

## **Nutritional Characteristics of North-East Indian States**

Malini L Tantri, Channamma Kambara, and Harshita Bhat

In this paper we investigate the trend and pattern of nutritional status of women and children in North East India and explore the factors that perhaps explain the same. The analysis is based on secondary data available from various rounds of NFHS survey, Economic survey of India and other supporting secondary literature portrait the dichotomy between growth and development through the lenses of nutritional parameter. Apparently different NER states have flared differently in nutritional parameter and thereby urge to have states specific approach in identifying and targeting factors contribute the same.

**Keywords:** Nutrition, North East States, Women, Children, Development

### **Introduction**

India is portrayed as a high globalised and a poster state since the reforms initiated by the Government of India in 1991 (Arora, 2012). It is one of the fastest-growing economies and the fifth largest economy in the world (Economic Survey 2019-20, 2020). The GDP value of India represents 2.31 per cent of the world economy in 2019 and GDP based on PPP, India represent 8.27 per cent of the world economy in 2020 (Singh & Neog, 2020).

Despite the consistent economic growth, India lacks impressive show in various forms of development parameters. For instance, India ranked 130 out of 189 countries on the Human Development Index (HDI) in the year 2017-2018 with the least contribution from the Education Index. To make the situation a bit complex, Indian states have projected a different growth and development trajectory. Goa, Delhi and Chandigarh have been classified in the very high HDI category in 2017-18 and among them, only Delhi has been classified in the very high HDI category in 2011-12. In 2011-12, only 7 Indian states were classified in the high HDI category while in 2017-18, it increased to 14 states in this category. Out of the 14 states, 7 states/UT like Andaman & Nicobar Island, Haryana, Karnataka, Meghalaya, Mizoram, Punjab, Sikkim, Telangana and Uttarakhand have upgraded from the medium HDI category.

---

Dr. Malini L. Tantri and Dr. Channamma Kambara are Assistant Professors at Centre for Economic Studies and Policy and Centre for Research in Urban Affairs respectively, and Harshita Bhat is Research Assistant at the Institute for Social and Economic Change, Bengaluru. [Email: malinilt@gmail.com]

Five out of the 8 northeastern states (NESs) were classified under the medium category of the HDI. Madhya Pradesh followed by Mizoram and Manipur have displayed a mixed scenario of growth and development. They are the top-three states with the highest growth of SGDP in 2019-20 as well as high and medium HDI scores which are Madhya Pradesh, Mizoram and Manipur.

One of the striking features of the dichotomy between growth and development could be seen in the status of nutrition in India. Although household surveys indicate greatly slower rates of per capita consumption growth than the national accounts estimates, even these slower growth rates are associated with a substantial decrease in poverty since the early 1980s. Yet, per capita calorie intake of nutrients is decreasing whereas intake of fat is unambiguously increasing (Deaton & Dreze, 2002). Another distress is seen regarding anthropometric indicators (weight for age, height for age etc.) of nutrition in adults and children are among the worst in the world and are concerning (Joe, et al., 2019). In addition, the progress of these indicators has also been very slow. Undernutrition levels in India also remain high than most countries of Sub-Saharan Africa, and these countries are much poorer than India (Deaton & Drèze, 2009). Malnutrition along with poverty and infection is a vicious circle that affects the entire population. Malnutrition in children is the most unfortunate and widely-spread disorder. It results as a consequence of a combination of inadequate dietary intake and infections. Children are most vulnerable to adverse environments and rapidly responsive to dietary changes. Thus, they are most at risk of becoming ill and malnourished (Bourke, Berkley, & Prendergast, 2016). In India, 28.5 per cent of the under-five population was found to be wasted (moderate and severe), 37.9 per cent stunted and 36.3 per cent underweight, respectively (Pathak, Mahanta, Arora, Kalita, & Kaur, 2020). It is the cause of at least 50 per cent of deaths of children under five (D'Rozario, 2001). According to data from the National Family Health Survey 5 (NFHS-5), 52 per cent of children under the age of 5 in India are stunted reflecting chronic malnutrition, 17.5 per cent wasted reflecting acute malnutrition and 53.4 per cent underweight.

Apparently, there aren't many studies that examine the status of nutrition/malnutrition in NER, which on the one hand have revealed a dichotomy between growth and development and on the other hand have high out-migration. This paper thus investigates the trend and pattern of nutritional status of women and children in North East India and explores the factors that perhaps explain the same. The analysis is based on secondary data available from various rounds of NFHS survey, Economic survey of India and other supporting secondary literature. The rest of this paper is organised as follows. The following section provides a brief outline of key growth and economic parameters of the NERs. The third section discusses the nutritional status of women and children in NER followed by a conceptual model of malnutrition which looks into basic, immediate and underlying factors of malnutrition. And the last section summarises the paper with key policy suggestions.

### **Brief Socio-Economic Profile of North Eastern States of India**

North-East Indian states which are officially known as the North Eastern Region (NER) is the easternmost region of India representing a geographic and political-

administrative division of the country. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim are eight states located in the North East of the country and command special importance in India, not only because of their location but also their cultural and historical uniqueness. They are known as eight siblings and referred to as 'eight sisters' or 'seven sisters and one brother'. The states have distinct cultures and multiple ethnic groups. According to the census of 2011, the total population of all the northeastern states combined is 21,68,37,959 with the highest contribution from Arunachal Pradesh and least from Sikkim with a majority of the male population. The percentage of population below the poverty line is higher than the country average among Arunachal Pradesh, Assam, Manipur (rural and urban), Mizoram (rural) and Nagaland (urban) along with the workforce participation being lesser than 50 per cent except for Nagaland and Sikkim. The workforce participation rate in the rural areas is more than that of the urban areas and all the NESs are above the all India rate of 41.8 per cent (rural) and 35.31 per cent (urban). The high rate of workforce participation indicates lower dependency in the region which is a sign of good utilisation of human resources. With these estimates, the unemployment rate in NESs is greater in the urban areas than the rural and is the highest in Nagaland followed by Tripura. The Indian economy has experienced high rates of GDP growth of 7.21 per cent in 2019-20 while the growth rates of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura have achieved growth rates of 10.99, 8.37, 14.0, 7.89, 14.94, 11.34, 8.47 and 12.11 respectively which is above the national average along with Manipur and Tripura being large gainers. The Estimates of Average Monthly Per Capita Expenditure (MPCE) as per MRP\* 2011-2012 is Rs. 1,287.17 at all India level, whereas in the NER it is an average of 1367.86. The workforce participation rate in the rural areas is more than that of the urban areas and all the NESs are above the all India rate of 41.8 per cent (rural) and 35.31 per cent (urban).

With a total area of 2,62,179 square kilometres, these states account for 7.9 per cent of the total geographical area of India. This region is well endowed with natural resources, like oil and gas, agro-horticultural resources, mineral deposits, immense hydroelectric potential and significant forest resources. However, despite the abundance of resources, the region has lagged many Indian States in vital development indicators.

The states' State Gross Domestic Product (SGDP) have improved over the years (Appendix Figure). SGDP at current prices from 2004 to 2020 was the highest for Assam during most of the period. The highest contribution to SGDP was from the services sector followed by the agricultural sector but with minimum input from the transport, storage and communication sector. The sub-sectors in the latter have also performed poorly over the years. The yearly growth of agriculture and allied, manufacturing, transport and services sectors have gradually increased, helping with the increase in SGDP of Assam. Sikkim is a small state has over time increased its SGDP but has the lowest compared to other northeastern states. The contribution of the transport, storage and communication sector was abysmally low or have an almost horizontal growth from 1999 to 2010 when compared to the other sectors of the NER

All the NER have the highest contribution to SGDP from the tertiary sector -- hotels and restaurants, public administration, real estate etc., followed by the secondary sector for all NESs except for Nagaland which has poor infrastructure and industrial development. The primary or agricultural sector and the transport, storage and communication sector take a backseat. There is a positive growth trend in the tertiary and secondary sectors of these economies.

Concerning the HDI scores of NESs for the latest available data indicate that in 2017-18 states like Sikkim, Mizoram and Meghalaya have high HDI scores (0.700-0.799) which is above India's HDI score of 0.672. Mizoram, Sikkim and Assam have improved their HDI scores significantly since 2011-12 by over 7 per cent whereas the other states managed to improve by three to five per cent. In comparison to all the states in India, Assam, Manipur, Nagaland and Tripura were classified under the medium HDI category despite improving their HDI score over 2011-12. Sikkim was the largest gainer in HDI out of all Indian states followed by Mizoram and Assam. Assam still has a long way to go since it is currently ranked 28 in India. Further understanding of whether the projected growth of these states has been able to improve the nutritional status is important to investigate and is presented in the next section.

Table 2: Human Development Index of North Eastern States

States	HDI Rank 2017-18	HDI Rank 2011-12	Difference in HDI rank
Arunachal Pradesh	30	29	-1
Assam	28	34	6
Manipur	21	23	2
Meghalaya	17	16	-1
Mizoram	10	14	4
Nagaland	23	21	-2
Sikkim	5	11	6
Tripura	25	27	2
INDIA *	130	134	4

Note: \*India's HDI rank and the score is in comparison to other countries of the world. Source: Gendering Human Development, Ministry of Statistics and Programme Implementation

### **Nutritional Status of Women and Children in the Northeastern States**

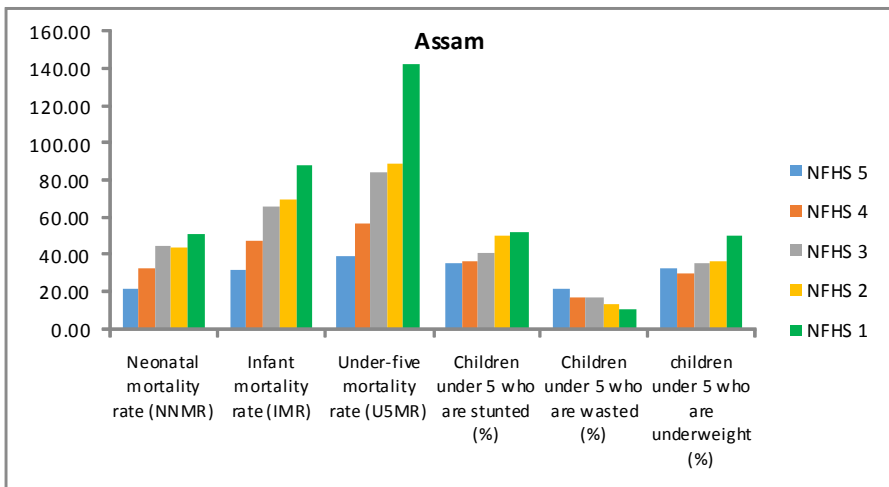
National Family Health Survey (NFHS) provides reliable data on nutritional status. Comparison between NFHS 1, 2, 3, 4, and 5 indicates that there has been a 21.3 per cent reduction in underweight prevalence in children less than 5 years of age in India. During 1992-93 (NFHS-1) Assam had the highest per cent of children under the age of 5 who are underweight (50.40). Also, in 2019-20 the rate is above the country's percentage of children under 5 who are underweight (India-32.10, Assam-32.80). Arunachal Pradesh and Tripura have remarkably lowered their per cent of children who are underweight from 1992-93 to 2019-20 even more than the country's average which was among the states with a high percentage of underweight children. Not a striking reduction can be observed in Nagaland which has been able to reduce by only 1.8 per cent. Wasting in children under the age of 5 or acute malnutrition in

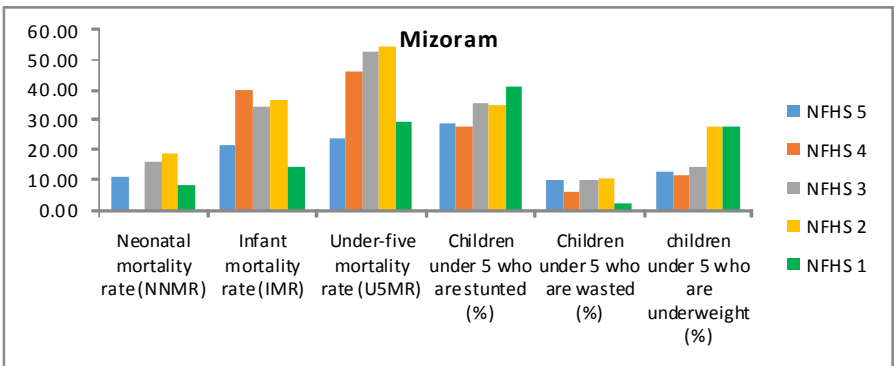
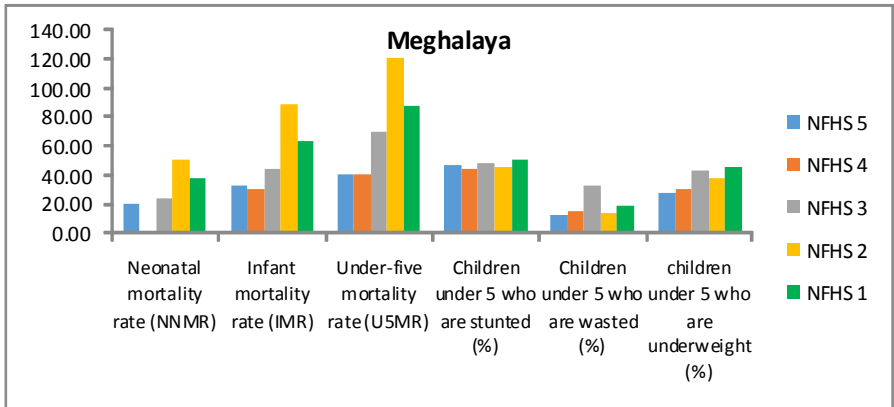
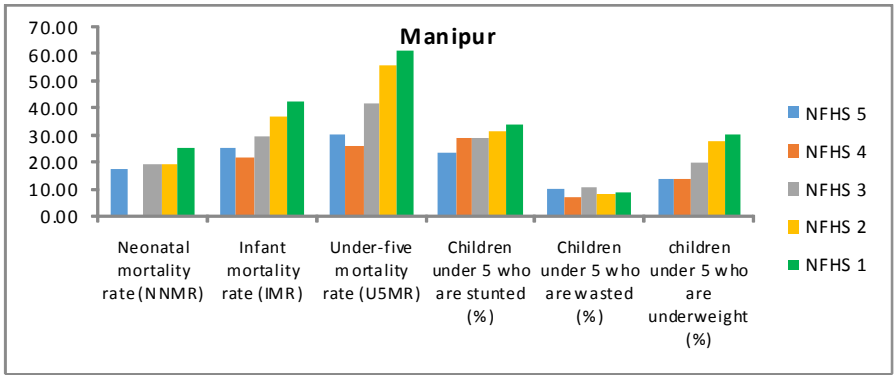
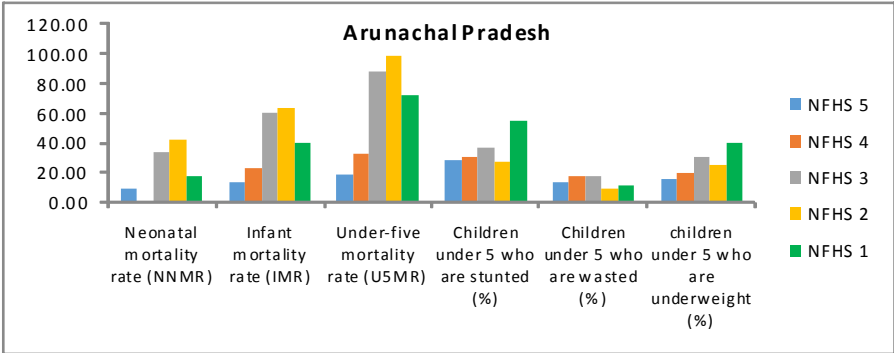
India according to NFHS-5 is 19.30 per cent and NESs like Assam is above the national average (21.70%). All the above indicators are an outcome of poorly implemented and monitored nutrition programmes. Acute malnutrition has increased by 1.8 per cent since 1992-93. NESs, except Mizoram, Meghalaya and Nagaland, have managed to reduce the rates by around 6 to 7 per cent. Assam also observed a sharp increase in acute malnutrition by 10 per cent from 1992-93 to 2019-20. In case of stunting in children less than 5 years, all NESs and India have been able to reduce it except Nagaland in which stunting has increased very marginally by 0.30 per cent. Arunachal Pradesh has performed better than the national average by reducing stunting in children by 25.90 per cent while India has reduced by 16.50 per cent.

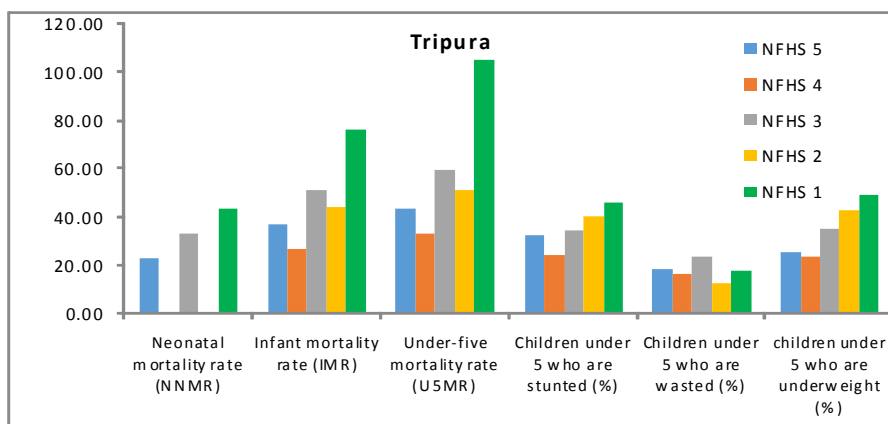
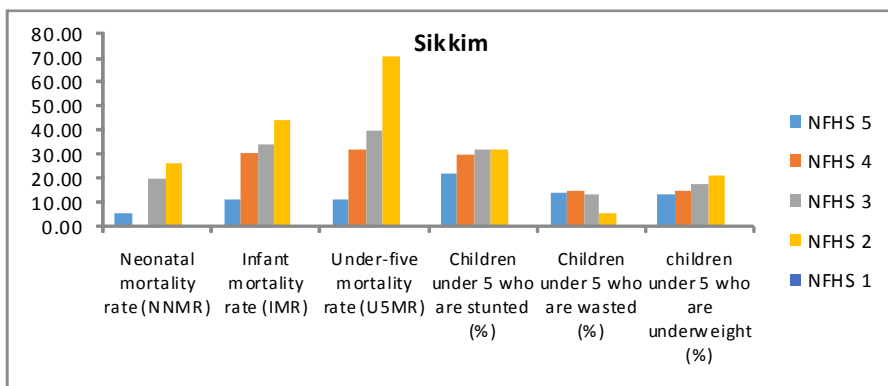
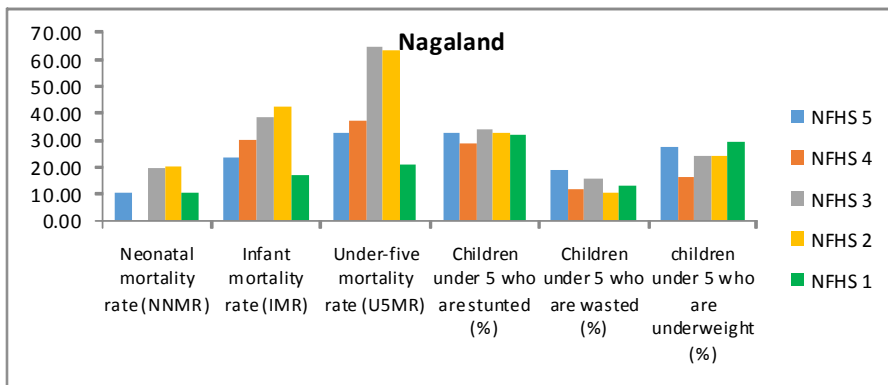
There are certain states with good performance, whereas there are some states with unavailability or inadequate food or access to food. Undernutrition accounts for 45 per cent of deaths in children globally which is a consequence of insufficient intake of nutrients. Adequate diets with healthy feeding practices are important aspects in stronger immunity among children. According to the Global Hunger Index, India was ranked 94 out of 107 countries which is much behind Nepal, Bangladesh and Pakistan (Ngaihte & Kaur, 2020).

Migration is a prevalent strategy adopted by families in India. Empirical works in developed and underdeveloped countries show that children living with single parents have worse developmental outcomes than children with two parents and parental presence leads to the healthy development of a child (Amato, 2001; Dawson, 1991). Parental out-migration also has some sort of a similar effect on a child’s nutritional status (Lei, Desai, & Chen, 2020). The census data shows that over the years there has been an increase in the number of female migrants. In this, the nutritional aspects of migrants change due to moving from one place to another (Anikeeva, Bi, Hiller, Ryan, Roder, & Han, 2010).

Figure 2: Nutritional Status of Children in North-East India







Source: NFHS 1, 2, 3, 4 & 5

Existing literature on women and nutrition has most often relied on indicators of empowerment like women’s education (Smith & Haddad, 2000; Haddad, 2000; Berti, Krasevec, & FitzGerald, 2007) and control over income. There are very few studies specifically in India that explore women’s nutrition. At the national level, nutritional components have been accounted for by exposure of women to land reforms (Ghosh, 2007) and agricultural employment (Agarwal, 1986). Most have treated household expenditure and equality as proxy indicators of nutrition and health (Gillespie, Harris,

& Kadiyala, 2012). In this section, we look at the status of health and nutrition of women in NESs with the help of secondary data from NFHS.

The problem of undernutrition and malnutrition is intensified by a lack of inadequate health services and food insecurity. According to NFHS-5, 18.70 per cent of Indian women in the age group 15-49 have a Body Mass Index (BMI) below normal level which reduced from 36.30 per cent as projected in NFHS-2. Tripura, Mizoram, Meghalaya and Manipur have achieved a reduction of over 10 per cent. The percentage of women who have a high-risk waist-to-hip ratio was observed to be the highest in Arunachal Pradesh despite it being one of the NESs with less population. All NESs, except Mizoram, had percentages above the country's average for women with a high-risk waist-to-hip ratio. Anaemia during pregnancy risks premature birth and in some cases death of infants. The percentage of the pregnant population who are anaemic has reduced for NESs since 1998-99 but not exceptionally. The all India estimate of pregnant women who are anaemic are continuously increasing. Pregnant women who are anaemic in Nagaland were significantly less compared to the other states in northeast India. Tripura and Assam also exhibit higher estimates of anaemic pregnant women than the country average.

Table 3: Nutritional Status of Women in Northeast India

Indicators (age 15-49 years)	Year	Women whose BMI is below normal (BMI <18.5 kg/m) (%)	Women who are overweight or obese (BMI =25.0 kg/m) (%)	Women who have high risk waist-to-hip ratio (=0.85) (%)	Pregnant women who are anaemic
Arunachal Pradesh	2019-20	5.70	23.90	68.90	27.90
	2015-16	8.50	18.80	na	37.80
	2005-06	15.50	10.50	na	51.80
	1998-99	10.70	5.10	na	49.20
Assam	2019-20	17.60	15.20	67.20	54.20
	2015-16	25.70	13.20	na	44.80
	2005-06	36.50	9.00	na	72.00
	1998-99	27.10	4.20	na	62.30
Manipur	2019-20	7.20	34.10	65.70	32.40
	2015-16	8.80	26.00	na	26.00
	2005-06	13.90	17.60	na	36.40
	1998-99	18.80	10.80	na	36.70
Meghalaya	2019-20	10.80	11.50	60.60	45.00
	2015-16	12.10	12.20	na	53.30
	2005-06	13.70	7.10	na	60.20
	1998-99	25.80	5.80	na	58.60
Mizoram	2019-20	5.30	24.20	47.60	34
	2015-16	8.40	21.00	na	27.00
	2005-06	15.30	12.00	na	51.70
	1998-99	22.60	5.30	na	45.70



Nagaland	2019-20	11.10	14.40	62.00	22.20
	2015-16	12.30	16.20	na	32.70
	2005-06	15.90	8.90	na	na
	1998-99	18.40	8.20	na	38.20
Sikkim	2019-20	5.80	34.70	75.60	40.7
	2015-16	6.40	26.70	na	23.60
	2005-06	9.60	19.50	na	62.10
	1998-99	11.20	15.70	na	47.60
Tripura	2019-20	16.20	21.50	62.50	61.50
	2015-16	18.90	16.00	na	54.40
	2005-06	35.10	7.80	na	57.60
	1998-99	35.20	8.40	na	53.60
India	2019-20	18.70	24.00	56.70	52.20
	2015-16	22.90	20.60	na	50.40
	2005-06	33.00	14.80	na	57.90
	1998-99	36.20	10.60	na	49.70

NOTE: NA - Not Available

Source: NFHS 1, 2, 3, 4 & 5

### **Determinants of Nutritional Status**

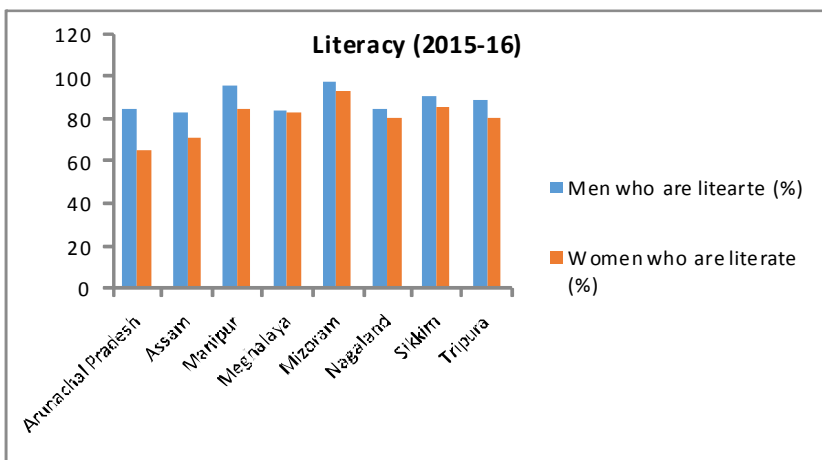
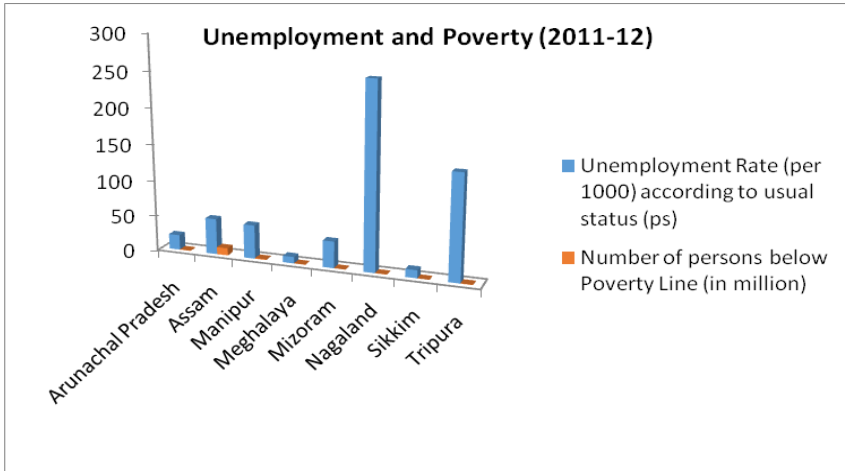
Along with adequate diets and nutrient intake at the micro-level, factors like drinking water, sanitation and education play a key role in shaping the nutritional levels. The conceptual model of malnutrition is a useful tool that helps to understand the many factors that have an impact on nutrition status. There are three levels of causality of malnutrition: basic, immediate and underlying. The basic causes of malnutrition are related to potential resources and the social, political, ideological and economic context like poverty, agriculture, public distribution systems, water and environmental sanitation, education and communication, control and use of resources etc. The immediate causes of malnutrition are inadequate dietary intake and diseases. Both can make each other worse; this is also referred to as the infection malnutrition cycle. Underlying determinant of undernutrition includes three main causes: inadequate household food security, inadequate care and inadequate health services and an unhealthy household environment.

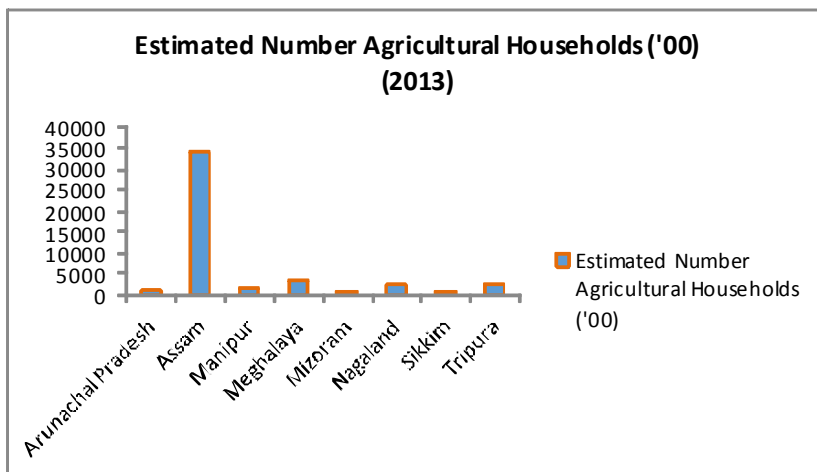
### **Basic Factors**

The basic determinants of nutrition such as poverty, unemployment, literacy, etc, also shape the nutritional status of the population. Such conditions can make people more vulnerable or strong. In 2015-16, 68.4 per cent of women in the Indian population were literate. Also, the literacy gap between men and women is getting narrower. Despite the growth in literacy, the rate of unemployment (per 1000) in India is 27. Among the NESSs, it is the highest in Nagaland which also has high literacy rates. This could mean that the human resources are underutilised and there is a lack of jobs for

the educated population in this state. In contrast, Sikkim and Meghalaya have low unemployment rates and high literacy rates. The number of households dependent on agriculture in Nagaland is less than 5,000 which indicates that the people are either unemployed or employed in other sectors of the economy. Poverty is abysmally low in most NESs when compared to All India.

Figure 3: Changes in basic determinants of nutrition in North East India





Source: Employment and Unemployment Situation in India, NSSO 68th Round; NFHS 4; Situation Assessment Survey of Agricultural Households (Jan-Dec 2013), National Sample Survey Office (NSSO)

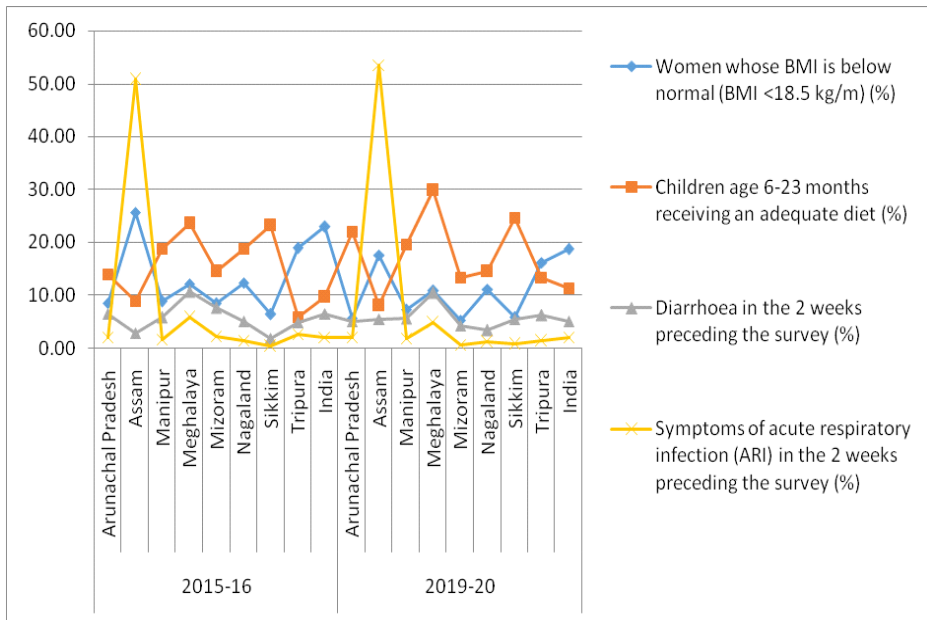
### Immediate Factors

Health and Nutrition-related interventions aim at improving the food, health and care environment for women and children. Among women, 18.7 per cent of the population had Body Mass Index (BMI) less than 18.5 kg/m in 2019-20. Since 2015-16 the percentage of women with low BMI is reducing for all the NESs (see Figure 3). Among children aged 6-23 months, only 11.3 per cent receive an adequate diet in India. The situation has improved since but not significantly. All the NESs, except Assam, are above the national average. In fact, in Meghalaya, 29.8 per cent of children between the age group of 6-23 months receive an adequate diet.

In India, 2.1 per cent of children less than 5 years of age had symptoms of Acute Respiratory Infection (ARI), and advice or treatment was sought from a health facility for 97.9 per cent of children. State-wise level of ARI was below 5.0 per cent in most Indian states and NESs. But Assam had the worst figure. The percentage of children with ARI was 53.5 per cent in 2019-20 which rose from 50.8 per cent in 2015-16. Around 5.1 per cent of the population had diarrhoea. The prevalence of diarrhoea has declined in NESs during 2015-16 and 2019-20 although it increased in a few states like Assam, Sikkim and Tripura.

Along with optimal feeding practices, maternal health is crucial. It is a predictor of child health. Access and availability of health services such as Iron Folic Acid (IFA) and Antenatal Care (ANC) play a pivotal role for both mother and child. In 2015-16, only 8.3 per cent of mothers consumed IFA for 100 days or more when they were pregnant (India). In 2019-20 the percentage rose to 23.8 which too are not exceptionally good. Six of the 8 NESs have performed above the national average and Mizoram has a percentage of 61.9 per cent. Women having ANC in India in the first trimester is 53.1 per cent whereas those who had at least 4 ANC visits was 36.5 per cent. Five NESs had at least 4 ANC above 60 per cent whereas the others were

Figure 4: Changes in immediate determinants of nutrition in North East India



Source: NFHS 4 and 5

around 50 per cent (see Figure 5). More than 70 per cent of pregnant women attended a medical facility to give birth in India as well as NESs except in Nagaland and Meghalaya (45.7 and 58.1 per cent respectively). The same is the case for births that were attended by skilled health professionals. Mothers, whose last birth was protected against neonatal tetanus, showed a promising picture in India and for all NESs. In addition, all NESs were above the national average of 76.9 per cent.

### Underlying Factors

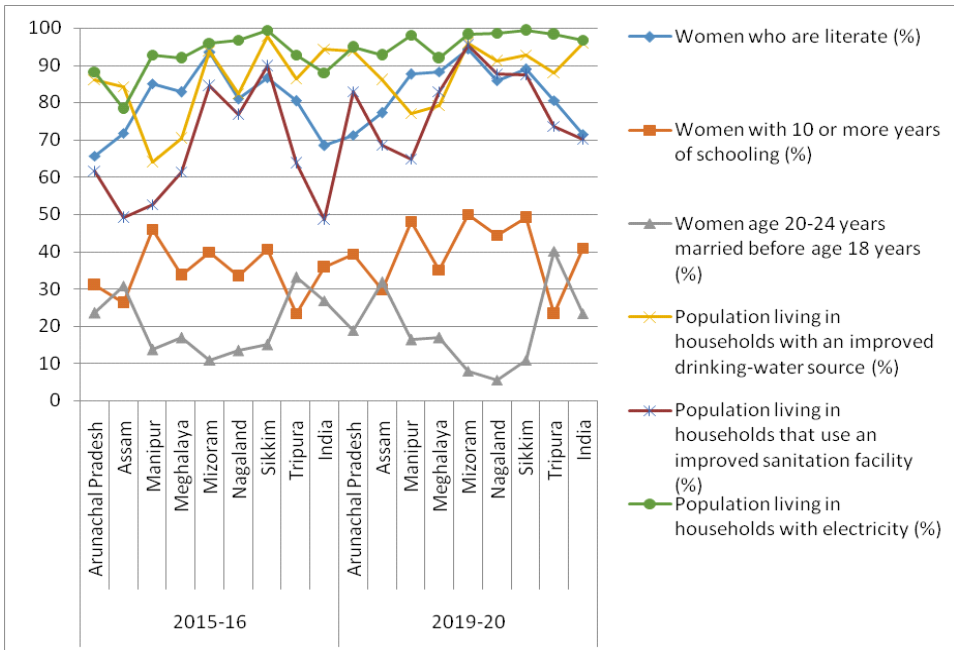
Inadequate and unsafe drinking water, poor sanitation and unhygienic practices lead to many diseases, especially among children, due to low immunity and high susceptibility towards infection. According to NFHS 5, in India, access to improved drinking water has reached a high level of 95.9 per cent (NFHS 5) and more than half of the Indian households have access to improved sanitation (70.2%). In 2015-16, Sikkim had achieved drinking water that was almost universal (97.8%) but it has reduced by 5 percentage points during 2019-20. Manipur, among all Indian states as well as NESs, has the lowest percentage of the population that has access to safe drinking water in the last two NFHS periods (2015-16, 2019-20).

India can achieve a lot of positive impact towards improving nutritional and health status by making improved sanitation facilities available. In India, 29.8 per cent of the population have either no access to sanitation or practise open defecation (NFHS 5) which was more than 50 per cent during 2015-16. Mizoram and Sikkim have the highest percentage of the population that has access to improved sanitation facilities (see Figure 5). In 2014, the Government of India launched the Swachh Bharat Mission

to improve hygiene and sanitation. According to recent reports, the programme was successful in building around 90 million toilets in India (Food and Nutrition Security Analysis, India, 2019). The use of improved drinking water by 95.9 per cent of households and efficient use of health facilities have also contributed to lower levels of ARI and diarrhoea among under-5 children in India (see Figure 3). Electricity is crucial for running all the appliances. In India, 96.8 per cent of the households have electricity. Households with electricity in Sikkim, Nagaland, Tripura and Mizoram are almost universal.

Women’s education has a positive impact on the health status of children. Since 2015-16, there has been an increase in the percentage of women with 10 or more years of schooling. In 2015-16, 68.4 per cent of women in the Indian population were literate and in 2019-20 it has increased by 3.1 per cent points. Also, the literacy gap between men and women is narrowing. Marriage at an early age among women is a constraint to their education and health. The government of India, in 2021, has made 21 the minimum age for marriage for women. Figure 5 indicates that around 20-30 per cent of the northeastern women. within the age group of 20-24. are married before 18 years. In India, the average rate is 23.3 per cent and Tripura stands at 40.1 per cent which is also one of the states that has a high female literacy (above 80%).

Figure 6: Changes in underlying determinants of nutrition in North East India



Source: NFHS 4 and 5

In this backdrop it becomes important to investigate the nutritional intake for the NESs. The Indian Council of Medical Research (ICMR) has recommended dietary requirements and intake across gender and the nature of work is given in the Table 4.

Table 4: ICMR Recommended Dietary Guidelines

Group	Particulars	Net energy kilocalories / day
Man	Sedentary work*	2320
	Moderate work^	2730
	Heavy work#	3490
Woman	Sedentary work	1900
	Moderate work	2230
	Heavy work	2850
Children	1-3 years	1060
	4-6 years	1350
	7-9 years	1690
Boys	10-12 years	2190
Girls	10-12 years	2010
Boys	13-15 years	2750
Girls	13-15 years	2330
Boys	16-17 years	3020
Girls	16-17 years	2440
Note: *Sedentary worker category consists of teachers, retired personnel, priests, computer professionals, housewives, etc.		
^Moderate worker category consists of agricultural labourers, industrial labourers, goldsmiths, fishermen, masons, servants etc.		
#Heavy worker includes stone cutter, blacksmiths, mine workers, wood cutters		

Source: ICMR Manual of Dietary Guidelines for Indians

Table 5: Per capita and per consumer unit intake of calorie, protein and fat per day

States	Year	Calorie		Protein		Fat	
Arunachal Pradesh	2011-12	1876	2083	47.4	53.3	18.2	28.2
	2004-05	2320	2263	67.7	93.3	33.6	44.7
Assam	2011-12	2010	2038	49.3	52.1	26.1	37.1
	2004-05	2067	2143	52.7	55.9	26.7	36.8
Manipur	2011-12	1974	1914	46.7	45.9	15.5	17.4
	2004-05	2299	2168	59.6	52.5	27.6	18.5
Meghalaya	2011-12	1686	1755	41.6	46	21.6	27.8
	2004-05	1900	1898	50.8	50.6	25.6	37.3
Mizoram	2011-12	2037	2166	48.1	53.5	25.4	38
	2004-05	2437	2360	77.2	67.6	43.4	50.9
Nagaland	2011-12	1901	1970	51.5	54	14.2	18.5
	2004-05	2044	2418	65.7	73.9	20.2	50.3
Sikkim	2011-12	2015	1958	51.5	50.8	44.6	46.6
	2004-05	1928	1922	49.9	51.5	36.7	40.7
Tripura	2011-12	2256	2252	54.5	56.9	27.4	35.1
	2004-05	1862	2092	47.1	56.9	21.9	35.1

Source: NSSO Round 68 and 61: Nutritional Intake in India, 2011-12, 2004-05

The urban areas are slightly better off in nutritional intake rather than the rural areas in the NER. The statewise data on calorie, protein and fat intake reveals that there has not been a positive increase in the consumption of calorie, protein and fat in any of the NESs except Tripura. It too has observed very marginal or null improvement in nutritional intake.

Multiple burdens of malnutrition is the coexistence of any two or all three forms of malnutrition: stunting, wasting and underweight. Among children aged 0-5 years 6.5 per cent of the children are stunted, wasted as well as underweight; 18.4 per cent of children are stunted and underweight and 8.2 per cent of the children are wasted and underweight in India. It also reveals that after disaggregating the coexistence of these three conditions, 13.6 per cent of the children are only stunted (against 38.4 per cent overall prevalence of stunting), 2.6 per cent are only underweight (against 35.7 per cent overall prevalence of underweight) and 6.3 per cent (against 21.0 per cent overall prevalence of wasting) are wasted. Most of the North Eastern states experience an increased burden of malnutrition. According to the anthropometric indicators (stunted, wasted and underweight), the nutritional status of children in the region shows that undernutrition among children is unacceptably high. Mizoram (1.4 per cent) and Manipur (1.4 per cent) are among the states in India having the lowest burden of multiple malnutrition and Assam (4.5 per cent) Tripura (3.4) and Meghalaya (3.2) have the highest existence of multiple burdens of malnutrition among the states in the NER.

A composite picture of the indicators reveals a lot about the region as a whole (Table 7). The states have had varied performances when compared among each other over the years. Yet, it is important to investigate the overall outlook of the eight states and the region as a whole.

Table 6: Multiple Burden of Malnutrition in Northeastern States 2015-16

States (percent)	Only Stunted	Only Wasted	Only Underweight	Stunted and underweight	Wasted and Underweight	Stunted, wasted & underweight
Arunachal Pradesh	17.3	8.7	1.1	9.7	6.3	2.3
Assam	15.6	5.7	2.3	16.2	6.7	4.5
Manipur	18.5	3.3	1.3	9	2.2	1.4
Meghalaya	22.2	6.5	1.6	18.4	5.7	3.2
Mizoram	19.4	2.3	1	7.3	2.4	1.4
Nagaland	16.8	4.9	1.1	9.2	3.8	2.6
Sikkim	21.2	8.4	1.8	6.6	4	1.8
Tripura	10.1	5.9	2.4	10.8	7.6	3.4
All India	13.6	6.3	2.6	18.4	8.2	6.5

Source: Food and Nutrition Security Analysis, Ministry of Statistics and Programme Implementation and The World Food Programme

Table 7: Comparison of various parameters

Parameters	Best	Moderate	Worst
Basic Determinants	Sikkim	Nagaland	Assam
Immediate Determinants	Mizoram	Manipur	Tripura
Underlying Determinants	Mizoram	Manipur	Assam
Conceptual Model Overall	Sikkim	Manipur	Assam
Nutrition	Sikkim	Manipur	Assam
Children Health	Arunachal Pradesh	Manipur	Meghalaya
Women Health	Mizoram	Manipur	Arunachal Pradesh
Households with drinking, sanitation and electricity facilities	Arunachal Pradesh	Sikkim	Assam
All	Sikkim	Manipur	Assam

Source: Authors' compilation

In nutritional parameters, Sikkim and Assam hold the highest and the lowest positions while Manipur has performed moderately. Assam has more percentage of neonatal and infant mortality, stunting of children under 5, women with low BMI etc. Children's and women's health is seen to be the best in Arunachal Pradesh and Mizoram respectively. Mortality rates among children were lesser in Arunachal Pradesh with children receiving adequate diet. Women of Mizoram had better pregnancy care when compared to other states. Electricity, drinking water and sanitation have become a basic necessities. The table shows that Arunachal outperformed other NESs in these facilities whereas Manipur and Assam were moderate and poor in this zone.

A comparison between the conceptual model of malnutrition and the other indicators, there isn't much difference in the states' performances. In terms of basic determinants of malnutrition, Sikkim has had the best performance in terms of the unemployment rate, poverty and literacy whereas the number of agricultural households was low. This has reflected in Sikkim's health and nutritional aspect when viewed at the composite table and thus, led to its best performance overall. Manipur has had moderate performances in all the parameters except in basic determinants of malnutrition and households with drinking water, sanitation and electricity facilities. In basic determinants, Manipur has had the highest poverty rate along with high literacy rates and moderate unemployment rates. Manipur has a mixed result in households with drinking water, sanitation and electricity facility where it has performed the best in sanitation, moderate in drinking water and worst in electricity. Mizoram has had the best performance in terms of immediate factors of malnutrition. It has also topped the list of underlying factors of malnutrition in which literacy and population with drinking water, sanitation and electricity facilities were good. Total children (age 6-23 months) receiving an adequate diet was the worst in Mizoram which is an immediate factor of malnutrition. From Table 6 it can be observed that Mizoram is one of the states with the highest stunting among children. This state has the highest literacy among women in the northeast as well as in India but this has not



been reflected in terms of child health and nutrition. Assam has had a disappointing performance in all parameters including the conceptual model of malnutrition. It has the most agricultural households and high rates of poverty and unemployment with low literacy levels which is the reason for its backwardness in health and nutritional parameters. To summarize, Sikkim has proven to be a strong state despite its size whereas Assam needs a lot of improvement.

### **Summary**

The paper explored the trend and pattern of nutritional status of women and children in North East India and the factors that perhaps explain the same. The analysis based on secondary data available from various rounds of NFHS survey, Economic survey of India and other supporting secondary literature portrait the dichotomy between growth and development through the lenses of nutritional parameter. Apparently different NE states have flared differently in nutritional parameter and thereby urge to have states specific approach in identifying and targeting factors contribute the same. In particular, Sikkim with its less population and size has had a significant level of growth in women's and children's health. It is also one of the states with high literacy and low poverty and unemployment rates. This has been affecting the nutritional status of the state. Manipur has had moderate performances in all the parameters except in basic determinants of malnutrition and households with drinking water, sanitation and electricity facilities. In basic determinants, Manipur has had the highest poverty rate along with high literacy rates and moderate unemployment rates. Whereas Mizoram which is one of the states with the highest literacy in India as well as in the northeast has had the worst performance in children's health and one of the best in women's health. Assam, in all parameters, has portrayed a disappointing picture. It being the biggest state in terms of GSDP, size and population, it has portrayed low literacy rates, high unemployment and poverty rates and dismal women and children health. Therefore, Sikkim overall has been the best performer, Manipur is performing moderately and Assam has had the worst performance.

### **References**

- Akter, S., Deshingkar, P., Sharma, P., & Kumar, S. (2008). Circular migration in Madhya Pradesh: Changing patterns and social protection needs. *European Journal of Development Research*, 20(4), 612-628.
- Amato, P. R. (2001). Children of divorce in the 1990s: An update of the Amato and Keith (1991) meta-analysis. *Journal of Family Psychology*, 15(3), 355-370.
- Anikeeva, O., Bi, P., Hiller, J. E., Ryan, P., Roder, D., & Han, G.-S. (2010). The Health Status of Migrants in Australia: A Review. *Asia Pacific Journal of Public Health*, 22(2), 159-193.
- Arora, R. U. (2012). Gender Inequality, Economic Development, and Globalisation: A State-Level Analysis of India. *The Journal of Developing Areas*, 46(1), 147-164.
- Bano, W. (2021). Food Security – A Case Study of Dakshina Kannada District. *International Journal of Emerging Technologies and Innovative Research*, 8(4), 444-456.

- Bourke, C. D., Berkley, J. A., & Prendergast, A. J. (2016). Immune Dysfunction as a Cause and Consequence of Malnutrition. *Trends in Immunology*, 37(6), 386-398.
- Dawson, D. A. (1991). Family structure and children's health and well-being: Data from the 1988 National Health Interview Survey on Child Health. *Journal of Marriage and Family*, 53(3), 573-584.
- Deaton, A., & Dreze, J. (2002). Poverty and Inequality in India. *Economic and Political Weekly*, 37(36).
- Deaton, A., & Drèze, J. (2009). Food and Nutrition in India: Facts and Interpretations. *Economic and Political Weekly*, 44(7), 42-65.
- Dholakia, R. H. (2003). Regional Disparity in Economic and Human Development in India. *Economic and Political Weekly*, 38(39), 4166-4172.
- D'Rozario, C. (2001). *Child Malnutrition in Karnataka*. Supreme Court.
- Gillespie, & McNeill, G. (1994). Food Health and Survival in India and. *Journal of Asian Studies*, 53(1), 254.
- Hemalatha, R., Laxmaiah, A., Sriswan, M. R., Boiroju, N. K., & Radhakrishna, K. V. (n.d.). *What India Eats*. Hyderabad: Indian Council of Medical Research and National Institute of Nutrition.
- Huhmann, M. B. (2011). Nutrition Status. *Encyclopedia of Cancer*.
- Jha, A., & Kawoosa, V. M. (2019, July). *What the 2011 census data on migration tells us*. Retrieved December 20, 2021, from Hindustan Times: <https://www.hindustantimes.com/delhi-news/migration-from-up-bihar-disproportionately-high/story-K3WAio8TrrvBhd22VbAPLN.html>
- Joe, W., Rajpal, S., Kim, R., Laxmaiah, A., Harikumar, R., Arlappa, N., et al. (2019). Association between anthropometric based and food based nutritional failure among children in India, 2015. *Maternal and Child Nutrition*, 15(4).
- Lalneizo, D., & Reddy, S. (2010). Health Status of Children in North Eastern States of India. *Indian Anthropological Association*, 40(2), 37-52.
- Lei, L., Desai, S., & Chen, F. (2020). Fathers' migration and nutritional status of children in India. *Demographic Research*, 43, 545-580.
- Lyndem, B., & De, U. K. (2004). *Education in North East India: Experience and Challenge*. New Delhi: Concept Publishing Company.
- Mamgain, R. P., & Reddy, D. (2015). *Out Migration from Hill Region of Uttarakhand: Magnitude, Challenges and Policy Options*. Hyderabad: National Institute of Rural Development (NIRD).
- Marchang, R. (2019). Economic, Occupational and Livelihood Changes of Scheduled Tribes of North East India. *Institute for Social and Economic Change*, 1-22.
- Martorell, R., & Ho, T. (1984). Malnutrition morbidity and mortality. *Population and Development Review*, 10, 49-68.
- Ngaihte, D. P., & Kaur, R. (2020). Nutritional Deficiencies In North-East India: A Weak Shield Against The Virus? *Outlook Poshan 2.0*.
- Pathak, J., Mahanta, T. G., Arora, P., Kalita, D., & Kaur, G. (2020). Malnutrition and Household Food Insecurity in Children Attending Anganwadi Centres in a District of North East India. *Indian Journal of Community Medicine*, 45(4), 405-409.
- Radhakrishna, R., & Ravi, C. (2004). Malnutrition in India: Trends and Determinants. *Economic and Political Weekly*, 39(7), 671-676.

- Remesh, B. P. (2012). Strangers in Their Own Land: Migrants from the North-East in Delhi. *Economic and Political Weekly*, 47(22), 35-40.
- Sánchez-García, S., García-Peña, C., Duque-López, M. X., Juárez-Cedillo, T., Cortés-Núñez, A. R., & Reyes-Beaman, S. (2007). Anthropometric measures and nutritional status in a healthy elderly population. *BMC Public Health*, 7(2).
- Singh, M. K., & Neog, Y. (2020). Contagion effect of COVID 19 outbreak: Another recipe for disaster on Indian economy. *Wiley Public Health Emergency Collection*.
- World Food Programme; Ministry of Statistics and Programme Implementation. (2019). *Food and Nutrition Security Analysis, India*. World Food Programme; Ministry of Statistics and Programme Implementation.