Height (Ref Long	Stature)										
Short Stature	-0.08	-0.36	-0.011	0.07	0.97	0.011	0.19	2.32**	0.029		
Children's Characteristics											
Male (Ref Female)	0.17	1.22	0.024	0.13	2.64***	0.022	0.09	1.42	0.013		
Age group (Ref >=36month	is)										
0 to 5 Months	0.79	3.19***	0.118	0.72	7.71***	0.129	0.63	6.1***	0.103		
6 to 11 Months	0.62	2.61***	0.088	0.5	5.73***	0.086	0.38	3.57***	0.058		
12 to 23 Months	0.59	3.12***	0.084	0.16	2.26**	0.025	0.19	2.26**	0.027		
24 to 35 Months	0.39	1.98**	0.052	0.11	1.56	0.017	0.13	1.58	0.018		
Birth Month	0	-0.12	0	0	-0.31	0	0	-0.09	0		
Birth Order	0.1	1.74*	0.015	0.06	2.43**	0.01	0.05	1.57	0.008		
Constant	-0.31	-0.23		-2.47	- 3.97***		-2.53	-4***			
Number of Observation		1493			9482			7514			
LR chi2(27)		96.8			404.46			211.25			
Prob > chi2	0			0			0				
Pseudo R2		0.07		0.04				0.03			
Log likelihood	-680.9				-4787.52			-3533.81			

Source: Author's estimation using NFHS 3, 4 and 5 data.

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels, respectively.

The results of regression for underweight were similar to stunting. Belonging to a rural area significantly reduced (3.4 percent in 2019-21) the chances of being underweight. Caste was an important determinant of underweight in all periods (Table 2.29). Belonging to SC, ST and OBC households increased the possibility of being underweight among children (by 7.6, 10 and 4.4 percent in 2019-21). Wealth not only influenced the likelihood of underweight in all periods but also had a high impact. Belonging to the poorest quintile increased the probability of a child being underweight by 17.9 percent in 2019-21. The likelihood of children being underweight was higher by 14.6 percent for the poorer quintile, 10 percent for the middle quintile and 7.1 percent for the richer quintile compared to the richest quintile in the same period. Children of illiterate mothers were at a significant disadvantage. It increased their chances of being underweight by 6.2 percent in 2019-21. Low BMI and short stature of the mother increase the chances of being underweight by 9.4 and 15.3 percent in 2019-21. The probability of a child being underweight decreased if the mother is overweight (by 9.1 percent) or obese (by 8.9 percent) in 2019-21. The chance of being underweight was higher

(2.1 percent in 2019-21) for each successive child. The younger age group is less prone to the problem of underweight. Belonging to the youngest age group reduced the likelihood of underweight by 10.1 percent in 2019-21.

Variables (Den Vari		2005-06			2015-16			2019-21		
Underweight)	coefficient	z-value	Marginal E <u>f</u> fect	coefficient	z-value	Marginal Effect	coefficient	z-value	Marginal E <u>f</u> fect	
Household Characteristics	3									
Rural (Ref Urban)	-0.15	-0.92	-0.031	-0.14	-1.97**	-0.03	-0.17	-1.75*	-0.034	
Social Group (Ref Other C	aste)									
Scheduled Caste	0.28	1.52	0.058	0.29	3.3***	0.058	0.4	3.76***	0.076	
Scheduled Tribe	0.57	3.1***	0.119	0.58	6.57***	0.119	0.52	4.85***	0.1	
Other Backward Caste	0.29	1.77*	0.06	0.29	3.48***	0.057	0.24	2.39**	0.044	
Religion (Ref None of the	above)									
Hindu	-2.47	-1.2	-0.444	-0.18	-0.38	-0.038	0.81	1.47	0.137	
Muslim	-1.77	-0.83	-0.295	-0.09	-0.18	-0.02	1.02	1.6	0.18	
Christian	-2.63	-1.25	-0.477	-0.39	-0.79	-0.079	0.78	1.4	0.132	
Wealth (Ref Richest)										
Poorest	1.8	4.54***	0.338	0.78	4.46***	0.153	1	5.16***	0.179	
Poorer	1.47	3.82***	0.263	0.76	4.48***	0.148	0.84	4.45***	0.146	
Middle	1.22	3.34***	0.208	0.4	2.41**	0.073	0.61	3.24***	0.1	
Richer	0.78	2.18**	0.119	0.24	1.47	0.043	0.45	2.35**	0.071	
Unimproved Water (Ref Improved Water)	-0.13	-0.95	-0.027	-0.17	-2.48**	-0.035	-0.08	-0.91	-0.015	
Unimproved Sanitation (Improved Water)	-0.16	-0.7	-0.033	0.06	0.85	0.012	0.08	1.34	0.015	
Mother's Characteristics							1			
Mother's Age	0	-0.16	0	-0.02	- 2.99***	-0.004	-0.01	-1.58	-0.002	
Mother's Education (Ref H	igher educatio	on)								
Illiterate	1.11	1.95*	0.201	0.39	2.52**	0.08	0.31	2.07**	0.062	
Primary	1.29	2.26**	0.239	0.38	2.41**	0.077	0.2	1.38	0.04	
Secondary	1.05	1.91*	0.189	0.18	1.24	0.036	0.07	0.5	0.013	
Mother's Body Mass Index	(Ref Normal)								
Thin (<18.5 kg/m2)	0.38	3.2***	0.08	0.61	12.2***	0.134	0.45	7.48***	0.094	
Overweight (>=25 kg/m2)	-1.01	-1.82*	-0.178	-0.37	- 3.98***	-0.072	-0.5	-5.47***	-0.091	
Obese (>=30 kg/m2)	-0.06	-0.07	-0.012	-0.98	- 4.35***	-0.166	-0.49	-2.65***	-0.089	
Mothers Height (Ref Long	Stature)									
Short Stature	0.59	3.51***	0.126	0.7	11.2***	0.151	0.72	10.62***	0.153	
Children's Characteristics										
Male (Ref Female)	-0.1	-0.9	-0.021	0.06	1.21	0.011	-0.08	-1.64	-0.017	
Age group (Ref >=36mont	hs)									
0 to 5 Months	-0.34	-1.55	-0.071	-0.49	- 5.26***	-0.099	-0.22	-2.34**	-0.043	
6 to 11 Months	-0.44	-2.1**	-0.089	-0.59	- 6.95***	-0.118	-0.55	-5.43***	-0.101	
12 to 23 Months	-0.03	-0.21	-0.007	-0.26	- 4.12***	-0.054	-0.1	-1.39	-0.02	
24 to 35 Months	-0.01	-0.09	-0.003	-0.04	-0.71	-0.009	-0.06	-0.81	-0.011	
Birth Month	-0.02	-1.31	-0.005	0	0.21	0	-0.01	-1.39	-0.002	
Birth Order	0.07	1.5	0.015	0.13	5.32***	0.026	0.11	3.7***	0.021	
Constant	-0.5	-0.24		-1.46	- 2.72***		-2.61	-4.27***		
Number of Observation		1504		9482				7754		
LR chi2(30)		222.21		1075.37				790.7		
Prob > chi2		0		0			0			
Pseudo R2		0.11			0.09			0.08		

Table 2.29 Determinants of Underweight among under five children in Odisha

Log likelihood	-897.94	-5654.84	-4461.41					
Note: * **and *** imply statistical significance at 100/ 50/ and 10/ layels representively								

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels, respectively. Source: Author's estimation using NFHS 3, 4 and 5 data.

Caste, mother's age and BMI, access to an improved toilet, age group of the child, birth month and birth order were the main determinants of anaemia among children of Odisha (Table 2.30). Children belonging to SC, ST and OBC households had 9, 11 and 5 percent higher chances of being anaemic in 2019-21. Belonging to the poorest quintile did increase the likelihood of being anaemic by six percent, however, the coefficients were insignificant for other wealth quintiles. Not having access to improved toilet increased the likelihood of anaemia by 4.4 percent in 2015-16. The coefficients for unimproved toilet were found to be insignificant for 2005-06 and 2019-21. Chances of anaemia lowered with an increase in the age of mother but the effect was small (by 0.4 percent in 2019-21). Education had a limited impact on anaemia as only children of illiterate mothers were more likely to be anaemic (seven percent in 2019-21). Among the BMI categories of mothers, low BMI significantly increased the chances of anaemia in 2015-16 only. In 2019-21, the coefficient was significant just for the overweight mothers (their children had four percent fewer chances of anaemia). The likelihood of anaemia was considerably higher among younger children. The youngest age group (6 to 11 months) had a 22 percent higher chance of being anaemic than the oldest group (36 to 59 months) in 2019-21 (anaemia was not estimated for the age group 0 to 5 months). Age group 12 to 23 months had 18 percent higher chances of anaemia in the same year. The probability of being anaemic also increased (by one percent in 2019-21) with each successive child.

Variables (Den Vari		2005-06			2015-16			2019-21	
Anaemia)	Coefficient	z-value	Marginal Effect	Coefficient	z-value	Marginal Effect	Coefficient	z-value	Marginal Effect
Household Characteristics									
Rural (Ref Urban)	-0.09	-0.5	-0.017	-0.29	-4.1***	-0.065	0.17	1.86*	0.04
Social Group (Ref Other Caste))								
Scheduled Caste	-0.17	-0.86	-0.035	0.56	6.65***	0.127	0.43	4.39***	0.09
Scheduled Tribe	0.71	3.34***	0.128	0.97	11.45***	0.223	0.5	5.08***	0.11
Other Backward Caste	-0.34	-2.02**	-0.071	0.41	5.28***	0.092	0.22	2.55**	0.05
Religion (Ref None of the abov	ve)								
Hindu	0.64	1.63	0.636	0.41	0.85	0.091	0.17	0.33	0.04
Muslim	-0.39	-0.59	-0.392	0.43	0.83	0.096	0.33	0.58	0.07
Christian	0	0***	0	0.38	0.78	0.085	-0.1	-0.2	-0.02
Wealth (Ref Richest)									
Poorest	1.14	3.08***	0.233	0.08	0.57	0.019	0.28	1.84*	0.06
Poorer	0.63	1.78*	0.134	0.17	1.18	0.038	0.22	1.53	0.05

Table 2.30 Determinants of Anaemia among under five children in Odisha

Middle	0.48	1.46	0.103	0.09	0.68	0.021	0.2	1.41	0.04	
Richer	0.74	2.45**	0.155	-0.16	-1.17	-0.036	0.18	1.31	0.04	
Unimproved Water (Ref Improved Water)	0.2	1.26	0.038	-0.19	-2.84***	-0.044	-0.16	-1.86*	-0.03	
Unimproved Sanitation (Ref Improved Sanitation)	0.07	0.28	0.013	0.2	3.05***	0.044	0.01	0.11	0.001	
Mother's Characteristics	's Characteristics									
Age	-0.01	-0.71	-0.002	-0.003	-0.52	-0.001	-0.02	-2.77***	-0.004	
Level of Education (Ref Highe	r education)									
Illiterate	0.36	0.93	0.072	0.35	2.57***	0.079	0.35	2.52**	0.07	
Primary	0.64	1.67*	0.126	0.1	0.73	0.023	0.25	1.83*	0.05	
Secondary	0.46	1.33	0.092	-0.01	-0.11	-0.003	0.09	0.83	0.02	
Body Mass Index (Ref Normal)									
Thin (<18.5 kg/m2)	-0.04	-0.32	-0.008	0.25	4.8***	0.056	0.04	0.58	0.01	
Overweight (≥25 kg/m2)	-0.86	-2.32**	-0.175	-0.17	-2.06**	-0.039	-0.17	-2.16**	-0.04	
Obese (≥30 kg/m2)	-1.43	-1.7*	-0.291	-0.07	-0.42	-0.015	-0.08	-0.57	-0.02	
Short Height (Ref Long Height)	0.22	1.17	0.042	0.03	0.41	0.006	0.09	1.1	0.02	
Children's Characteristics							1			
Male (Ref Female)	-0.18	-1.39	-0.034	-0.05	-1.19	-0.012	-0.05	-0.91	-0.01	
Age group (Ref ≥36 Months)							1			
6 to 11 Months	1.54	6.04***	0.287	1.04	12.74***	0.236	1.1	10.57***	0.22	
12 to 23 Months	1.43	7.79***	0.272	0.73	12.15***	0.168	0.86	11.74***	0.18	
24 to 35 Months	0.49	3.07***	0.105	0.33	5.62***	0.075	0.52	7.64***	0.12	
Birth Month	-0.001	-0.05	-0.0002	0.02	2.85***	0.004	0.02	2.14**	0.004	
Birth Order	0.11	1.92*	0.021	0.08	3.48***	0.019	0.07	2.1**	0.01	
Constant	-1.61	-2.28**		-1.67	-3.19***		-0.41	-0.74		
Number of Observation		1326			8813		6821			
LR chi2(26)		230.4			884.95			438.58		
Pseudo R2		0.13			0.07			0.05		
Log likelihood		-748.1		-5664.07				-4147.12		

Note: *, **and *** imply statistical significance at 10%, 5% and 1% levels respectively. Anaemia is not estimated for 0 to 5 months children.

Source: Author's estimation using NFHS 3, 4 and 5 data.

2.5 Discussion

The comparison between nutritional indicators of states and all India shows all three states doing better than all India. Better performance of Rajasthan and Odisha is especially significant because both states lack in other development indicators (both states are in the group often referred to as BIMARU & Odisha). Rajasthan and Odisha also showed better performance in terms of achieving the nutritional targets for children than all India. The difference in actual and target percentage was the smallest for Rajasthan. Rajasthan was the only state to overachieve the target of reducing the incidence of underweight among children. Himachal Pradesh was the worst performer in terms of achieving the nutritional targets.

The analysis for determinants shows that wealth, caste, sanitation, mother's education, mother's health (BMI and height), and age of the child are important factors influencing the

incidence of stunting, wasting, underweight and anaemia. However, there is a difference in the results of Chi-square test and regression analysis. The regression shows that the coefficients for improved toilet were significant only in the case of anaemia. However, wealth seems to be playing an important role in lowering incidence of malnutrition. Since the lack of improved toilet is more prevalent among the poor and less educated, the inclusion of wealth as an explanatory variable may be the reason for insignificant coefficients of sanitation. However, the results clearly show the role of mother's education and health in combating malnutrition. It suggests that strengthening schemes aiming to improve mother's education and nutritional status may have a positive impact on child's health too.

Rajasthan has shown improvement in the nutritional status of its children over the period of study with the gap narrowing down among various socio-economic categories. Region and caste are important determinants of malnutrition. However, their importance has been coming down. Overall, the narrowing down of the differences is a positive development. Also, the difference across wealth categories is still large. These differences are large enough to warrant further efforts. Mothers' education and health are important determinants of malnutrition among children. The results suggest that focusing on mother's health and education may be highly beneficial in reducing incidence of malnutrition.

The analysis for Odisha shows a strong linkage between malnutrition and caste. The difference in caste group was more prominent than found in Himachal Pradesh and Rajasthan. It seems that the gap among the caste groups is narrowing at a slower pace in Odisha. Wealth is also playing an important role in determining malnutrition among children. It is not only the poorest but also the middle and richer quintiles were doing significantly worse than the richest quintile. The major role of wealth along with caste indicates that tackling malnutrition requires focusing on both the social and economic upliftment of the people. Similar to our results for Himachal Pradesh and Rajasthan, mothers' education and health are important determinants of malnutrition among children. An improvement in these indicators may substantially improve the nutritional outcome for the children. Access to an improved toilet again showed beneficial effects for anaemia.

2.6 Summary

The analysis of nutritional status shows that all three states, Himachal Pradesh, Rajasthan and Odisha, have a lower incidence of malnutrition than all India. While lower incidence in Rajasthan and Odisha is a good sign. The source of lower incidence makes Rajasthan a better

achiever. The lower incidence of malnutrition in Rajasthan is the result of the better nutritional status of SC and ST children. It suggests that Rajasthan is doing better in terms of narrowing the difference between deprived and affluent sections. In contrast, Odisha's lower incidence of malnutrition is the result of lower malnutrition among affluent sections. While a lower incidence of malnutrition is a positive indication, Odisha needs to work more on narrowing the gap among caste groups.

There is a decline in incidence of stunting, wasting and underweight in all states over time. Rajasthan and Odisha have performed better than all India in lowering the incidence of malnutrition. Himachal Pradesh is far behind in achieving the target reduction in incidence of stunting, wasting and underweight. Nonetheless, it still has better nutritional status than all India.

The analysis shows caste, wealth of the household, and mother's characteristics (age, education, BMI and height) being important determinants of stunting, wasting, underweight and anaemia in three states. The problem of stunting, wasting and underweight is less among the younger group of children. Incidence of anaemia has increased in 2019-21. Lack of improved toilet increases the probability of anaemia. Wealth is again coming to be an important determinant of the incidence of malnutrition. The results, however, are not consistent over time. Caste and region remained important but their effect has been reduced. Wealth, mother's BMI and children's age group are the most important determinants of nutrition status in the recent survey.

Chapter 3: Food Security and Nutritional Status among SC and ST in Himachal Pradesh

3.1 Food Security among SC and ST in Himachal Pradesh

The distinction between the two study districts- Chamba (for ST households) and Sirmaur (for SC households) in terms of food insecurity suggests that Sirmaur is higher food security as compared to Chamba. This can be gathered from Figure 3.1, wherein the share of households who are food secure in Sirmaur is nine percentage points higher as compared to the share of food-secure households in Chamba. It can be inferred that SC households are more food secured as compared to those of ST households. The distinction between the two districts vis a vis SC and ST households is starker in the scale of moderately food insecure. Again, a higher share of SCs in Chamba district are moderately food insecure as compared to the share of STs in Sirmaur district. The difference, however, is one percentage point between the two on the scale of severely food insecure.





Source: Author's plot using primary survey data

If the Other caste is included for the comparison, then it is found that taking the two districts together, only about 73 percent of the ST and SC households are food secure as compared to about 83 percent for the households belonging to other castes. The share of ST and SC households are higher in both the scales of moderately and severely food insecure. Specifically, the ST households in Chamba face severe food insecurity as can be seen in

Table 3.1 that over 12 percent of the ST households are in the severe food insecure scale, as compared to none in other caste. On the contrary, the other caste in Sirmour district seem to face higher severe food insecurity. In Sirmour, while 10 percent of the other caste households are in the severely food insecure scale, the share of SC households in the same is 7.5 percent. In moderately food insecure scale, the shares of ST households in Chamba and share of SC households in Sirmour are higher as compared to the respective shares of Other caste households in both the districts.

It follows from the analysis in Table 3.1, that the other caste group in Chamba is more food secured as compared to all other categories in both the districts. Again, it is the ST households in Chamba that constitute the least food secured group. Thus, in Chamba, which is the ST district, differences w.r.t the three scales are more pronounced between the two social groups (ST and Other caste), as compared to that of the SC district Sirmour (w.r.t. SC and Other caste).

Table 3.1 Social group wise Status of Food insecurity among households in Himachal Pradesh (in percent)

	Chamba	(ST Dist	rict)	Sirmour (S	et)		Total		
Food Security Scale	Scheduled Tribes (ST)	Other Caste	Total	Scheduled Caste (SC)	Other Caste	Total	ST&SC	Other	Total
Food Secure	66.3	85.0	70.0	78.8	80.0	79.0	72.5	82.5	74.5
Moderately Food insecure	21.3	15.0	20.0	13.8	10.0	13.0	17.5	12.5	16.5
Severely Food Insecure	12.5	0.0	10.0	7.5	10.0	8.0	10.0	5.0	9.0
Total	100	100	100	100	100	100	100	100	100
	(80)	(20)	(100)	(80)	(20)	(100)	(160)	(40)	(200)

Note: Values in the parentheses are total number of observations.

Source: Author's estimation using primary survey data

The analysis along food security scale, occupation wise, shows that for the ST households in Chamba self-employed, followed by private service households constitute the most food secured households. The non-farm labour, cultivator, and agricultural labour households have a relatively lower share in the scale of food security. In fact, more that 33 percent of the agricultural households belonging to ST category in Chamba face severe food insecurity, followed by the unemployed (23 percent) and non-farm labour households (21 percent). Other caste households (whose occupation fell into two categories of unemployed and others) were found a higher share of food security households in each occupational and educational category than the ST households in Chamba.

One issue with the figures of food insecurity is that it is estimated using information pertaining to the time period effected by the coronavirus disease 2019 (COVID-19)

pandemic. The overall primary survey was conducted between December 2021 to April 2022. The questions asked for estimating food insecurity covers one year prior to the survey. This period includes months when COVID-19 was at the peak and the restrictions were imposed on economic activities and movement of the people. Hence, the food insecurity figures may be higher than a normal year.

To estimate the impact of COVID-19 on food insecurity, the respondents, who responded with 'Yes' to a question of FIES scale, were asked the reason for the 'Yes' response in a follow up question (see Table 3.1A). For example, the first question asks the respondent if they were worried that they would not have enough food to eat. In Himachal Pradesh, 144 respondents responded the question with 'Yes'. These 144 respondents, in a follow up question, were asked if COVID-19 was the reason behind their 'Yes' response. The follow up question was recorded in Likert scale score ranging from 1 to 5 with 1 denoting strongly disagree and 5 strongly agree. Mean score of the follow up question is 4.98. It denotes that the respondents strongly agree with the statement that COVID-19 is the reason behind 'Yes' response to the food insecurity question. Mean Likert scale score is five for the remaining seven of the food insecurity questions. It suggests that the food insecurity in Himachal Pradesh was significantly higher during the survey period owing to the effect of the pandemic.

Individual questions of FIES scale	Response of the Respondents		Is COVID-19 reason for the YES response? (Average Likert scale score)
	Yes	No	Mean
You were worried that you would not have enough food to eat.	72.00	28.00	4.98 (144)
You were unable to eat healthy and nutritious food.	70.50	29.50	5 (140)
You ate only a few kinds of foods.	64.50	35.50	5 (129)
You had to skip a meal.	23.00	77.00	5 (46)
You ate less than you thought you should.	16.50	83.50	5 (33)
Your household ran out of food.	12.50	87.50	5 (25)
You were hungry but did not eat.	12.00	88.00	5 (24)
You went without eating for a whole day.	9.50	90.50	5 (19)

Table 3.1A: Responses to Individual Questions of FIES Scale and COVID-19 as their main reason in Himachal Pradesh

Note: (i) Response of the question "Is COVID-19 reason for the YES response?" was taken on a five-point Likert scale where 1 means completely disagree and 5 means completely agree). (ii) Values in parentheses is the no. of observations ('Yes' responses). Source: Calculated by the authors from the primary survey data Table 3.1B provides information on the consumption of wheat, rice and pulses along with the source of their procurement. Households in Himachal Pradesh get more than half of their requirement of rice, wheat and pulses from government agencies through public distribution system (PDS). Households in severely food were largely dependent on government with 87.9 percent of rice, 69.7 percent of wheat and 61.2 percent of pulses coming from PDS. The share of government agencies is found to be high (ranging from 54 to 72 percent) among food secure and modulatory food secure too.

		Rice	
Variables	Food Secure	Moderately Food Insecure	Severely Food Insecure
Total consumption	21.23	20.45	20.67
own produced	0	0	0
from market	28.68 (6.09)	28.50 (5.83)	9.7(2)
from govt agencies	71.26 (15.13)	72.27 (14.78)	87.9(18.17)
		Wheat	
	Food Secure	Moderately Food Insecure	Severely Food Insecure
Total consumption	32.07	31.15	26.44
own produced	0	.09	0
from market	41.78 (13.4)	43.40 (13.52)	32.33 (8.55)
from govt agencies	57.21 (18.35)	55.18(17.19)	69.74 (18.44)
		Pulses	
	Food Secure	Moderately Food Insecure	Severely Food Insecure
Total consumption	5.11	5.06	4.72
of own produced	.45	.33	.11
from market	35.42 (1.81)	35.17 (1.78)	36.44 (1.72)
from govt agencies	54.79 (2.8)	58.49 (2.96)	61.22 (2.89)

Table 3.1B: Average total monthly consumption of major cereals and pulses and their major sources in Himachal Pradesh

Note: (i) Values in parenthesis is the average consumption. (ii) Average family size was 4.5 size in Himachal Pradesh.

Source: Calculated by the authors from the primary survey data

Table 3.2 shows that among the ST households in Chamba, in the secondary and above educated category, share of households in terms of both food security (71 percent) and severe food insecurity (18 percent) is the highest. The ST households in the below primary and secondary category seem to face more moderate food insecurity as compared to the ST

households in other educational categories. For the Other caste in Chamba, except for the households in the secondary educated category, 80 percent of the households in all other educational categories have food security (see table 5.2).

Table 3.2 Status	of Food insecurity	among ST and	Other househ	olds in	Chamba	district of
Himachal Prades	sh by occupation, le	vel of education	and MPCE (in	Percen	t)	

				C	hamba (S7	T District)			
			Scheduled T	ribes (ST)			Other Ca	stes	
M	ain Occupation	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total
	Cultivator	57.14	35.71	7.14	100 (14)				
	Agri Labour	66.67	0.00	33.33	100 (3)				
	Domestic Help								
uo	Non-farm labour	47.37	31.58	21.05	100 (19)				
ati	Businessman								
Jecup	Private Service	91.67	8.33	0.00	100 (12)				
u u	Self employed	100.00	0.00	0.00	100 (5)				
Mai	Unemployed	61.54	15.38	23.08	100 (13)	83.33	16.67	0	100 (6)
	Others	71.43	21.43	7.14	100 (14)	85.71	14.29	0	100 (14)
	Total	66.25	21.25	12.50	100 (80)	85.00	15.00	0	100 (20)
_	Below Primary	65.38	23.08	11.54	100 (26)	100.00	0.00	0	100 (2)
cation	Primary	76.47	11.76	11.76	100 (17)	80.00	20.00	0	100 (5)
f Edu	Secondary	55.00	35.00	10.00	100 (20)	66.67	33.33	0	100 (3)
evel o	Secondary and above	70.59	11.76	17.65	100 (17)	90.00	10.00	0	100 (10)
F	Total	66.25	21.25	12.50	100 (80)	85.00	15.00	0	100 (20)
	Quintile1	53.33	23.33	23.33	100 (30)				
lle	Quintile2	61.54	30.77	7.69	100 (13)				
Quinti	Quintile3	83.33	16.67	0.00	100 (18)				
PCE (Quintile4	71.43	21.43	7.14	100 (14)	0.00	100.00	0	100 (1)
W	Quintile5	80.00	0.00	20.00	100 (5)	89.47	10.53	0	100 (19)
	Total	66.25	21.25	12.50	100 (80)	85.00 (17)	15.00 (3)	0	100 (20)

Note: (i) No worker was found in the blank categories; (ii) Values in the parentheses are total number of observations Source: Author's estimation using primary survey data

Similar to the STs in Chamba, among the SCs in Sirmour, it is the self-employed category and Others that have the higher share (100 percent) of food secured households relative to all other occupational categories. In contrast to ST cultivator households in Chamba (57 percent), the share of SC cultivator households in Sirmour (79 percent) are found to have higher food security. The households in the occupational categories. In case of the other castes in Sirmour, barring the unemployed households, all occupational categories have food security.

The share of ST households with food security is the lowest in the first Quintile. Concurrently, the share of ST households with severe food insecurity is the highest in the first Quintile (Table 3.2). The same holds for the SC households in the Sirmour district (Table 33).

In Other caste households from Chamba, it is found that households fall in the high-income earning quintile of either Q4 or Q5. While the highest income earning, quintile have about 10 percent of households as moderately food insecure, for the next high-income earning quintile, all households are moderately food insecure. For the Other caste households from Sirmour, Table 33 shows that in the lowest income quintile of first and second, 50 percent are food secured households whereas 50 percent are severely food insecure. In the highest income quintiles as one may expect all households have food security. This indicates that low-income households have lesser food security as compared to high income households.

Table 3.3 Status of Food insecurity among SC and Other households in Sirmour district of Himachal Pradesh by occupation, level of education and MPCE (in Percent)

					Sirn	nour				
			Scheduled Cas	stes (SC)		Other Castes				
M	Iain Occupation	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	
	Cultivator	79.41	14.71	5.88	100 (34)	100.00	0.00	0.00	100 (8)	
	Agri Labour									
pation	Domestic Help									
	Non-farm labour	57.14	21.43	21.43	100 (14)	100.00	0.00	0.00	100 (2)	
ccu	Businessman									
ain O	Private Service					0.00	100.00	0.00	100 (1)	
Ÿ	Self employed	100.00	0.00	0.00	100 (6)	100.00	0.00	0.00	100 (1)	
	Unemployed	76.47	17.65	5.88	100 (17)	57.14	14.29	28.57	100 (7)	

	Others	100.00	0.00	0.00	100 (9)	100.00	0.00	0.00	100 (1)
	Total	78.75	13.75	7.50	100 (80)	80.00	10.00	10.00	100 (20)
	Below Primary	56.25	25.00	18.75	100 (16)	75.00	0.00	25.00	100 (4)
cation	Primary	83.78	8.11	8.11	100 (37)	71.43	28.57	0.00	100 (7)
f Educ	Secondary	77.78	22.22	0.00	100 (18)	85.71	0.00	14.29	100 (7)
evel of	Secondary and above	100.00	0.00	0.00	100 (9)	100.00	0.00	0.00	100 (2)
Γe	Total	78.75	13.75	7.50	100 (80)	80.00	10.00	10.00	100 (20)
	Quintile1	60.87	26.09	13.04	100 (23)	50.00	0.00	50.00	100 (2)
e	Quintile2	82.35	11.76	5.88	100 (17)	50.00	0.00	50.00	$ \begin{array}{c} 100 \\ (2) \end{array} $
uintil	Quintile3	76.47	11.76	11.76	100 (17)	50.00	50.00	0.00	100 (4)
CE Q	Quintile4	92.86	7.14	0.00	100 (14)	100.00	0.00	0.00	100 (7)
MP	Quintile5	100.00	0.00	0.00	100 (9)	100.00	0.00	0.00	100 (5)
	Total	78.75	13.75	7.50	100 (80)	80.00	10.00	10.00	100 (20)

Note: No worker was found in the blank categories. Parentheses values are number of observations Source: Author's estimation using primary survey data

Comparing the SC households across different educational categories in Sirmour, it can be inferred that as the level of education, the households become more food secured. While all SC households in the secondary and above educated category have food security, only 56 percent of the households in the below primary educated category have food security. Besides the latter has the highest share of severely food insecure households. In case of Other castes, similar inference can be made. However, the share of households that have food insecurity is much lesser as compared to those of SC households.

Table 3.4 Status of Food insecurity among ST &SC and Other households in Himachal Pradesh by occupation, level of education and MPCE (in Percent)

				Н	imacha	l Pradesh			
			ST and SC	Castes	Other Castes				
Ma	ain Occupation	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Food Moderately Severely Food Food Food Insecurity Insecurity		Total
uo	Cultivator	72.92	20.83	6.25	100 (48)	100.00	0.00	0.00	100 (8)
Main upati	Agri Labour	66.67	0.00	33.33	100 (3)	100.00	0.00	0.00	100 (2)
000	Non-farm labour	51.52	27.27	21.21	100 (33)				

	Private Service	91.67	8.33	0.00	100 (12)	0.00	100.00	0.00	100 (1)
	Self employed	100.00	0.00	0.00	100 (11)	100.00	0.00	0.00	100 (1)
	Unemployed	70.00	16.67	13.33	100 (30)	69.23	15.38	15.38	100 (13)
	Others	82.61	13.04	4.35	100 (23)	86.67	13.33	0.00	100 (15)
	Total	72.50	17.50	10.00	100 (160)	82.50	12.50	5.00	100 (40)
	Below Primary	61.90	23.81	14.29	100 (42)	83.33	0.00	16.67	100
ation	Primary	81.48	9.26	9.26	100 (54)	75.00	25.00	0.00	(0) 100 (12)
Educ	Secondary	65.79	28.95	5.26	100 (38)	80.00	10.00	10.00	100 (10)
vel of	Secondary and above	80.77	7.69	11.54	100 (26)	91.67	8.33	0.00	100 (12)
Le	Total	72.50	17.50	10.00	100 (160)	82.50	12.50	5.00	100 (40)
	Quintile1	56.60	24.53	18.87	100 (53)	50.00	0.00	50.00	100 (2)
9	Quintile2	73.33	20.00	6.67	100 (30)	50.00	0.00	50.00	100 (2)
uintil	Quintile3	80.00	14.29	5.71	100 (35)	50.00	50.00	0.00	(-) 100 (4)
CE Q	Quintile4	82.14	14.29	3.57	100 (28)	87.50	12.50	0.00	100 (8)
MP	Quintile5	92.86	0.00	7.14	100 (14)	91.67	8.33	0.00	100 (24)
	Total	72.50	17.50	10.00	100 (160)	82.50	12.50	5.00	100 (40)

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

The ST and SC households together shows that it is the occupational categories of non-farm labour followed by agricultural labour households that have relatively higher share of food insecure households (Table 3.4). Food insecurity is there in more than 48 percent and more than 33 percent of the households in the occupational categories of non-farm labour and agricultural labour respectively. The unemployed households among SCs and STs also face a relatively higher food insecurity as compared to other categories. For Other castes, barring the unemployed households, all households in other occupational categories face much lower food insecurity as compared to those of ST and SC households.

The ST and SC households in the educational categories of below primary educated and secondary & above educated face lesser food insecurity as compared to households in other educational categories. However, it is to note below primary educated SC and SC households have a much higher share of severely food insecure households. In case of other caste, share

of households in food security are higher across all educational categories as compared to ST and SC households. However, it is intriguing that the other caste below primary educated households have a higher share (17 percent) of severely food insecure households as compared to those of the SC and ST households (14 percent).

The quintile distribution suggests that the share of households having severe food insecurity is much higher in the low-income quintiles among the other caste as compared to those of SC and ST category (Table 3.4). In the high- income quintiles, however, there is no household from the other caste having severe food insecurity. For SC and ST households, a distinguishing observation is that even for the high-income quintiles, there are households that are severely food insecure.

3.2 Dietary Diversity among SC and ST at Household Level in Himachal Pradesh

Dietary Diversity indicates the nutrient adequacy of a household's diet. Here, dietary diversity is examined across three categories of lowest, medium, and high dietary diversity. The ST and SC households fall largely in the category of high dietary diversity. However, these households have lower dietary diversity as compared to other caste households. All households in the other caste, belong to the high dietary diversity category. If we compare the ST households (Chamba) and SC households (Sirmour), then we find that the share of SC households in high dietary diversity is smaller as compared that of ST households.

Table 3.5	District-wise	share of	dietary	diversity	among	households	by	social	groups	in
Himachal P	Pradesh									

	Chamba (ST District)			Sirmour (SC District)			Total		
Diversity	Scheduled	Other	T 1	Scheduled	Other	T - 4 - 1	GT P GC	041	T - 4 - 1
	Tribes (ST)	Caste	Totai	Caste (SC)	Caste	10101	STASC	Other	10101
Lowest Dietary Diversity	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium Dietary Diversity	2.5	0.0	2.0	11.3	0.0	9.0	6.9	0.0	5.5
High Dietary Diversity	97.5	100.0	98.0	88.8	100.0	91.0	93.1	100.0	94.5
Total	100 (90)	100	100	100 (90)	100	100	100	100	100
Total	100 (80)	(20)	(100)	100 (80)	(20)	(100)	(160)	(40)	(200)

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

Across occupations, ST and SC households belonging to self-employed, others, and non-farm labour have a higher share in the high dietary diversity category. It can be inferred that a lower share of cultivator (about 90 percent) and unemployed (90 percent) households fall in high dietary diversity category. So far education is concerned, ST and SC households in secondary educated category have a relatively higher share in the medium dietary diversity (about 12 percent) as compared to households at other levels of education.

As is evident that all households from other caste have high dietary diversity across all income quintiles, in case of ST and SC households also most of these households have high dietary diversity in each quintile. However, for the lower income quintiles, the share of ST and SC households having medium dietary diversity is relatively larger as compared to the high-income quintiles (Table 3.6).

Table 3.6 Share of Dietary diversity among SC&ST and Other households in Himachal Pradesh by occupation, level of education and MPCE (in Percent)

		Himachal Pradesh										
			ST and S	C Castes			Other Ca	astes				
	Indicators	Lowest Dietary Diversity	Medium Dietary Diversity	High Dietary Diversity	Total	Lowest Dietary Diversity	Medium Dietary Diversity	High Dietary Diversity	Total			
	Cultivator	0	10.42	89.58	100 (48)	0	0	100	100(8)			
_	Agri Labour	0	0	100	100(3)							
patio	Non-farm labour	0	3.03	96.97	100(33)	0	0	100	100(2)			
con	Private Service	0	8.33	91.67	100(12)	0	0	100	100(1)			
ŏ	Self employed	0	0	100	100(11)	0	0	100	100(1)			
ain	Unemployed	0	10	90	100(30)	0	0	100	100(13)			
Ë	Others	0	4.35	95.65	100(23)	0	0	100	100(15)			
	Total	0	6.88	93.13	100(160)	0	0	100	100(40)			
	Below Primary	0	7.14	92.86	100(42)	0	0	100	100(6)			
<u>ب</u> ۲	Primary	0	5.56	94.44	100(54)	0	0	100	100(12)			
l of	Secondary	0	5.26	94.74	100(38)	0	0	100	100(10)			
Leve Educs	Secondary and above	0	11.54	88.46	100(26)	0	0	100	100(12)			
	Total	0	6.88	93.13	100(160)	0	0	100	100(40)			
	Quintile1	0	9.43	90.57	100(53)	0	0	100	100(2)			
	Quintile2	0	13.33	86.67	100(30)	0	0	100	100(2)			
E I	Quintile3	0	2.86	97.14	100(35)	0	0	100	100(4)			
١. P	Quintile4	0	3.57	96.43	100(28)	0	0	100	100(8)			
< C	Quintile5	0	0	100	100(14)	0	0	100	100(24)			
	Total	0	6.88	93.13	100(160)	0	0	100	100(40)			

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

3.3 Dietary Diversity among SC and ST Women in Himachal Pradesh

The dietary diversity among women also show pattern as the overall results (Table 3.7). While all women belonging to other caste have high dietary diversity, 97 percent of ST women (Chamba) and 92 percent of SC women (Sirmour) have high dietary diversity. Thus, a relatively higher share of ST women has high dietary diversity as compared to the SC women.

	Cham	ba (ST Dis	trict)	Sirmour	· (SC Distr	ict)	Total		
Dietary Diversity	Scheduled Tribes (ST)	Other Caste	Total	Scheduled Caste (SC)	Other Caste	Total	ST&SC	Other	Total
Lowest Dietary Diversity	0	0	0	0	0	0	0	0	0
Medium Dietary Diversity	2.75	0	2.27	8.11	0	6.72	5.45	0	4.51
High Dietary Diversity	97.25	100	97.73	91.89	100	93.28	94.55	100	95.49
Total	100(109)	100(23)	100(132)	100(111)	100(23)	100(134)	100(220)	100(46)	100(266)

Table 3.7 District wise Dietary diversity rate of women in Himachal Pradesh

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

Comparing medium and high dietary diversity among ST and SC women across different occupations, it can be seen that share women from non-farm labour and unemployed category having high dietary diversity is relatively lesser as compared to other occupational categories (Table 3.8). Self-employed women, women in private service, and those working as agricultural labour have high dietary diversity.

For SC and ST women with different educational attainment, it is interesting to note that all below primary educated women have high dietary diversity. In contrast, a relatively smaller share of primary educated women has high dietary diversity. In so far as quintile distribution is concerned, comparable share of SC and ST women from the lowest income quintile have high dietary diversity as those from highest income quintile. Barring for the second quintile, share of women having high dietary diversity is by and large the same across all quintile groups.

Table 3.8 provides some insights for 100 percent dietary diversity among women from other castes. One of the possible reasons is that none of these women were from the lowest quintile. Given that overall dietary diversity is relatively better in Himachal Pradesh with nearly 95 percent of SC & ST women falling, the relatively better wealth status of the others category would have helped women from these households to attain high dietary diversity. One crucial result is significant difference in outcome between women from other castes than their counterparts from SC & ST categories. in our sample are in non-farm work.

Table 3.8 Dietary diversity rate of ST&SC and Other caste women by occupation, level of education and MPCE Quintile in Himachal Pradesh

					Himacha	l Pradesh			
			ST and S	C Castes			Other C	Castes	
	Indicators	Lowest Dietary Diversity	Medium Dietary Diversity	High Dietary Diversity	Total	Lowest Dietary Diversity	Medium Dietary Diversity	High Dietary Diversity	Total
	Cultivator								
	Agri Labour	0	0	100	100(1)				
on	Domestic Help								
ati	Non-farm labour	0	9.52	90.48	100(84)	0	0	100	100(16)
dn	Businessman								
) C	Private Service	0	0	100	100(2)				
E.	Self employed	0	0	100	100(1)				
Iai	Unemployed	0	3.25	96.75	100(123)	0	0	100	100(23)
4	Others	0	0	100	100(9)	0	0	100	100(7)
	Total	0	5.45	94.55	100(220)	0	0	100	100(46)
	Below Primary	0	0	100	100(33)	0	0	100	100(7)
. E	Primary	0	9.09	90.91	100(55)	0	0	100	100(5)
l o l	Secondary	0	6.98	93.02	100(43)	0	0	100	100(9)
Leve	Secondary and above	0	4.49	95.51	100(89)	0	0	100	100(25)
	Total	0	5.45	94.55	100(220)	0	0	100	100(46)
	Quintile1	0	4.84	95.16	100(62)				
	Quintile2	0	10.64	89.36	100(47)	0	0	100	100(3)
E E	Quintile3	0	3.92	96.08	100(51)	0	0	100	100(4)
l 🖞 i	Quintile4	0	4.76	95.24	100(42)	0	0	100	100(12)
	Quintile5	0	0	100	100(18)	0	0	100	100(27)
	Total	0	5.45	94.55	100(220)	0	0	100	100(46)

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

3.4 Nutritional Status of Children in Himachal Pradesh

The nutritional status of children is examined via the three indicators of stunting, wasting, and underweight. The children belonging to other caste in both the districts are non-stunted, non-wasted, and non-underweight. As compared to the SC district, the ST district has a larger share of children who are stunted. However, the SC district has a larger share of wasting, and underweight children as compared to that of the ST district. In terms of wasting, and underweight the SC children have a lower nutritional status as compared to ST children.

Table 3.9 District-wise Status of Nutritional insecurity of children in Himachal Pradesh

Nutritional Status	Chamba (ST District)			Sirmau	r (SC Dist	rict)	Total			
	Scheduled	Other	T-4-1	Scheduled	Other	T-4-1	ST & SC	Other	Total	
	Tribes (ST)	Caste	Total	Caste (SC)	Caste	Total		Caste		
Stunted	77.78	-	77.78(7)	33.33	0	30.8(4)	52.38	0	50(11)	
Waste	14.29	-	14.29(1)	25	0	23.08(3)	21.05	0	20(4)	
Underweight	33.33	-	33.33(3)	33.33	0	30.774)	33.33	0	31.82(7)	

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data Table 3.10 provides information on socio-economic category wise incidence of stunting, wasting and underweight among children (under five years). Incidence of stunting was 47 percentage point higher in Chamba than Sirmour. However, Chamba had lower incidence of stunting than Sirmaur (14.29 percent compared to 23.08 percent). Data show lower incidence of stunting, wasting and underweight among males. Incidence of stunting and underweight was nearly nine percentage point higher among females than males. Incidence of wasting among female children was 30 percent compared to 10 percent for males. Age group wise analysis does not show any particular pattern. Nonetheless, the children in older age group were less likely to be stunted, wasted or underweight. Mother's education and wealth seems to be having positive impact on incidence of stunting, wasting and underweight. Holding BPL card, however, is not associated with stunting, wasting and underweight. Access to improved toilet and drinking water shows a positive impact on incidence of stunting, wasting and underweight. These results are similar to the one found in secondary data analysis.

Background	Stunting			l I	Vasting		Underweight				
Variables	Chamba	Sirmaur	All	Chamba	Sirmur	All	Chamba	Sirmur	All		
By Gender Groups											
Male	66.67	20	45.45	0	20	10	16.67	40	27.27		
Female	100	37.5	54.55	50	25	30	66.67	25	36.36		
By Age Group of Child											
0 to 5 Months	100	0	50	100	0	50	100	0	50		
6 to 11 Months		66.67	66.67	0	0	0		33.33	33.33		
12 to 23 Months	100		100	0		0	50		50		
24 to 35 Months	100	33.33	66.67	0	33.33	20	33.33	33.33	33.33		
36 to 56 Months	33.33	16.67	22.22	0	33.33	22.22	0	33.33	22.22		
By Mother's Education											
Illiterate		0	0					0	0		
Primary		0	0		40	40		40	40		
Secondary	100	66.67	83.33				66.67	0	33.33		
Higher	66.67	50	60	20	25	22.22	16.67	50	30		
Secondary and above											
Wealth Quantile (Household)											
Poorest	60	0	42.86				20	0 14.29			
Poorer		33.33	33.33		33.33	33.33		33.33	33.33		
Middle	100	20	50	50	40	42.86	66.67	40	50		
Richer	100	100	100				0	50	33.33		
Richest		0	0					0	0		
Type of fuel used for cooking											
Gas											
Wood	100		100						0		
Both Gas and	66.67	30.77	42.11	20	23.08	22.22	50	30.77	36.84		

Table 3.10 Nutritional Status of children (under five years) in Himachal Pradesh

Wood											
Type of toilet											
Improved toilet	71.43	30.77	45	14.29	23.08	20	42.86	30.77	35		
Not improved toilet	100		100								
Source of drinking water											
Improved water	71.43	40	52.94(9)	4.29	10	11.76	42.86	20	29.41		
Not improved water	100	0	40(2)		66.67	66.67		66.67	40		
Holding BPL card											
Yes	66.67	14.29	38.46(5)	20	42.86	33.33	33.33	42.86	38.46		
No	100	50	66.67(6)				33.33	16.67	22.22		
Food Security Status											
Food Secure	66.67	36.36	47.06(8)	20	18.18	18.75	33.33	27.27	29.41		
Moderately Food Insecure	100		100(2)	0		0	50		50		
Severely Food Insecure	100	0	33.33(1)	0	50	33.33	0	50	33.33		
Dietary Diversity Status											
Lowest Dietary Diversity											
Medium Dietary Diversity	0		0	0		0	0		0		
High Dietary Diversity	87.5	30.77	52.38(11)	16.67	23.08	21.05	37.5	30.77	33.33		
Total	77.78	30.77	50(11)	14.29	23.08	20	33.33	30.77	31.82		

Note: Frequency table of this table is given in appendix-4. Source: Author's estimation using primary survey data

3.5 Determinants of Nutritional Status

The regression results for Himachal Pradesh are not significant (Table 3.11). The result shows high incidence of stunting, wasting and underweight among ST and SC. BPL card is also increases the likelihood of stunting. However, the number of observations was small and a number of important variables were dropped due to high multicollinearity.

	Dep. Var: Stunting			De	p. Var: Wast	ting	Dep. Var: Underweight				
Indicators	Coefficient	Z-value	marginal effect	Coefficient	Z-value	marginal effect	Coefficient	Z- value	marginal effect		
Types of Family Dummies (Reference: Nuclear Family)											
Joint family	211.37	0.05	0.96	89.06	0.02	0.55	2.42	1.13	0.35		
Social Group Dummies (Reference: General Caste)											
ST	149.91	0.46	0.64	-53.68		-1.34	13.42	0	2.35		
SC	165.82			-82.61	-0.03	-2.07	13.67	0	2.39		
Family Size	-53	-0.05	0.96	-59.31	-0.02	-1.48	-0.99	-1.44	-0.17		
BPL Card	11.69	0.07	0.94	0	0***	0	-0.84	-0.67	-0.15		
Water Source Dummies (Reference: Not-improved Water)											
Improved	28.04	0.06	0.95	-254.64	-0.03	-0.8	-0.67	-0.53	-0.12		
water											
Mother's Age	8.62	0.05	0.96	0.08	0	0	0.01	0.07	0		
Child's Age group dummies (Reference: 0 to 23 Months)											
---	---------	-------	------	--------	-------	-------	------------------	--------	------	--	--
24 to 59 Months	-51.47	-0.05	0.96	0	0***	0	-0.2 -0.17 -0.04				
Food Insecure	-7.08	-0.04	0.97	-61.91		-1.55	0.18	0.11	0.03		
Constant	-201.97	-0.31		527.77	0.03		-8.92	0			
Number of		22			20			22	22		
Observation		22			20			22			
LR chi2(18)		22.76			17.24		4.68				
Prob > chi2		0			0						
Pseudo R2		0.75		0.86			0.17				
Log likelihood		-3.87		-1.39				-11.42			

Note: Other independent variables are not included due to collinearity

Source: Author's estimation using primary survey data

3.6 Summary

Himachal Pradesh has high share of food secure households. However, the food security is less among SC & ST households. The results show higher food security among selfemployed, other workers, employees of private enterprises and cultivators. The food security shows improvement with household wealth and educational qualification of household head. More than 90 percent of the households in Himachal have dietary diversity. However, the dietary diversity was found to be low among SC and ST households compare to Other castes. Diatery diversity was also higher for self-employed, non-farm labour, employees of private enterprises and agricultural labour. Dietary diversity among women is found to be higher and follows a similar pattern. An analysis of nutritional status shows high incidence of stunting, wasting and underweight in Himachal Pradesh. Incidence of stunting, wasting and underweight are higher among SC and ST. Incidence of stunting, wasting and underweight is also higher among female children. Household wealth and mother's education is associated with lowering of the incidences of malnutrition. Improved toilet seems to lower the incidence of malnutrition too.

Chapter 4: Food Security and Nutritional Status among SC and ST in Rajasthan

4.1 Food Security among SC and ST in Rajasthan

The severely food insecure households constitute 74 percent of the total surveyed households in Rajasthan. There is stark difference in the incidence of severe food insecurity in the two districts of Banswara and Hanumangarh. The share of households in Banswara having severe food insecurity is as high as 86 percent, whereas the same for Hanumangarh is 62 percent. Given that Banswara is the district with the highest share of ST population, one can infer that food insecurity is more pronounced among the ST households in Rajasthan. The analysis follows to probe into the issue at hand.



Figure 4.1: District-Wise status of Food insecurity among households in Rajasthan (in Percent)

Source: Author's plot using primary survey data

Table 4.1 shows that the scale of food insecurity tends to be high in both the districts, with high food insecurity even among the other caste households. Among the STs in Banswara, over 99 percent of the households are severely food insecure as compared to about 33 percent for the other caste. The corresponding shares for the SC households in Hanumangarh stand at nearly 66 percent and 48 percent respectively.

Food Soowity	Banswa	ra (ST Dis	strict)	Hanuman	grah (SC	District)		Total	
Scale	Scheduled Tribes (ST)	Other Caste	Total	Scheduled Caste (SC)	Other Caste	Total	ST&SC	Other	Total
Food Secure	0.63	55	11.5	16.88	30	19.5	8.75	42.5	15.5
Moderately Food insecure	0	12.5	2.5	17.5	22.5	18.5	8.75	17.5	10.5
Severely Food Insecure	99.38	32.5	86	65.63	47.5	62	82.5	40	74
Total	100(160)	100(40)	100(200)	100(160)	100(40)	100(200)	100(320)	100(80)	100(400)

Table 4.1 Social group wise Status of Food insecurity among households in Rajasthan (in percent)

Note: Parentheses values are number of observations Source: Author's plot using primary survey data

A comparison of the STs and Other caste households in the Banswara district across occupational categories is made in Table 4.2. For the STs, except for the about 14 percent of the households in private service, none of the other occupational category households have food security. All the households are under the brunt of severe food insecurity. For the Other castes, high severe food insecurity is evident among the other labour (100 percent), and unemployed (75 percent) households.

A few ST households wherein the educational level is secondary and above depict food security. The ST households in the remaining educational levels face severe food insecurity. The Other caste households with higher educational level have higher food security relatively those with lower educational level. For instance, while nearly 56 percent of the other caste households below primary educational level are severely food insecure, the same for households with secondary and above education is less than 17 percent.

Barring the relatively higher income quintile 4, severe food insecurity persists among all quintiles in case of the households belonging to ST group. Even for the high-income quintile only 20 percent of the households have food security. The lowest income households from Other castes are also under the brunt of severe food insecurity. However, in most of the higher income quintiles the share of households having food insecurity is lower as compared to those of the ST households.

Rajasthan shows a similar pattern in terms of responses to the follow up question (Table 4.1A). Households in Rajasthan report high food insecurity (highest of the three surveyed states). Nonetheless, they attribute the current food insecurity to the economic shock owing to COVID-19. Average Likert scale score for each follow up question is 5 in Rajasthan. It

means that food insecurity in Rajasthan was much higher than the normal period and this high food insecurity was a largely a consequence of COVID-19. However, the relatively higher food insecurity in Rajasthan than in Himachal Pradesh and Odisha (see Figure 3.1 in chapter 3 and 5.1 in chapter 5) is likely be a consequence of the pandemic causing a much larger economic shock in Rajasthan than the other two or the government being less successful in managing the economic shock and its implications on food insecurity or both.

	Respon	se of the	Is COVID-19 reason
Individual questions of FIES scale	Respo	ondents	for the YES response?
	Yes	$\mathbf{N}_{\mathbf{a}}\left(0/1\right)$	(Average Likert scale
	(%)	NO (%)	score)
You were worried that you would not have	02	7	5 (271)
enough food to eat.	95	/	5 (571)
You were unable to eat healthy and nutritious	01.25	0 75	5 (265)
food.	91.23	0.75	5 (305)
You ate only a few kinds of foods.	87.50	12.50	5 (350)
You had to skip a meal.	77.75	22.25	5 (311)
You ate less than you thought you should.	86.00	14.00	5 (344)
Your household ran out of food.	74.50	25.50	5 (298)
You were hungry but did not eat.	75.50	24.50	5 (302)
You went without eating for a whole day	74 75	25 25	5(299)

Table 4.1A: Responses to Individual Questions of FIES Scale and COVID-19 as their main reason in Rajasthan

Note: (i) Response of the question "Is COVID-19 reason for the YES response?" was taken on a five-point Likert scale where 1 means completely disagree and 5 means completely agree). (ii)Values in parentheses is the no. of observations ('Yes' responses).

Source: Calculated by the authors from the primary survey data

One of possible reason for the relative high food insecurity is that Rajasthan government provides only wheat through PDS (Table 4.1B). Households depends on the market for the rest of the purchases. In contrast, Himachal Pradesh provide rice, wheat and pulses (Table 3.1B in chapter 3). Odisha provides rice and wheat to the households (Table 5.1B in chapter 5). The share of food grain obtained through PDS was also much less in Rajasthan than Himachal Pradesh. Households in severely insecure category in Rajasthan (who are 74 percent of the surveyed households) obtain around one-third of the total wheat consumption through PDS. The same is nearly 70 percent in Himachal Pradesh, twice the share in Rajasthan. The respondents also complained regarding lack of continuous supply of wheat through PDS. Transportation facility is another issue in Banswara which increases their cost of getting food from PDS and market. While one-fourth of the wheat demand of severely

food insecure household is met through their own production. Production related uncertainties (which are common to agricultural sector, particularly in Rajasthan) adds to the food insecurity. Thus, both the economic shock due to pandemic and inefficiencies associated with PDS may be the reason for much higher food insecurity in Rajasthan in the year preceding to the survey.

	Rice								
Variables	Food Secure	Moderately Food Insecure	Severely Food Insecure						
Total consumption (kg)	9.42	3.77	5.40						
own produced (%)	0	0	0						
from market (%)	100 (9.42)	100 (3.77)	100 (5.40)						
from govt agencies (%)	from govt agencies 0		0						
	Wheat								
	Food Secure	Moderately Food Insecure	Severely Food Insecure						
Total consumption (kg)	45.23	48.68	49.01						
own produced (%)	11.56 (5.23)	0.65 (0.32)	25.34 (12.42)						
from market (%)	70.94 (32.09)	62.63 (30.49)	39.86 (19.54)						
from govt agencies(%)	17.46 (7.90)	36.68 (17.86)	34.72 (17.02)						
		Pulses							
	Food Secure	Moderately Food Insecure	Severely Food Insecure						
Total consumption (kg)	3.55	3.43	3.09						
own produced (%)	0	0	0						
from market (%)	100 (3.55)	100 (3.43)	100 (3.09)						
from govt agencies (%)	0	0	0						

Table 4.1B: Average total monthly consumption of major cereals and pulses and their major sources in Rajasthan

Note: (i) Values in parenthesis is the average consumption. (ii) Average family size was 4.8 size in Rajasthan.

Source: Calculated by the authors from the primary survey data

					Banswara (ST District)		
			Scheduled '	Tribes (ST)			Other C	astes	
	Indicators	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total
	Cultivator	0	0	100	100(15)	100	0	0	100(2)
	Agri Labour	0	0	100	100(2)				
no	Domestic Help								
atio	Non-farm Labour	0	0	100	100(85)	0	0	100	100(2)
dn	Businessman	0	0	100	100(1)	100	0	0	100(1)
Doc	Private Service	14.29	0	85.71	100(5)	50	30	20	100(10)
E.	Self employed	0	0	100	100(2)	75	6.25	18.75	100(16)
Maj	Unemployed	0	0	100	100(48)	12.5	12.5	75	100(8)
	Others		0			100	0	0	100(1)
	Total	0.63	0	99.38	100(160)	55	12.5	32.5	100(40)
	Below Primary	0	0	100	100(106)	44.44	0	55.56	100(9)
J 5	Primary	0	0	100	100(24)	42.86	14.29	42.86	100(14)
l o la	Secondary	0	0	100	100(7)	80	20	0	100(5)
Leve	Secondary and above	4.35	0	95.65	100(23)	66.67	16.67	16.67	100(12)
	Total	0.63	0	99.38	100(160)	55	12.5	32.5	100(40)
e	Quintile1	0	0	100	100(77)	0	0	100	100(3)
ntil	Quintile2	0	0	100	100(50)	0	100	0	100(1)
Zui	Quintile3	0	0	100	100(28)	25	25	50	100(4)
E	Quintile4	20	0	80	100(5)	0	0	100	100(4)
	Quintile5					75	10.71	14.29	100(28)
E	Total	0.63	0	99.38	100(160)	55	12.5	32.5	100(40)

Table 4.2 Status of Food insecurity among ST and Other households in Banswara district of Rajasthan by occupation, level of education and MPCE (in Percent)

Note: No worker was found in the blank categories. Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

For the SC households in Hanumangarh, the incidence of food insecurity is highest among the households in private service (80 percent), cultivator households (79 percent) followed by businessman (59 percent) and unemployed households (33 percent). As compared to the STs in Banswara, SCs in Hanumangarh across different occupational categories show lesser incidence of food insecurity. Although, Other castes are better positioned in terms of food security as compared to the SCs, yet in most occupational categories, half or more than half of the households have food insecurity.

The educational level comparison suggests that with improvement in educational level, the households are able to gain food security. For SCs, only 14 percent of the households have food security as compared to 40 percent of the secondary and above educated households. A similar trend can be observed for the Other castes as well. At higher levels of education, it is observed that the share of SC and Other caste households become comparable, i.e., the gap in share of SC and Other caste households having food security reduces.

Clearly, the lowest income quintile has the highest share of severely food insecure households, both among the SCs and Other castes. However, the shares exhibit huge differences: 84 percent for SCs vis-à-vis 25 percent for other castes. For the SC households with some deviations in the mid-income quintile, there is increase in share of households having food security from the low to high income quintiles. The same trend holds for other caste households.

Table 4.3 Status of Food insecurity among SC and Other households in Hanumangrah district of Rajasthan by occupation, level of education and MPCE (in Percent)

					Hanuma	angrah			
			Scheduled C	astes (SC)			Other C	astes	
	Indicators	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total
	Cultivator					50	0	50	100(4)
	Agri Labour	12.77	8.51	78.72	100(47)	40	0	60	100(2)
ion	Domestic Help								
pat	Non-farm Labour				(78)	17.65	41.18	41.18	100(5)
lno	Businessman	17.95	23.08	58.97	100				
ŏ	Private Service	0	20	80	100(5)	50	0	50	100(17)
ii.	Self employed	50	16.67	33.33	100(6)	25	25	50	100(4)
Ma	Unemployed	16.67	16.67	66.67	100(24)				
	Others					37.5	12.5	50	100(8)
	Total	16.88	17.5	65.63	100(160)	30	22.5	47.5	100(40)
	Below Primary	14.02	15.89	70.09	100(107)	8.33	16.67	75	100(12)
J u	Primary	17.14	22.86	60	100(35)	25	37.5	37.5	100(16)
el c ati	Secondary	25	25	50	100(8)	100	0	0	100(3)
Lev Educ	Secondary and above	40	10	50	100(10)	44.44	11.11	44.44	100(9)
	Total	16.88	17.5	65.63	100(160)	30	22.5	47.5	100(40)
ile	Quintile1	16.67	0	83.33	100(12)	25	50	25	100(4)
int	Quintile2	5.56	27.78	66.67	100(18)	20	60	20	100(5)
Qu	Quintile3	22.22	17.78	60	100(45)	14.29	28.57	57.14	100(7)
E	Quintile4	14.29	21.43	64.29	100(56)	18.18	9.09	72.73	100(11)
PC	Quintile5	20.69	10.34	68.97	100(29)	53.85	7.69	38.46	100(13)
Σ	Total	16.88	17.5	65.63	100(160)	30	22.5	47.5	100(40)

Note: No worker was found in the blank categories. Parentheses values are number of observations Source: Author's estimation using primary survey data

For the ST and SC households taken together, it is seen that the self-employed category has the lowest share (50 percent) of severely food insecure households. The corresponding share for the Other caste is 25 percent. Most of the ST and SC households in the remaining occupational categories either have moderate food insecurity or severe food insecurity. It is interesting to note that the share of households with businessman as main occupation having food security is 100 percent for other castes whereas it is nil for ST and SC groups.

For SC and ST households, the share of households having food security shows gradual increase with improvement in the level of education. However, the difference in share of households under the brunt of food insecurity is still wide between the SC and STs and Other castes.

Although for the Other caste groups a clear trend cannot be observed between income and food security, yet for the ST and SC groups it can be said that as income increases, there is increase in food security as evident in the rising share of households having food security as we move from the lowest income quintile to the highest income quintile.

Table 4.4 Status of Food insecurity among SC&SC and Other households in Rajasthan by occupation, level of education and MPCE (in Percent)

					Rajas	sthan			
			ST and SC	C Castes			Other C	Castes	
	Indicators	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total
	Cultivator	0	0	100	100(15)	75	0	25	100(4)
=	Agri Labour	12.24	8.16	79.59	100(49)	40	0	60	100(5)
ltio	Other Labour	8.59	11.04	80.37	100(163)	15.79	36.84	47.37	100(19)
adn	Businessman	0	0	100	100(1)	100	0	0	100(1)
	Private Service	8.33	8.33	83.33	100(12)	50	21.43	28.57	100(14)
0	Self employed	37.5	12.5	50	100(8)	65	10	25	100(20)
ai	Unemployed	5.56	5.56	88.89	100(72)	25	12.5	62.5	100(16)
Z	Others					100	0	0	100(1)
	Total	8.75	8.75	82.5	100(320)	42.5	17.5	40	100(80)
	Below Primary	7.04	7.98	84.98	100(213)	23.81	9.52	66.67	100(21)
5	Primary	10.17	13.56	76.27	100(59)	33.33	26.67	40	100(30)
el c	Secondary	13.33	13.33	73.33	100(15)	87.5	12.5	0	100(8)
Lev Educ	Secondary and above	15.15	3.03	81.82	100(33)	57.14	14.29	28.57	100(21)
	Total	8.75	8.75	82.5	100(320)	42.5	17.5	40	100(80)
ile	Quintile1	2.25	0	97.75	100(89)	14.29	28.57	57.14	100(7)
inti	Quintile2	1.47	7.35	91.18	100(68)	16.67	66.67	16.67	100(6)
Ŋ	Quintile3	13.7	10.96	75.34	100(73)	18.18	27.27	54.55	100(11)
E	Quintile4	14.75	19.67	65.57	100(61)	13.33	6.67	80	100915)
PC	Quintile5	20.69	10.34	68.97	100(29)	68.29	9.76	21.95	100(41)
Σ	Total	8.75	8.75	82.5	100(320)	42.5	17.5	40	100(80)

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

4.2 Dietary Diversity among SC and ST at Household Level in Rajasthan

Dietary diversity as analysed across lowest, medium, and high dietary diversity shows that the most of the ST and SC households (66 percent) have medium dietary diversity, whereas most of the other caste households (80 percent) have high dietary diversity (table 4.5). Across the two districts, it is found that for both Banswara and Hanumangarh the share of households having high dietary diversity is larger for the other caste as compared to the corresponding shares among the STs and SCs respectively. The difference in proportions of dietary diversity is more pronounced between SCs and Other castes in Hanumangarh as compared to that between STs and Other castes in Banswara.

Table 4.5 District-wise share of dietary diversity among households by social groups in Rajasthan

	Banswa	ra (ST Dis	trict)	Hanuman	grah (SC]	District)		Total		
Diversity	Scheduled	Other	Total	Scheduled	Other	Total	STRCC	Other	Total	
	Tribes (ST)	Caste	10101	Caste (SC)	Caste	10101	STASC	Olner	Total	
Lowest Dietary	1.2	0.0	1.0	1.3	0.0	1.0	12	0.0	1.0	
Diversity	1.5	0.0	1.0	1.5	0.0	1.0	1.5	0.0	1.0	
Medium Dietary	75.0	2.5	60.5	57 5	27.5	52.5	66.2	20.0	57.0	
Diversity	75.0	2.3	00.5	57.5	57.5	55.5	00.5	20.0	57.0	
High Dietary Diversity	23.8	97.5	38.5	41.3	62.5	45.5	32.5	80.0	42.0	
Total	100 (160)	100(40)	100(200)	100(160)	100(40)	100(200)	100(320)	100(80	100(400)	

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

Table 4.6 Share of Dietary diversity among SC&ST and Other households in Rajasthan by occupation, level of education and MPCE (in Percent)

					Raja	Asthan Other Castes										
			ST and S	C Castes			Other C	astes								
Ma	in Occupation	Lowest	Medium	High		Lowest	Medium	High								
		Dietary	Dietary	Dietary	Total	Dietary	Dietary	Dietary	Total							
		Diversity	Diversity	Diversity		Diversity	Diversity	Diversity								
	Cultivator	6.67	66.67	26.67	100(15)	0	0	100	100(4)							
	Agri Labour	0	51.02	48.98	100(49)	0	20	80	100(5)							
ion	Non-farm Labour	1.23	67.48	31.29	100(163)	0	47.37	52.63	100(19)							
ain	Businessman	0	100	0	100(1)	0	0	100	100(1)							
cnł W	Private Service	0	41.67	58.33	100(12)	0	7.14	92.86	100(14)							
õ	Self employed	0	62.5	37.5	100(8)	0	0	100	100(20)							
	Unemployed	1.39	77.78	20.83	100(72)	0	31.25	68.75	100(16)							
	Others					0	0	100	100(1)							
	Total	1.25	66.25	32.5	100(320)	0	20	80	100(80)							
	Below Primary	1.41	68.54	30.05	100(213)	0	38.1	61.9	100(21)							
on	Primary	1.69	59.32	38.98	100(59)	0	23.33	76.67	100(30)							
el (Secondary	0	73.33	26.67	100(15)	0	0	100	100(8)							
Lev Educ	Secondary and above	0	60.61	39.39	100(33)	0	4.76	95.24	100(21)							
	Total	1.25	66.25	32.5	100(320)	0	20	80	100(80)							
	Quintile1	2.25	79.78	17.98	100(89)	0	71.43	28.57	100(7)							
<u>و</u> ر	Quintile2	1.47	70.59	27.94	100(68)	0	33.33	66.67	100(6)							
E CI	Quintile3	1.37	69.86	28.77	100(73)	0	36.36	63.64	100(11)							
MP	Quintile4	0	57.38	42.62	100(61)	0	20	80	100(15)							
- 0	Quintile5	0	24.14	75.86	100(29)	0	4.88	95.12	100(41)							
	Total	1.25	66.25	32.5	100(320)	0	20	80	100(80)							

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

In the lowest dietary category of ST and SC households, half constitutes the other labour and remaining half constitutes the cultivator and unemployed households (Table 4.6). None of the occupational categories in other castes have the lowest dietary diversity. In the medium dietary diversity, about 52 percent of the ST and SC households has other labour as the main occupation, followed by unemployed (26 percent), and agricultural labour (about 12 percent). Similar pattern can be observed for the other castes having medium dietary diversity: 56 percent constitute other labour households followed by unemployed households constituting 31 percent. It is interesting to note that among SC and STs having high dietary diversity, agricultural labour and other labour households constitute the higher shares. For Other castes having high dietary diversity, self-employed, private service, and other labour constitute the larger shares.

Among the SCs and STs, the lowest dietary diversity persists among the below primary educated and primary educated. The SC and ST households having medium dietary diversity also are majorly primary or below primary educated. As we move to the high dietary diversity, the distribution of SC and ST households become slightly more disperse across all educational levels. The Other caste households depict more dispersion in the shares of households across different educational categories. For the Other caste households having high dietary diversity, the share of households with secondary education and above is much higher as compared to the corresponding shares of the ST and SC households.

In so far as the income quintile distribution is concerned, a pattern that emerges is that for the ST and SC households as the income increases, the share of households in the lowest and medium dietary diversity decreases, whereas those of high dietary diversity increases. This pattern is also apparent among the other caste households.

4.3 Dietary Diversity among SC and ST Women in Rajasthan

Table 4.7 shows that majority of ST women are having medium dietary diversity, and almost 25 per cent of them are having high dietary diversity. But in comparison to other caste women in the same district, their performance is not better. Similarly, SC women are almost equally divided between high and medium dietary diversity and their performance is not poorer in comparison to other caste women in the same district.

	Banswar	ra (ST Dist	trict)	Hanuman	grah (SC	District)		Total		
Diversity	Scheduled	Other	Total	Scheduled	Other	Total	STPSC	Other	Total	
	Tribes (ST)	Caste	10101	Caste (SC)	Caste	10101	STASC	Olner	Total	
Lowest Dietary Diver	1.0	0.0	0.8	0.4	0.0	0.4	0.7	0.0	0.6	
Medium Dietary	746	0.0	50.5	517	42.2	50.2	62.6	10.4	519	
Diver	/4.0	0.0	39.3	51.7	42.2	30.2	02.0	19.4	34.8	
High Dietary Diversi	24.4	100.0	39.7	47.8	57.8	49.5	36.7	80.6	44.7	
Total	100(209)	100(53)	100(262)	100(230)	100(45)	100(275)	100(439)	100(98)	100(537)	

Table 4.7 District wise Dietary diversity rate of women in Rajasthan

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

Table 4.8 Dietary diversity rate of ST&SCT and Other caste women by occupation, level of education and MPCE Quintile in Rajasthan

					Raja	sthan			
			ST and SC	C Castes			Other Ca	astes	
Ma	in Occupation	Lowest Dietary Diversity	Medium Dietary Diversity	High Dietary Diversity	Total	Lowest Dietary Diversity	Medium Dietary Diversity	High Dietary Diversity	Total
	Cultivator					v			
	Agri Labour	0.0	0.0	100.0	100(2)	0.0	0.0	100.0	100(1)
ion	Domestic Help								
ain Dat	Other Labour	0.0	33.3	66.7	100(3)	0.0	0.0	100.0	100(1)
M ²	Private Service	0.0	66.7	33.3	100(3)	0.0	0.0	100.0	100(2)
0 0	Unemployed	0.7	63.2	36.1	100(429)	0.0	20.2	79.8	100(94)
0	Others	0.0	100.0	0.0	100(1)	0.0			
	Total	0.7	62.6	36.7	100(439)	0.0	19.4	80.6	100(98)
	Below Primary	0.9	66.1	33.0	100(215)	0.0	25.0	75.0	100(24)
fion	Primary	0.0	63.2	36.8	100(68)	0.0	21.4	78.6	100(28)
el o cati	Secondary	0.0	67.2	32.8	100(58)	0.0	33.3	66.7	100(9)
Leve	Secondary and above	1.0	52.0	46.9	100(98)	0.0	10.8	89.2	100(37)
	Total	0.7	62.6	36.7	100(439)	0.0	19.4	80.6	100(98)
	Quintile1	1.9	80.6	17.5	100(103)	0.0	60.0	40.0	100(5)
e	Quintile2	1.1	72.2	26.7	100(90)	0.0	60.0	40.0	100(5)
nti CE	Quintile3	0.0	66.3	33.7	100(92)	0.0	46.7	53.3	100(15)
Ŭ.	Quintile4	0.0	50.9	49.1	100(106)	0.0	21.1	79.0	100(19)
20	Quintile5	0.0	25.0	75.0	100(48)	0.0	3.7	96.3	100(54)
	Total	0.7	62.6	36.7	100(439)	0.0	19.4	80.6	100(98)

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

The examination of the status of dietary diversity by occupational category suggests that the ST and SC women with the lowest dietary diversity are unemployed (table 4.7). Similarly, most of these women with either medium or high dietary diversity are found to be unemployed. The same trend is obtained for the women belonging to other castes.

The SC and ST women with lowest dietary diversity are either below primary educated (nearly 67 percent) or secondary or above educated (33 percent) (Table 4.8). Although for the medium and high dietary diversity the shares become more dispersed, yet a large share of the

women is below primary educated. In case of women belonging to other caste, a large share of women with high dietary diversity is secondary and above educated.

None of the women from other castes was found in low dietary diversity category. Since the share of women in low diversity is negligible in Rajasthan, the better income status of the Other castes may have helped them in terms of maintaining better dietary diversity. Since women working as agricultural labour are doing relatively better, working in agricultural sector may also be playing a role in better dietary diversity of women from other castes by increasing access to diverse food.

4.4 Nutritional Status of Children in Rajasthan

The analysis of nutritional status of children (under five years) shows high incidence of stunting, wasting and underweight among SC and ST compared to the other castes. SC & ST had 62.4 percent incidence of stunting compared to 22.22 percent for other castes. Incidence of wasting and underweight were also higher in Banswara.

Table 4.9	District-	wise Sta	atus of I	Nutritional	insecurity	of	children	in	Rajasthan

	Banswara (ST District)			Hanumai	ngarh (SC	District)	Total		
Nutritional Status	Scheduled	Other	Tatal	Scheduled	Other	Tatal	ST & SC	Other	Total
	Tribes (ST)	Caste	Total	Caste (SC)	Caste	Total	51 & 50	Caste	
Stunted	62.37(58)	28.57(2)	60(60)	62.5(20)	18.18(2)	51.16(22)	62.4(78)	22.22(4)	57.34(82)
Waste	43.82(39)	28.57(2)	42.71(41)	20(6)	0(0)	14.63(6)	37.82(45)	11.11(2)	34.31(47)
Underweight	61.86(60)	28.57(2)	59.62(62)	43.75(14)	18.18(2)	37.21(16)	57.36(74)	22.22(4)	53.06(78)

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

Incidence of stunting, wasting and underweight give mix results for female and male children (Table 4.10). Incidence of stunting was higher among female in Banswara (67.5 percent compared to 55 percent) but lower in Hanumangarh (36.84 percent compared to 62.5 percent). Incidence of underweight had the same pattern. In case of wasting, the trend reversed. Wasting was found to be lower among females in Banswara (39.02 percent compared to 45.45 percent) and higher in Hanumangarh (15.79 percent compared to 13.64 percent). The incidence of stunting, wasting and underweight shows improvement with increase in age of the child, mother's education level and wealth of the household. Access to improved toilet seems to play positive role in terms of reducing the incidence of malnutrition.

Background		Stunting			Wasting			Underweight			
Variables	Banswara	Hanumangarh	All	Banswara	Hanumangarh	All	Banswara	Hanumangarh	All		
	-]	By Gender G	roups						
Male	55	62.5	57.14	45.45	13.64	36.36	57.38	41.67	52.94		
Female	67.5	36.84	57.63	39.02	15.79	31.67	62.79	31.58	53.23		
			Ву	Age Group	of Child						
0 to 5 Months	71.43	66.67	69.23	28.57	0	18.18	66.67	50	60		
6 to 11 Months	75	25	50(4)	75	25	50	100	0	50		
12 to 23 Months	61.9	50	57.58	35	16.67	28.13	56.52	25	45.71		
24 to 35 Months	76.47	55.56	69.23	53.33	11.11	37.5	64.71	55.56	61.54		
36 to 56 Months	50.98	50	50.79	42	16.67	37.1	54.9	41.67	52.38		
	By Mother's Education										
Illiterate	60.87	56.25	59.68	48.89	25	42.62	69.39	37.5	61.54		
Primary	54.55	50	52.94	42.86	8.33	30.3	54.55	33.33	47.06		
Secondary	62.5	40	53.85	14.29	0	9.09	37.5	40	38.46		
Higher	62.5	50	58.82	36.36	11.11	29.03	50	40	47.06		
Secondary and											
above			Week	th Owentile ((Jangahald)						
Wealth Quantile (Household)											
Pooror	60	50	50.38	35 71	0	22.22	51.61	50	51.52		
Middle	58.33	37.5	59.38	41.67	12.5	33.33	66.67	25	50		
Richer	50	50	50	50	12.5	22.22	50	37.5	38.80		
Richest	16.67	58.82	17.83	16.67	13.33	1/ 20	16.67	41.18	34.78		
Type of fuel used for cooking											
Gas	40	0	33 33	40	0	33 33	40	0	33 33		
Wood	63.74	75	65.42	43.68	20	40.2	63.16	56.25	62.16		
Both Gas and	0	38.46	33.33	2.5	12	13.79	0	26.92	23.33		
Wood	Ŭ	20110	00100			10117	Ŭ	2002	20100		
				Type of to	ilet		1				
Improved toilet	47.06	30.77	40	41.18	16.67	31.03	58.82	30.77	46.67		
Not improved	62.65	60	61.95	43.04	13.79	35.19	59.77	40	54.7		
toilet											
			Sou	rce of drinki	ng water						
Improved water	62.5	45.71	48.84	37.5	12.12	17.07	50	34.29	37.21		
Not improved	59.78	75	61	43.18	25	41.67	60.42	50	59.62		
water				II II' DDI							
\$7	59.92	12.96	5(1	Holding BPL	card	20	(0)	29.57	5176		
Yes	58.82	42.86	57.94	36.36	0	30	60 50.42	28.57	54.76		
110	00.01	52.78	J7.84	40.05	17.05	30.08	39.42	30.09	32.38		
Food Secure	14.20	26.26	г 27.79	14 20		11 11	14.20	27.27	22.22		
Moderately	14.29	50.50	27.78	14.29	9.09	11.11	14.29	21.21	22.22		
Food Insecure	100	37.5	44.44	100	0	11.11	100	25	33.33		
Severely Food											
Insecure	63.04	62.5	62.93	44.32	22.73	40	62.5	45.83	59.17		
			Die	etary Diversit	ty Status						
Lowest Dietary					•						
Diversity											
Medium Dietary	63.77	65.38	64.21	41.79	24	36.96	64.38	50	60.61		
Diversity											
High Dietary	51.61	29.41	43.75	44.83	0	28.89	48.39	17.65	37.5		
Diversity	(0)	F1 1/	67.24	(2.51	14 (3	24.21	50.70	27.21	52.04		
Total	60	51.16	57.34	42./1	14.03	54.51	59.62	37.21	53.06		

Table 4.10 Nutritional status of children (under five years) in Rajasthan

Note: Frequency table for this table is given in appendix-5 Source: Author's estimation using primary survey data

4.5 Determinants of Nutritional Status in Rajasthan

The logit regression for Rajasthan shows significantly higher incidence (36 percent) of stunting among SC. Though other variables are not showing any significant effect, the food insecurity seems to be increasing incidence of stunting, wasting and underweight. Mother's education and health (long height) had positive effect on nutritional status of children. Access to safe drinking water is associated with lowering of the incidence of malnutrition. Increase in wealth, however, do not show a positive effect.

	Dep. V	ar: Stu	nting	Dep. V	Var: Was	sting	Dep. Var: Underweight			
Indicators	Coefficient	Z-	marginal	Coefficient	Z-	marginal	Coefficient	Z-	marginal	
	Coefficient	value	effect	Coefficient	value	effect	Coefficient	value	effect	
		Family	type dummi	es (Reference:	Nuclear F	amily)				
Joint family	-0.62	-1.03	-0.13	0.59	0.92	0.11	0.69	1.1	0.14	
Household Head	0.22	0.49	0.05	0.23	0.47	0.04	0.19	0.4	0.04	
		R	eligion Dumi	nies (Reference	e: Muslim)				
Hindu	-0.77	-0.85	-0.15	-0.09	-0.08	-0.02	-0.8	-0.9	-0.15	
~~~	1.0	Social g	group Dumm	ies (Reference:	: General	Caste)	0.0 <b>-</b>		0.17	
ST	1.9	1.31	0.4	1.64	0.93	0.27	0.85	0.58	0.17	
SC	1.72	1.85*	0.36	0.8	0.67	0.11	0.78	0.86	0.16	
Family Size	0.13	0.93	0.03	-0.16	-1.01	-0.03	0.2	1.41	0.04	
Income Quintile Dummies (Reference: Quintile 1)										
Quintile2	0.05	0.09	0.01	-0.72	-1.14	-0.13	-1.29	_ 2.15**	-0.26	
Quintile3	-0.35	-0.51	-0.08	-0.42	-0.58	-0.08	-0.85	-1.14	-0.17	
Quintile4	-0.22	-0.22	-0.05	-0.34	-0.28	-0.07	-1.57	-1.39	-0.32	
Quintile5	1.16	0.82	0.21	-0.16	-0.1	-0.03	-1.62	-1.14	-0.33	
BPL Card dummies (Reference: No)										
Yes	0.06	0.12	0.01	-0.64	-1.12	-0.12	0.19	0.34	0.04	
Water Source Dummies (Reference: Not-improved Water)										
Improved water	0.2	0.28	0.04	-0.2	-0.27	-0.04	-0.07	-0.1	-0.01	
Sanitation Dummies (Reference: Not-improved toilet)										
Improved toilet	-0.33	-0.53	-0.07	1.43	1.98**	0.27	1.48	2.13**	0.26	
Mother's Age	-0.08	- 1.76*	-0.02	0.02	0.46	0	-0.05	-1.15	-0.01	
		Mother	's Education	Dummies (Ref	erence: Li	iterate)				
Illiterate	-0.26	-0.59	-0.06	0.69	1.38	0.13	0.6	1.29	0.12	
		Mot	her's Height	(Reference: Sl	hort Statu	re)				
Long Stature	-0.67	-0.97	-0.14	-0.83	-1.16	-0.17	-1.21	-1.49	-0.23	
		Chi	ild's Sex Dur	nmies (Referen	ce: Fema	le)				
Male	-0.12	-0.31	-0.03	0.44	1.02	0.08	0.02	0.05	0	
	(	Child Age	e group dum	mies (Referenc	e: 0 to 23	Months)				
24 to 59 Months	0.05	0.12	0.01	0.38	0.82	0.07	0.22	0.52	0.04	
		Food In	security Dun	nmies (Referen	ce: Food S	Secure)				
Moderately Food Insecure	1.42	1.09	0.31	0.48	0.29	0.07	1.1	0.85	0.21	
Severely Food	1.22	1.4	0.20	1 1 1	0.00	0.10	1.52	1 (0	0.2	
Insecure	1.32	1.4	0.29	1.11	0.99	0.19	1.53	1.62	0.3	
Constant	0.15	0.07		-3.02	-1.23		-0.37	-0.16		
Number of		137			120			138		
Observation		157			129		138			

Table 4.11 Determinants of Nutritional Status in Rajasthan

LR chi2(20)	18.15	22.46	28.12
Prob > chi2	0.58	0.32	0.11
Pseudo R2	0.1	0.14	0.15
Log likelihood	-84.27	-71.56	-81.23

Source: Author's estimation using primary survey data

#### 4.6 Summary

Rajasthan had very high share of food insecure households. Eighty six percent of households in Banswara and 62 percent in Hanumangarh were severe food insecure. Food insecurity is especially high among SC and ST. More than 99 percent of ST in Banswara and almost two-third SC households in Hanumangarh had severe food insecurity. Only hosueholds having employment in private enterprises reported some food security (nearly 15 percent households). Dietary diversity was found to be low in Rajasthan. Most of the respondents reported medium diversity in their diet. Dietary diversity was again significantly lower among SC and ST. Dietary diversity for women does not differ considerably from the dietary diversity of the households. High incidence of stunting, wasting and underweight was found in Rajasthan. The incidence of malnutrition was especially high for SC and ST. Women also had higher incidence in Banswara. Mother's education and health seems to lower the incidence of malnutrition. Food security shows a positive effect on the nutritional status too.

# **Chapter 5: Food Security and Nutritional Status among SC and ST in Odisha**

#### 5.1 Food Security among SC and ST in Odisha

District-wise analysis of primary survey paints an encouraging picture of food security in Odisha (Figure 5.1 & Table 5.1). Both Sonepur (ST district) and Gajapati (SC district) had more than 83 percent food secure households. Overall, the percentage of food insecure households were merely 5.5 percent. The share of moderately food insecure households was found to be 10.75 percent.



Figure 5.1 District-Wise status of Food insecurity among households in Odisha (in Percent)

Source: Author's estimation using primary survey data

One surprising finding from the primary data is that ST had higher food security than other castes in Sonepur (85.63 percent among ST compared to 80 percent for other castes). Severe food insecurity was 4.38 percent among ST compared to 7.5 percent among other castes in the same district. In Gajapati, the food security was only slightly higher among other castes (85 percent) than SC (82.5 percent). The severe food insecurity was still lower among SC (5.63 percent) compared to other castes (7.5 percent). Overall, SC and ST together found to be doing better in terms of food security in Odisha and had much lower share of households are severe food insecure than other castes. The respondents attributed to this food security to various schemes of the state government, such as one-rupee subsidized rice, food to children in Anganwadi, eggs to children and women through Integrated Child Development Services Scheme, cooked hot meals to the poor and needy people at the cost of five rupees in the urban

areas under Aahaar scheme, and transfer of Rs 5000 to pregnant women under MAMATA. It is important to underline here that as per the State Ranking Index for NFSA (2022), Odisha is the top most ranking states for implementation of the National Food Security Act (NFSA), followed by Uttar Pradesh and Andhra Pradesh. Therefore, high state of food security in Odisha is not a surprise.

Table 5.1 Social group wise Status of Food insecurity among households in Odisha (in percent)

	Sonepu	ur (ST Dis	strict)	Gajapa	nti (SC Di	strict)	Total		
Food Security Scale	Scheduled Tribes (ST)	Other Caste	Total	Scheduled Caste (SC)	Other Caste	Total	ST&SC	Others	Total
<b>Food Secure</b>	85.63	80.00	84.50	82.50	85.00	83.00	84.06	82.50	83.75
Moderately Food insecure	10.00	12.50	10.50	11.88	7.50	11.00	10.94	10.00	10.75
Severely Food Insecure	4.38	7.50	5.00	5.63	7.50	6.00	5.00	7.50	5.50
Total	100(160)	100(40)	100(200)	100(160)	100(40)	100(200)	100(320)	100(80)	100(400)

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

Odisha shows a different pattern of food insecurity. It not only has low food insecurity despite lower development level, but also the major concerns are availability of fewer varieties of food and non-availability of healthy and nutritious food (Table 5.1A). In contrast to other two states, households in Odisha are less worried about availability of food. Also, average Likert scale score is less than 3 for 6 out of 8 questions. The highest average is 3.49 for the first question. High average Likert scale score for the question means that COVID-19 did create uncertainty. However, the extent of uncertainty was smaller compared to Himachal Pradesh and Rajasthan. Lower average score of the follow up question also indicates that the food insecurity figures for Odisha are closer to a normal year and is likely to persist even after the recovery from the economic shock caused by the pandemic.

Table 5.1A: Responses to Individual Questions of FIES Scale and COVID-19 as their main reason in Odisha

Individual questions of FIES scale	Respor th Respor	nse of e ndents	Is COVID-19 reason for the YES response? (Average Likert scale score)
	Yes	No	Mean
You were worried that you would not have enough	20.25	79.75	3.49 (49)

food to eat.			
You were unable to eat healthy and nutritious food.	63.75	36.25	1.34 (223)
You ate only a few kinds of foods.	71.00	29.00	1.25 (224)
You had to skip a meal.	19.75	80.25	1.71 (7)
You ate less than you thought you should.	10.00	90.00	1 (4)
Your household ran out of food.	9.25	90.75	2 (4)
You were hungry but did not eat.	11.75	88.25	3 (1)
You went without eating for a whole day.	11.00	89.00	1 (2)

Note: (i) Response of the question "Is COVID-19 reason for the YES response?" was taken on a five-point Likert scale where 1 means completely disagree and 5 means completely agree). (ii)Values in parentheses is the no. of observations ('Yes' responses). Source: Calculated by the authors from the primary survey data

Rice is the major food source in Odisha (Table 5.1B). Households in severely food insecure category receive around 38 percent of the rice consumed from government agencies and purchase the rest from the market. Share of government agencies. This share is a little higher than share of wheat obtained from the government in Rajasthan (wheat is used for comparison because it is the main food in Rajasthan) but much lower than the share of wheat or rice received from the government in Himachal Pradesh (Table 3.1B, Table 4.1B and Table 5.1B). Food secure and moderately food insecure households produce a part of the rice consumed in their farms. Food secure households receive relatively higher share (48.4 percent) of rice from the government. This percentage is much higher than a similar figure of wheat in Rajasthan. Since the share of food secure households receive half of their major food consumed from the government. In addition, the households in Odisha get a part of their wheat supply from the government. The interviews with the respondents also suggest that the government supply of food grains is largely stable in Odisha. These may be the main reasons behind lower food insecurity in Odisha than in Rajasthan.

Table 5.1B: Average total monthly c	onsumption o	of major cere	als and pulse	s and their i	major
sources in Odisha					

		Rice							
Variables	Food Soouro	Moderately Food Ingoouro	Severely Food						
	rood Secure	Moderatery Food Insecure	Insecure						
Total consumption	26.02	41.22	50.12						
(kg)	30.02	41.55	39.12						
own produced (%)	1.2 (0.45)	6.4 (2.66)	0(0.0)						
from market (%)	50.3 (18.12)	53.6 (22.15)	62.81 (36.81)						
from govt agencies (%)	48.4 (17.45)	40.0 (16.52)	37.7 (22.31)						

		Wheat	
	Food Secure	Moderately Food Insecure	Severely Food Insecure
Total consumption (kg)	4.03	3.02	3.26
own produced (%)	0 (0.0)	0 (0.0)	0(0.0)
from market (%)	81.5 (1.81)	85.1 (2.57)	75.2 (2.45)
from govt agencies (%)	18 (0.41)	14.9 (0.45)	25 (0.81)
		Pulses	
	Food Secure	Moderately Food Insecure	Severely Food Insecure
Total consumption (kg)	2.22	3.02	3.26
own produced (%)	0 (0.0)	0 (0.0)	0(0.0)
from market (%)	100 (2.8)	100 (2.86)	100 (3.76)
from govt agencies (%)	0 (0.0)	0 (0.0)	0 (0.0)

Note: (i) Values in parenthesis is the average consumption. (ii) Average family size was 4.4 size in Odisha

Source: Calculated by the authors from the primary survey data

Table 5.2 provides data on food security by occupation, level of education and MPCE in Sonepur. Food security found to be higher among self-employed, cultivators and agricultural labour. In comparison, domestic help was the least secure with 100 percent in severely food insecure category followed by non-agricultural labour and unemployed. Unemployed had significantly higher percentage of severe food insecure for Other castes than ST. Food security does not show any clear association with education level either. The food security status initially shows improvement with increase in education level of the household head. However, the pattern reverses for higher secondary & above (HS&A) education who had the lowest share of food secure among ST (75 percent) and Other castes (73.91 percent). The percentage of severely food insecure is more than eight percent for HS&A education. Quintile of monthly per capita expenditure (MPCE) shows interesting results too. Households in the lowest quintile and the highest quintile for ST are relative food secure. It is the middle quintiles which face the highest food insecurity. In case of Other castes, the highest quintile had the smallest share of households in food secure category (66.7 percent) and largest in severe food insecure category (16.7 percent).

Table 5.2 Status of Food insecurity among ST and Other households in Sonepur district of Odisha by occupation, level of education and MPCE (in Percent)

					Sonepur (S	ST District)			
			Scheduled 7	Tribes (ST)			Other C	Castes	
	Indicators		Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total
	Cultivator	89.47	5.26	5.26	100(19)	91.67	8.33	0.00	100(12)
	Agri Labour	92.00	8.00	0.00	100(25)				
ion	Domestic Help	0.00	0.00	100.00	100(1)				
Dat	Non-farm Labour	75.00	20.00	5.00	100(20)	0.00	100.00	0.00	100(1)
Ino	Businessman	100.00	0.00	0.00	100(1)	85.71	0.00	14.29	100(7)
Ő	Private Service					100.00	0.00	0.00	100(2)
Ŀ.	Self employed	100.00	0.00	0.00	100(2)	100.00	0.00	0.00	100(2)
Ma	Unemployed	85.87	9.78	4.35	100(92)	66.67	20.00	13.33	100(15)
	Others					100.00	0.00	0.00	100(1)
	Total	85.63	10.00	4.38	100(160)	80.00	12.50	7.50	100(40)
	Below Primary	83.91	11.49	4.60	100(87)				
f	Primary	92.86	7.14	0.00	100(14)	80.00	0.00	20.00	100(5)
el c	Secondary	89.36	6.38	4.26	100(47)	91.67	8.33	0.00	100(12)
Lev Educ	Higher Secondary and above	75.00	16.67	8.33	100(12)	73.91	17.39	8.70	100(23)
	Total	85.63	10.00	4.38	100(160)	80.00	12.50	7.50	100(40)
	Quintile1	80.65	12.90	6.45	100(62)				
<u>ہ</u> و	Quintile2	90.91	9.09	0.00	100(44)	88.89	11.11	0.00	100(9)
E C I	Quintile3	89.47	5.26	5.26	100(19)	75.00	25.00	0.00	100(4)
	Quintile4	83.33	8.33	8.33	100(12)	100.00	0.00	0.00	100(4)
	Quintile5	100.00	0.00	0.00	100(3)	66.67	16.67	16.67	100(18)
	Total	85.71	10.00	4.29	100(140)	77.14	14.29	8.57	100(35)

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

Food insecurity in Gajapati shows similar pattern (Table 5.3). All domestic help were found to be in severely food insecure category. The share of food secure among SC was the lowest for domestic help, agricultural labour and other category of workers. For Other caste groups, the food security was lowest among cultivators followed by other non-farm labour. Other labour had the highest share (15.79 percent) of households in severely food insecure category in other castes category. The education-wise pattern shows increasing food security with level of education, the pattern had reversed for HS&A. HS&A education is associated with the highest share of severely food insecure. Food security again found to be worse for higher MPCE quintile.

Table 5.3 Status of Food insecurity among SC and Other households in Gajapati district of Odisha by occupation, level of education and MPCE (in Percent)

					Gajapati (S	SC District)			
			Scheduled (	Castes (SC)			Other Ca	astes	
	Indicators	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total	Food Security	Moderately Food Insecurity	Severely Food Insecurity	Total
	Cultivator	87.50	6.25	6.25	100(16)	66.67	33.33	0.00	100(3)
	Agri Labour	75.00	25.00	0.00	100(8)				
ion	Domestic Help	0.00	0.00	100.00	100(2)				
oat	Other Labour	85.71	10.20	4.08	100(49)	78.95	5.26	15.79	100(19)
Ino	Businessman	100.00	0.00	0.00	100(2)	100.00	0.00	0.00	100(4)
õ	Private Service	85.71	14.29	0.00	100(7)	100.00	0.00	0.00	100(3)
Main	Self employed	78.00	16.00	6.00	100(50)	100.00	0.00	0.00	100(2)
	Unemployed	91.67	4.17	4.17	100(24)	88.89	11.11	0.00	100(9)
	Others	50.00	50.00	0.00	100(2)				
	Total	82.50	11.88	5.63	100(160)	85.00	7.50	7.50	100(40)
	Below Primary	80.68	12.50	6.82	100(88)	82.35	5.88	11.76	100(17)
f	Primary	79.31	13.79	6.90	100(29)	88.89	11.11	0.00	100(9)
el (	Secondary	90.00	10.00	0.00	100(30)	85.71	14.29	0.00	100(7)
Lev Educ	Higher Secondary and above	84.62	7.69	7.69	100(13)	85.71	0.00	14.29	100(7)
	Total	82.50	11.88	5.63	100(160)	85.00	7.50	7.50	100(40)
	Quintile1	80.00	20.00	0.00	100(25)	87.50	0.00	12.50	100(8)
ہے و	Quintile2	89.47	7.89	2.63	100(38)	83.33	16.67	0.00	100(6)
F C	Quintile3	83.78	8.11	8.11	100(37)	100.00	0.00	0.00	100(3)
	Quintile4	83.33	11.11	5.56	100(36)	75.00	8.33	16.67	100(12)
	Quintile5	70.83	16.67	12.50	100(24)	90.91	9.09	0.00	100(11)
	Total	82.50	11.88	5.63	100(160)	85.00	7.50	7.50	100(40)

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

The combined data of two districts had similar trends (Table 5.4). All domestic workers were severely food insecure. Food insecurity was the highest among other workers, non-farm labour and unemployed. Education of the household head did not show noteworthy effect on food security except for some improvement in food security for secondary education before reversal of the pattern. The food insecurity is the highest for HS&A education. MPCE quintiles do not show a specific trend either. The food insecurity only seems to increase with the increase in MPCE. While the better situation of poor quintiles may be the result of state policies, the low food security among higher expenditure quintiles is not a desirable situation.

Table 5.4 Status of Food insecurity among SC&SC and Other households in Odisha by occupation, level of education and MPCE (in Percent)

					Odis	ha			
			ST and S	C Castes			Other (	Castes	
	Indicators	<b>F</b> 1	Moderately	Severely		Г 1	Moderately	Severely	
		Food	Food	Food	Total	Food	Food	Food	Total
		Security	Insecurity	Insecurity		Security	Insecurity	Insecurity	
	Cultivator	88.57	5.71	5.71	100(35)	86.67	13.33	0.00	100(15)
	Agri Labour	87.88	12.12	0.00	100(33)				
ion	Domestic Help	0.00	0.00	100.00	100(3)				
oat	Other Labour	82.61	13.04	4.35	100(69)	75.00	10.00	15.00	100(20)
Ino	Businessman	100.00	0.00	0.00	100(3)	90.91	0.00	9.09	100(11)
Main Oc	Private Service	85.71	14.29	0.00	100(7)	100.00	0.00	0.00	100(5)
	Self employed	78.85	15.38	5.77	100(52)	100.00	0.00	0.00	100(4)
	Unemployed	87.07	8.62	4.31	1009(116)	75.00	16.67	8.33	100(24)
	Others	50.00	50.00	0.00	100(2)	100.00	0.00	0.00	100(1)
	Total	84.06	10.94	5.00	100(320)	82.50	10.00	7.50	100(80)
	Below Primary	82.29	12.00	5.71	100(175)	82.35	5.88	11.76	100(17)
f a	Primary	83.72	11.63	4.65	100(43)	85.71	7.14	7.14	100(14)
el o ati	Secondary	89.61	7.79	2.60	100(77)	89.47	10.53	0.00	100(19)
Leve	Higher Secondary and above	80.00	12.00	8.00	100(25)	76.67	13.33	10.00	100(30)
	Total	84.06	10.94	5.00	100(320)	82.50	10.00	7.50	100(80)
	Quintile1	80.46	14.94	4.60	100(87)	87.50	0.00	12.50	100(8)
ہ ہے	Quintile2	90.24	8.54	1.22	100(82)	86.67	13.33	0.00	100(15)
F C	Quintile3	85.71	7.14	7.14	100(56)	85.71	14.29	0.00	100(7)
	Quintile4	83.33	10.42	6.25	100(48)	81.25	6.25	12.50	100(16)
≥ c	Quintile5	74.07	14.81	11.11	100(27)	75.86	13.79	10.34	100(29)
	Total	84.00	11.00	5.00	100(320)	81.33	10.67	8.00	100(80)

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

## 5.2 Dietary Diversity among SC and ST at Household Level in Odisha

While the data show SC and ST to be relatively food secure, the dietary diversity is still low especially among SC (Table 5.5). In Sonepur, 61.9 percent of ST households had high dietary diversity compared to 95 percent for other castes. Among SC, the high dietary diversity was found among just 37 percent of the households compared to 62.5 percent of other castes. Nearly 16 percent of SC households in Gajapati had the lowest dietary diversity. For SC and ST combined, the high dietary diversity was found among 49 percent households and 8.4 percent had the lowest dietary diversity. Comparative figure for other castes was 79 and 1.25 percent, respectively.

	Sonepu	ır (ST Dis	trict)	Gajapat	rict)	Total			
Dietary Diversity	Scheduled Tribes (ST)	Other Caste	Total	Scheduled Caste (SC)	Other Caste	Total	ST&SC	Other	Total
Lowest Dietary Diversity	0.63	0	0.5	16.25	2.5	13.5	8.44	1.25	7
Medium Dietary Diversity	37.5	5	31	46.88	35	44.5	42.19	20	37.75
High Dietary Diversity	61.88	95	68.5	36.88	62.5	42	49.38	78.75	55.25
Total	100(160)	100(40)	100(200)	100(160)	100(40)	100(200)	100(320)	100(80)	100(400)

Table 5.5 District-wise share of dietary diversity among households by social groups in Odisha

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

Occupation-wise data shows that domestic help had the highest dietary diversity followed by agricultural labour and cultivators for SC and ST caste groups (Table 5.6). For Other castes, businessmen, employees in private sector and unemployed had the highest dietary diversity. Unlike food security, the dietary diversity showed an increase with educational attainment of the household head. Among ST and SC households, the percentage of households reporting the highest dietary were 68 percent for HS&A education compared to 49.38 percent for below primary. Even for the Other castes, the percentage of the highest dietary diversity was about 12 percentage point higher for HS&A education than below primary education. However, MPCE still do not show a clear pattern. Going up the MPCE quintiles, the dietary diversity increased at first but the trend was reversed after second quintile for SC and ST and third quintile for other castes.

Table 5.6 Share of Dietary diversity among SC&ST and Other households in Odisha by occupation, level of education and MPCE (in Percent)

					Odi	isha			
			ST and S	C Castes			Other C	astes	
	Indicators	Lowest	Medium	High		Lowest	Medium	High	
		Dietary	Dietary	Dietary	Total	Dietary	Dietary	Dietary	Total
		Diversity	Diversity	Diversity		Diversity	Diversity	Diversity	
	Cultivator	5.71	25.71	68.57	100(35)	0.00	13.33	86.67	100(15)
_	Agri Labour	12.12	15.15	72.73	100(33)				
ion	Domestic Help	0.00	0.00	100.00	100(3)				
pat	Other Labour	10.14	53.62	36.23	100(69)	0.00	25.00	75.00	100(20)
cnl	Businessman	33.33	66.67	0.00	100(3)	0.00	18.18	81.82	100(11)
õ	Private Service	0.00	42.86	57.14	100(7)	0.00	20.00	80.00	100(5)
E.	Self employed	13.46	57.69	28.85	100(52)	0.00	50.00	50.00	100(4)
Ma	Unemployed	5.17	40.52	54.31	100(116)	4.17	16.67	79.17	100(24)
	Others	0.00	100.00	0.00	100(2)	0.00	0.00	100.00	100(1)
	Total	8.44	42.19	49.38	100(320)	1.25	20.00	78.75	100(80)
	Below Primary	8.00	46.86	45.14	100(175)	0.00	23.53	76.47	100(17)
f	Primary	13.95	30.23	55.81	100(43)	0.00	42.86	57.14	100(14)
el c	Secondary	5.19	45.45	49.35	100(77)	5.26	15.79	78.95	100(19)
Lev	Higher Secondary and above	12.00	20.00	68.00	100(25)	0.00	10.00	90.00	100(30)
	Total	8.44	42.19	49.38	100(320)	1.25	20.00	78.75	100(80)

	Quintile1	4.60	45.98	49.43	100(87)	0.00	37.50	62.50	100(8)
	Quintile2	8.54	29.27	62.20	100(82)	0.00	26.67	73.33	100(15)
E C I	Quintile3	8.93	44.64	46.43	100(56)	0.00	0.00	100.00	100(7)
	Quintile4	12.50	41.67	45.83	100(48)	0.00	31.25	68.75	100(16)
	Quintile5	18.52	59.26	22.22	100(27)	3.45	13.79	82.76	100(29)
	Total	9.00	41.67	49.33	100(320)	1.33	21.33	77.33	100(80)

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

#### 5.3 Dietary Diversity among SC and ST Women in Odisha

Dietary diversity among women in Odisha showed a similar pattern (Table 5.7). The diversity is much higher among other castes compared to SC and ST women. However, the data show a slightly higher dietary diversity among women than for the household in Sonepur. Among SC women in Gajapati, the dietary diversity was slightly lower (by 1.6 percentage points) than for the household. However, the dietary diversity among women was low by 6.4 percentage points than the household figure for other castes in Gajapati. Overall, the women are doing better in Sonepur and worse in Gajapati.

	Sonepur	(ST Distr	ict)	Gajapa	ti (SC Dist	trict)	Total		
Dietary Diversity	Scheduled Tribes (ST)	Other Caste	Total	Scheduled Caste (SC)	Other Caste	Total	ST&SC	Other	Total
Lowest Dietary Diver	1.44	0	1.12	14.78	6.06	12.84	8.45	3.17	7.27
Medium Dietary Diver	34.62	1.67	27.24	50	37.88	47.3	42.69	20.63	37.77
High Dietary Diversi	63.94	98.33	71.64	35.22	56.06	39.86	48.86	76.19	54.96
Total	100(208)	100(60)	100(268)	100(230)	100(66)	100(296)	100(438)	100(126)	100(564)

Table 5.7 District wise Dietary diversity rate of women in Odisha

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

Occupation-wise trend were also similar for SC women with domestic help, agricultural labour and cultivators as main earning source of household reported high dietary diversity (Table 5.8). For Other caste women, the main occupations associated with high dietary diversity were cultivation and employment in private sector. Level of education was also showed positive association with high dietary diversity. For SC & ST and Other castes, the high dietary diversity was nearly 15 percentage point more for HS&A education than below primary education. MPCE quintiles repeated the pattern found for household. Initially, the dietary diversity increased with expenditure quintiles (from 48.86 percent in Quintile 1 to

64.71 percent for SC & ST). However, it witnessed a drop in food diversity afterwards (to merely 25.49 percent in quintile 5 for SC & ST).

					Od	isha			
			ST and S	C Castes			Other (	Castes	
	Indicators	Lowest	Medium	High		Lowest	Medium	High	
		Dietary	Dietary	Dietary	Total	Dietary	Dietary	Dietary	Total
		Diversity	Diversity	Diversity		Diversity	Diversity	Diversity	
	Cultivator	0.00	37.50	62.50	100(16)	0.00	0.00	100.00	100(1)
E	Agri Labour	0.00	24.00	76.00	100(25)				
atic	Domestic Help	0.00	0.00	100.00	100(5)				
3dn	Other Labour	13.85	56.92	29.23	100(65)	0.00	33.33	66.67	100(9)
DCC	Private Service	0.00	100.00	0.00	100(1)	0.00	0.00	100.00	100(1)
0	Self employed	15.00	62.50	22.50	100(40)	25.00	25.00	50.00	100(4)
Maiı	Unemployed	7.77	38.87	53.36	100(283)	2.73	20.00	77.27	100(110)
	Others	0.00	66.67	33.33	100(3)	0.00	0.00	100.00	100(1)
	Total	8.45	42.69	48.86	100(438)	3.17	20.63	76.19	100(126)
	Below Primary	11.93	50.00	38.07	100(176)	4.35	26.09	69.57	100(23)
ي <u>م</u>	Primary	10.14	30.43	59.42	100(69)	0.00	27.27	72.73	100(11)
el c ati	Secondary	6.20	37.98	55.81	100(129)	7.69	23.08	69.23	100(39)
Lev Educ	Higher Secondary and above	1.56	45.31	53.13	100(64)	0.00	15.09	84.91	100(53)
	Total	8.45	42.69	48.86	100(438)	3.17	20.63	76.19	100(126)
	Quintile1	5.04	47.06	47.90	100(119)	0.00	20.00	80.00	100(10)
ه د	Quintile2	7.84	27.45	64.71	100(102)	0.00	27.27	72.73	100(22)
F C	Quintile3	6.41	46.15	47.44	100(78)	0.00	18.18	81.82	100(11)
MP0 Outin	Quintile4	14.93	41.79	43.28	100(67)	0.00	32.14	67.86	100(28)
	Quintile5	15.69	58.82	25.49	100(51)	8.16	14.29	77.55	100(49)
	Total	8.87	42.69	48.44	100(438)	3.33	21.67	75.00	100(126)

Table 5.8 Dietary diversity rate of ST&SCT and Other caste women by occupation, level of education and MPCE Quintile in Odisha

Note: Parentheses values are number of observations

Source: Author's estimation using primary survey data

## 5.4 Nutritional Status of Children in Odisha

Sonepur and Gajapati shows a contrasting result for nutritional status (Table 5.9). The share of stunted was high among ST (62.16 percent) of Sonepur, SC (64.71 percent) of Gajapati and Other castes (61.54 percent) of Gajapati. In comparison, children of the Other castes found to have just 12.5 percent incidence of stunting. Wasting was found to be highest among SC (36.36 percent) followed by Other castes (20 percent) in Gajapati, whereas the surveyed households of the Other castes in Sonepur had zero incidence of wasting. Incidence of wasting among SC was 10.53 percent. Underweight among children had similar pattern with ST having 54.05 percent incidence followed by SC with 38.46 percent. Other castes in Sonepur had zero incidence of underweight. Same figure for Other castes in Gajapati was 21.43 percent.

Nutritional	Sonepu	r (ST Dist	rict)	Gajap	ati (SC Dis	trict)	Total		
Indicators	Scheduled	Other	T-4-1	Scheduled	Other	T-4-1	SC&ST	Other	T-4-1
Indicators	Tribes (ST)	Caste	Total	Caste (SC)	Caste	Total		Caste	Totai
Stunted	62.16(23)	12.5(1)	53.33(24)	64.71(33)	61.54(8)	64.06(41)	63.64(56)	42.86(9)	59.63(65)
Wasted	36.36(12)	0	29.27(12)	10.53(4)	20(2)	12.5(6)	22.54(16)	11.11(2)	20.22(18)
Underweight	54.05(20)	0	44.44(20)	38.46(20)	21.43(3)	34.85(23)	44.94(40)	13.64(3)	38,74(43)

Note: Parentheses values are number of observations Source: Author's estimation using primary survey data

Despite high food security, Odisha witnessed a high incidence of stunting, wasting and underweight (Table 5.10). Female children are doing better than male in all indicators of malnutrition. Stunting and underweight were found to be lower in the younger age group. Stunting, wasting and underweight showed significant decline with increase in mother's educational attainment and wealth of the households. Incidence of stunting was found to be higher among BPL card holders. Access to improved toilet does show some effect on stunting in Sonepur. However, it does not show any improvement in nutritional outcome in other cases.

<b>Background Variables</b>	kground Variables Stunting Wasting						Ur	nderweight			
	Sonepur	Gajapati	OD	Sonepur	Gajapati	OD	Sonepur	Gajapati	OD		
			By Gen	der Group	s						
Male	60.87	64.86	63.33	38.1	14.29	24.49	56.52	35.14	43.33		
Female	45.45	62.96	55.1	20	10	15	31.82	34.48	33.33		
By Age Group of Child											
0 to 5 Months	80	75	76.92	0	0	0	60	37.5	46.15		
6 to 11 Months	62.5	66.67	64.71	25	25	25	25	30	27.78		
12 to 23 Months	54.55	75	65.22	50	12.5	33.33	63.64	25	43.48		
24 to 35 Months	66.67	50	56.25	0	0	0	33.33	20	25		
36 to 56 Months	33.33	60	50	35.71	15.79	24.24	40	46.15	43.9		
By Mother's Education											
Illiterate	80	58.33	64.71	50	0	14.29	80	16.67	35.29		
Primary	66.67	65.38	65.85	38.46	21.05	28.13	46.67	44.44	45.24		
Secondary	53.33	72.73	61.54	35.71	12.5	27.27	53.33	54.55	53.85		
Higher Secondary and	20	60	44	0	9.09	4.76	10	18.75	15.38		
above											
	1	Wea	lth Quar	ntile (Hous	ehold)		I				
Poorest	75	61.54	68	40	9.09	23.81	58.33	38.46	48		
Poorer	66.67	66.67	66.67	14.29	6.25	8.7	66.67	36.36	45.16		
Middle	71.43	41.67	52.63	28.57	16.67	21.05	42.86	25	31.58		
Richer	50	71.43	63.64	100	50	83.33	75	57.14	63.64		
Richest	16.67	81.82	58.82	0	14.29	7.69	0	25	16.67		
		Тур	e of fuel	used for co	oking						
Gas	11.11	100	20	0	100	10	0	100	10		
Wood	65.22	58.33	60.56	47.62	11.11	24.56	60.87	35.42	43.66		
<b>Both Gas and Wood</b>	66.67	80	74.07	20	9.09	14.29	50	29.41	37.93		
			Туре	e of toilet							

Table 5.10 Nutritional status of children (Under five years) in Odisha

Improved toilet	44.83	78.95	64.18	30.77	11.11	20.75	48.28	47.5	47.83		
Not improved toilet	68.75	42.31	52.38	26.67	14.29	19.44	37.5	15.38	23.81		
Source of drinking water											
Improved water	0	66.67	28.57	0	66.67	28.57	0	66.67	28.57		
Not improved water	58.54	63.93	61.76	32.43	8.89	19.51	48.78	33.33	39.42		
Holding BPL card											
Yes	64.71	65.91	65.57	40	10	20	52.94	35.56	40.32		
No	46.43	60	52.08	23.08	16.67	20.45	39.29	33.33	36.73		
Food Security Status											
Food Secure	50	60.38	56.18	29.41	12.5	20.27	38.89	32.73	35.16		
<b>Moderately Food</b>	66.67	87.5	78.57	0	16.67	10	66.67	50	57.14		
Insecure											
Severely Food Insecure	66.67	66.67	66.67	66.67	0	40	66.67	33.33	50		
		D	ietary Di	versity Sta	tus						
Lowest Dietary		86.67	86.67		12.5	12.5		16.67	16.67		
Diversity		80.07	80.07		12.5	12.5		40.07	40.07		
Medium Dietary	61 54	46.43	51.22	3636	11 54	18.92	53.85	17.86	29.27		
Diversity	01.34	-10.15	51.22	50.50	11.54	10.72	55.05	17.00	27.21		
High Dietary Diversity	50	71.43	58.49	26.67	14.29	22.73	40.63	47.83	43.64		
Total	53.33	64.06	59.63	29.27	12.5	20.22	44.44	34.85	38.74		

Note: Frequency table of this table 5.10 is given in appendix-6

Source: Author's estimation using primary survey data

## 5.5 Determinants of Nutritional Status in Odisha

The logit regression results show a significant effect of food security, living in joint family, access to improved drinking water, and family size to have significant effect on stunting. Food insecure had 35 percent higher probability of being stunted than food secure. Access to improved water lowers the incidence of stunting by 61 percent. However, these variables do not have significant coefficient for wasting and underweight. The results show higher incidence of stunting and underweight among SC and ST (Table 6.11). However, the coefficients are not significant. Wealth, mother's literacy and mother's height had positive effect on stunting, wasting and underweight as seen in secondary data. Nonetheless, their coefficients are not significant in these cases too.

Indicators	Dep	. Var: Stu	nting	Dep	. Var: Wa	sting	Dep. Var: Underweight					
Indicators	Coefficient	Z-	marginal	Coefficient	Z-	marginal	Coefficient	Z-	marginal			
		value	effect		value	effect	coefficient	value	effect			
Loint family	2.24	2 02**	Family type	(Reference: N	o o4	mily)	1.71	1 20	0.27			
Joint family	3.24	2.03**	0.4	-5.52	-0.94	-0.13	1./1	1.28	0.27			
nousellolu neau	1.01	0.00	Religion Du	0 mmies (Refer	onco: Mu	elim)	-2.39	-1.29	-0.38			
Hindu	-3 46	-1.6	-0.37	0	0***	siiii)	-18.16	-0.01	-0.54			
Christian	0	0***	0.57	0	0***		0	0***	#VALUE!			
	0	Soc	ial Group Dur	nmies (Refere	ence: Gen	eral Caste)	0	Ū	" THEEL			
ST	1.98	0.98	0.33	-0.24	-0.06	-0.02	17.88	0.01	0.61			
SC	2.01	1	0.34	-6.07	-1.4	-0.3	16.42	0.01	0.38			
Family Size	-0.74	- 2.09**	-0.13	0.11	0.06	0.01	-0.31	-0.87	-0.05			
		Inc	ome Quintile	Dummies (Re	ference: (	Quintile 1)						
Quintile2	0.51	0.65	0.09	-5.17	-1.51	-0.2	0.43	0.57	0.07			
Quintile3	0.4	0.44	0.07	-3.76	-1.06	-0.15	-0.45	-0.49	-0.07			
Quintile4	-0.82	-0.62	-0.14	1.85	0.63	0.1	0.75	0.6	0.13			
Quintile5	2.3	1.53	0.33	-28.98	-0.01	-0.37	-1.65	-0.84	-0.23			
			BPL Card	dummies (Re	eference:	No)						
Yes	0.36	0.48	0.06	-1.76	-0.55	-0.08	0.28	0.37	0.04			
	Water Source Dummies (Reference: Not-improved Water)											
Improved water	-5.04	- 2.17**	-0.61	33.38	0.01	0.76	1.07	0.58	0.17			
Sanitation Dummies (Reference: Not-improved toilet)												
Improved toilet	0.82	1.17	0.14	1.46	0.6	0.06	1.48	2.03**	0.24			
Mother's Age	0.11	1.34	0.02	-1.53	- 2.08**	-0.07	-0.01	-0.1	0			
		Mot	her's Education	on Dummies (	Referenc	e: Literate)						
Illiterate	-0.13	-0.15	-0.02	-2.53	-0.28	-0.08	-0.24	-0.24	-0.04			
	1		Mother's Heig	ght (Reference	e: Short S	tature)	1					
Long Stature	0.03	0.04	0.01	-1.18	-0.43	-0.06	-0.1	-0.12	-0.02			
N 1	0.57	0.01	Child's Sex D	oummies (Ref	erence: F	emale)	1 (1	0 10**	0.24			
Male	0.57	0.91	0.1	0.52	0.18	0.02	1.61	2.19**	0.24			
24 to 59 Months	0.62		Age group du	a 10	1 42	0.15	0.31	0.52	0.05			
24 to 37 Months	-0.02	-1.03 Foo	-0.11 d Insecurity D	ummies (Refe	rence: Fo	od Secure)	0.51	0.52	0.05			
Moderately Food		100		uninites (ixeix		ou secure)						
Insecure	2.62	2.09**	0.35	0.61	0.15	0.03	1.35	1.35	0.22			
Severely Food	0.88	0.68	0.15	1.84	0.53	0.29	1.02	0.81	0.17			
Insecure	0.00	0.00	0.15		0.55	0.27	1.02	0.01	0.17			
Constant	-0.26	-0.07	0	38.27	1.96**	0	2.32	0.57	0			
Number of 84 Observation					61			86				
LR chi2(18) 26.42			41.73			32.05						
<b>Prob &gt; chi2</b> 0.05			0			0.04						
Pseudo R2		0.24			0.69		0.28					
Log likelihood		-42.61			-9.38		-41.24					

# Table 5.11 Determinants of Nutritional Status in Odisha

Source: Author's Estimation using primary survey data

#### 5.6 Summary

The results for Odisha show high food security among all households. SC & ST households reported even higher food security than Other caste households. However, dietary diversity is low among SC & ST households. It could be because, the government programmes which had ensured high food security do not emphasise on the dietary diversity. There is no significant difference in the dietary diversity of household and women. Despite high food security found in Odisha, the incidence of stunting, wasting and underweight are still high. Among the surveyed states, Odisha had the highest percentage of stunted. The regression results show food security to be playing significant role in lowering the incidence of stunting in Odisha.

# **Chapter 6: Conclusion**

The present study uses both secondary (National Family Health Survey) and primary data. Three states, Rajasthan, Himachal Pradesh and Odisha, are doing better than all India in terms of nutrition among children. The secondary data is used to examine nutritional status of children over time. The data shows a notable reduction in incidence of stunting, wasting, underweight and anaemia in Himachal Pradesh, Odisha and Rajasthan. There is also narrowing of gap across socio-economic groups such as, castes, wealth quintiles, mother's education, mother's health and age group of children. However, the analysis of nutritional targets and achievements shows Himachal Pradesh lagging behind. In comparison, Rajasthan and Odisha have done better in terms of achieving the targets. Rajasthan, despite being among the least developed states in India, is the best performer of the three. Chi-square test shows a significant association between various indicators of malnutrition among children and sanitation. The logit regression also found improved toilet to significant in case of anaemia.

The primary survey shows a high food security among households in Odisha and Himachal Pradesh. Household in Odisha not only had the highest food security but the food security among SC and ST households was found to be higher than the food security of other castes. Food security in Odisha did not show any significant relation with wealth and education either. In comparison, Rajasthan had the lowest food security. The food insecurity was much severe among ST and SC households. Food security in Rajasthan was also associated with wealth and education level.

Malnutrition among children found to be higher in Rajasthan followed by Odisha. Odisha had the highest percentage of stunting. Incidence of malnutrition was relatively lower in Himachal Pradesh. High incidence of stunting, wasting and underweight in Odisha despite the high food security in the state is a puzzle. It is possible that not giving enough emphasis on dietary diversity may be resulting in the high incidence of malnutrition. The regression on the primary data suggests positive effect of food security on nutritional status of children.

Overall, mother's characteristics (education and health) seem to be extremely important in terms of reduction in incidence of malnutrition. Though caste and wealth are becoming less important, there is still significant gap among caste groups and wealth quintiles.

# **Chapter 7: Policy Implications**

High food security and relatively lower incidence of malnutrition in Himachal Pradesh compared to Rajasthan show that the economic development of state can improve the food security. Having achieved a good state of food security always helps in achieving higher state of nutritional security. However, higher decline in malnutrition in Rajasthan and Odisha than Himachal Pradesh and all India (despite being less developed states) along with high food security in Odisha suggest that food security and better nutritional are achievable through target policy instruments too. While high food security in Odisha is still a long way to translate into high nutritional security. Our analysis allows us to prescribe following policy suggestions, under two heads-general and specific, which may play an important role in lowering the incidence of malnutrition:

A. General Policy Prescriptions

1. Ensuring Food Security

We found in our study that despite being an underdeveloped state Odisha has achieved higher level of food security due to which extent of malnourishment among under-5 children is lower in the state. Since our regression results in case of Odisha and Rajasthan suggest that food security is an important determinant of malnutrition, especially among SCs and STs, policy makers can take steps to improve the situation of food security. This is particularly true for Rajasthan as it experiences higher food insecurity and high malnutrition as well.

2. Dietary Diversity

Dietary diversity at the household level, in general and for women, in particular has huge significance for children's nourishment. Therefore, awareness about necessity of dietary diversity and policy steps to ensure dietary diversity will not only help in improving food security but also can check malnutrition.

3. Mother's Education

Mother's education is a significant determinant of malnourishment among children. Therefore, government and policy makers may try to check malnourishment by improving education of mothers.

#### 4. Mother's Health

Although India has achieved much success in providing all the necessary facilities to pregnant mother and supplying diets in the initial months after delivery of child, mother's health is still a key determinant of children's nourishment. Therefore, policy focus on supplying adequate facilities to expected mother and mothers after delivery of child should not be lifted in any manner.

5. Lowering Income Inequalities

Since wealth plays an important role as various quintiles of wealth are found to be significant determinants of malnourishment and quintile 1, in particular, has higher incidences of malnutrition; government and policy makers can tackle the problem of malnutrition by improving upon the wealth inequality situation.

6. Improved Sanitation & Safe Drinking Water

Improved toilet facility has shown significant association (Chi-square test) with stunting, wasting, underweight, and anaemia. In regression results, improved sanitation had significant effect on anaemia in case all of states. Similarly, access to safe drinking water has shown significant effect on nutritional status. Although the recent Government policies have improved the sanitation facilities and access to safe drinking water, there is still lot to be done. Further improvement in these two fronts will be highly useful in improving nutritional status, in general, and among SCs and STs in particular.

- **B.** Specific Policy Prescription
- 1. One of the major issues in ensuring food and nutritional security is availability of less variety of food. Subsidised ration shops in Rajasthan provides only wheat. Odisha currently provides wheat and rice, but it has recently announced to include pulses, millets, and vegetables in its PDS items. Himachal Pradesh is going better in terms of providing variety of food items. There is need to fix the number of food items provided at subsidised rate keeping in mind the nutritional requirements of the people.
- 2. Delays in getting subsidised ration is common, particularly in Rajasthan. The delay multiplies the problem for ST households given their geographical location which usually is far away from nearest market places. The delay increases the cost of getting the food and increases uncertainty leading to higher food insecurity. This problem

accentuates particularly during negative shocks in the economy like COVID-19. Therefore, specific policies are needed to make delays more accountable.

- 3. The cost of getting subsidised ration is high in places like Banswara in Rajasthan due to dearth of transportation facilities and houses are scattered. There is need to solve the issue by ensuring delivery of food close to the homes.
- 4. People depend on own produce and market to satisfy the excess demand (above the limit set for subsidised food) of the food grains. It is a significant share of total consumption in Rajasthan and Odisha. While this excess requirement may not matter in a normal year, it increases food insecurity among vulnerable sections during a bad year or economic shock, such as the one caused by COVID-19. Hence, the government must identify vulnerable households and keep a watch on situations that may cause distress among them.
- 5. The government should make provisions for additional assistance to these vulnerable household during the bad year. Since the economic shocks and their likelihood may be area (eg. district) specific, the government may have area specific plans.

#### Appendix 1

## <u>Schedule for Survey of Households in Selected Villages in Odisha, Rajasthan, and</u> <u>Himachal Pradesh</u>

**Topic: Food and Nutritional Security among Scheduled Castes and Scheduled Tribes: Evidences from Three Indian States** 

## Funding Agency: National Human Rights Commission (NHRC), India

<u>Implementing Institution</u> Department of Economics Central University of Himachal Pradesh Dharamshala Kangra, Himachal Pradesh-176215

#### Introduction of the Project and Consent From Respondents

Project Title: Food and Nutritional Security among Scheduled Castes and Scheduled Tribes: Evidences from Three Indian States

#### Funding Agency: National Human Rights Commission (NHRC), India

**Principal Investigator:** Dr. Amit Kumar Basantaray, Assistant Professor, Department of Economics, Central University of Himachal Pradesh, Dharamshala, Himachal Pradesh. Contact Number-9805843839

**Co-Principal Investigator:** Dr. Indervir Singh, Assistant Professor, Department of Economics, Central University of Himachal Pradesh, Dharamshala, Himachal Pradesh . Contact Number-9816031535

State	District	Block	Village	Schedule						
				Number						
Respondents Nam	ne (If not household	l head):								
Address & Contact Number of the Household:										
Date of Interview										
Starting Time of I	nterview:									
Ending Time of I	nterview:									
Eight Instantionstant' normal										
Field-Investigator	s name:									
Language of Inter	view:									

Namaskar. My name is _____. I am working with (name of organization). We are conducting a survey about food insecurity and malnutrition.

The information on food and nutritional insecurity that we collect from households and individuals will help the government in general and NHRC in particular to plan better so that these insecurities are checked at the earliest. Your household was selected for the survey. I would like to ask you some questions about your household.

All of the answers you give will be confidential and will not be shared with anyone other than members of our survey team. Your participation in the survey is voluntary. If I ask you any question you don't want to answer, just let me know and I will go on to the next question or you can stop the interview at any time.

Do you agree to participate in this survey? (Yes/No)	
Signature of the Respondent	

# Section-1A: Household Details

H No:	Family Type: (Joint=1; Nuclear=2)	
Household Head: (Male=1; Self=2) If 1 then write the relation of that male to you:		
Religion:	<i>Hindu=1;Muslim=2;Christian=3;Others=4</i> <b>Response Code:</b>	
Caste:	ST=1, SC=2, OBC(BC-I=3 and BC-II=4) and Others=5 Response Code:	
Family Size:		
Type of Dwelling	Katcha wall with Slate/thatched/tin Roof=1; Semi Pucca with Slate/thatched/tin Roof =2; Pucca wall with Cemented roof=3; Response Code:	
Source of Drinking Water	Tap-1; Water Purifier=2; Tubewell/Borewell=3; Well: Protected=4Unprotected=5; Others=6Response Code:	
Type of Toilet	Open defecation=1; Toilet with Tin Sheets=2; Toilet with Brick walls=3; Others=4 Response Code:	
Where is the	Inside your house=1; Inside your yard=2; Outside your yard=3; others	
toilet located?	? Response Code:	
How many persons use that toilet?		
Method of Gas=1; Fuel Wood=2; Both=3		
Cooking:	Response Code:	
Do you have a	Yes=1; No=2	
separate room for		
Kitchen?	<b>Response Code:</b>	
Location of the	Inside your house=1; ouiside your house but inside the yard=2; ouiside the yard=3: others=4	
KIUIICII!	Response Code:	
Type of Ration	Rel = 1: Antodaya=2: Neither RPL nor Antodaya=3: Others=4	
Card	Response Code:	
Does any member	r of your household possess MGNREGS job card? (yes=1; No=2)	
How many days of work he/she did in the last year?		
By Observation Only		
Is the household having a separate wash basin: Yes=1; No=2		
Response Code:		
If Yes, what type hand wash is placed there? Soap=1; Liquid hand wash=2; nothing=3;		
otners=4 Despense Code:		
If no ask where are they going to wash hands? Inside house=1 outside house=?: others=?		
Response Code:		
Response Cout.		
#### Section-1B: Details of Household Members

S1.	Age (in	Sex	Educatio	Relation to	Whether	If yes in col.6,	Annual	If No in col.6,	Annual Income	Total Annual
No.	Year and	(Male=1;F	n (Code)	Respondent	currently	then write the	Income of	then write	from other	Household
	wonths)	Transgend		(Code)	Employed?	Main	the	Reasons for	sources. Write the	Income (col8
		er=3)			(Yes=1; No=2)	Occupation (Code)	Household	not employed	other source in	total+col10
							from	(Code)	bracket	total)
							his/her			
							occupation			
1	2	3	4	5	6	7	8	9	10	11
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										

Main Occupation Code: Cultivator=1; Agricultural Labour=2; Domestic Help=3; Other Labour=4; Businessman (employer) =5; Private Service=6; Self-Employed=7; Not Employed=9; Others=1 Reasons for not employed Code: Young Age=0; Attending Education=1; Doing Household Work=2; Physically Challenged=3; Due to old age=4; Appropriate job is not available=5; Not willing to work=6; others=7

General Education Code: Not literate -01, literate without formal schooling: through EGS/NFEC/AEC - 02, through TLC -03, others- 04; literate with formal schooling: below primary -05, primary -06, middle -07, secondary -08, higher secondary -10, diploma/certificate course -11, graduate -12, postgraduate and above -13

Relation to Head: self-1, spouse of head-2, married child-3, spouse of married child-4, unmarried child-5, grandchild-6, father/mother/father-in-law/mother-in-law-7, brother/sister/brother-in-law/sister-in-law/other relatives-8, servants/employees/other non-relatives-9

Note: Tick mark the serial No. of the head of the family

<b>Supplementary Inform</b>	ation to Section 1B (	<b>Only about Children</b>	between 1-59 months)

Sl. No from Section 1B	Date of Birth	Number of months of breast	Has the child taken formula	If yes from which month?	Till how many months the child has taken following vitamin drops?		Has the child missed any	Has any of child's vaccine missed?	How many days the vaccination (s) got	Whether the child suffered from any illness in	If Yes, give details of the	
		feeding the child has taken	milk (Yes/No)		Iron	D3	A-Z	vaccine? (Yes/No). If yes name the vaccine missed	(Yes/No). If yes name the vaccine delayed.	delayed	the last one year (Yes=1; No=2; Don't know)	illness

							Last Kh	ariff Season					
			Produce	from irriga	ted	Land				Produce fr	om un-irrig	ated Land	
SI No.	Crop	Land (0.000Ha)	Produce (kg)	Price/kg	Va	alue	Value of the by- product	Land (0.000Ha)	Produce (kg)	Price/kg	Value	Value of th	e by-product
1	•						ŀ						
2													
3													
4													
							Last R	labi Season					
			Produce	from irriga	ted	Land	-			Produce fr	om un-irrig	ated Land	
SI No.	Crop	Land (0.000Ha)	Produce (kg)	Price/kg	Va	alue	Value of the by- product	Land (0.000Ha)	Produce (kg)	Price/kg	Value	Value of th	e by-product
	· ·												<i>,</i> ,
1													
2													
3													
4													
			Р	roduce and	l va	lue of c	outputs on fa	rming of anir	nals during	the last 30	days		
Item	s Descriptior	۱				Total _I	oroduce		Quantity	y Sold	Sale Va	lue	Total Value
milk (dairy, sheep, goat, etc.) (litre)													
Egg (poultry, duckery, etc.) (no.)													
Live animals (e.g., cattle, sheep, goat, pig, poultry &													
duckery, etc.)													
Others													

## Section-1C: Land holding and Value of the Crops & Livestock Produced in the last Year

Electricity	Yes	No	Black & White Television	Yes	No
Mattress	Yes	No	Colour Television	Yes	No
Pressure cooker	Yes	No	Computer	Yes	No
A Table	Yes	No	Refrigerator	Yes	No
A chair	Yes	No	Washing machine	Yes	No
Electric Fan	Yes	No	Bicycle	Yes	No
Air Cooler	Yes	No	Motorcycle	Yes	No
Air Conditioner	Yes	No	Car	Yes	No
Land Line Phone	Yes	No	Water Pump	Yes	No
Mobile Telephone	Yes	No	Thresher	Yes	No
Internet	Yes	No	Tractor	Yes	No

Section-1D: Wealth Possession of Household: Does your household have the following items? (Tick Mark the response)

## Section-1E: Information on smoking & drinking habits; and communicable & non-communicable disease

Sl No. of member from Table 1B who smoke	What do they smoke? (Code)	Frequency of Smoking (Code)	Does this the members drink? Yes=1; No=2	If Yes, then What does the member drink?	Frequency of drinking (Code)
Sl No. of member from Table 1B who suffer from non- communicable disease	Name of the disease (Code)	Number of months the member has been suffering from the disease	Give Sl No. of the family member who suffered from any communicable disease in the last one year?	Write the name of the communicable disease.	When members of your family get sick, where do they go generally for treatment? (Code)

What do they smoke Co	ode: Coal=1; Hukka=2	; Bidi=3, Cigarette=4; ot	thers=5						
Frequency of Smoking code: Once in a week=1; frequently in a week=2; daily=3; more than 1 in a day=4; more than 3 a day=5									
Once in months=1; Once in a month=2; Once in weeks=3; Once in a week=4; frequently in a week=5; daily=6; More than once in a day=7									
Name of the disease code: Diabetic=1, Cardio-vascular disease=2, Thyroid=3, Cancer=4, Others=5									
Place of treatment code: Govt hospital=1; Govt. Dispensary=2; community health centre=3; primary health centre=4; sub centre=6; Ayush									
centre=7; anganwadi centre=8; Asha worker=9; private hospital=10; private clinic=11, Any local health worker=12; others=13									

### Section-2: Household level food surplus/deficit (collect the data of last 30 days)

						Quantity received from various food security schemes in India					
Food Items	Unit	Quantity Consumed	Quantity of Own Produce (To be taken from section 1C)	Qunatity purchased from market	Market Price for purchased commodities	Ration shop/PDS	Integrated Child Development Services (ICDS)	Midday Meal Scheme (MDMS)	Pradhan Mantri Matri Vandana Yojana (PMMVY)		
Rice	kg										
Atta	kg										
Pulses	kg										
Edible Oil	gram										
Ghee	gram										
Milk	litre										
Vegetables	kg										
Leafy Vegetables	kg										
Eggs	number										
Red Meat	kg										
Chicken	kg										

Fish	kg				
Sugar	kg				
Fruits	kg				
Others					

## Section-3: Intra Household Consumption

# Now, I would now like to know the frequency of consumption of following food items in the last 7 days by household members.

Food Items (Record frequencies)	SI No of the family member ( <i>Yes=1; No=2; Don't Know=3</i> )													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Juice or juice drinks														
Clear broth														
Milk such as tinned, powdered, or														
fresh animal milk?														
IF YES: How many times did														
drink milk?														
Infant formula?														
IF YES: How many times did														
drink infant formula?														
Any other liquids?														
Any commercially fortified baby														
food, e.g. Cerelac or Farex?														
(Only in case of seriel number of														
child)														
Yogurt?														
IF YES: How many times did														
(NAME) eat yogurt?														
Any bread, roti, chapati, rice,														
noodles, biscuits, idli, or any														
other foods made from grains?														

Any pumpkin, carrots, squash or sweet potatoes that are yellow or							
orange inside?							
Any white polatoes, while yams,							
foods made from roots?							
Any dark groop leafy vegetables?							
Any rine mangaes papayas							
cantaloupe or jackfruit?							
Any other fruits or vegetables?							
Any liver, kidney, heart or other organ meat?							
Any chickens, duck, or other birds?							
Any other meat?							
Any eggs? Write the number of							
eggs taken							
Any fresh or dried fish or							
shellfish?							
Any foods made from beans,							
peas, lentils, or nuts?							
Any cheese or other food made							
from milk?							
Any other solid, semi-solid, or							
soft food?							
Any type of cold drink?							
Any type of pocketed chips/snacks							

#### Section-4: Food Insecurity Experience Scale (FIES) Questions

During the last 12 months, was there a time when, because of lack of money or other resources any member of your family (Read the questions one by one)

S. No.	Questions	Response (Codes: Yes=1; No=2; Don't Know=3	If the response in previous column is yes, then agree or disagree with following statement on 1 to 5 scale (1 means completely disagree and 5 means completely agree).
1	You were worried you would not have enough food to		COVID 17 reason for the yes answer.
2	You were unable to eat healthy and nutritious food?		
3	You ate only a few kinds of foods?		
4	You had to skip a meal?		
5	You ate less than you thought you should?		
6	Your household ran out of food?		
7	You were hungry but did not eat?		
8	You went without eating for a whole day?		

### Section-5: Anthropometric measures of children and Women

Serial	No.	Height	(In	Weight	Weight (In Grams)Odema in case of children 0-59		Haemoglobin Count (latest		
from	Section-	Cms)					months (Yes/No	o)	count to be collected from
1B				Current Weight	Birth weight (or	ıly	Left Feet	Right Feet	Anganwadi centres or record the
				-	for children 0-	59			value of latest test of done)
					months)				
	Children under 5 years (0 to 59 months)								

Children between 6 to 14 years									
Sl. No (from section 1B)	Height (In Cms)	Current Weight	Whether enrolled in school or not? (Yes=1; No=2)	If yes, receivin day meals or no	ng mid- t?	Haemo collect record	oglobin Count (latest count to be ted from Anganwadi centres or the value of latest test of done)		
		Won	nen of reproductive ag	ge (14 to 49 Years	s)				
Sl. No (from section 1B)	Height (In Cms)	Current Weight	Pregnant (Y) or Non-pregnant (N)	Haemoglobin Count (latest count to be collected from Anganwadi centres or record the value of latest test of done)					

#### Sample Selection Procedure

As mentioned in data and methodology chapter, two-point criteria- one is development index (DI) and second is share of SC and ST population- was used to select sample districts.

#### **Explanation of Criterion-1:**

Development index is based on three variables, namely, literacy rate, infant mortality rate, and poverty rate.

Poverty line, used for the calculation of poverty rate, was taken from report titled 'poverty estimates for 2011-12' of erstwhile planning commission. On the basis of this, we generated a new poverty line for states for the year 2018-19 using CPI data of 2018-19. State-level poverty line was used as proxy for district level poverty line. As the district level poverty line is not available, state-level poverty line was used for all the districts with an assumption that each district will have the poverty line same as state. Finally, we calculated poverty rate at the district level using this poverty line for all the selected states. The data used for the calculation of poverty line and rate were taken from PLFS-2018-19 of NSSO. District level literacy rate and infant mortality rate were taken from Census, 2011.

District level literacy rate index (LRI) was calculated using the formula: <u>Maximum value-Actual value</u> <u>Maximum value-Minimum value</u>

Infant mortality rate index (IRI) for each district was calculated using the formula: <u>Actual value-Minimum value</u> <u>Maximum value-Minimum Value</u>

And poverty rate index (PRI) at the district level was calculated using the formula: <u>Actual value-Minimum value</u> <u>Maximum value-Minimum Value</u>

Finally,  $DI = \frac{1}{3}(LRI + IRI + PRI)$  and  $0 \le DI \le 1$ .

Accordingly, rank was given to the districts as per their DI score and score of 1 imply most underdeveloped district and a score of 0 imply most developed district. District wise scores for LRI, IRI, PRI, DI, and ranks each district for Odisha, Rajasthan, and Himachal Pradesh are given in Table 1A, 1B, and 1C, respectively.

District	LRI	PRI	IRI	DI	Rank
Bargarh	0.30	0.07	0.00	0.12	28
Jharsuguda	0.21	0.17	0.06	0.15	27
Sambalpur	0.27	0.50	0.15	0.30	16
Debagarh	0.38	0.11	0.35	0.28	18
Sundargarh	0.35	0.11	0.25	0.24	21
Kendujhar	0.50	0.25	0.15	0.30	17
Mayurbhanj	0.60	0.31	0.04	0.32	15
Baleshwar [#]	0.21	0.00	0.04	0.08	30
Bhadrak	0.14	0.45	0.06	0.22	23
Kendrapara	0.06	0.59	0.17	0.28	19
Jagatsinghapur	0.00	0.46	0.00	0.15	26
Cuttack	0.04	0.33	0.13	0.16	25
Jajapur	0.19	0.31	0.08	0.20	24
Dhenkanal	0.22	1.00	0.19	0.47	10
Anugul	0.25	0.61	0.31	0.39	11
Nayagarh	0.17	0.49	0.31	0.33	14
Khordha	0.01	0.13	0.13	0.09	29
Puri	0.05	0.46	0.15	0.22	22
Ganjam	0.39	0.45	0.31	0.38	12
Gajapati [*]	0.83	0.92	0.79	0.85	1
Kandhamal	0.60	0.77	1.00	0.79	2
Baudh	0.42	0.60	0.46	0.49	9
Subarnapur	0.33	0.32	0.08	0.24	20
Balangir	0.55	0.18	0.33	0.36	13
Nuapada	0.73	0.53	0.42	0.56	8
Kalahandi	0.69	0.53	0.63	0.61	7
Rayagada	0.91	0.27	0.77	0.65	6
Nabarangapur	1.00	0.46	0.65	0.70	4
Koraput	0.93	0.32	0.73	0.66	5
Malkangiri	0.97	0.55	0.79	0.77	3

Table 1A: DI scores and Rank of districts in Odisha.

Note: * & # means worst performing and best performing district in terms of DI. Source: Researchers' own calculation

District	LRI	PRI	IRI	DI	Rank
Ganganagar	0.28	0.17	0.21	0.22	29
Hanumangarh	0.39	0.20	1.00	0.53	14
Bikaner	0.59	0.38	0.13	0.36	24
Churu	0.48	0.26	0.17	0.30	27
Jhunjhunun	0.11	0.00	0.08	0.07	33
Alwar	0.34	0.31	0.23	0.29	28

Bharatpur	0.40	0.22	0.29	0.30	26
Dhaulpur	0.47	0.60	0.42	0.49	18
Karauli	0.53	0.82	0.42	0.59	8
Sawai Madhopur	0.52	0.83	0.35	0.57	11
Dausa	0.43	0.23	0.46	0.37	23
Jaipur	0.08	0.19	0.00	0.09	31
Sikar	0.23	0.08	0.04	0.12	30
Nagaur	0.63	0.40	0.35	0.46	22
Jodhpur	0.54	0.24	0.21	0.33	25
Jaisalmer	0.97	0.53	0.21	0.57	12
Barmer	0.99	0.30	0.25	0.51	16
Jalor	1.00	0.17	0.31	0.49	17
Sirohi	0.97	0.37	0.50	0.61	5
Pali	0.63	0.28	0.52	0.48	20
Ajmer	0.35	0.53	0.54	0.47	21
Tonk	0.65	0.36	0.46	0.49	19
Bundi	0.66	0.61	0.33	0.53	13
Bhilwara	0.68	0.37	0.67	0.57	9
Rajsamand	0.61	0.32	0.60	0.51	15
Dungarpur	0.82	0.52	0.44	0.59	7
Banswara*	0.96	0.57	0.92	0.82	1
Chittaurgarh	0.63	0.62	0.54	0.60	6
Kota [#]	0.00	0.16	0.10	0.09	32
Baran	0.46	0.79	0.46	0.57	10
Jhalawar	0.67	1.00	0.33	0.67	3
Udaipur	0.71	0.64	0.63	0.66	4
Pratapgarh	0.96	0.74	0.58	0.76	2

Note: * & # means worst performing and best performing district in terms of DI. Source: Researchers' own calculation

Table 1C: DI scores and Rank of districts in Himachal Pradesh

District	LRI	PRI	IRI	DI	Rank
Chamba	1.00	0.72	0.38	0.70	2
Kangra	0.15	0.42	0.90	0.49	4
Lahul & Spiti	0.58	0.90	0.24	0.57	3
Kullu	0.52	0.39	0.38	0.43	6
Mandi	0.39	0.30	0.00	0.23	11
Hamirpur [#]	0.00	0.03	0.38	0.14	12
Una	0.13	0.03	1.00	0.39	8
Bilaspur	0.21	0.18	0.86	0.41	7
Solan	0.30	0.65	0.38	0.44	5
Sirmaur	0.63	1.00	0.95	0.86	1
Shimla	0.21	0.33	0.33	0.29	9
Kinnaur	0.40	0.00	0.43	0.28	10

Note: * & # means worst performing and best performing district in terms of DI. Source: Researchers' own calculation

### **Explanation of Criterion-2:**

Upon application of first criterion, we got the ranking of districts for three selected states in terms of development parameters, thereby meeting our purpose to identify most underdeveloped districts. Then our next task was to identify two districts out of most underdeveloped districts, one of which has at least 25 percentage share of SC population and the other has at least 25 percentage share of ST population to their respective districts' total population. Our justification for second criterion is that the sample district selected as a representative of SC households must have a sizeable SC population and similarly the district selected as a representative of ST households must have a sizeable ST population.

Table 2A to 2C gives the rank in terms of DI, share of SC and ST population of each district of three selected states.

District	DI Rank	Share of SC Population	Share of ST Population
Gajapati	1	6.78	54.29
Kandhamal	2	15.76	53.58
Malkangiri	3	22.55	57.83
Nabarangapur	4	14.53	55.79
Koraput	5	14.25	50.56
Rayagada	6	14.41	55.99
Kalahandi	7	18.17	28.50
Nuapada	8	13.46	33.80
Baudh	9	23.79	12.55
Dhenkanal	10	19.62	13.59
Anugul	11	18.81	14.10
Ganjam	12	19.50	3.37
Balangir	13	17.88	21.05
Nayagarh	14	14.17	6.10
Mayurbhanj	15	7.33	58.72
Sambalpur	16	18.43	34.12
Kendujhar	17	11.62	45.45
Debagarh	18	16.67	35.33
Kendrapara	19	21.51	0.66
Subarnapur/Sonepur	20	25.60	9.37
Sundargarh	21	9.16	50.75
Puri	22	19.14	0.36
Bhadrak	23	22.23	2.02
Jajapur	24	23.72	8.29
Cuttack	25	19.00	3.57
Jagatsinghapur	26	21.83	0.69

Table 2A: District-Wise DI rank, Share of SC, and Share of ST population in Odisha

Jharsuguda	27	18.05	30.50
Bargarh	28	20.17	18.98
Khordha	29	13.21	5.11
Baleshwar	30	20.62	11.88

Source: DI rank is calculated by the researcher. Share of SC and ST population is based on Census, 2011.

It can be seen from table 2A that district Gajapati (with a DI rank of 1) is the most underdeveloped district in Odisha and it has also 54.29 per cent of SC population. Therefore, Gajapati district is selected as representative of SC district for our study. District Sonepur's rank is 20 but it is the only district in Odisha whose share of ST population is above 25 per cent. Therefore, Sonepur district is selected as representative of ST district for our study.

District	DI Rank	Share of SC Population	Share of ST Population
Banswara	1	4.46	76.38
Pratapgarh	2	6.96	63.42
Jhalawar	3	17.26	12.91
Udaipur	4	6.14	49.71
Sirohi	5	19.48	28.22
Chittaurgarh	6	16.20	13.05
Dungarpur	7	3.76	70.82
Karauli	8	24.31	22.28
Bhilwara	9	16.94	9.52
Baran	10	18.09	22.64
Sawai Madhopur	11	20.87	21.40
Jaisalmer	12	14.80	6.33
Bundi	13	18.97	20.57
Hanumangarh	14	27.85	0.81
Rajsamand	15	12.81	13.90
Barmer	16	16.76	6.77
Jalor	17	19.53	9.77
Dhaulpur	18	20.36	4.86
Tonk	19	20.26	12.54
Pali	20	19.54	7.10
Ajmer	21	18.51	2.46
Nagaur	22	21.16	0.31
Dausa	23	21.68	26.51
Bikaner	24	20.88	0.33
Jodhpur	25	16.49	3.23
Bharatpur	26	21.87	2.12
Churu	27	22.15	0.55
Alwar	28	17.77	7.87
Ganganagar	29	36.58	0.68

Table 2B: District-Wise DI rank, Share of SC, and Share of ST population in Rajasthan

Sikar	30	15.64	2.81
Jaipur	31	15.14	7.97
Kota	32	20.78	9.42
Jhunjhunun	33	16.88	1.95

Source: DI rank is calculated by the researcher. Share of SC and ST population is based on Census, 2011.

In so far as Rajasthan is concerned, district Banswara is selected as ST district for our study as it is the most back ward district in terms of development (with a rank in terms of DI of 1) and 76.38 per cent of its total population are ST. And district Hanumangarh is selected as SC district due to its DI rank of 14 and 27.85 per cent of SC population in its total population.

Table 2C: District-Wise DI rank, Share of SC, and Share of ST population in Himachal Pradesh

District	DI Rank	Share of SC Population	Share of ST Population
Sirmaur	1	30.34	2.13
Chamba	2	21.52	26.10
Lahul & Spiti	3	7.08	81.44
Kangra	4	21.15	5.60
Solan	5	28.35	4.42
Kullu	6	28.01	3.84
Bilaspur	7	25.92	2.80
Una	8	22.16	1.65
Shimla	9	26.51	1.08
Kinnaur	10	17.53	57.95
Mandi	11	29.38	1.28
Hamirpur	12	24.02	0.67

Source: DI rank is calculated by the researcher. Share of SC and ST population is based on Census, 2011.

In Himachal Pradesh, district Simraur (with a DI rank of 1 and share of SC population of 30.34 per cent) is selected as SC district and district Chamba (with a DI rank of 2 and share of ST population of 26.10 per cent) is selected as ST district.

#### Village and Household Selection:

In the next stage of sample selection, we selected one block from each selected district. Blocks from the SC districts and ST districts are selected on the basis of highest share of SC population and ST population, respectively in the total population at the block level. Villages from the selected blocks in SC and ST districts were selected on the basis of higher share of SC and ST population, respectively. Finally, households from the selected villages were selected randomly.

#### Food Insecurity Experience Scale (FIES)

Food Insecurity score for each household was calculated on the basis of set of eight questions which was answered by the respondent on behalf of his/her household. All the questions are of Yes/No type and 1 is given for yes and 0 is given for no/don't know. Following is the set of eight questions asked for the construction of FIES.

During the last 12 months, was there a time when, because of lack of money or other resources any member of your family

- 1. You were worried you would not have enough food to?
- 2. You were unable to eat healthy and nutritious food?
- 3. You ate only a few kinds of foods?
- 4. You had to skip a meal?
- 5. You ate less than you thought you should?
- 6. Your household ran out of food?
- 7. You were hungry but did not eat?
- 8. You went without eating for a whole day?

Based on the global standard we used the three categories of food insecurity- Food Secure (FIES score of 0 to 2), moderately food insecure (FIES score of 3 to 6), and severe food insecurity (7, 8) - for our study.

indinitional status of children (onder nive years) in finnachai rhadesh (i requency fable	Nutritional status of children	(Under five y	vears) in Himachal	Pradesh (	Frequency	Table)
-------------------------------------------------------------------------------------------	--------------------------------	---------------	--------------------	-----------	-----------	--------

<b>Background Variables</b>		Stunting			Wasting		Ur	nderweight	
	Chamba	Sirmaur	All	Chamba	Sirmaur	All	Chamba	Sirmaur	All
	1	1	By Gen	der Group	<b>S</b>		1	11	
Male	4	1	5	0	1	1	1	2	3
Female	3	3	6	1	2	3	2	2	4
		B	y Age G	roup of Ch	ild				
0 to 5 Months	1	0	1	1	0	1	1	0	1
6 to 11 Months	0	2	2	0	0	0	0	1	1
12 to 23 Months	2	0	2	0	0	0	1	0	1
24 to 35 Months	3	1	4	0	1	1	1	1	2
36 to 56 Months	1	1	2	0	2	2	0	2	2
		By	y Mothe	r's Educat	ion				
Illiterate	0	0	0	0	0	0	0	0	0
Primary	0	0	0	0	2	2	0	2	2
Secondary	3	2	5	0	0	0	2	0	2
Higher Secondary and									
above	4	2	6	1	1	2	1	2	3
	-	Weal	th Quai	ntile (Hous	ehold)				
Poorest	3	0	3	0	0	0	1	0	1
Poorer	0	1	1	0	<u>l</u>	1	0	1	1
Middle	3	1	4	1	2	3	2	2	4
Richer	1	2	3	0	0	0	0	1	1
Richest	0	0	0	0	0	0	0	0	0
		Туре	of fuel	used for co	oking				
Gas	0	0	0	0	0	0	0	0	0
Wood	3	0	3	0	0	0	0	0	0
Both Gas and Wood	4	4	8		3	4	3	4	7
<b>T 1</b> / <b>1</b> /	_		Туре	e of toilet	-		-		
Improved toilet	5	4	9	1	3	4	3	4	7
Not improved toilet	2	0	2		0	0	0	0	0
Turner and such as	~	501	urce of o	arinking wa	ater		2	2	~
Improved water	5	4	9	1	1	2	3	2	5
Not improved water	2	0	2 Haldin		2	2	0	2	2
Vac	4	1	Holain	g BPL card		4	2	2	5
1 es	4	1	5	1	3	4	2	3	3
	5	3	0 Food So	U U	0	0		I	2
Food Secure	4	1	000 50		15	2	2	2	5
Moderately Food	4	4	0	1	2	3		3	5
Insecure	2	0	2	0	0	0	1	0	1
Severely Food Insecure	1	0	1	0	1	1	0	1	1
	-	Di	etary D	iversity Sta	itus	-	Ŭ	-	-
Lowest Dietary									
Diversity	0	0	0	0	0	0	0	0	0
Medium Dietary									
Diversity	0	0	0	0	0	0	0	0	0
High Dietary Diversity	7	4	11	1	3	4	3	4	7
Total	7	4	11	1	3	4	3	4	7

Source: Author's estimation using primary survey data

Nutritional s	status of ch	nildren (Un	der five	e years) in I	Rajasthan (	Freque	ency Table)		
<b>Background Variables</b>		Stunting			Wasting		Ur	derweight	
	Chamba	Sirmaur	All	Chamba	Sirmaur	All	Chamba	Sirmaur	All
			By Gen	der Group	S				
Male	33	15	48	25	3	28	35	10	45
Female	27	7	34	16	3	19	27	6	33
		By	y Age G	roup of Ch	ild				
0 to 5 Months	5	4	9	2	0	2	6	3	9
6 to 11 Months	3	1	4	3	1	4	4	0	4
12 to 23 Months	13	6	19	7	2	9	13	3	16
24 to 35 Months	13	5	18	8	1	9	11	5	16
36 to 56 Months	26	6	32	21	2	23	28	5	33
		By	y Mothe	er's Educati	ion				
Illiterate	28	9	37	22	4	26	34	6	40
Primary	12	6	18	9	1	10	12	4	16
Secondary	5	2	7	1	0	1	3	2	5
Higher Secondary and									
above	15	5	20	8	1	9	12	4	16
		Weal	th Qua	ntile (Hous	ehold)				
Poorest	33	0	33	24		24	36		36
Poorer	18	1	19	10	0	10	16	1	17
Middle	7	3	10	5	1	6	8	2	10
Richer	1	8	9	1	3	4	1	6	7
Richest	1	10	11	1	2	3	1	7	8
~		Туре	of fuel	used for co	oking				
Gas	2	0	2	2	0	2	2	0	2
Wood	58	12	70	38	3	41	60	9	69
Both Gas and Wood	0	10	10		3	4	0	7	7
T 14 11 4	0		Тур	e of toilet			10		
Improved toilet	8	4	12	7	2	9	10	4	14
Not improved toilet	52	18	70	34	4	38	52	12	64
T	-	Sou	irce of	drinking w	ater			10	1.6
Improved water	5	16	21	3	4	1	4	12	16
Not improved water	55	6	61	38	2	40	58	4	62
Vac	20	2	Holdin	g BPL card		10	01	2	22
1 es	20	3	23	12	0	12	21	2	23
INU	40	19 T	59 Food So	29 Aurity State	6	35	41	14	22
Food Secure	1	ſ			15	2	1	2	4
Food Secure Moderately Food	1	4	5	1	1	2	1		4
Insecure	1	3	Δ	1	0	1	1	2	3
Severely Food Insecure	58	15	73	30	5	1	60	11	71
severery i sou insecure	50	Di	etarv D	iversity Sta	itus	77	00	11	/ 1
Lowest Dietary		DI	j D						
Diversity	0	0	0	0	0	0	0	0	0
Medium Dietary									
Diversity	44	17	61	28	6	34	47	13	60
High Dietary Diversity	16	5	21	13	0	13	15	3	16
Total	60	22	82	41	6	47	62	16	78

Source: Author's estimation using primary survey data

Sonepur         Gajapati         OD         Sonepur         Gajapati         OD         Sonepur         Gajapati         OD           By Gender Groups         By Gender Groups         13         13         37           Male         14         24         38         8         4         12         13         13         37           Female         10         17         27         4         2         6         7         10         29           By Age Group of Child           0 to 5 Months         4         6         10         0         0         3         3         8           6 to 11 Months         5         6         11         2         2         4         2         3         10           12 to 23 Months         6         9         15         5         1         6         7         3         12           24 to 35 Months         5         15         20         5         3         8         6         12         26           Primary         10         17         27         5         4         9         7         12         27           Secondary         8
By Gender Groups           Male         14         24         38         8         4         12         13         13         37           Female         10         17         27         4         2         6         7         10         29           By Age Group of Child           0 to 5 Months         4         6         10         0         0         3         3         8           6 to 11 Months         5         6         11         2         2         4         2         3         10           12 to 23 Months         6         9         15         5         1         6         7         3         12           24 to 35 Months         4         5         9         0         0         0         2         2         10           36 to 56 Months         5         15         20         5         3         8         6         12         26           By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12         27           Secondary <t< th=""></t<>
Male         14         24         38         8         4         12         13         13         37           Female         10         17         27         4         2         6         7         10         29           By Age Group of Child         0         0         0         0         3         3         8           6 to 5 Months         4         6         10         0         0         0         3         3         8           6 to 11 Months         5         6         11         2         2         4         2         3         10           12 to 23 Months         6         9         15         5         1         6         7         3         12           24 to 35 Months         4         5         9         0         0         0         2         2         10           36 to 56 Months         5         11         2         0         2         4         2         12         27           Secondary         8         8         16         5         1         6         7         5         13           Poorest         9         8
Female         10         17         27         4         2         6         7         10         29           By Age Group of Child           0 to 5 Months         4         6         10         0         0         3         3         8           6 to 11 Months         5         6         11         2         2         4         2         3         10           12 to 23 Months         6         9         15         5         1         6         7         3         12           24 to 35 Months         4         5         9         0         0         0         2         2         10           36 to 56 Months         5         15         20         5         3         8         6         12         26           By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11
By Age Group of Child           0 to 5 Months         4         6         10         0         0         3         3         8           6 to 11 Months         5         6         11         2         2         4         2         3         10           12 to 23 Months         6         9         15         5         1         6         7         3         12           24 to 35 Months         4         5         9         0         0         0         2         2         10           36 to 56 Months         5         15         20         5         3         8         6         12         26           By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         3         16           Poorer         6         14         20         <
0 to 5 Months         4         6         10         0         0         3         3         8           6 to 11 Months         5         6         11         2         2         4         2         3         10           12 to 23 Months         6         9         15         5         1         6         7         3         12           24 to 35 Months         4         5         9         0         0         0         2         2         10           36 to 56 Months         5         15         20         5         3         8         6         12         26           By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12           Primary         10         17         27         5         4         9         7         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         3         1
6 to 11 Months         5         6         11         2         2         4         2         3         10           12 to 23 Months         6         9         15         5         1         6         7         3         12           24 to 35 Months         4         5         9         0         0         0         2         2         10           36 to 56 Months         5         15         20         5         3         8         6         12         26           By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         3         16           Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6
12 to 23 Months       6       9       15       5       1       6       7       3       12         24 to 35 Months       4       5       9       0       0       0       2       2       10         36 to 56 Months       5       15       20       5       3       8       6       12       26         By Mother's Education         Illiterate       4       7       11       2       0       2       4       2       12       27         Secondary       10       17       27       5       4       9       7       12       27         Secondary       8       8       16       5       1       6       8       6       11         Higher Secondary and above       2       9       11       0       1       1       1       3       16         Poorest       9       8       17       5       1       6       7       5       13         Pooref       9       8       17       5       1       6       7       5       13         Pooref       9       8       17       5
24 to 35 Months         4         5         9         0         0         0         2         2         10           36 to 56 Months         5         15         20         5         3         8         6         12         26           By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12           Primary         10         17         27         5         4         9         7         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         1         3         16           Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6         8         22           Middle         5         5         10         2         2         4         3         3
36 to 56 Months         5         15         20         5         3         8         6         12         26           By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12         27           Primary         10         17         27         5         4         9         7         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         1         3         16           Poorest         9         8         17         5         1         6         7         5         13           Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6         8         22           Middle         5         5         10         2         2         4         3         3<
By Mother's Education           Illiterate         4         7         11         2         0         2         4         2         12           Primary         10         17         27         5         4         9         7         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         3         16           Poorest         2         9         11         0         1         1         3         16           Poorest         9         8         17         5         1         6         7         5         13           Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6         8         22           Middle         5         5         10         2         2         4         3         3         12           Richest
Illiterate       4       7       11       2       0       2       4       2       12         Primary       10       17       27       5       4       9       7       12       27         Secondary       8       8       16       5       1       6       8       6       11         Higher Secondary and above       2       9       11       0       1       1       1       3       16         Poorest       2       9       11       0       1       1       1       3       16         Poorest       9       8       17       5       1       6       7       5       13         Poorer       6       14       20       1       1       2       6       8       22         Middle       5       5       10       2       2       4       3       3       12         Richest       1       9       10       0       1       1       0       3       12         Model       15       28       43       10       4       14       14       17       48
Primary         10         17         27         5         4         9         7         12         27           Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         1         3         16           Poorest         2         9         11         0         1         1         1         3         16           Poorest         9         8         17         5         1         6         7         5         13           Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6         8         22           Middle         5         5         10         2         2         4         3         3         12           Richer         2         5         7         4         1         5         3         4         7           Richest         1         9
Secondary         8         8         16         5         1         6         8         6         11           Higher Secondary and above         2         9         11         0         1         1         1         3         16           Poorest         2         9         11         0         1         1         1         3         16           Poorest         9         8         17         5         1         6         7         5         13           Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6         8         22           Middle         5         5         10         2         2         4         3         3         12           Richer         2         5         7         4         1         5         3         4         7           Richest         1         9         10         0         1         1         0         1         1           Modd         15         28
Higher Secondary and above29110111316Weile Weile
above         2         9         11         0         1         1         1         3         16           Wealth Quantile (Household)           Poorest         9         8         17         5         1         6         7         5         13           Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6         8         22           Middle         5         5         10         2         2         4         3         3         12           Richer         2         5         7         4         1         5         3         4         7           Richest         1         9         10         0         1         1         0         3         12           Gas         1         1         2         0         1         1         0         1         1           Wood         15         28         43         10         4         14         14         17         48           Bot
Poorest         9         8         17         5         1         6         7         5         13           Poorer         6         14         20         1         1         2         6         8         22           Middle         5         5         10         2         2         4         3         3         12           Richer         2         5         7         4         1         5         3         4         7           Richest         1         9         10         0         1         1         0         3         12           Gas         1         1         2         0         1         1         0         1         1           Wood         15         28         43         10         4         14         14         17         48           Bath Gas and Wood         8         12         20         2         1         3         6         5         17
Poorest       9       8       17       5       1       6       7       5       13         Poorer       6       14       20       1       1       2       6       8       22         Middle       5       5       10       2       2       4       3       3       12         Richer       2       5       7       4       1       5       3       4       7         Richest       1       9       10       0       1       1       0       3       12         Type of fuel used for cooking         Gas       1       1       2       0       1       1       0       1       1         Wood       15       28       43       10       4       14       14       17       48         Both Gas and Wood       8       12       20       2       1       3       6       5       17
Poorer       6       14       20       1       1       2       6       8       22         Middle       5       5       10       2       2       4       3       3       12         Richer       2       5       7       4       1       5       3       4       7         Richest       1       9       10       0       1       1       0       3       12         Type of fuel used for cooking         Gas       1       1       2       0       1       1       0       1       1         Wood       15       28       43       10       4       14       14       17       48         Both Gas and Wood       8       12       20       2       1       3       6       5       17
Middle       5       5       10       2       2       4       3       3       12         Richer       2       5       7       4       1       5       3       4       7         Richest       1       9       10       0       1       1       0       3       12         Type of fuel used for cooking         Gas       1       1       2       0       1       1       0       1       1         Wood       15       28       43       10       4       14       14       17       48         Both Gas and Wood       8       12       20       2       1       3       6       5       17
Richer         2         5         7         4         1         5         3         4         7           Richest         1         9         10         0         1         1         0         3         12           Type of fuel used for cooking           Gas         1         1         2         0         1         1         0         1         1           Wood         15         28         43         10         4         14         14         17         48           Both Gas and Wood         8         12         20         2         1         3         6         5         17
Richest         1         9         10         0         1         1         0         3         12           Type of fuel used for cooking           Gas         1         1         2         0         1         1         0         3         12           Gas         1         1         2         0         1         1         0         1         1           Wood         15         28         43         10         4         14         14         17         48           Both Cas and Wood         8         12         20         2         1         3         6         5         17
Type of fuel used for cooking           Gas         1         1         2         0         1         1         0         1         1           Wood         15         28         43         10         4         14         14         17         48           Both Gas and Wood         8         12         20         2         1         3         6         5         17
Gas         1         1         2         0         1         1         0         1         1           Wood         15         28         43         10         4         14         14         17         48           Both Gas and Wood         8         12         20         2         1         3         6         5         17
Wood         15         28         43         10         4         14         14         17         48           Both Gas and Wood         8         12         20         2         1         3         6         5         17
<b>Both Gas and Wood</b> 8 12 20 2 1 3 6 5 17
Type of toilet
Improved toilet         13         30         43         8         3         11         14         19         40
Not improved toilet         11         11         22         4         3         7         6         4         26
Source of drinking water
Improved water         0         2         2         0         2         2         0         2         3
Not improved water         24         39         63         12         4         16         20         21         63
Holding BPL card
Yes 11 29 40 6 3 9 9 16 45
No 13 12 25 6 3 9 11 7 21
Food Security Status
Food Secure         18         32         50         10         5         15         14         18         55
Moderately Food
Insecure         4         7         11         0         1         1         4         4         8           Severaly Food Insecure         2         2         4         2         0         2         2         1         2
Dietary Diversity Status
Lowest Dietary
<b>Diversity</b> 0 13 13 1 1 0 7 15
Medium Dietary     I     I     I     I     I
Diversity 8 13 21 4 3 7 7 5 28
High Dietary Diversity         16         15         31         8         2         10         13         11         23
Total         24         41         65         12         6         18         20         23         66

### <u>Appendix-6</u>

Nutritional status of children (Under five years) in Odisha (Frequency Table)

Source: Author's estimation using primary survey data

# <u>Appendix-7</u>

## Memories from Himachal Pradesh

































### Memories from Rajasthan






























## <u>Appendix-9</u>

## Memories from Odisha





















