

# Improving Nutrition in Tripura

## *Insights from Examining Trends in Outcomes, Determinants and Interventions between 2006 and 2016*

### INTRODUCTION

India has made considerable progress on child nutrition outcomes in the last decade. These rates of improvement, however, have been highly variable across the states, mostly due to variability in state-level changes in the determinants of nutrition and in the coverage of health and nutrition interventions. Although all of the states operate under a similar national policy and programmatic environment, the variability in trends in nutritional outcomes points to state-specific factors. An understanding of such factors can facilitate both state-specific learning and cross-state learning, and assist in identifying strategies to help India accelerate progress in nutrition. In a series of *Policy Notes*, we examine state-specific trends in nutrition outcomes, determinants and the coverage of interventions, with the overall goal of supporting the state. This *Policy Note* focuses on Tripura.

Tripura, situated in the north-east of India, accounts for 0.3 percent of the area of the country and includes 8 districts (Government of Tripura 2017). The state is home to more than 3 million people (0.3 percent of the population of India) of which 87.8 percent is literate (Census of India 2011). Tripura has a sex ratio of 960 females per 1,000 males (Census of India 2011). The state largely depends on agriculture, which accounts for 64 percent of the total employment in the state (Government of Tripura 2017).

The purpose of this *Policy Note* is to examine the trends in undernutrition in Tripura and to document trends and geographic variability in the major determinants of nutrition and the coverage of key nutrition and health interventions. In doing this analysis, we aim to highlight the key areas of action to improve nutrition in Tripura.

### METHODS

We used summary data from the recently released National Family Health Survey-4 (NFHS-4 2015–16) fact sheets (International Institute for Population Sciences 2017) and data from the NFHS-3 from 2005–06 to compare trends in outcomes, determinants and interventions over a decade (International Institute for Population Sciences 2008). We also used information from fact sheets of the Rapid Survey on Children (RSoc 2013–14) (Ministry of Women and Child Development 2015) for indicators that are currently not available in NFHS-4 fact sheets. We used summary data reported in NFHS-4 district-level fact sheets to examine inter-district variability. This policy note maintains the older demarcation of 4 districts since the National Family Health Survey has sampled based on the Census 2011 data.

For outcome indicators, we examined progress on a set of global nutrition targets for maternal, infant and young child nutrition (WHO 2014). These include stunting, wasting, low birth weight,

exclusive breastfeeding, and anemia status among women of reproductive age.

We also examined the levels and changes in several immediate, underlying and basic determinants of nutrition (Black et al. 2013). For intervention coverage, we chose to examine a set of nutrition-specific interventions across the lifecycle for which data are currently available. These include interventions affecting pregnant women, newborn babies, infants, and children.

## FINDINGS

### Trends in nutrition outcomes and variability in outcomes by district

Overall, there have been improvements in nutrition outcomes in Tripura between 2006 and 2016. Stunting prevalence fell from 35.7 percent to 24.3 percent (Figure 1). Anemia among women of reproductive age declined from 65.1 percent to 54.5 percent. The prevalence of low birth weight decreased by 8.8 percentage points, from 27.3 percent to 18.5 percent in the last ten years. The prevalence of exclusive breastfeeding nearly doubled from 36.1 percent to 70.7 percent.

Wasting declined from 24.6 percent to 16.8 percent.

Stunting among children <5 years varies highly among districts, ranging from 19.5 percent in West Tripura to 32.5 percent in Dhalai (Map 1). The prevalence of anemia among women of reproductive age is high (above 50 percent) in all four districts of Tripura (Map 2). The prevalence of wasting ranges from 14.2 percent (West Tripura) to 23.3 percent (Dhalai) (Map 3). South Tripura and Dhalai have very high wasting prevalence (>15 percent). Severe wasting ranges from 4.3 percent (North Tripura) to 12.1 percent (Dhalai) (Map 4). Exclusive breastfeeding (EBF) rates are missing for South Tripura district. Among the remaining three districts, EBF is the lowest (66.3 percent) in North Tripura and the highest (72.3 percent) in West Tripura. Dhalai performs poorly on most indicators (stunting, wasting, severe wasting and anemia among women of reproductive age).

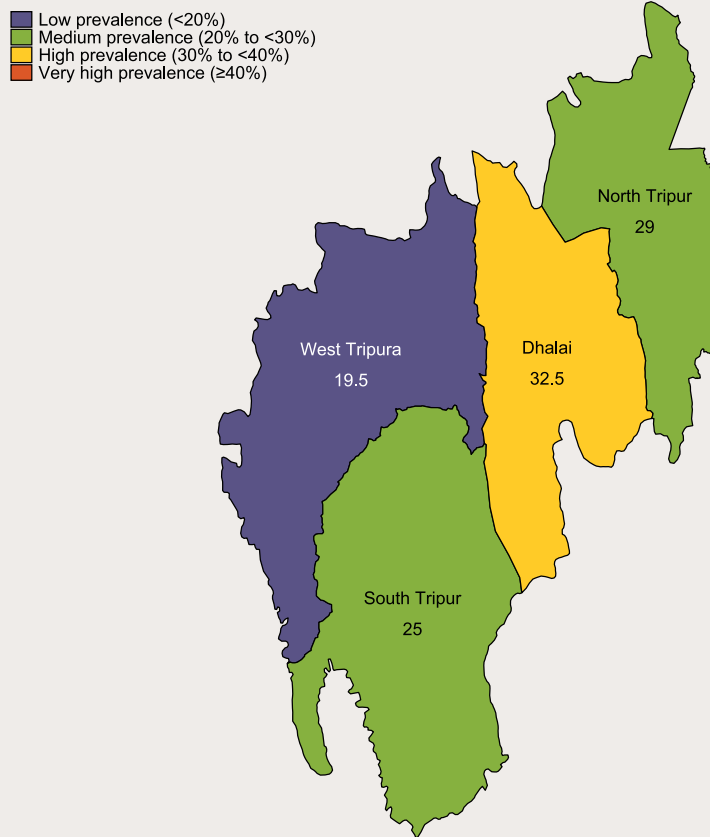
FIGURE 1 Trends in key nutrition outcomes in Tripura, 2006 to 2016



Source: NFHS-3 and NFHS-4; RSoC data used for low birth weight.

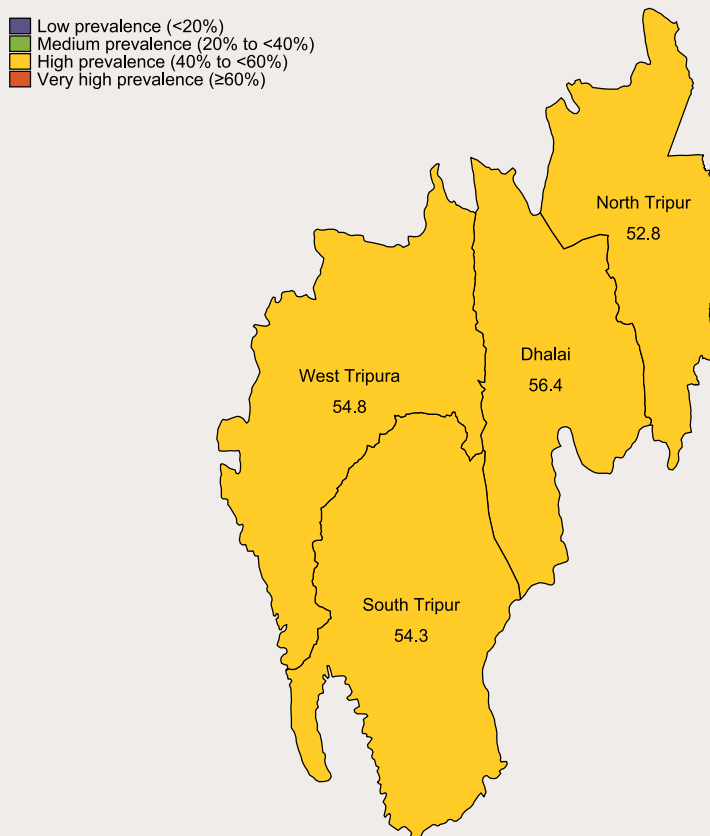
Note: A set of global nutrition targets for maternal, infant and young child nutrition were endorsed by the World Health Assembly (WHA) in 2012. The red lines represent the WHA targets to be achieved by the state, by 2025. The baseline reference year for these targets is 2012. The state baseline estimates are based on NFHS-4 (2016) as there is no survey data for 2012. Child overweight data is not available. Refer to endnotes for indicator definitions.

MAP 1 Stunting (among children &lt;5 years) in Tripura in 2016, by district



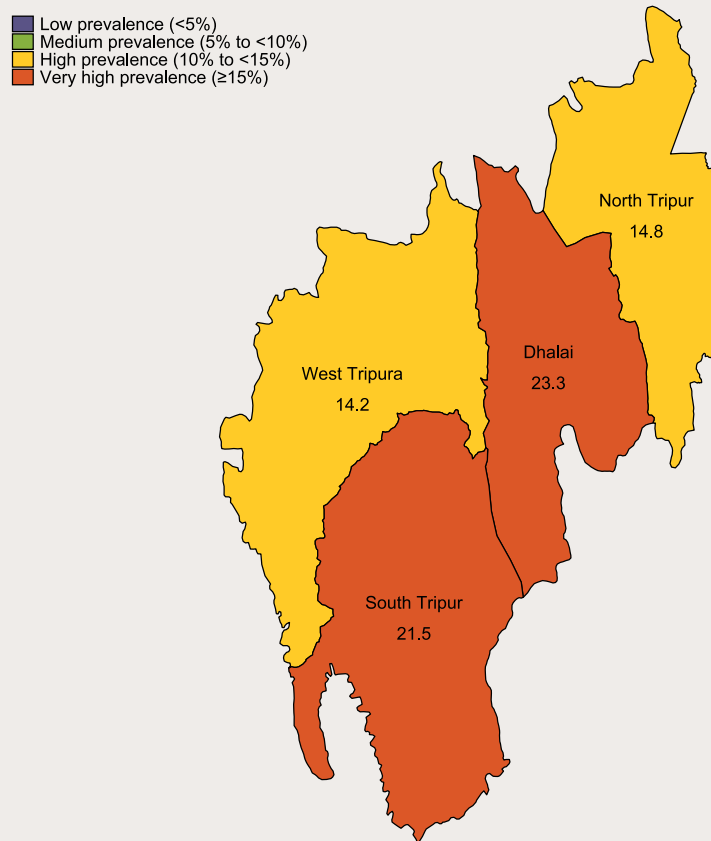
Source: NFHS-4.

MAP 2 Anemia (among women of reproductive age) in Tripura in 2016, by district



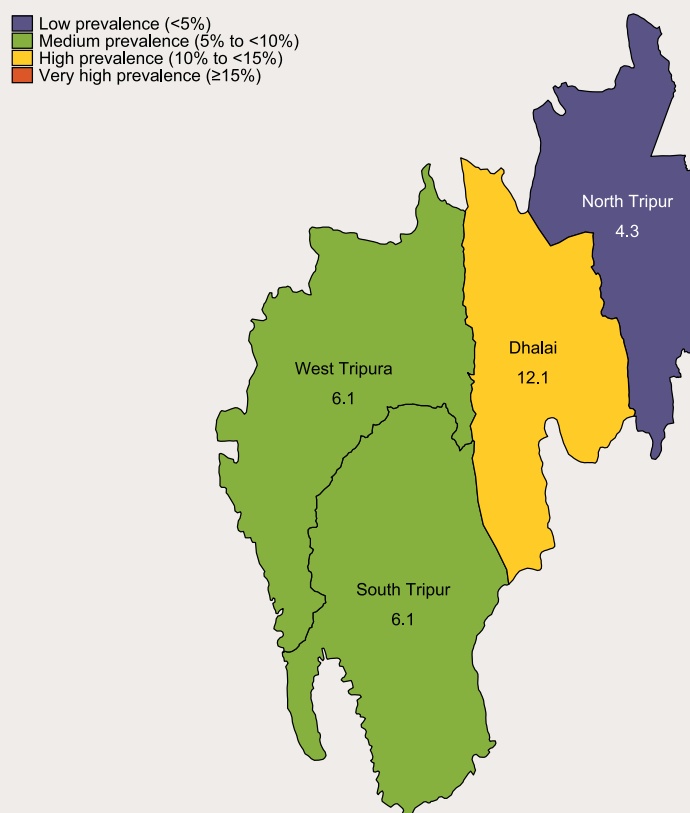
Source: NFHS-4.

MAP 3 Wasting (among children &lt;5 years) in Tripura in 2016, by district



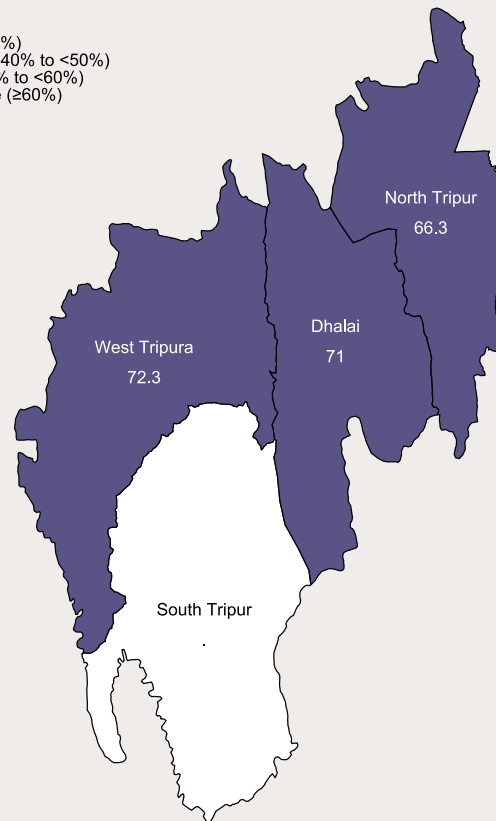
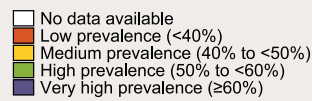
Source: NFHS-4.

MAP 4 Severe wasting (among children &lt;5 years) in Tripura in 2016, by district



Source: NFHS-4.

## MAP 5 Exclusive breastfeeding in Tripura in 2016, by district



Source: NFHS-4.

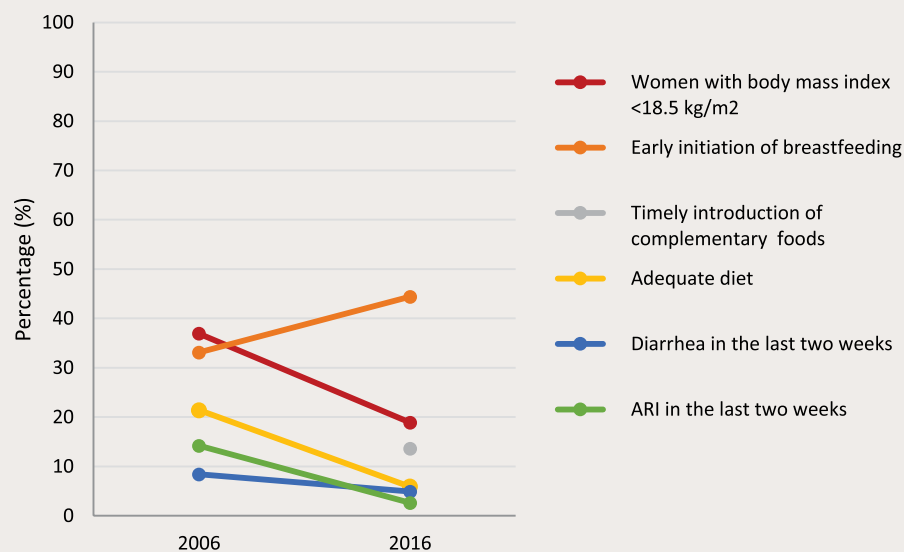
### Changes in the determinants of nutrition

Improving nutrition for women and children requires that investments be made in changing the determinants of poor nutrition, using a variety of policy instruments and other efforts. Here, we examine changes in the immediate determinants and of nutrition-specific interventions to address those determinants. We also describe changes in the underlying determinants of nutrition. We do not examine coverage data on programs to improve the underlying determinants in this Note because data on those are not available at this time.

Changes in **immediate determinants** of nutrition in Tripura are described in Figure 2. The proportion of women with low body mass index (BMI <18.5 kg/m<sup>2</sup>) decreased from 36.9 percent in 2006 to 18.9 percent in 2016. Early initiation of breastfeeding improved from 33.1 percent to 44.4 percent, but over half of children are still not breastfed within an hour of birth. Child morbidity reduced in the last ten years. from 8.4 percent to 4.9 percent for diarrhea and from 14.2 percent to 2.6 percent for Acute Respiratory Infection (ARI).

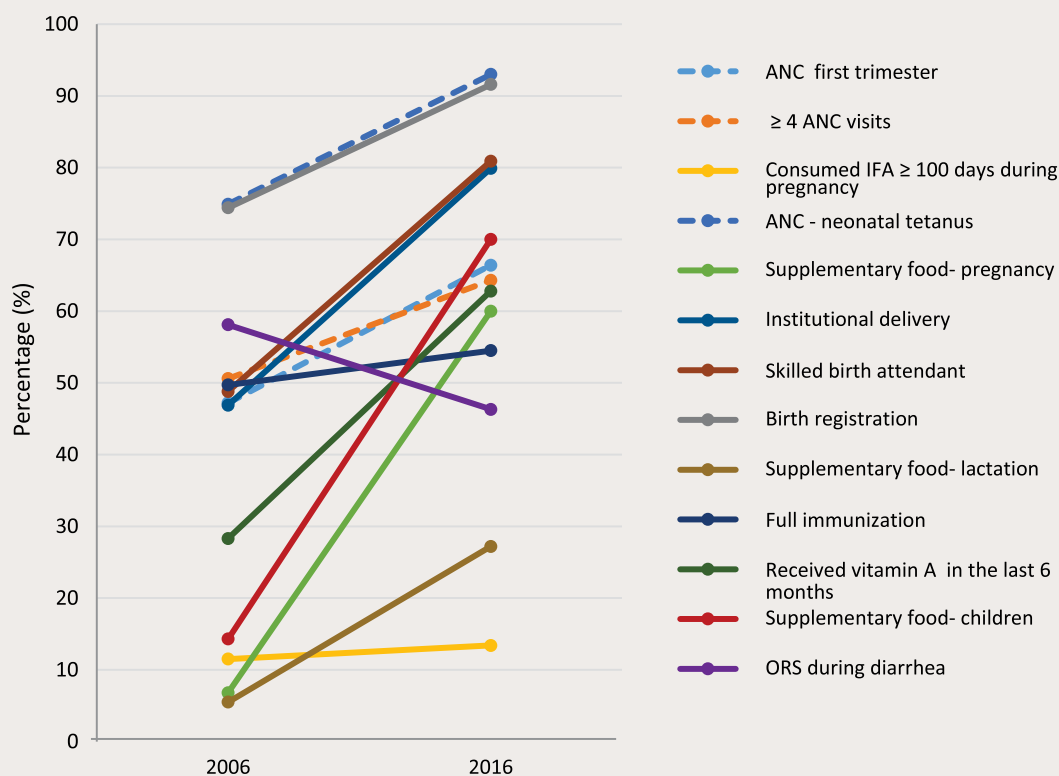
Complementary feeding is still far from adequate in Tripura, as it is for India. In 2016, only 13.6 percent of children (between 6 and 8 months of age) received timely introduction of complementary foods and only 5.9 percent of children (between 6 and 23 months of age) received an adequate diet.

The coverage of all **nutrition-specific interventions** in Tripura improved during the last decade (Figure 3). During pregnancy, the proportion of women who received antenatal care (ANC) during the first trimester improved by 19.2 percentage points, reaching 66.4 percent in 2016. The proportion of women who received at least 4 ANC visits increased from 50.6 percent to 64.3 percent. Iron and folic acid (IFA) consumption during pregnancy improved only marginally from 11.5 percent in 2006 to 13.4 percent in 2016. Interventions related to delivery, such as births assisted by health professionals and institutional deliveries, improved substantially by 32 to 33 percentage points. Birth registered also saw an increase from 74.4 percent to 91.6 percent.

**FIGURE 2** Changes in immediate determinants of nutrition in Tripura, 2006 to 2016


**Source:** NFHS-3 and NFHS-4.

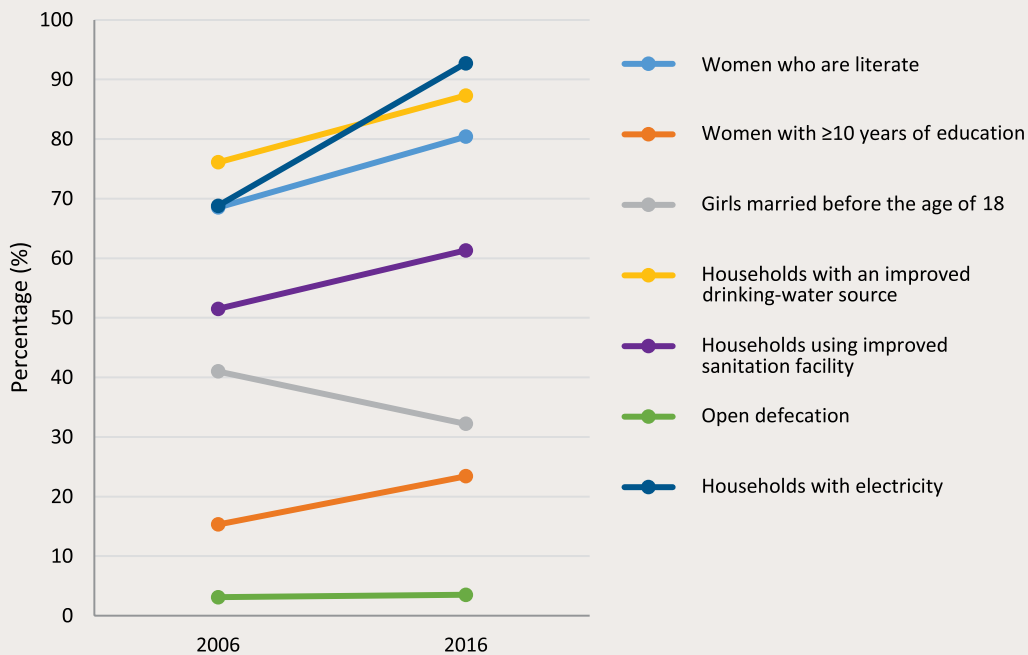
**Note:** ARI = Acute respiratory infection; Refer to endnotes for indicator definitions.

**FIGURE 3** Changes in coverage of nutrition-specific interventions along the continuum of care in Tripura, 2006 to 2016


**Source:** NFHS-3 and NFHS-4; RSoC data used for food supplementation.

**Note:** ANC: Antenatal care; IFA= Iron and folic acid; ORS = Oral rehydration salts; Refer to endnotes for indicator definitions.

FIGURE 4 Changes in underlying determinants of nutrition in Tripura, 2006 to 2016



Source: NFHS-3 and NFHS-4; RSoC data used for open defecation indicator.

Note: Refer to endnotes for indicator definitions.

Between 2006 and 2016, coverage of food supplements for pregnant women increased ten fold (from 6.8 percent to 60 percent), while for lactating women it increased five fold (from 5.5 percent to 27.2 percent). Similar improvement in food supplementation was observed for children (from 14.3 percent to 70 percent). Nutrition interventions focused on children have improved in the last ten years as well. The proportion of children receiving vitamin A supplementation increased from 28.3 percent to 62.8 percent, and children who were fully immunized increased from 49.7 percent to 54.5 percent. Children with diarrhea who received oral rehydration salts (ORS) showed a reverse trend, decreasing from 58.1 percent to 46.3 percent.

Changes in **underlying determinants** of nutrition are presented in Figure 4. Between 2006 and 2016 there has been an increase in the proportion of women who are literate (from 68.5 percent to 80.4 percent) and the proportion of women with more than 10 years of education (from 15.3 percent to 23.4 percent). Early marriage among girls declined by 9 percentage points, from 41 percent in 2006 to 32.2 percent in 2016.

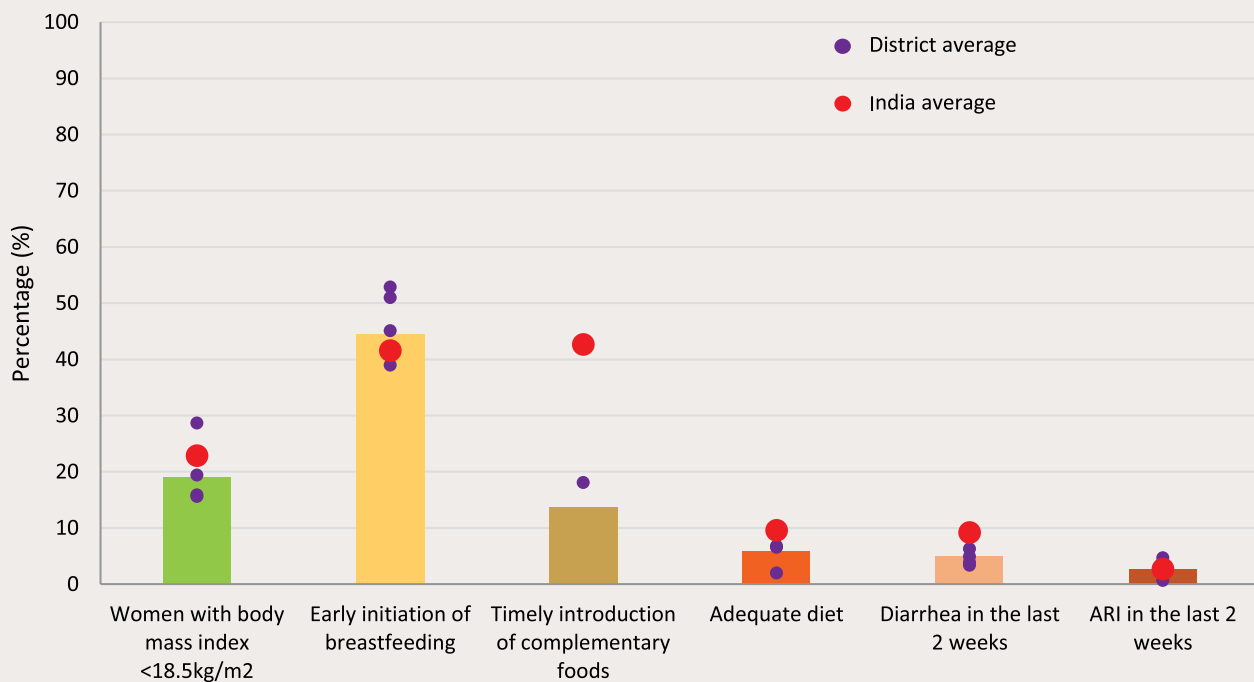
The state demonstrated substantial improvements in infrastructure where households with an improved drinking-water source increased from 76.1 percent in 2006 to 87.3 percent in 2016 and households with electricity improved from 68.8 percent to 92.7 percent. Households using improved sanitation facilities increased as well from 51.5 percent to 61.3 percent. Tripura has an open defecation rate of 3.5 percent, which is amongst the lowest in the country (RSoC 2013–14).

### Inter-district variability in selected determinants and coverage of interventions in Tripura, in 2016

The 4 districts of Tripura for which NFHS-4 data is available cover a range of socio-economic characteristics. Among these districts there is a high degree of variability for most of the immediate and underlying determinants, as well as on the coverage of interventions (Figures 5-7). There is limited inter-district variability for child morbidity, IFA consumption during pregnancy and newborn check-up, which is mostly uniformly low across districts.

On some indicators such as, early initiation of breastfeeding, ANC, births registered, children with diarrhea and women's literacy, most districts in

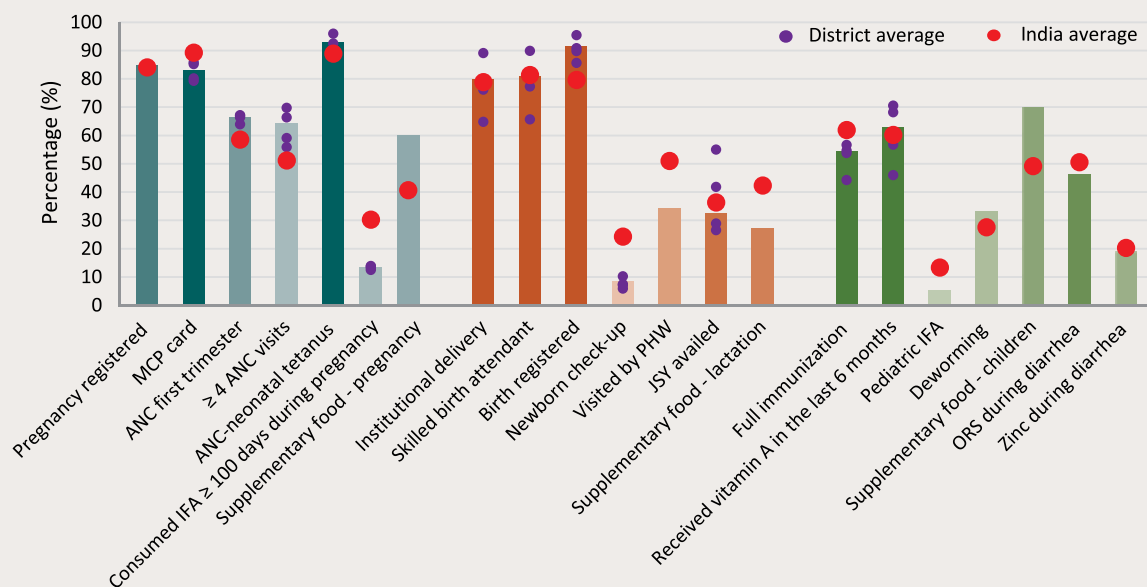
FIGURE 5 Inter-district variability in immediate determinants in Tripura, in 2016



Source: NFHS-4.

Note: Bars represent state averages; ARI= Acute respiratory infection; Refer to endnotes for indicator definitions.

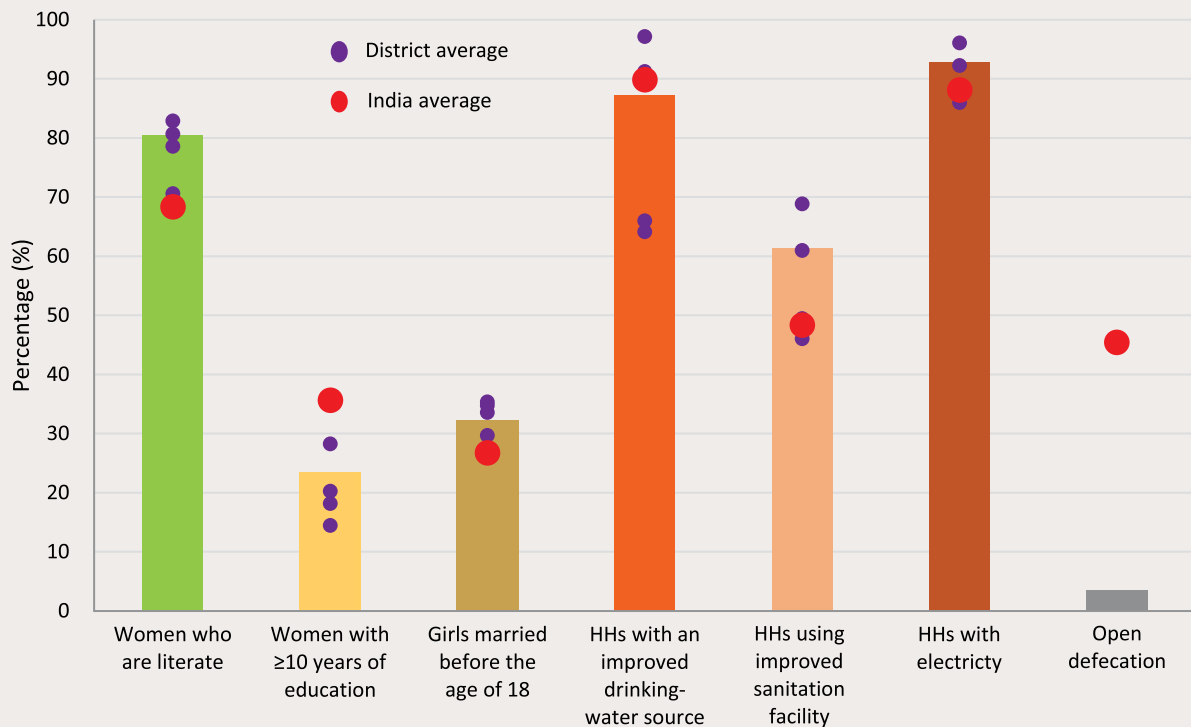
FIGURE 6 Inter-district variability in coverage of selected interventions in Tripura, in 2016



Source: NFHS-4; RSoC data was used for indicators on pregnancy registration, food supplementation during pregnancy, lactation and for children, visits by health worker, pediatric IFA and deworming for children.

Note: Bars represent state averages; As RSoC data is not representative at the district-level, district variability is unavailable for these indicators; ANC= Antenatal care; IFA= Iron and folic acid; JSY= Janani Suraksha Yojana; ORS= Oral rehydration salts; MCP= Mother and child protection; PHW= Primary health worker; Refer to endnotes for indicator definitions.

FIGURE 7 Inter-district variability in underlying determinants in Tripura, in 2016



**Source:** NFHS-4; RSoC data is used for indicator for open defecation.

**Note:** Bars represent state averages; HHs= Households; Refer to endnotes for indicator definitions.

Tripura perform better than the national average. On some other indicators including adequate diet, IFA consumption during pregnancy, women's education, and early marriage in girls, most districts in Tripura are worse off than the national average. On the rest of the indicators such as low BMI in women (<18.5 kg/m<sup>2</sup>), diarrhea and ARI prevalence among children, and households with electricity, the coverage for at least half of the districts in Tripura is nearly close to the national average.

### LOOKING FORWARD: IMPLICATIONS & RECOMMENDATIONS

In the era where India has now embraced the sustainable development goals, it is an opportune time for Tripura to set its own nutrition targets to be achieved by 2025 and to set in motion accelerated actions for improved nutrition. In the last ten years, the state has seen improvements in the coverage of most nutrition-specific interventions such as care during pregnancy and delivery, postnatal care

and care for children. These improvements seem to commensurate with the progress in all nutrition outcomes, that is, reduction in stunting, wasting, anemia among women and low birth weight.

To achieve progress in nutrition, the state should invest in improving the coverage of interventions targeting the first 1000 days of life. On nutrition-specific interventions, during pregnancy, Tripura has made considerable progress in ANC and supplementary food for pregnant women but further improvement is required. Special efforts are needed to improve the low coverage of IFA consumption (13.4 percent). Interventions related to delivery have made good progress in the last ten years but more improvement is required to achieve full coverage.

Significant investments are needed to strengthen the coverage of several postnatal interventions, particularly infant and young child feeding practices. While good progress is seen in the coverage of exclusive breastfeeding, the

coverage of adequate diet in children and timely introduction of complementary foods is still very low (6-14 percent). For other postnatal care interventions, such as ORS during diarrhea, full immunization, and vitamin A supplementation, further improvements are required as the coverage is still not optimal (46-63 percent). Tripura has made good progress in improving the coverage of supplementary food for children, but efforts need to continue to achieve full coverage. Greater efforts are required for supplementary food for mothers during lactation, which is still low (27.2 percent).

On underlying determinants, the state needs to sustain the progress it had made in female literacy, and households with electricity. However, much more effort is required in improving women's education, early marriage in girls and households using improved sanitation facility. Finally, the inter-district variability across outcomes and multiple determinants calls for district-specific strategies to bridge these gaps.

Alongside investments in improving early nutrition, it is also important for Tripura to consider the challenge

of non-communicable diseases. As Figure 8 shows, the challenge is slowly emerging in Tripura, with 16 percent of women and men being overweight or obese. High blood pressure and high blood sugar are other significant public health challenges in Tripura. Levels of high blood pressure among women and high blood sugar among both men and women in Tripura are higher than the national average. This suggests that Tripura needs to consider ways to simultaneously address undernutrition and emerging non-communicable diseases related to nutrition.

## NOTES

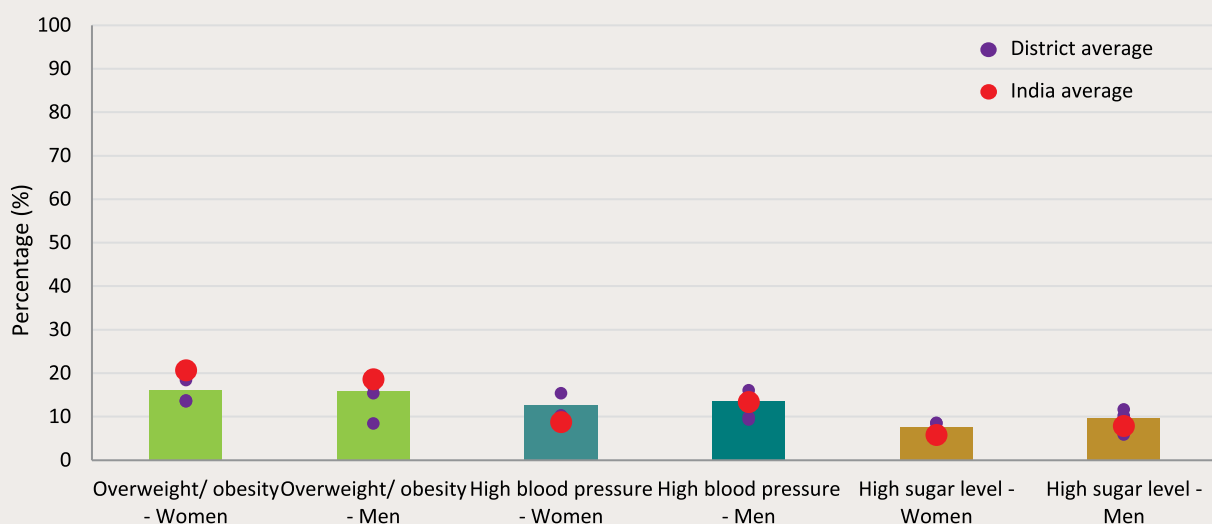
1. Tripura currently has 8 districts. Since the National Family Health Survey-4 used Census 2011 district boundaries, this Policy Note reports information for only 4 districts.
2. Indicator definitions, in alphabetical order:

**Acute respiratory infection (ARI) in the last two weeks:**

Percentage of children below 5 years of age with symptoms of ARI in 15 days preceding the survey.

**Adequate diet:** Percentage of children 6–23 months old who received 4 or more food groups and a minimum meal frequency.

FIGURE 8 Levels of non-communicable diseases in Tripura and India, in 2016



Source: NFHS-4.

Note: Bars represent state averages; Refer to endnotes for indicator definitions.

**ANC (4 or more visits):** Percentage of mothers receiving at least 4 ANCs for the last birth in the last 5 years.

**ANC (first trimester):** Percentage of mothers who received antenatal care during the first trimester of pregnancy for the last birth in the last 5 years.

**ANC-neonatal tetanus injections:** Percentage of mothers who were protected against neonatal tetanus for the last birth in the last 5 years.

**Anemia among women of reproductive age:** Percentage of women 15–49 years old who are anemic (<12.0 g/dl for non-pregnant women and <11.0 g/dl for pregnant women).

**Birth registered:** Percentage of children under age 5 years whose birth was registered.

**Consumed IFA  $\geq$  100 days during pregnancy:** Percentage of mothers who took iron and folic acid supplements for at least 100 days for the last birth in the last 5 years.

**Deworming:** Percentage of children 6–59 months old who were given deworming medication in the last 6 months.

**Diarrhea in the last two weeks:** Percentage of children below 5 years of age who had diarrhea in 15 days preceding the survey.

**Early initiation of breastfeeding:** Percentage of children who were breastfed within one hour of birth.

**Exclusive breastfeeding:** Percentage of infants 0–5 months old who were exclusively breastfed.

**Full immunization:** Percentage of children 12–23 months old who received BCG, measles, and three doses each of DPT and polio vaccine (excluding polio vaccine given at birth).

**Girls married before the age of 18 years:** Percentage of women 20–24 years old married before the age of 18 years.

**High blood pressure:** 15–49 years old men and women with systolic  $\geq$ 140 mm of Hg and/or diastolic  $\geq$ 90 mm of Hg.

**High blood sugar:** 15–49 years old men and women with blood sugar level  $>$ 140 mg/dl.

**Households with an improved drinking-water source:** Percent distribution of households with an improved drinking water source.

**Households with electricity:** Percentage of households with electricity.

**Households using improved sanitation facility:** Percent distribution of households using improved sanitation facilities.

**Institutional delivery:** Percentage of births delivered in a health facility for births in the last 5 years.

**Janani Suraksha Yojana (JSY) availed:** Percentage of women who received financial assistance under JSY for births delivered in an institution for the last birth in the last 5 years.

**Low birth weight:** Percentage of live births in the last 5 years weighing less than 2,500 grams at birth.

**Mother Child Protection (MCP) card:** Percentage of registered pregnancies for which the mother received an MCP card.

**Newborn check-up:** Percentage of children who received a health check after birth from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of birth.

**Open defecation:** Percentage of households having no sanitation facilities.

**ORS during diarrhea:** Percentage of children below 5 years of age who received ORS during diarrhea.

**Overweight/obesity:** 15–49 years old men and women with body mass index  $\geq$ 25 kg/m<sup>2</sup>.

**Pediatric IFA:** Percentage of children 6–59 months old who received iron and folic acid supplement in the last 6 months.

**Pregnancy registered:** Percentage of pregnancies registered among women who had a live birth in the 35 months preceding the survey.

**Severe wasting:** Percentage of children 0–59 months old who are  $<$ -3SD from median weight for height of the WHO Child Growth Standards.

**Skilled birth attendant:** Percentage of births assisted by a doctor/nurse/LHV/ANM/other health personnel.

**Stunting:** Percentage of children 0–59 months old who are  $<$ -2SD from median height for age of the WHO Child Growth Standards.

**Supplementary food (children):** Percentage of children 6–35 months old covered by an *Anganwadi* center (AWC) who received supplementary food provided at the AWC in the last 12 months.

**Supplementary food (lactation):** Percentage of mothers with children under the age of 6 years in areas covered by an AWC who received supplementary nutrition from the AWC during lactation.

**Supplementary food (pregnancy):** Percentage of mothers with children under the age of 6 years in areas covered by an AWC who received supplementary nutrition from the AWC during pregnancy.

**Timely introduction of complementary foods:** Percentage of infants 6–8 months old who received solid and semi-solid foods and breastmilk.

**Visited by primary health worker (PHW):** Percentage of women who were visited by a primary health worker (AWW/ASHA/ANM) at home within one week of delivery/discharge from health institution, among those who had a live birth in 35 months preceding the survey.

**Vitamin A:** Percentage of children 9–59 months old who received vitamin A supplements in the last six months.

**Wasting:** Percentage of children 0–59 months old who are  $<$ -2SD from median weight for height of the WHO Child Growth Standards.

**Women who are literate:** Percentage of women who are literate.

**Women with at least 10 years of education:** Percentage of women 15–49 years old having at least 10 years of schooling.

**Women with body mass index (BMI)  $<$ 18.5kg/m<sup>2</sup>:** Percentage of women 15–49 years old with BMI less than 18.5 kg/m<sup>2</sup>.

**Zinc during diarrhea:** Percentage of children below 5 years of age who received zinc during diarrhea.

## REFERENCES

- Black, R.E., C.G. Victora, S.P. Walker, Z.A. Bhutta, P. Christian, M.D. Onis, M. Ezzati, et al. 2013. "Maternal and Child Undernutrition and Overweight in Low-Income and Middle-Income Countries." *The Lancet* 382 (9890): 427–51.
- India Report. NFHS-3 (National Family Health Survey-3), International Institute for Population Studies. 2008. Accessed April 2017. [http://rchiips.org/nfhs/volume\\_1.shtml](http://rchiips.org/nfhs/volume_1.shtml)
- India Fact Sheet. NFHS-4 (National Family Health Survey-4), International Institute for Population Studies. 2017. Accessed April 2017. <http://rchiips.org/NFHS/pdf/NFHS4/India.pdf>
- Government of Tripura. Accessed April 2017. <http://tripura.gov.in/>
- Census of India. Accessed April 2017. <http://censusindia.gov.in/2011census/censusinfodashboard/>
- RSoc (Rapid Survey on Children), Ministry of Women and Child Development, Government of India. 2014. Accessed February 2017. <http://wcd.nic.in/acts/rapid-survey-children-rsoc-2013-14>
- Global Targets 2025. World Health Organization. 2014. Accessed April 2017. <http://www.who.int/nutrition/global-target-2025/en/>

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## ABOUT POSHAN

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN) is a multi-year initiative that aims to build evidence on effective actions for nutrition and support the use of evidence in decision-making. It is supported by the Bill & Melinda Gates Foundation and led by IFPRI in India.

## ABOUT POLICY NOTES

POSHAN Policy Notes aim to provide evidence-based guidance to support policy and program actions for nutrition in India.

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