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Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India

Policy Note

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Improving Nutrition in Sikkim

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

INTRODUCTION

India has made considerable progress in child nutrition outcomes in the last decade. These rates of improvement, however, have been highly variable across the states, mostly due to variabilities in state-level changes in the determinants of nutrition and in the coverage of health and nutrition interventions. Although all 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 its 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 Sikkim.

Sikkim is located in the north east of India, sharing borders with Nepal, China and Bhutan. Sikkim is India's least populous state, with 610,577 inhabitants, and has a population density of 86 people per square kilometer. The sex ratio of the state is 890 females per 1000 males (Census of India 2011). The state is divided into four districts, North, West, South and East Sikkim (Government of Sikkim 2017).

The purpose of this *Policy Note* is to examine the trends in undernutrition in Sikkim 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 Sikkim.

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.

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 levels and changes in several immediate, underlying and basic determinants (Black et al. 2013). For intervention coverage, we chose a set of nutrition-specific interventions across the lifecycle, including interventions affecting pregnant women, newborn babies, infants, and children.

FINDINGS

Trends in nutrition outcomes and variability in outcomes by district

The trends in nutrition and health outcomes in Sikkim between 2006 and 2016 have been mixed (Figure 1). Stunting prevalence among children

under five years declined from 38.3 percent to 29.6 percent. Anemia among women of reproductive age improved remarkably from 59.5 percent to 34.9 percent. Exclusive breastfeeding increased from 37.2 percent to 54.6 percent over the last decade. Low birth weight reduced marginally from 10.3 percent to 10 percent. However, wasting and severe wasting increased in the state, from 9.7 percent to 14.2 percent, and from 3.3 percent to 5.9 percent respectively.

There are variations in the status of these indicators across the four districts of Sikkim. Stunting among children below the age of five ranges from 24 percent in East Sikkim to 42.3 percent in West Sikkim (Map 1). East and North Sikkim have a moderate prevalence of stunting, while South and West Sikkim have high and very high prevalence respectively. Anemia levels among women of reproductive age are lowest in South Sikkim at 31.9 percent, and highest in North Sikkim at 44.3 percent (Map 2).

Wasting ranges from 11.9 percent in East Sikkim to 19.3 percent in North Sikkim (Map 3). All four districts of Sikkim are categorized as having high and very high prevalence of wasting. Map 4 shows severe wasting prevalence across the districts of Sikkim, ranging from 5.1 percent in West Sikkim to 7.9 percent in South Sikkim.

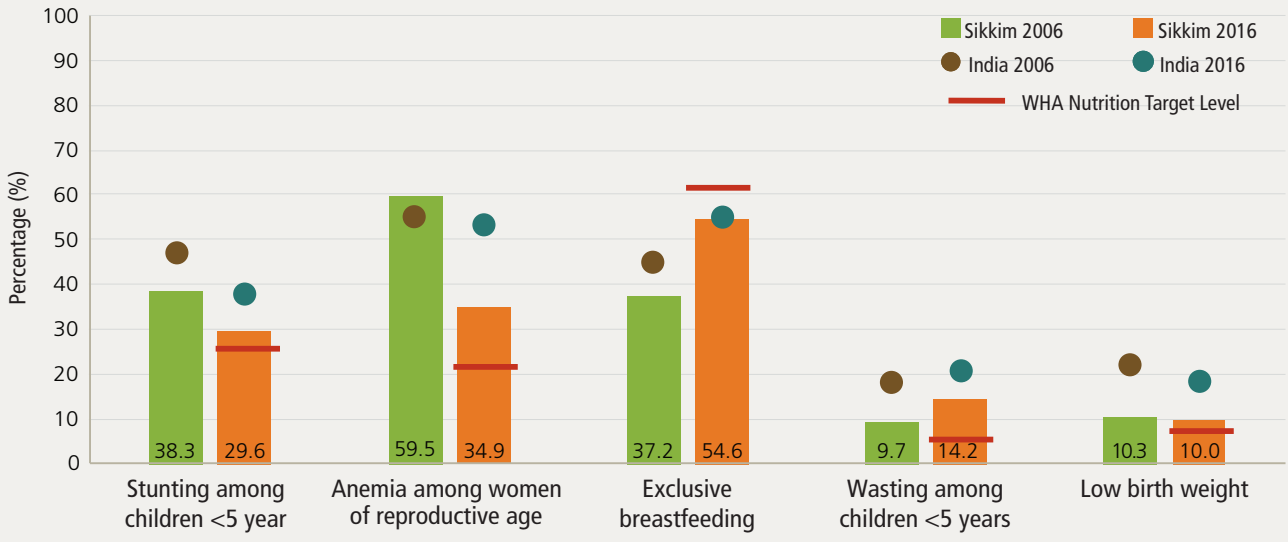
Exclusive breastfeeding data are available for only 1 district – 60.2 percent in East Sikkim (Map 5).

Changes in the determinants of nutrition

Improving nutrition for women and children requires that investments be made in the determinants of 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 are not available at this time.

Changes in the **immediate determinants of nutrition** are described in Figure 2. The proportion of women with body mass index less than 18.5 kg/m^2 decreased from 11.2 percent in 2006 to 6.4 percent in 2016. Early initiation of breastfeeding increased remarkably from 43.3 percent to 66.5 percent over the last decade, but timely introduction of complementary foods declined from 85.4 percent to 61.8 percent in the same period. In

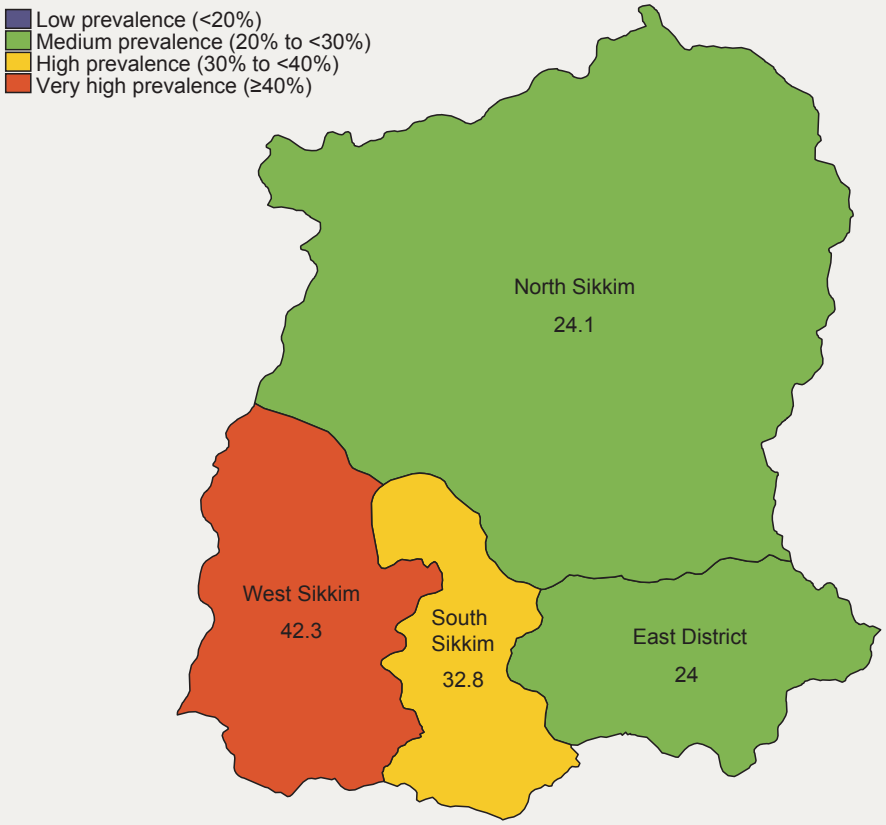
FIGURE 1 Trends in nutrition outcomes in Sikkim, 2006 to 2016



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

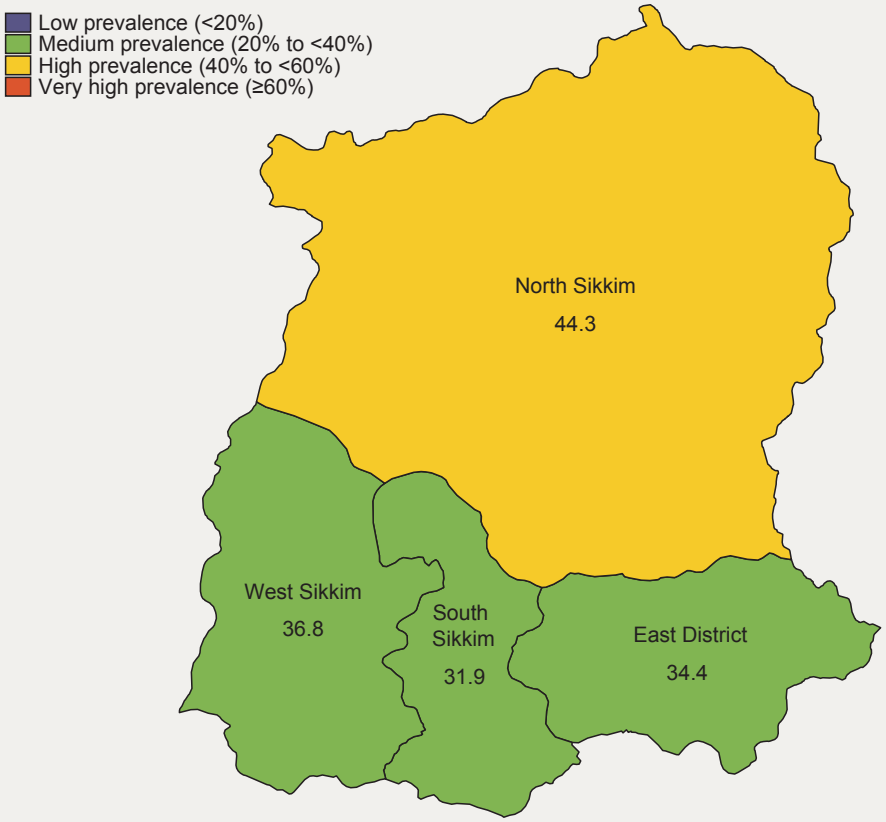
Note: A set of global nutrition targets for maternal, infant and young child nutrition were endorsed by the World Health Assembly (WHA) in 2012. The red lines represent the WHA targets to be achieved by the state, by 2025. The baseline reference year for these targets is 2012. The state baseline estimates 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 <5 years) in Sikkim in 2016, by district



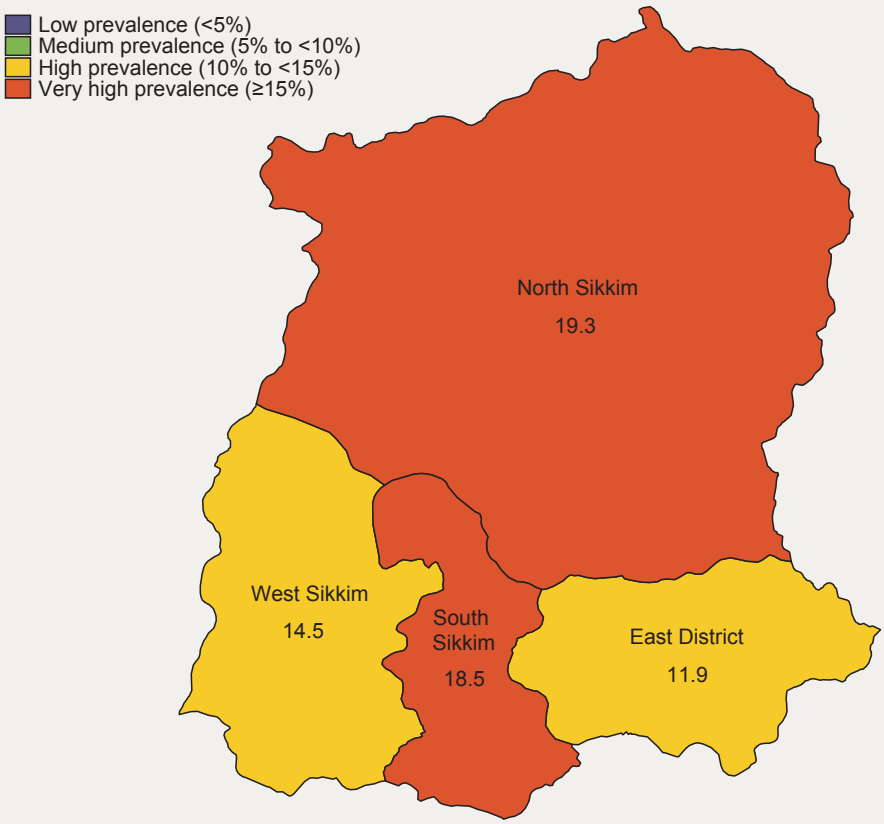
Source: NFHS-4.

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



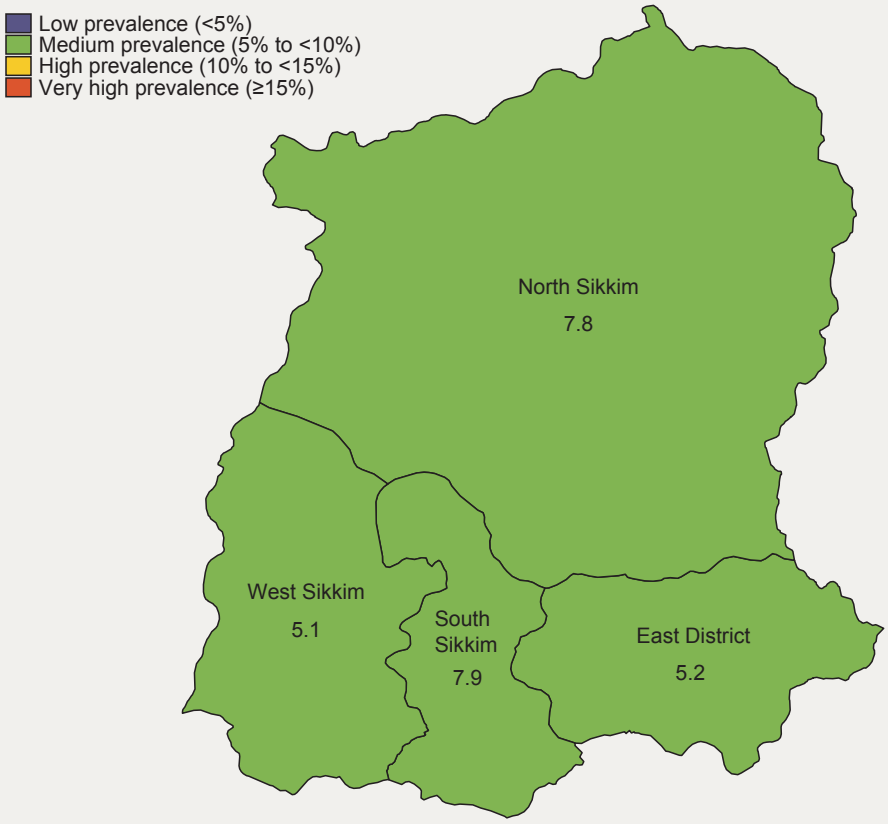
Source: NFHS-4.

MAP 3 Wasting (among children <5 years) in Sikkim in 2016, by district



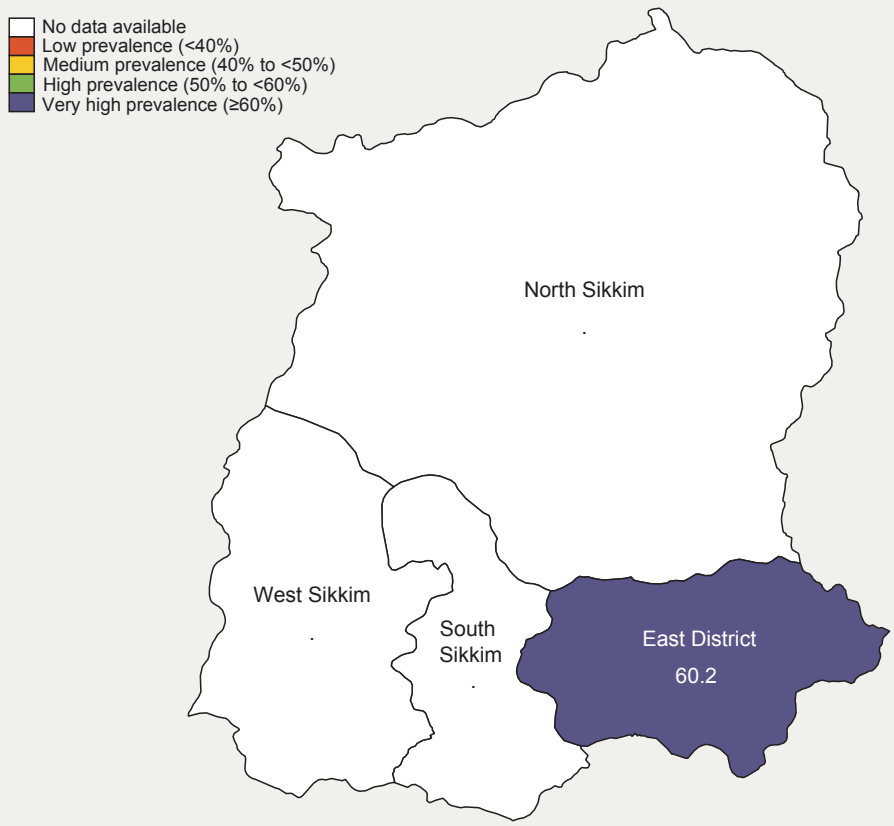
Source: NFHS-4.

MAP 4 Severe wasting (among children <5 years) in Sikkim in 2016, by district



Source: NFHS-4.

MAP 5 Exclusive breastfeeding in Sikkim in 2016, by district



Source: NFHS-4.

2016, less than a quarter of children aged 6 to 23 months received adequate diet.

Disease burden among children experienced improvements in the last decade. Diarrhea decreased from 16.5 percent in 2006 to 1.8 percent in 2016, and acute respiratory infection (ARI) declined from 5 percent to 0.3 percent over the same time period.

Changes in **nutrition-specific interventions** in Sikkim are presented in Figure 3.

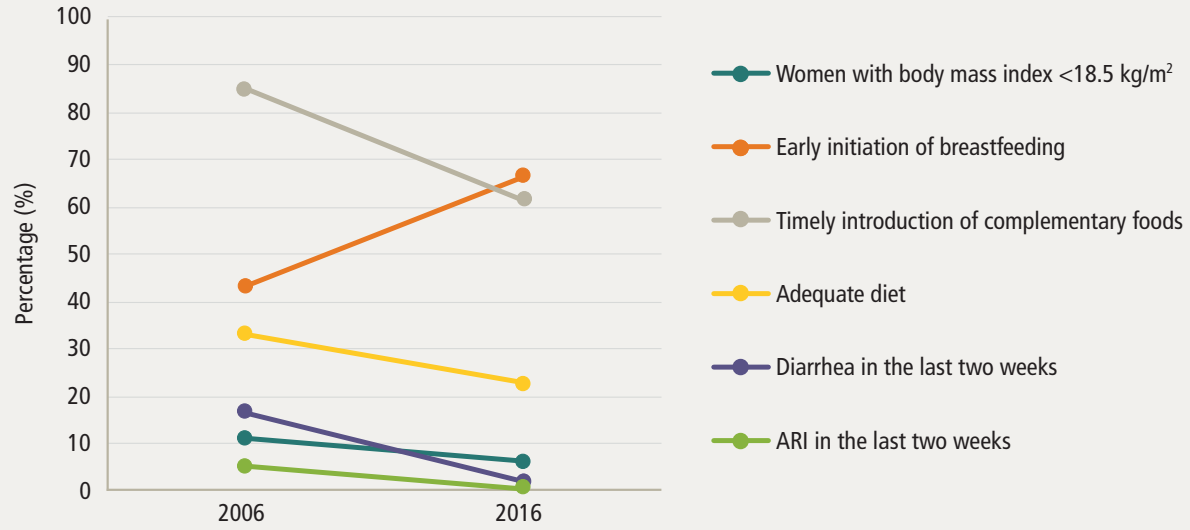
Coverage of interventions related to pregnancy has improved over the last 10 years. The proportion of women who received antenatal care (ANC) during the first trimester and at least 4 ANC visits increased by 18-19 percentage points, rising from 56-58 percent to 75-76 percent. Women reporting consumption of 100 or more iron and folic acid (IFA) supplements doubled from 26.3 percent to 52.8 percent. Mothers who were immunized against tetanus during the prenatal period also increased from 81.1 percent to 97.2 percent.

Sikkim has experienced improvements in child delivery over the last decade. Institutional deliveries doubled from 47.2 percent in 2006 to 94.7 percent in 2016. Deliveries attended by skilled-birth attendants also increased substantially from 53.7 percent to 97.1 percent. The proportion of births that were registered during this period improved from 85.7 percent to 98.5 percent.

Coverage of all nutrition-specific interventions for children improved between 2006-16. Full immunization increased from 69.6 percent to 83 percent. The proportion of children receiving vitamin A supplements improved remarkably by 66.3 percentage points, rising from 18 percent to 84.3 percent.

Between 2006 and 2014, the coverage of food supplements provided through the Integrated Child Development Services improved for all the beneficiary groups. The coverage of food supplements increased by 30.5 percentage points for pregnant women (from 24.6 percent

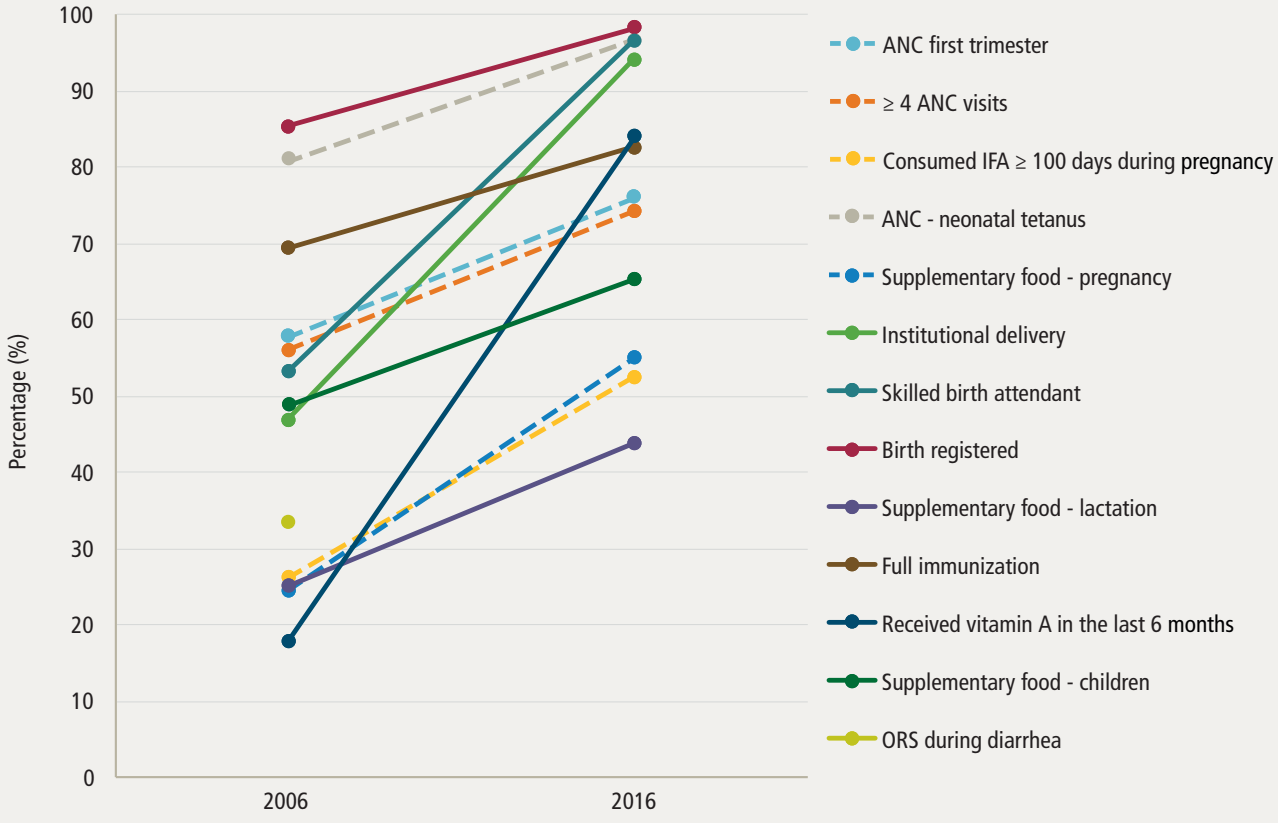
FIGURE 2 Changes in immediate determinants of nutrition in Sikkim, 2006 to 2016



Source: NFHS-3 and NFHS-4.

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

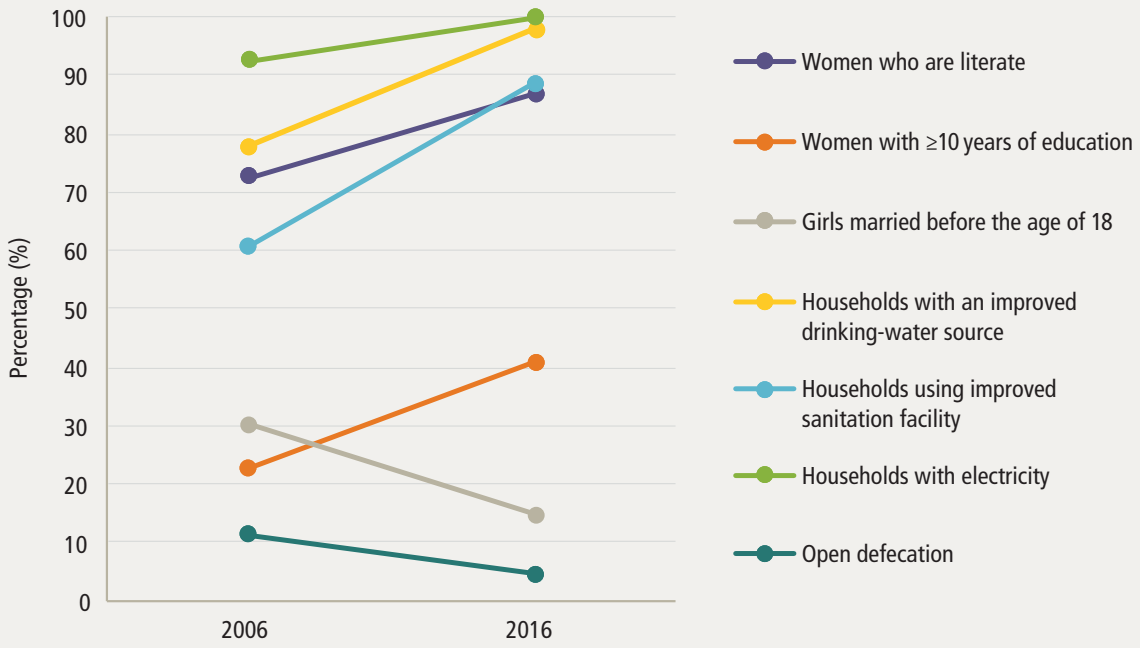
FIGURE 3 Changes in coverage of nutrition-specific interventions along the continuum of care in Sikkim, 2006 to 2016



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 Sikkim, 2006 to 2016



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

Note: Refer to endnotes for indicator definitions.

to 55.1 percent), by 18.7 percentage points for lactating women (from 25.2 percent to 43.9 percent) and by 16.7 percentage points for children (from 49 percent to 65.7 percent).

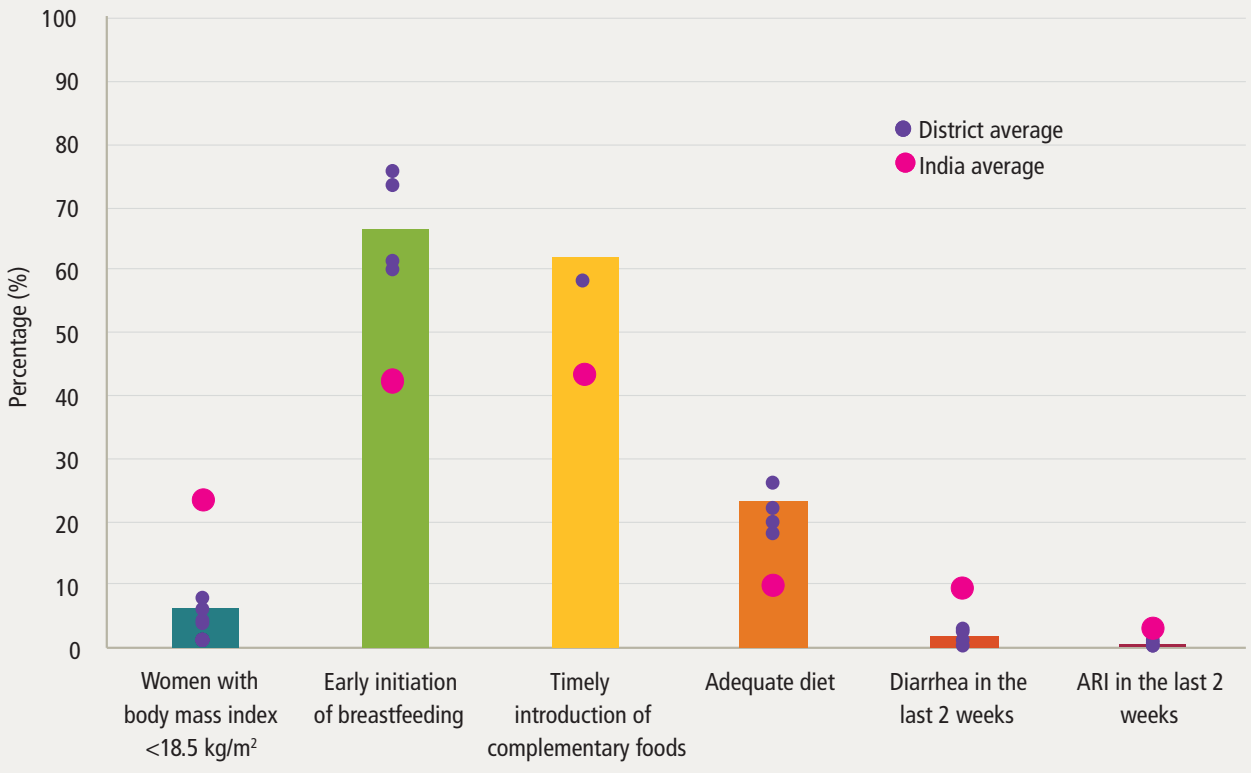
In the last decade, there has been progress across all **underlying determinants** of nutrition in Sikkim (Figure 4). The proportion of literate women increased from 72.3 percent in 2006 to 86.6 percent in 2016, and the proportion of women with more than 10 years of education increased from 22.5 percent to 40.7 percent. Underage marriage among girls declined from 30.1 percent to 14.5 percent. Households with an improved drinking water source increased from 77.6 percent to 97.6 percent, and household access to electricity increased from 92.2 percent to 99.4 percent. The state has made progress in sanitation in the last decade, with an increase in households using improved sanitation facility from 60.7 percent to 88.2 percent and a decline in open defecation rates from 11 percent to 4.4 percent.

Inter-district variability in determinants and coverage of interventions in Sikkim, in 2016

In the figures below, we highlight the district variability in immediate determinants (Figure 5), coverage of health and nutrition interventions (Figure 6) and underlying determinants (Figure 7). There is some degree of inter-district variability among the four districts' status of key determinants (early initiation of breastfeeding, ANC provision, IFA consumption during pregnancy, JSY scheme being availed, full immunization). In contrast, there is little inter-district variability for some other determinants (mother and child protection card, neonatal tetanus provision, institutional delivery, skilled birth attendants during delivery, literacy among women, household with electricity) where the coverages are uniformly high.

On most indicators, all districts of Sikkim perform better than the national average. On some indicators, such as newborn check-up, JSY availed, most districts are below or at par with the national average.

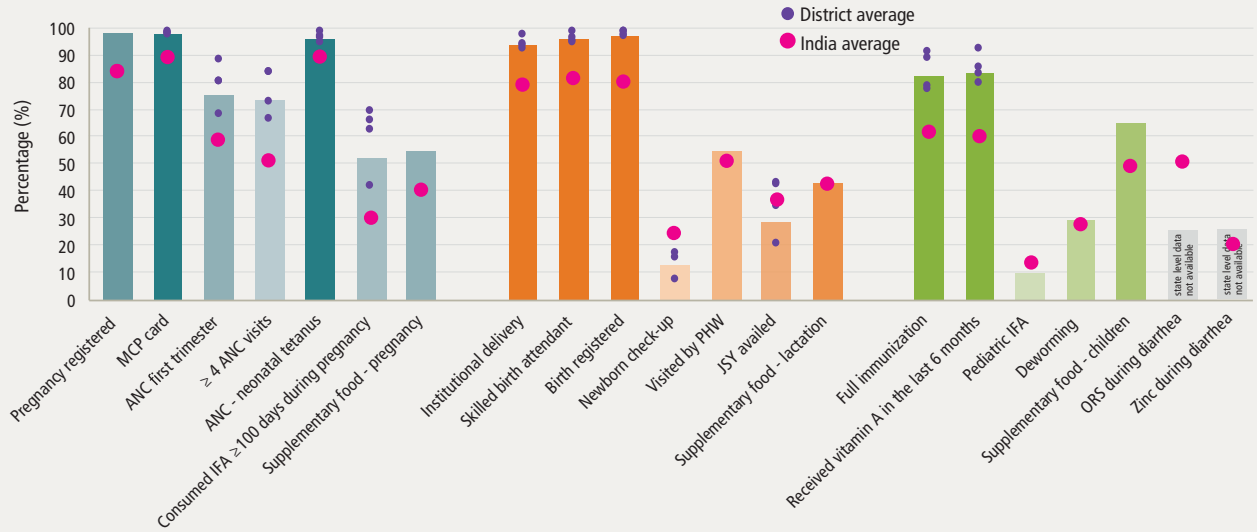
FIGURE 5 Inter-district variability in immediate determinants in Sikkim, in 2016



Source: NFHS-4.

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

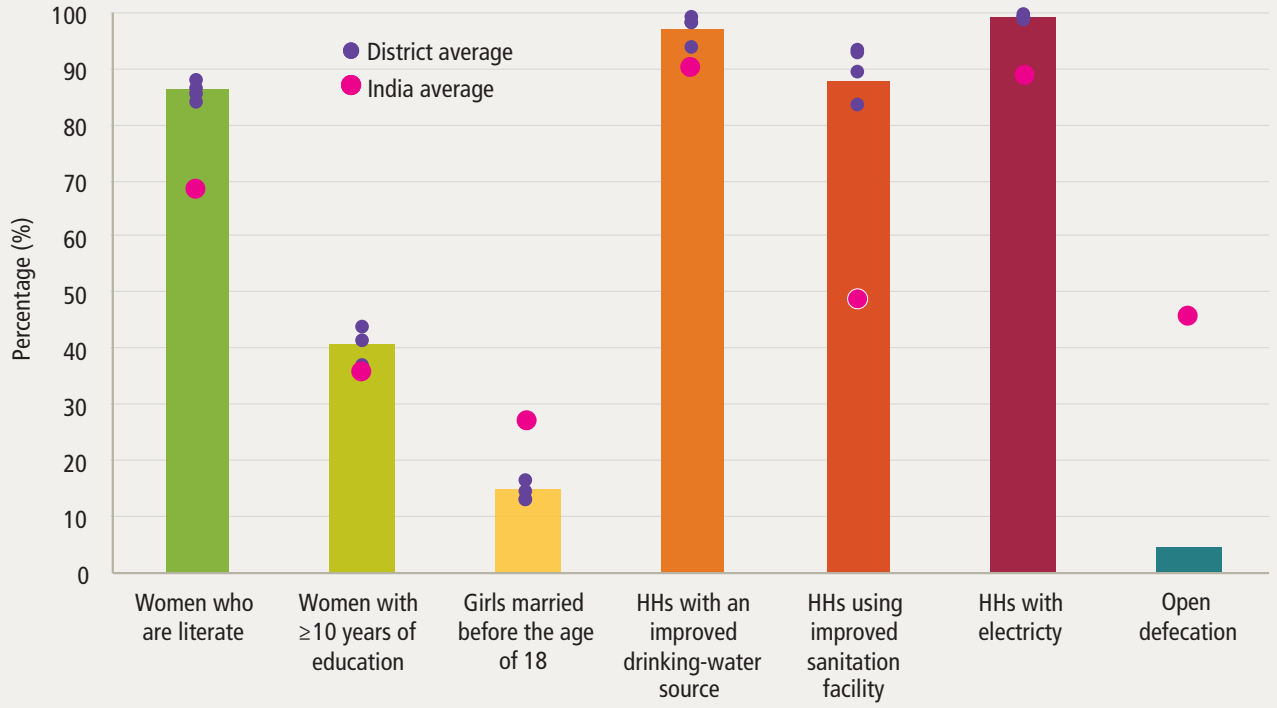
FIGURE 6 Inter-district variability in coverage of selected interventions in Sikkim, in 2016



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

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 Sikkim, in 2016



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

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

LOOKING FORWARD: IMPLICATIONS & RECOMMENDATIONS

In the era of India's commitment to global nutrition targets, it is an opportune time for Sikkim to set its own nutrition targets to be achieved by 2025, to examine progress within and across the state, and to accelerate actions necessary to improve all forms of malnutrition.

The state has progressed well on most outcomes and determinants of nutrition and health. However, there are still some clear challenges ahead for the state, particularly the rising rates of wasting and severe wasting in the region. On one hand, it is important for Sikkim to sustain the improvements it has experienced over the last decade, on stunting among children below the age of five, low birth weight, exclusive breastfeeding and anemia among women of reproductive age. On the other hand, it should aim to reverse the rising trend of wasting and severe wasting, which increased by 4.5 and 2.6 percentage points respectively over the decade. This will help the state build a strategy towards the WHA targets mentioned in Figure 1.

To achieve progress on undernutrition, Sikkim should continue investments in improving the coverage of interventions targeting the first 1000 days of life. On nutrition-specific interventions, during the prenatal phase, emphasis is needed to increase the current levels of IFA consumption and supplementary food provision, both of which are far from universal. It is also essential to sustain the remarkable progress achieved on child birth interventions (institutional delivery and skilled birth attendance during delivery).

The notable improvements seen among coverage of post-natal interventions should be sustained, with the aim of achieving universal immunization and vitamin A supplementation. Special attention is required to reverse the declining trend in the timely introduction of complementary foods and improve the low coverage of adequate diet. Efforts need to be placed on improving the coverage of newborn check-ups, and JSY usage by households, both of which perform worse than the national average.

Most of Sikkim's districts perform better than the India average on underlying determinants, and the state should focus on maintaining its current success.

There have been substantial improvements in women's education, underage marriage, household access to amenities, and the state should put in place measures to sustain this progress.

Focus on the emerging challenge of non-communicable diseases in Sikkim is required alongside investments in early nutrition. Over a quarter of adult men and over a third of adult women in the state are overweight or obese. As Figure 8 below shows, overweight, high blood pressure and high blood sugar are all emerging as health challenges in the state. Sikkim exceeds or is at par with the national averages for all these indicators, urging simultaneous measures to address undernutrition as well as non-communicable diseases.

NOTES

1. 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.

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 ANC 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 the age of 5 years whose birth was registered.

Consumed IFA ≥ 100 days during pregnancy: Percentage of mothers who took IFA 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 ≥140 mm of Hg and/or diastolic ≥90 mm of Hg.

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

FIGURE 8 Levels of non-communicable diseases in Sikkim, in 2016

Source: NFHS-4.

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

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 household 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 ≥25 kg/m^2.

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^2: Percentage of women 15–49 years old with BMI less than 18.5 kg/m^2.

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.

Census of India. Accessed April 2017. http://censusindia.gov.in/2011census/censusinfodashboard/stock/profiles/en/IND027_Sikkim.pdf.

Global Targets 2025. World Health Organization. 2014. Accessed April 2017. http://www.who.int/nutrition/global-target-2025/en/.

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.

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.

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.

Sikkim District Fact Sheets. NFHS-4 (National Family Health Survey-4), International Institute for Population Studies. 2016. Accessed April 2017. http://rchiips.org/nfhs/SK.shtml.

Sikkim Fact Sheet. NFHS-4 (National Family Health Survey-4), International Institute for Population Studies. 2017. Accessed April 2017. http://rchiips.org/NFHS/pdf/NFHS4/Sikkim.pdf.

Sikkim Population Census data 2011: History. Census Population 2015 Data. Accessed May 2017. http://www.census2011.co.in/census/state/Sikkim.html.

Sikkim at a glance. Department of Information Technology, Government of Sikkim. 2017. Accessed July 2017. https://www.sikkim.gov.in/portal/portal/StatePortal/AboutSikkim/SikkimGlance.

Sikkim Statistical Journal. Department of Information Technology, Government of Sikkim. 2017. Accessed July 2017. https://www.sikkim.gov.in/stateportal/UsefulLinks/sikkim_statistics_2011-2012.pdf.

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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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