

# Chapter 13

## Progress Made by the Northeastern States of India Towards the 2030 Health-Related Sustainable Development Goals (SDGs): Performance of the Health and Well-Being Indicators



Sahana Bhattacharjee

**Abstract** The Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030, which were adopted by 193 United Nations Member States at the UN General Assembly Summit in 2015. The third goal of the 17 SDGs is ‘good health and well-being: Ensure healthy lives and promote well-being for all at all ages’, accomplishing which is crucial for the very existence of humankind. Although many studies in the Indian context on SDGs have been conducted, none has particularly focused on how far or how close Northeast Indian states have been able to achieve the targets of the Sustainable Development Goals Agenda, especially in the context of SDG 3. This study is an attempt to carry out a data-based assessment of how far India and its northeastern states in particular have been able to achieve the targets set under Goal 3 of the SDGs to be achieved by 2030 with respect to some of the health and well-being indicators such as family planning services, child immunization and nutritional status of children and adults, maternity care and delivery care services available, tobacco use and consumption among adults, Under-five Mortality Rate (U5MR), Infant Mortality Rate (IMR), Maternal Mortality Ratio (MMR), Neo-natal Mortality Rate (NNMR). It is expected that this study will bring forth the gaps in the health sector which needs to be addressed for realizing SDG 3 for India and its northeastern region in particular.

**Keywords** Sustainable development goal (SDG) · Health · Well-being · Indicators · Northeastern states

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## 13.1 Introduction

The Sustainable Development Goals (SDGs) form a collective vision in terms of some well-defined goals which aim to eradicate poverty, preserve the planet for our next generation and provide all the inhabitants of the world with a peaceful and prosperous life by 2030, which were adopted by 193 United Nations Member States at the UN General Assembly Summit in 2015. It was adopted as a part of the 2030 Agenda for sustainable development where a detailed 15-year plan for successive achievement of the goals was laid out, and it came into effect from 1 January 2016 (The Sustainable Development Agenda, n.d.; What are the Sustainable Development Goals?, n.d.; Sustainable Development Goals (SDGs), n.d.). The agenda encompasses 17 SDGs and 169 targets and seeks to build on the success of the Millennium Development Goals (MDGs), to achieve what could not be accomplished by these. They aim to balance the three dimensions of sustainable development: the economic, social and environmental.

India, among all the other nations, has taken a lead in streamlining the SDGs, and its commitment towards achieving the SDGs is very well reflected in its convergence with the national development agenda as reflected in the motto of Sabka Saath Sabka Vikaas (Collective Efforts for Inclusive Growth) (Voluntary National Review 2020, India, n.d.). Prime Minister Narendra Modi spoke of India's development plans having conjunction with the SDGs in the Sustainable Development Summit of the United Nations, and in his words, sustainable development of one-sixth of humanity which calls India its home will be of great consequence to the world and our beautiful planet (Voluntary National Review Report on Implementation of Sustainable Development Goals, n.d.). India moved ahead of the other countries in implementing and measuring success in achieving the goals by construction of the SDG India Index by NITI Aayog, Government of India, which spans across 13 out of 17 SDGs (leaving out Goals 12, 13, 14 and 17) (SDG India Index, n.d.). The index was developed to be used as a yardstick of social, economic and environmental status of the country and its states and UTs and aims to measure the overall country's and its state-wise progress towards the SDGs for 2030.

Of the 17 goals of the SDGs, the third goal is 'good health and well-being: Ensure healthy lives and promote well-being for all at all ages'. However, there are other goals which ultimately converge towards ensuring good health for all, which are Goal 2 (ending hunger, achieving food security and improved nutrition), ensuring availability and sustainable management of water and sanitation for all (Goal 6) and ensuring access to affordable, reliable, sustainable and modern energy for all (Goal 7) (India and Sustainable Development Goals: The Way Forward 2016). The overall well-being of an individual across all ages is vital for sustainable development. Only if the mind and body of a person are fully fit will he be able to contribute towards the society by giving his complete efforts. Some of the targets that have been set under Goal 3 of the SDGs to be achieved by 2030 are—bringing down the global figures for Maternal Mortality Rate, Infant Mortality Rate, Neo-natal Mortality Rate, prevention

and treatment of substance abuse, achieve universal health coverage, reducing illness and deaths from epidemics and those from hazardous chemicals.

The Constitution of India states that it is the right of every citizen of India to attain the highest attainable standard of physical and mental health. The protection of life and fortification of personal liberty is assured by Article 21 of the Constitution of India (Mathiharan 2003). Further, Article 47 of the constitution directs the states that the highest standard of living, quality of public health and level of nutrition should be made available to its residents and the state should prohibit the consumption of intoxicating drinks and drugs that are injurious to health, except for when it is to be used for medicinal purposes (Article 47 in The Constitution of India 1949 n.d.). Despite the laws and provisions made to safeguard the best of health for its citizens, India has not been able to make considerable progress in the field of health. Also, in the fiscal year 2018, the public health expenditure by states and UTs together amounted to only around 1.28% of the country's GDP (Value of public health expenditure in India FY 2014–2018, 2020). India contributes to 15% of the global maternal deaths (Zodpey and Negandhi 2018). India is ranked 50 out of 222 countries with respect to IMR. India is globally ranked 1 for tuberculosis (TB), and 43% of Indian children are underweight today, which is higher than even some of the lesser developed countries such as Pakistan (32%). India's share in the global burden of diseases is 20%, which is quite high. About 5.4 million children die before reaching 5 years of age (SDG 3: Good Health and Well-Being, n.d.). Looking at the highlights of the SDG India Index 2018, it can be seen that most of the northeastern states have been tagged as either aspirant (having SDG Index value <50) or performer (having SDG Index value between 50 and 65) (SDG India Index, n.d.). Northeast is the easternmost region of India comprising of eight states—Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. About 45 million people reside in this part of the country, which comprises of 3.76% of India's population (Dikshit and Dikshit 2014). The Northeastern Region is characterized by a unique geographical location, uneven terrain, high rainfall, vast hilly region as well as forest areas, economic backwardness, insurgency, etc. and is home to a large number of diverse ethnic groups. Therefore, it is not a very homogenous territory for easily providing round the clock normal healthcare services to all the 47 million people belonging to the region (Medical and Health, n.d.). In the annual report of the Government of India, year 2015–16, some areas concerning the health sector in the northeastern states were identified, viz. shortage of trained manpower, effective and timely utilization of financial resources and services available, morbidity and mortality due to malaria, high level of tobacco consumption, large number of HIV/AIDS cases in Nagaland and Manipur and the increasing occurrence of these diseases in Mizoram and Meghalaya to name a few. Although many studies revolving around Northeast India have elaborated on its health status and healthcare infrastructure, none of them have focused on how far or how close Northeast India is from accomplishing the targets of the Sustainable Development Goals Agenda by the year 2030. This paper attempts to give the readers an insight into the current health scenario via the different health and well-being indicators of northeastern states of India in reference to some of the targets set under Goal 3 of the SDGs to be achieved

by 2030. The inter-state disparity among the northeastern states will also be analysed. This research paper intends to bring forward the success achieved so far as well as the gaps in the health sector which need to be addressed by the concerned authorities if they are to realize their dream of efficaciously achieving SDG 3 for this part of the country in particular.

## **13.2 Data and Methodology**

### ***13.2.1 Data Source***

Data for attaining the objectives of this paper have been collected from multiple secondary sources. For gathering information on family planning services, child immunization and nutritional status of children and adults, maternity care and delivery care services available, tobacco use and consumption among adults, the state fact sheets/reports for India as a whole and for each northeastern state separately, of the National Family Health Survey-1 (NFHS-1) (1992-93), NFHS-2 (1998-99), NFHS-3 (2005-06) and NFHS-4 (2015-16), conducted by Government of India's Ministry of Health and Family Welfare, has been considered. Data on the various mortality indicators such as Under-five Mortality Rate (U5MR), Infant Mortality Rate (IMR), Maternal Mortality Ratio (MMR), Neo-natal Mortality Rate (NNMR) have been collected from the Sample Registration System Statistical Report for the years 2014–2018 and Compendium of India's Fertility and Mortality Indicators, 1971–2013, published by the Office of the Registrar General, India, and available in the Census of India website (<https://censusindia.gov.in/>).

### ***13.2.2 Methodology***

The following methods have been used to fulfil the objectives of the paper.

#### **13.2.2.1 Multiple bar Diagram**

A multiple bar chart is used to display and compare the number, frequency or other measure (e.g., mean) on two or more sets of inter-related data for different discrete categories of data. The length of the bars is set in proportion to the magnitude of the values represented through the diagram. This graph facilitates comparison between more than one inter-related phenomena.

### 13.2.2.2 Descriptive Statistics

A descriptive statistic is a summary statistic which summarizes a given data set so as to extract meaningful information about the variables from it and also to highlight potential relationships between the variables. Descriptive statistics is popularly classified into two categories—measures of central tendency (values of the variable which is the representative of the entire data set, also known as an ‘average’ value of the data set) and measures of dispersion (values which indicate the skewness or scatteredness among the members of the data set).

### 13.2.2.3 Percentage Change

Percentage change is a simple mathematical formula which calculates the extent of change over time. It is calculated as

$$\text{Percentage change of a variable over two time points} = \frac{\text{Value of the variable at (Second time point - First time point)}}{\text{First time point}} \times 100\%$$

If the percentage change is positive, it means the value of the variable has increased over the time period under consideration.

If the percentage change is negative, it means the value of the variable has decreased over the time period under consideration.

## 13.3 Analysis and Results

This section contains the summary of analysis of the collected data.

### 13.3.1 Family Planning Services

The National Family Welfare Programme in India renamed as the ‘Reproductive and Child Health Programme’ aims at meeting the health concerns of women and children more completely, including all aspects of women’s reproductive health throughout their lifespan. In regard to the family planning issue, the new approach promotes the use of contraceptives among eligible couples, allows the couples to choose from among some contraceptive methods including condoms, oral pills, IUDs and male and female sterilization and assures high-quality health care to them (Family planning, n.d.). The following table shows the residence-wise percentage use of any family planning method by currently married women in the age group 15–49 years.

Table 13.1 shows that the average percentage use of family planning services over the four rounds of NFHS is the least for the state of Nagaland (both for rural and urban areas) and is the highest for Tripura (both for rural and urban). Further, Mizoram and Assam fared better than India, both as a whole and for rural and urban areas, separately. Also, rural Sikkim is seen to fare better than rural India. However, the values corresponding to total as well as rural–urban areas are seen to decrease in NFHS-4 as compared to NFHS-3.

### ***13.3.2 Child Immunization***

The Expanded Programme on Immunization (EPI), the brain child of the Government of India, was established in 1978 with the aim to reduce morbidity, mortality and disabilities from six serious but preventable diseases, viz. tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis and measles by making free vaccination services easily available to all eligible children (Mortality, Morbidity and Immunization n.d.). Subsequently, the Universal Immunization Programme was introduced in 1985–86 with the objective of covering at least 85% of all infants against the six vaccine-preventable diseases by 1990 and to achieve self-sufficiency in vaccine production. Figure 13.1 exhibits the percentage of children in the age group 12–23 months who have received full immunization (BCG, measles, three doses each of polio and DPT) in India and its northeastern states during NFHS-1 to NFHS-4.

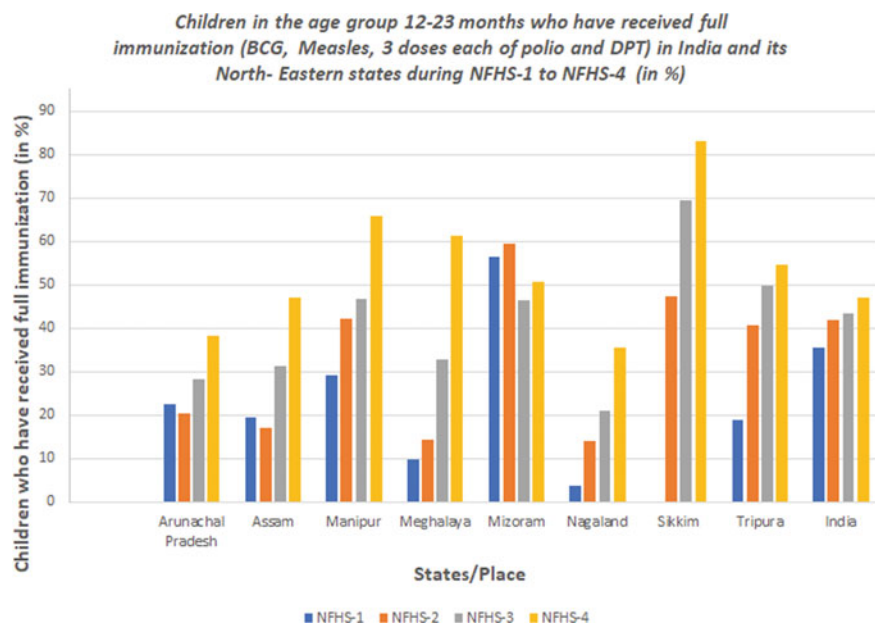
Figure 13.1 clearly shows that except for Arunachal Pradesh, Assam and Mizoram, the percentage of children receiving full immunization (for which the value had dropped in the NFHS-2 and NFHS-3, respectively), all the other states have shown an increase in the percentage from NFHS-1 to NFHS-4. The average percentage of children receiving full immunization over these four NFHS rounds is found to be the highest for Sikkim (66.67%), followed by Mizoram (53.3%) and Manipur (46%), the only states which have averages higher than the all India average of 42%. Additionally, the variability of the percentage change is seen to be the highest for Meghalaya (413.05) and the least for Mizoram (25.75), both of which are greater than the variability of the all India data (17.95).

### ***13.3.3 Maternal and Reproductive Health***

Promotion of maternal and child health has been one of the most important objectives of the Family Welfare Programme in India. The Ministry of Health and Family Welfare, Government of India, included motherhood and child health services into the Reproductive and Child Health Programme, which integrated maternal and child health and fertility regulation interventions with reproductive health programmes

**Table 13.1** Residence-wise percentage use of any family planning method by currently married women in the age group 15-49 years

State/place	NFHS-1		NFHS-2		NFHS-3		NFHS-4		Average						
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural			
Arunachal Pradesh	23.6	39.5	20.8	35.4	47.3	33.3	43.2	47.3	41.6	31.7	26.5	33.3	33.475	40.15	32.25
Assam	42.8	62.3	40.1	54.7	68.3	53.4	56.5	66	54.5	52.4	54.9	52	51.6	62.875	50
Manipur	34.9	44.3	30.3	38.7	44.9	35.6	48.7	54.5	46	23.6	25	22.7	36.475	42.175	33.65
Meghalaya	20.7	31.9	18	20.2	45.3	13.8	24.3	43.7	18.4	24.3	32.8	22.4	22.375	38.425	18.15
Mizoram	53.8	57.1	50.5	57.7	65.1	49.7	59.9	64.3	54.8	35.3	38.5	31.6	51.675	56.25	46.65
Nagaland	13	20.6	10.9	30.3	46.7	26.1	29.7	41.9	24.8	26.5	31.3	24.1	24.875	35.125	21.475
Sikkim	NA	NA	NA	53.8	56.8	53.3	57.6	63.1	56.4	46.7	36.9	51.4	52.7	52.26667	53.7
Tripura	56.1	71.1	52.4	55.5	70	51.8	65.7	66.8	65.5	64.1	66.8	63	60.35	68.675	58.175
India	40.7	51.1	37.1	48.2	51.2	39.9	56.3	64	53	53.5	57.2	51.7	49.675	55.875	45.425



**Fig. 13.1** Percentage of children in the age group 12–23 months who have received full immunization (BCG, measles, three doses each of polio and DPT) in India and its northeastern states during NFHS-1 to NFHS-4

meant for all adults (Maternal and Reproductive health n.d.). The important components of the programme with regard to the maternal and reproductive health include—provision of ante-natal care, encouragement of institutional deliveries or home deliveries assisted by trained health personnel, provision of postnatal care, including at least three postnatal visits, identification and management of reproductive tract and sexually transmitted infections. The following table shows the residence-wise percentage of institutional deliveries in India and northeastern states during NFHS-1 to NFHS-4:

It is evident from Table 13.2 that the average percentage use of institutional deliveries over the four rounds of NFHS is the least for the state of Nagaland (both for rural and urban areas) and is the highest for Sikkim (both for rural and urban). Further, only Tripura and Sikkim fared better than India as a whole as well as for the rural area. Further, urban areas of the states of Tripura, Sikkim, Meghalaya and Manipur have better percentages than urban India. However, the values corresponding to total as well as rural–urban areas are seen to increase from NFHS-1 to NFHS-4.

The following table shows the residence-wise percentage of mothers who received ante-natal care in India and northeastern states during NFHS-1 to NFHS-4:

It can be observed from Table 13.3 that the average percentage of mothers who received ante-natal care over the four rounds of NFHS is the least for the state of Nagaland (both for rural and urban areas) and is the highest for Sikkim (both for rural and urban). As compared to India, only the states of Manipur, Mizoram, Sikkim and



**Table 13.2** Residence-wise percentage of institutional deliveries in India and northeastern states during NFHS-1 to NFHS-4

State/place	NFHS-1	NFHS-2	NFHS-3			NFHS-4			Average		
	Total	Total	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Arunachal Pradesh	19.9	31.2	31.7	64.1	19	52.2	81.5	44.1	33.75	72.8	31.55
Assam	11.1	17.6	22.9	59	18.6	70.6	92.7	68.2	30.55	75.85	43.4
Manipur	23	34.5	49.3	71.2	40.9	69.1	86.3	60.5	43.975	78.75	50.7
Meghalaya	29.6	17.3	29.7	75	20.4	69.1	86.3	60.5	36.425	80.65	40.45
Mizoram	48.9	57.6	64.6	89.8	39.1	79.7	97.2	61.4	62.7	93.5	50.25
Nagaland	6	12.1	12.2	32	6.6	32.8	56.3	24.3	15.775	44.15	15.45
Sikkim	NA	31.5	49	87.6	43.1	94.7	95.3	94.4	58.4	91.45	68.75
Tripura	30.7	45.2	48.9	75.7	44.8	79.9	92.6	75.7	51.175	84.15	60.25
India	25.2	33.6	38.6	67.4	28.9	78.9	88.7	75.1	44.075	78.05	52

*Note* The residence-wise data on percentage of institutional deliveries in India and northeastern states were not available for NFHS-1 and NFHS-2

Tripura are seen to have better percentages, both as a whole and for urban–rural areas. Further, for none of the northeastern states and for India, the percentages of mothers receiving ante-natal care are seen to increase steadily over NFHS-1 to NFHS-4. For Nagaland and Meghalaya, the percentage is observed to decrease, both as a whole and for rural–urban area from NFHS-3 to NFHS-4.

The following figure shows the residence-wise percentage of children who received postpartum checkup within two days/months of birth in India and northeastern states during NFHS-2 to NFHS-4.

It is clear from Fig. 13.2 that the percentage of children receiving postpartum checkup within two days/months of birth is the highest for India as well as for all the northeastern states as a whole and also residence-wise, for NFHS-3. All these percentages are seen to drop in NFHS-4. As far as the comparison of the states is concerned, Manipur during NFHS-2, Sikkim during NFHS-3 and Assam during NFHS-4 are seen to register highest percentages among the states, residence-wise as well as in totality.

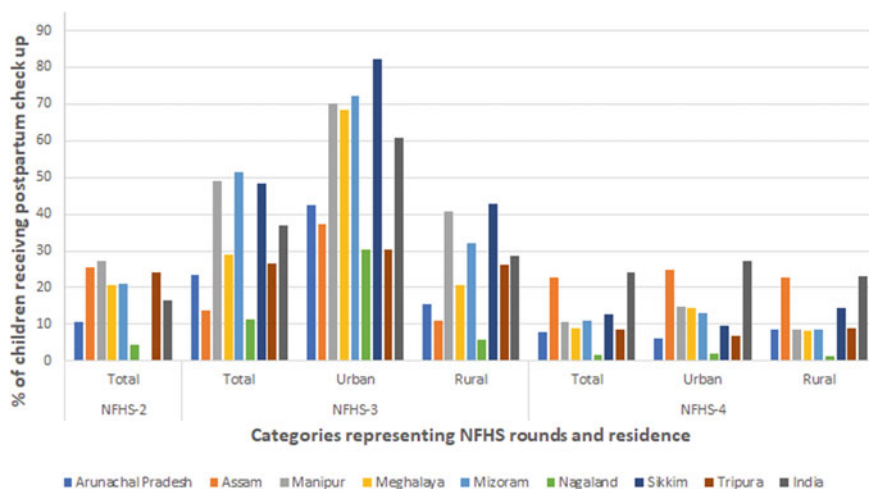
### 13.3.4 Nutritional Status of Children

Nutritional status is a major determinant of the health and well-being of children. Inadequate or unbalanced diets and chronic illness are associated with poor nutrition among children. Inadequate nutrition also proves to be a hindrance in a child's physical and mental development. Nutritional status of children has three main indicators—underweight, stunting and wasting. In the present study, only the status of underweight children in India has been studied (Key findings n.d.). The following

**Table 13.3** Residence-wise percentage of mothers who received ante-natal care in India and northeastern states during NFHS-1 to NFHS-4

State/place	NFHS-1		NFHS-2		NFHS-3		NFHS-4			Average			
	Total	Total	Total	Total	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
Arunachal Pradesh	48.9	61.6	36.4	56.6	28.3	37.3	23.5	43.4	46.95	25.9	46.95	46.95	25.9
Assam	49.3	61.1	36.3	68.9	32.3	60.3	44.8	48.275	64.6	38.55	48.275	64.6	38.55
Manipur	63.4	80.2	70.1	85.9	64	81.7	62	70.675	83.8	63	70.675	83.8	63
Meghalaya	51.8	53.6	53.4	81	47.8	71.3	46.3	52.2	76.15	47.05	52.2	76.15	47.05
Mizoram	88.9	91.8	57.8	41.3	75.1	77.5	42.9	74.975	59.4	59	74.975	59.4	59
Nagaland	39.3	60.4	31.6	57.9	23.9	28.6	9.3	36.575	43.25	16.6	36.575	43.25	16.6
Sikkim	NA	70.3	69.4	96.1	65	75.6	74.2	71.46667	85.85	69.6	71.46667	85.85	69.6
Tripura	64.9	70.8	58.7	72.5	56.5	77	59.9	64.675	74.75	58.2	64.675	74.75	58.2
India	63.2	43.8	50.7	73.8	42.8	66.4	44.8	52.225	70.1	43.8	52.225	70.1	43.8

*Note* The residence-wise data on percentage of mothers who received ante-natal care in India and northeastern states were not available for NFHS-1 and NFHS-2. Further, for NFHS-3 and NFHS-4, the % of mothers who received had at least 3 and 4 ante-natal care visits for the last birth, respectively, was considered



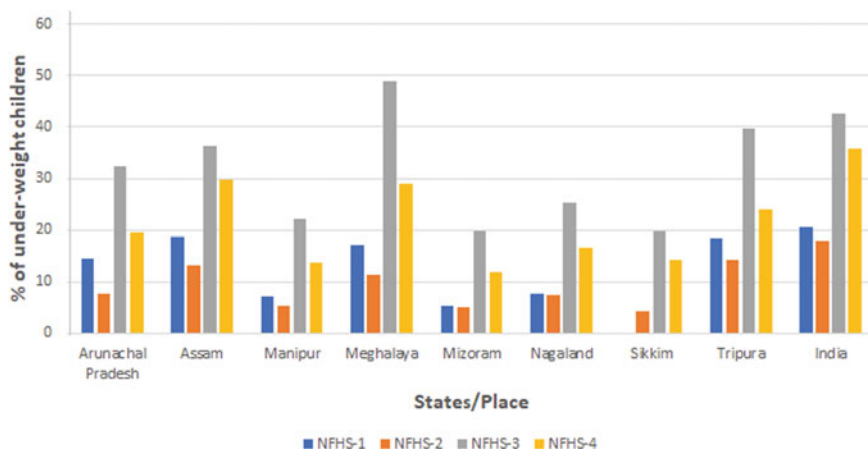
**Fig. 13.2** Residence-wise percentage of children who received postpartum checkup within two days/months of birth in India and northeastern states during NFHS-2 to NFHS-4. *Note* For NFHS-1, data on postpartum check for both states and India are not available. For NFHS-2, the % of children who received postpartum checkup within 2 months of delivery was considered, and for NFHS-3 and NFHS-4, the % of children who received postpartum checkup within 2 days of delivery was considered

figure exhibits the percentage of underweight children under 3/4/5 years of age in India and northeastern states during NFHS-1 to NFHS-4:

It is evident from Fig. 13.3 that Mizoram has the lowest % of underweight children during all the four rounds of NFHS, whereas Tripura, Meghalaya and Assam on average have almost the same % of underweight children over the four rounds of NFHS. However, none of the states have % of underweight children higher than that in India during each of the NFHS rounds. Thus, compared to the overall undernutrition scenario in India, the northeastern states are placed in a marginally better position.

### 13.3.5 Nutritional Status of Adults

The Body Mass Index (BMI) is a measure of the nutrition in adults, which is calculated by dividing the weight in kilograms by the height in squared metre (Nutrition and the prevalence of anaemia). A threshold value of  $18.5 \text{ kg/m}^2$  is used to define thinness or acute undernutrition in adults, and a BMI of  $25 \text{ kg/m}^2$  or above indicates overweight or obesity. A BMI of  $17.0\text{--}18.4 \text{ kg/m}^2$  would indicate mild thinness, and a BMI less than  $17.0 \text{ kg/m}^2$  refers to moderately/severely thinness. A BMI of over  $30.0 \text{ kg/m}^2$  simply means the 'obesity' condition. If a breast-feeding mother in particular is not properly nourished, her children will in turn not receive proper nutrition from her. Also, the extreme conditions of malnourishment or obesity in adults pose several



**Fig. 13.3** Percentage of underweight children under 3/4/5 years of age in India and its northeastern states during NFHS-1 to NFHS-4. *Note* For NFHS-1, the % of children under 3 years of age was considered. For NFHS-2, the % of children under 4 years of age was considered. For NFHS-3 and NFHS-4, the % of children under 5 years of age was considered

health problems such as heart attack, infertility, difficulty in conception. Table 13.4 shows the percentage of adults (15–49 years of age) whose BMI is below 18.5 kg/m<sup>2</sup>.

It can be seen from Table 13.4 that among the northeastern states, Tripura and Assam have the highest (greater than even the all India average) and Sikkim has the lowest percentage of both under-nourished male and female adults on average. It can

**Table 13.4** Percentage of adults (15–49 years of age) whose BMI is below 18.5 kg/m<sup>2</sup> in India and its northeastern states during NFHS-2 to NFHS-4

State/place	NFHS-2	NFHS-3		NFHS-4		Average	
	Total	Female	Male	Female	Male	Female	Male
Arunachal Pradesh	10.7	16.4	15.2	8.5	8.3	12.45	11.75
Assam	27.1	36.5	35.6	25.7	20.7	31.1	28.15
Manipur	18.8	14.8	16.3	8.8	11.1	11.8	13.7
Meghalaya	25.8	14.6	14.1	12.1	11.6	13.35	12.85
Mizoram	22.6	14.4	9.2	8.4	7.3	11.4	8.25
Nagaland	18.4	17.4	14.2	12.3	11.5	14.85	12.85
Sikkim	11.2	11.2	12.2	6.4	2.4	8.8	7.3
Tripura	35.2	36.9	41.7	18.9	15.7	27.9	28.7
India	35.8	35.5	34.2	22.9	20.2	29.2	27.2

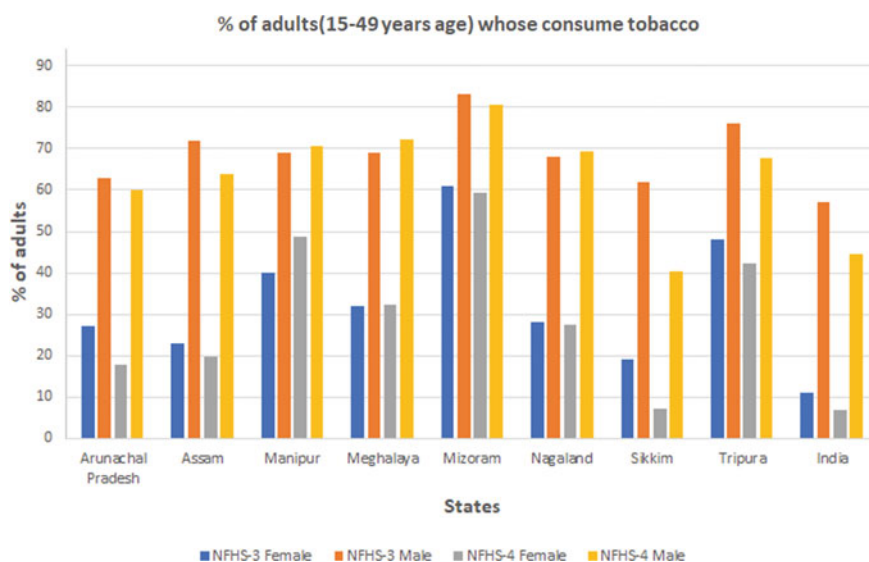
*Note* For NFHS-1, the data on % of adults (15–49 years of age) whose BMI is below normal were not available. For NFHS-2, the data on % of only ever married women (15–49 years of age) whose BMI is below normal were considered. For NFHS-3 and NFHS-4, the data on % of both men and women (15–49 years of age) whose BMI is below normal were considered

also be observed that the percentage of under-nourished male and female adults has decreased from NFHS-3 to NFHS-4.

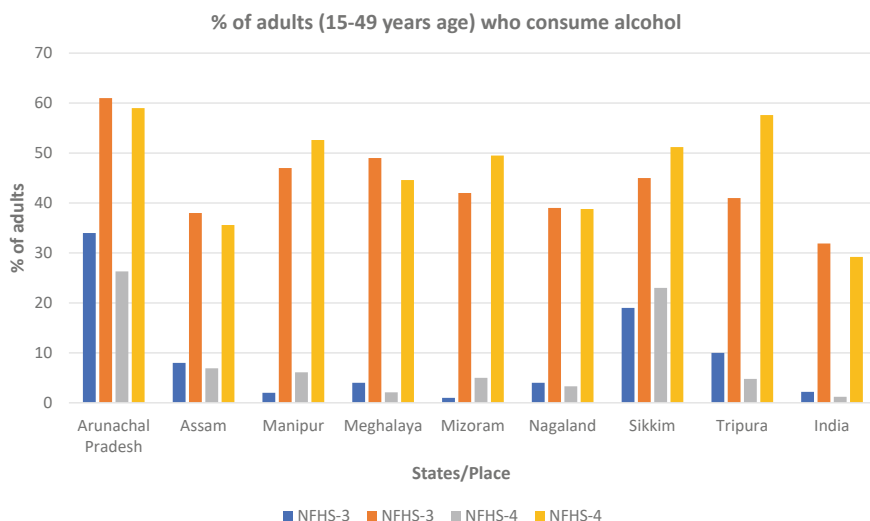
### 13.3.6 Tobacco and Alcohol Consumption

Tobacco and alcohol usage is associated with many diseases, including lung and heart diseases, diabetes and arthritis (India Report 2017). In addition, women who use tobacco experience difficulty in conception and are at an increased risk of infertility, pregnancy complications, premature births, low birth-weight infants, still births, miscarriages and infant deaths. These two factors are also found fourth and fifth most important contributors to the global burden of diseases (Bonu et al. 2004). Figure 13.4 shows the gender-wise percentage of adults in the age group 15–49 years who consume tobacco.

It is evident from Fig. 13.4 that the % of male and female who consume tobacco is the highest in the state of Mizoram and the least for Sikkim, during both NFHS-3 and NFHS-4. Except for Manipur, tobacco consumption among females is seen to decrease from NFHS-3 to NFHS-4. As far as tobacco consumption among males is concerned, the % of consumers is seen to increase marginally in the states of Manipur, Meghalaya and Nagaland from NFHS-3 to NFHS-4, whereas for the other states as



**Fig. 13.4** Gender-wise % of adults in the age group 15–49 years who consume tobacco in India and its northeastern states during NFHS-3 and NFHS-4. *Note* For NFHS-1 and NFHS-2, the data on % of adults (15–49 years of age) who consume tobacco were not available



**Fig. 13.5** Gender-wise % of adults in the age group 15–49 years of age who consume alcohol in India and its northeastern states during NFHS-3 and NFHS-4. *Note* For NFHS-1 and NFHS-2, the data on % of adults (15–49 years of age) who consume alcohol were not available

well as for India as a whole, it is seen to decrease. Fig. 13.5 displays the gender-wise percentage of adults in the age group 15–49 years who consume alcohol:

It can be observed from Fig. 13.5 that the highest percentage of adults who consume alcohol, both among males and females, hails from the state of Arunachal Pradesh. The all India average percentage of alcohol consumers is observed to be less than that of each of the northeastern states of India, both during NFHS-3 and NFHS-4. The average percentage of alcohol consumers among males is seen to be the least for Assam, and for females, it is the least for Mizoram. Table 13.5 shows the gender-wise percentage change of the percentage of adults in the age group 15–49 years who consume alcohol:

It is clear from Table 13.5 that for Arunachal Pradesh, Assam, Meghalaya and Nagaland, the % of alcohol consumers among both males and females has dropped from NFHS-3 to NFHS-4, whereas for Tripura, the % of consumers among males has dropped, but the % of females has increased by 40%.

### 13.3.7 Infant Mortality Rate

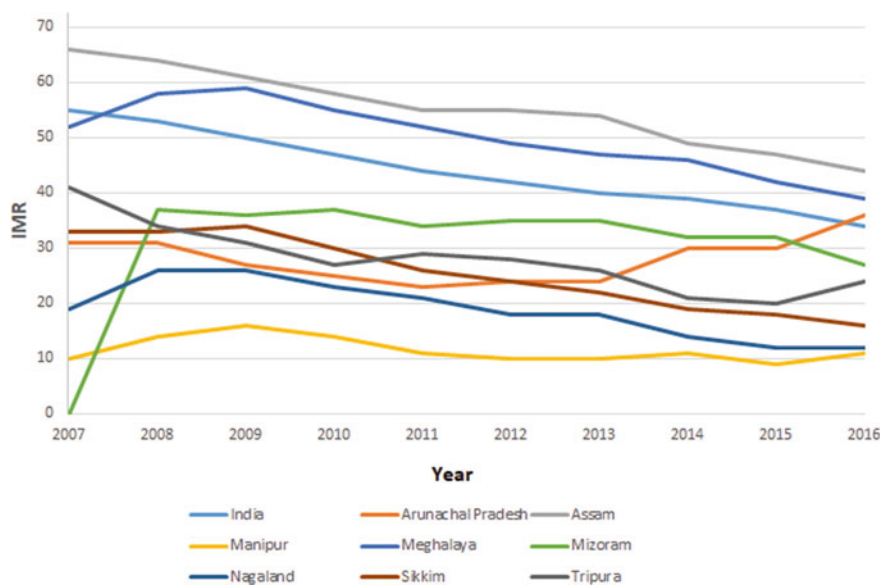
Infant Mortality Rate (IMR) is defined as the probability of death of children under one year of age per 1000 live births. IMR is widely used as a measure of population health and quality of health care, and a nation is believed to do well in terms of its

**Table 13.5** Gender-wise percentage change of the % of adults in the age group 15–49 years who consume alcohol

States/place	% change from NFHS-3 to NFHS-4 for males	% change from NFHS-3 to NFHS-4 for females
Arunachal Pradesh	–22.6471	–3.27869
Assam	–13.75	–6.31579
Manipur	205	11.91489
Meghalaya	–47.5	–8.97959
Mizoram	400	17.85714
Nagaland	–17.5	–0.51282
Sikkim	21.05263	13.77778
Tripura	–52	40.4878
India	–45.4545	–8.46395

health if it has a fairly low IMR. Figure 13.6 shows the Infant Mortality Rate of India and its northeastern states during a period of 10 years, ranging from 2007 to 2016:

Figure 13.6 shows that out of the eight northeastern states of India, Assam is the worst-performing state and Manipur is the best-performing state over the period 2006–2017. The IMR of India as a whole has decreased gradually from 2007 to 2016, and except for Meghalaya and Assam, the IMR of the other northeastern states per year is lesser than that of India (barring 2007 in which Meghalaya had an IMR lesser

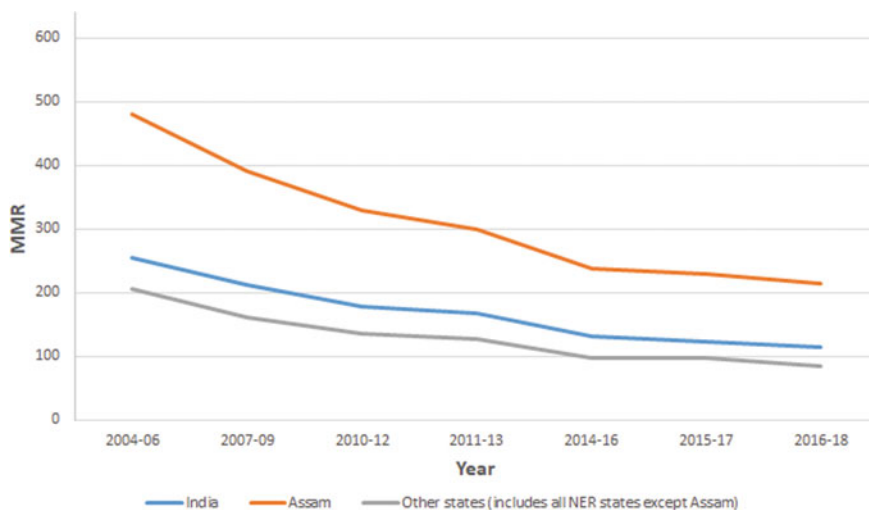
**Fig. 13.6** Infant mortality rate of India and its northeastern states during the period 2007–2016

than that of India). It can further be seen that following a steep increase in IMR from 2007 to 2008, the IMR has more or less remained uniform from 2008 till 2016. For Nagaland and Sikkim, the IMR is seen to decrease after an initial increase in the IMR. For Tripura, there has been a decrease in IMR from 2007 to 2016, whereas for Arunachal Pradesh, after a decrease till 2013, the IMR is seen to increase.

### 13.3.8 Maternal Mortality Ratio

The Maternal Mortality Ratio (MMR) of a given place is defined as the number of maternal deaths occurring during a given time period per 100,000 live births during the same time period in that place (Series Metadata, n.d.). Maternal mortality is widely considered as a general indicator of the overall health of a population, of the status of women in society and of the functioning of the health system. Higher mortality ratio thus indicates lack of proper health facilities for women and also, gender inequalities to some extent. The drawback of this measure is that it does not throw any light on the cause of maternal deaths or interventions required for curbing maternal deaths. Figure 13.7 shows the Maternal Mortality Ratio of India, Assam and other states (including all NER states except Assam) for the period 2004–06 to 2016–18.

Figure 13.7 throws light into the fact that as compared to India and all the other Indian states, the MMR of Assam is the highest each year from 2004–06 to 2016–18, but the MMR is seen to decrease over these years, which is a very positive development. Also, as compared to India, the average of the MMR for all the other



**Fig. 13.7** Maternal Mortality Ratio of India, Assam and other states (including all NER states except Assam) for the period 2004–06 to 2016–18



states (except Assam) is seen to be lower for each year, and both have experienced a decreasing trend in MMR.

### 13.3.9 Under-Five Mortality Rate

Under-five Mortality Rate (U5MR) or Child Mortality Rate is defined as the probability of dying before age 5 years per 1000 newborns. U5MR is a leading indicator of the level of child health and overall development in countries. It reflects the impacts of complex health determinants such as high-risk fertility behaviour, extent of poverty and gender inequality, health infrastructure, effectiveness of delivery services (Awofeso and Rammohan 2012). Figure 13.8 shows the residence-wise Under-five Mortality Rate for India and Assam for the years 2011–2018:

It is evident from Fig. 13.8 that for India, the Under-five Mortality Rate is the highest in the rural areas as compared to only the urban areas in each year from 2011 to 2018 (except for the year 2015 where the U5MR for urban India was more than that of rural India). Also, the U5MR for rural Assam is seen to be higher than that of urban Assam for each year from 2011 to 2018. Furthermore, the U5MR for rural Assam, urban Assam as well as Assam as a whole is higher than that of rural India, urban India and India. The trend in the U5MR is seen to be decreasing over the period 2011–2018 (except for a peak in 2015 for urban India and a trough in 2015 for India).

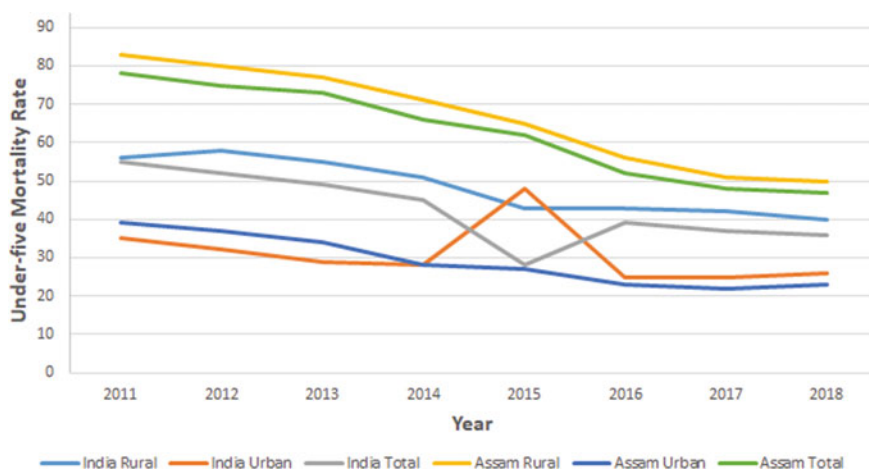


Fig. 13.8 Residence-wise Under-five Mortality Rate for India and Assam for the years 2011–2018

### 13.3.10 Neo-Natal Mortality Rate

The Neo-natal Mortality Rate (NMR) of a place is defined as the number of neo-natal deaths during a given time period per 1000 live births during that time period in the same place. NMR is a significant indicator of newborn care and reflects the quality of postpartum care and newborn healthcare assistance. It contributes the most to the IMR and U5MR. With about 0.75 million deaths of neonates in India annually, it records the highest NMR among all the countries of the world (Sankar et al. 2016). Figure 13.9 shows the residence-wise Neo-natal Mortality Rate for India and Assam for the years 2011–2018:

It can be seen from Fig. 13.9 that for both India and Assam, the NMR is the highest in the rural area as compared to the urban area for each year from 2011 to 2018. As compared to India, the corresponding NNMR of Assam (both for urban and rural areas) is less for every year during the period 2011–2018. Except for the NMR trend of urban Assam, which shows an increase from 2013 till 2015 and exhibits a nearly constant trend thereafter, all the other trends are seen to be decreasing over the considered time period.

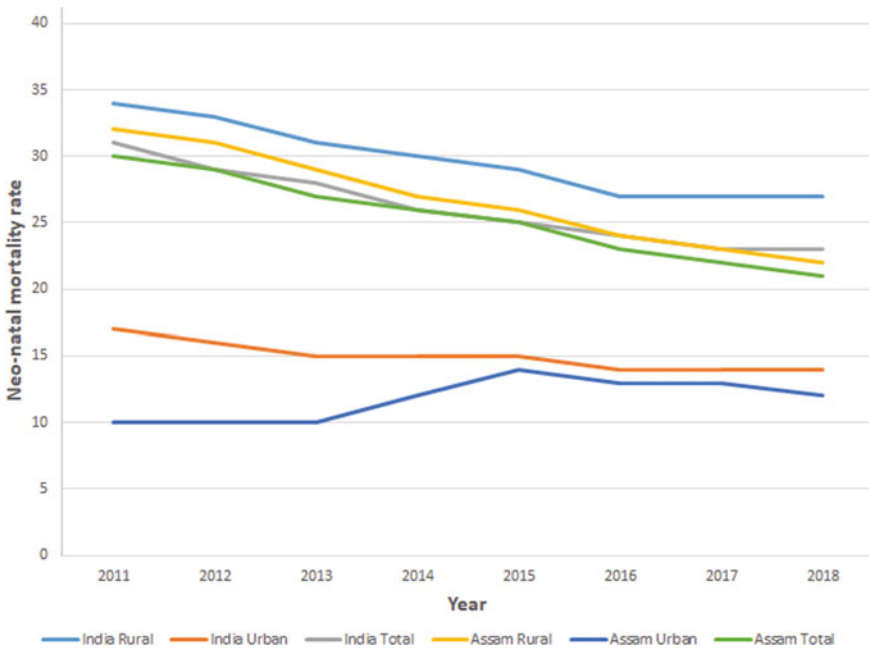


Fig. 13.9 Residence-wise Neo-natal Mortality Rate for India and Assam for the years 2011–2018

## 13.4 Summary and Conclusions

India is one of those developing countries of the world which has taken a lead in accomplishment of the SDGs by construction of the SDG India Index, an initiative taken up by NITI Aayog, Government of India. The northeastern states of India in particular are seen to underperform in respect of the SDGs, as reflected by their SDG India Index values. A humble attempt has been made through this paper to identify how far behind the northeastern states of India are in achieving the targets set under Goal 3 of the SDGs by the year 2030, with respect to some of the health and well-being indicators. Although it is aimed to reduce the global MMR to 70 per 100,000 live births by 2030, Assam and all other states (including NE states) recorded 215 and 85 maternal deaths per 100,000 live births in 2016–18, which is quite far behind the target. Assam registered 21 neo-natal deaths and 47 under 5 years death per 1000 live births in 2018, which is marginally behind the target of at least 12 neo-natal deaths per 1000 live births and at least 25 under-five age deaths per 1000 newborns globally by 2030. The average IMR of the northeastern states in 2016 is approximately 26 per 1000 live births, and infant deaths contribute the most to the neo-natal and under-five child deaths. A very few percentage women in the age group 15–49 years of the rural areas of the northeastern states of India use the family planning services, which has dropped from NFHS-3 to NFHS-4. The percentage of institutional deliveries in the northeastern states is far from 100%, although it has increased considerably from NFHS-1 to NFHS-4. Thus, it can be said that the northeastern states of India are yet to achieve the target of universal access to reproductive healthcare services. Most of the northeastern states (except for Mizoram and Sikkim) have less than 50% children in the age group 12–23 years receiving full immunization. Also, Arunachal Pradesh, Assam and Nagaland have less than 50% of mothers receiving ante-natal care. Furthermore, except for Manipur and Mizoram, for the remaining six northeastern states of India, less than the Indian average of 25% children are receiving postpartum checkup within two days/months of birth. These show that the Northeast Indian states are lagging far behind the target of achieving universal access to quality healthcare services and access to effective and quality vaccines. As far as the nutritional status of children in the Northeast Indian states is concerned, each of them has lesser percentage of underweight children over the four rounds of NFHS as compared to the national average of 29%. It has also been found that most of the Northeast Indian states have considerably low percentage (<32%) of under-nourished male and female adults. Although the % of adults in the northeastern states who consume tobacco has decreased from NFHS-3 to NFHS-4, the male consumers in these states (except Sikkim) still remain high (>50% and greater than the all India average). Manipur and Mizoram have almost 50% female consumers of tobacco. An overall conclusion can therefore be drawn that the northeastern states of India are far from the achievement of the global target of tobacco control in all countries. The percentage of alcohol consumers in each of the northeastern states of India is found to be less than the all India average, both during NFHS-3 and NFHS-4. There is a drop in the percentage of consumers from NFHS-3

to NFHS-4, which is a step closer towards the target of achievement of prevention and control of alcohol consumption. Sikkim is, thus, seen to be the Northeast Indian state which is performing well in respect of most of the health and well-being indicators, and Nagaland is seen to fare poorly in most of them. The Northeast Indian states are yet to achieve the targets of SDGs. To control the prevention of tobacco and alcohol consumption, awareness programmes informing about their ill effects can be conducted. Government should ensure that people of the northeastern states receive a regular supply of food products at a minimal cost so that even the economically backward sections of the society can have an access to the basic food requirement and the undernutrition of adults prevalent in this part of the country can be tackled. Also, measures should be taken so as to ensure that the health services, maternity-related services in particular reach the mothers and newborns of Northeast Indian region. This will help cope with less pregnant mothers and newborns receiving ante-natal and postpartum checkup, respectively. It is believed that India with the help of sustained efforts and its far-fetched vision will be able to realize the most of the targets of Goal 3 of SDGs by the year 2030.

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