

Improving Nutrition in Tamil Nadu

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 Tamil Nadu.

Tamil Nadu, situated on the east coast of India, accounts for 4 percent area of the country, includes 32 districts subdivided by 385 blocks, 12,618 villages and 561 towns (Government of Tamil Nadu 2017). Tamil Nadu is home to more than 70 million (6 percent of population of India) (Government of Tamil Nadu 2017) and is better positioned compared to many other states in terms of economy, infrastructure, industrialization, governance and social indicators. The state has a literacy rate of over 80 percent.

The purpose of this *Policy Note* is to examine the trends in undernutrition in Tamil Nadu, and to document trends 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 Tamil Nadu (Census of India 2011).

METHODS

We used summary data from the recently released National Family Health Survey-4 (NFHS-4 2015–16) factsheets (International Institute for Population Sciences 2017) and data from NFHS-3 from 2005–06 to compare trends in outcomes, determinants and interventions over a decade (International Institute for Population Sciences 2008). We also use 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

Overall there have been improvements in some nutrition outcomes in Tamil Nadu between 2006 and 2016 (Figure 1). Stunting prevalence declined from 31 percent in 2006 to 27 percent in 2016. Exclusive breastfeeding improved from 34 percent in 2006 to 48 percent in 2015. Wasting prevalence declined slightly from 22 percent in 2006 to 20 percent in 2016 and severe wasting declined from 9 percent to 8 percent during the same time period (IIPS 2008 and IIPS 2017).

Anemia among women remains a significant public health concern in Tamil Nadu with 55 percent of women of reproductive age being anemic. The prevalence of anemia among women of reproductive age increased slightly from 53 percent in 2006 to 55 percent in 2016. The prevalence of low birth

weight is another concern which remained unchanged between 2006 and 2014 at 17 percent.

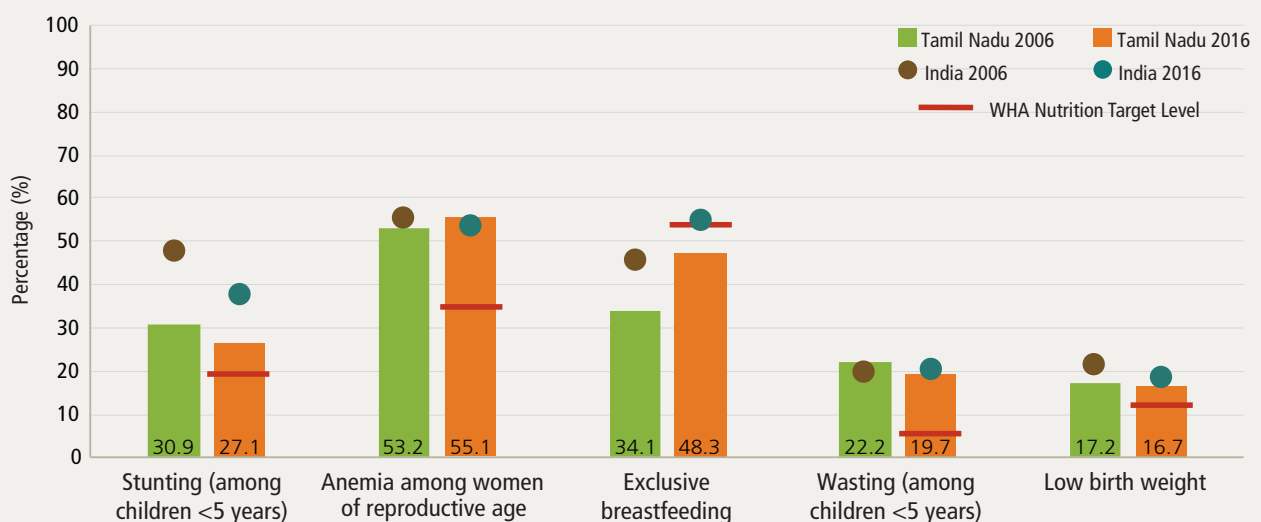
Stunting among children under five years of age varies widely among districts, ranging from 17 percent to 37 percent (Map 1). Stunting rates are high (30–37 percent) in 8 of the 32 districts. Anemia in women of reproductive age ranges between 45–66 percent and is below 50 percent in only five districts (Map 2).

Wasting prevalence also varies considerably among districts, with the highest prevalence in Tiruvannamalai (35 percent), and the lowest in Kanniyakumari (9 percent) (Map 3). Map 4 shows that the same districts have the highest prevalence of severe wasting (18.7 percent in Tiruvannamalai) and the lowest prevalence of severe wasting (2 percent in Kanniyakumari). Data on exclusive breastfeeding are available for only 3 of the 32 districts (Map 5).

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

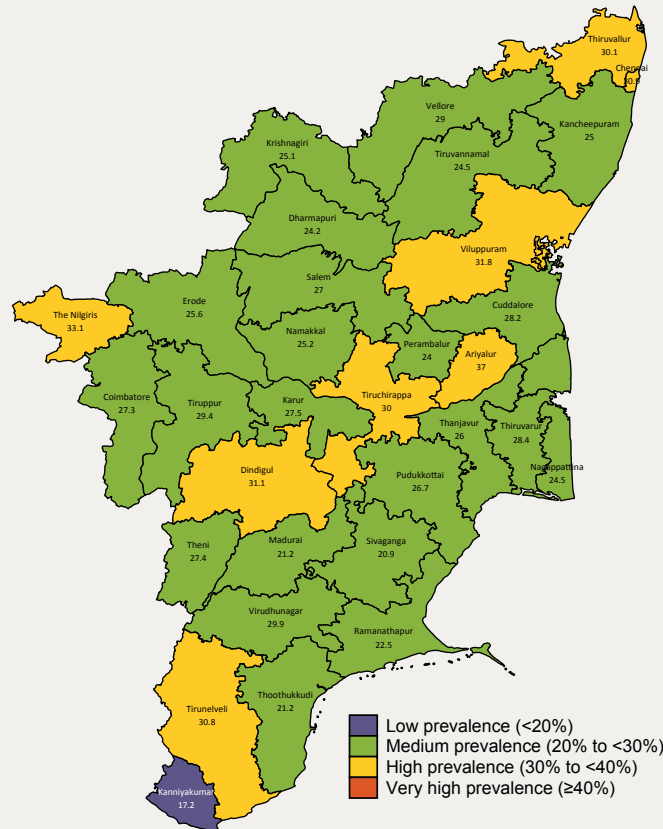
FIGURE 1 Trends in nutrition outcomes in Tamil Nadu, 2006 to 2016



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

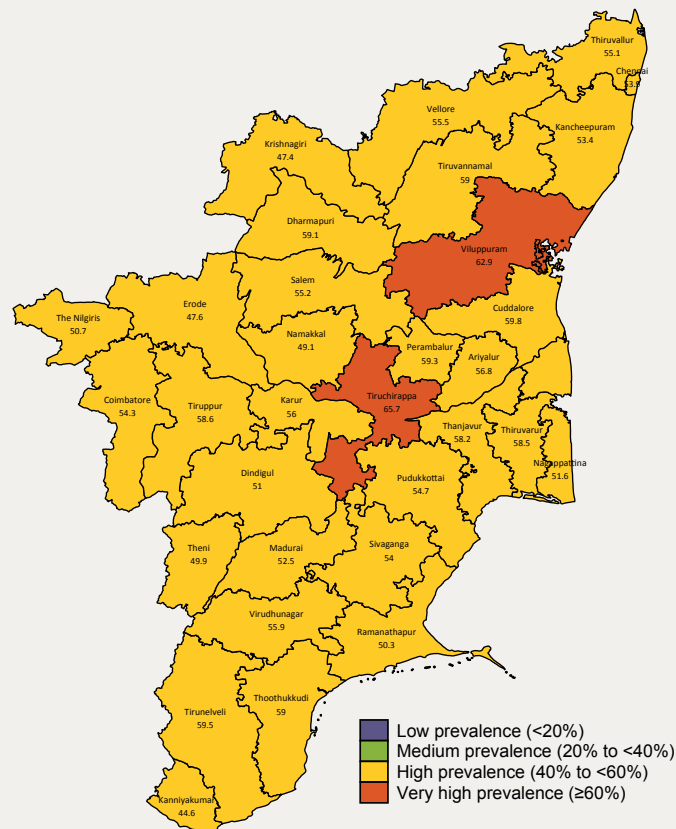
Note: A set of global nutrition targets for maternal, infant and young child nutrition were endorsed by the World Health Assembly (WHA) in 2012. The red lines represent the WHA targets to be achieved by the state, by 2025. The baseline reference year for these targets is 2012. The state baseline estimates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



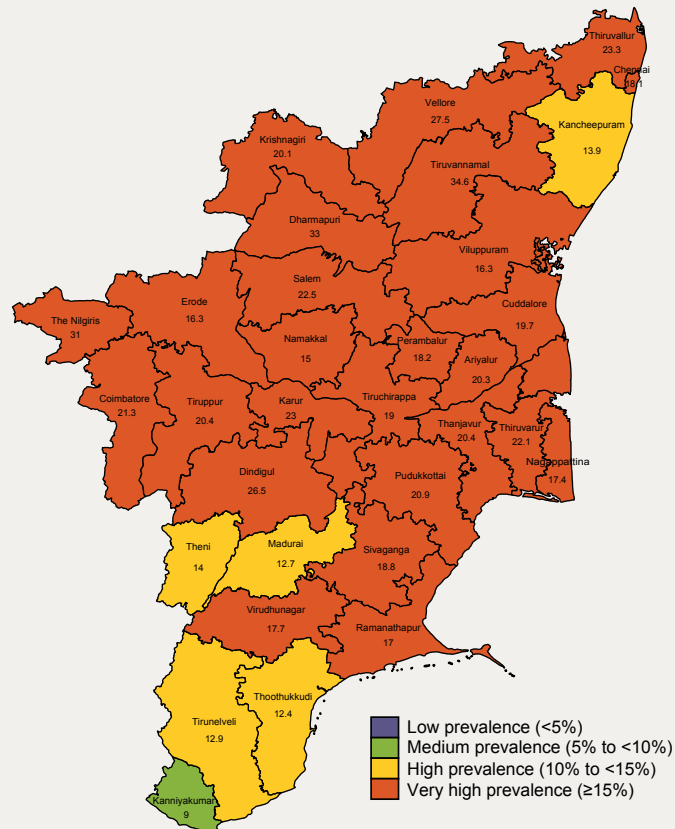
Source: NFHS-4.

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



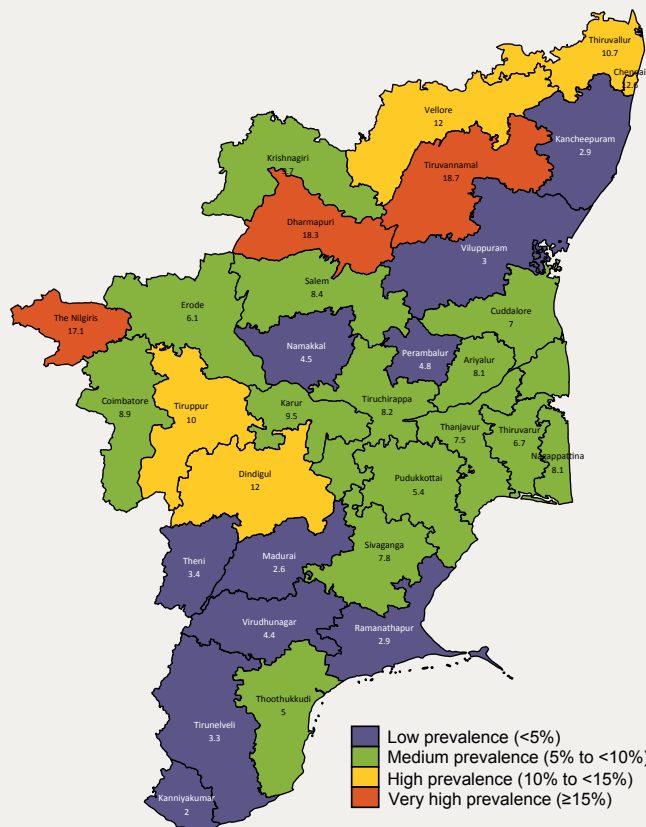
Source: NFHS-4.

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



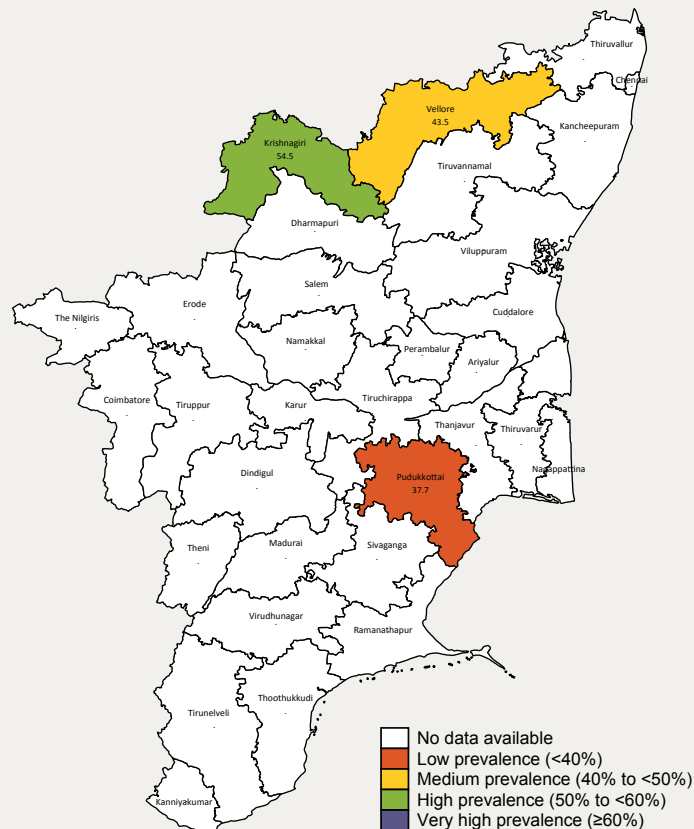
Source: NFHS-4.

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



Source: NFHS-4.

MAP 5 Exclusive breastfeeding in Tamil Nadu in 2016, by district



Source: NFHS-4.

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.

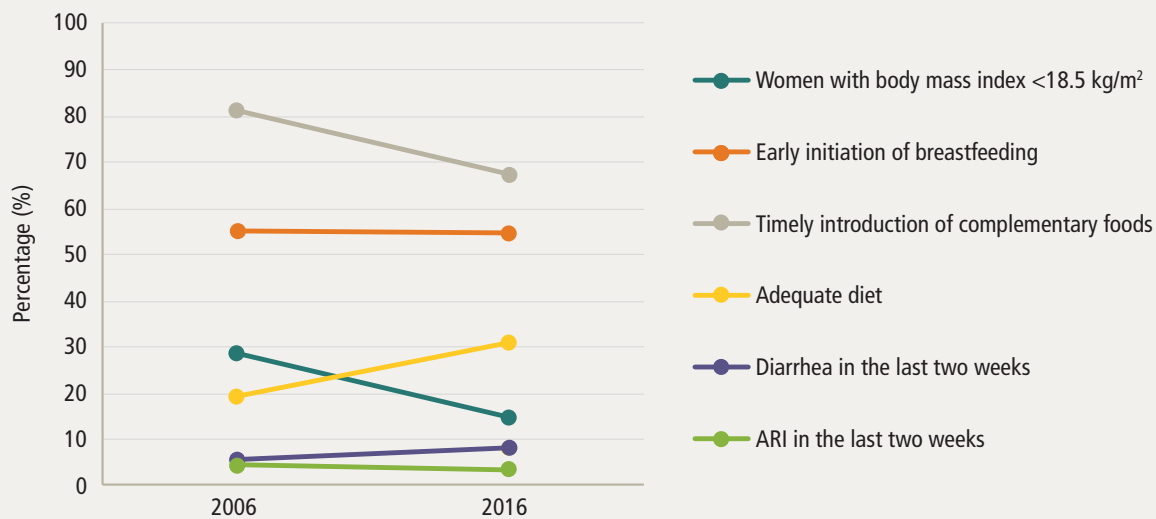
Changes in the **immediate determinants** of nutrition in Tamil Nadu are described in Figure 2. The prevalence of low body mass index (<18.5 kg/m²) among women declined from 28 percent to 15 percent. Although the prevalence is low, the proportion of children with diarrhea has increased slightly over time (from 5 percent in 2006 to 8 percent in 2016), and the proportion of children with acute respiratory infection (ARI) declined very slightly from 4 percent to 3 percent for the same time period.

Between 2006 and 2016, there was no progress on infant and young child feeding (IYCF) practices. Early initiation of breastfeeding declined slightly from

55.2 percent to 54.7 percent. Timely introduction of complementary foods (between 6 and 8 months of age) declined over the last decade (from 81 percent to 68 percent). In 2016, 31 percent of children (between 6 and 23 months of age) received an adequate diet.

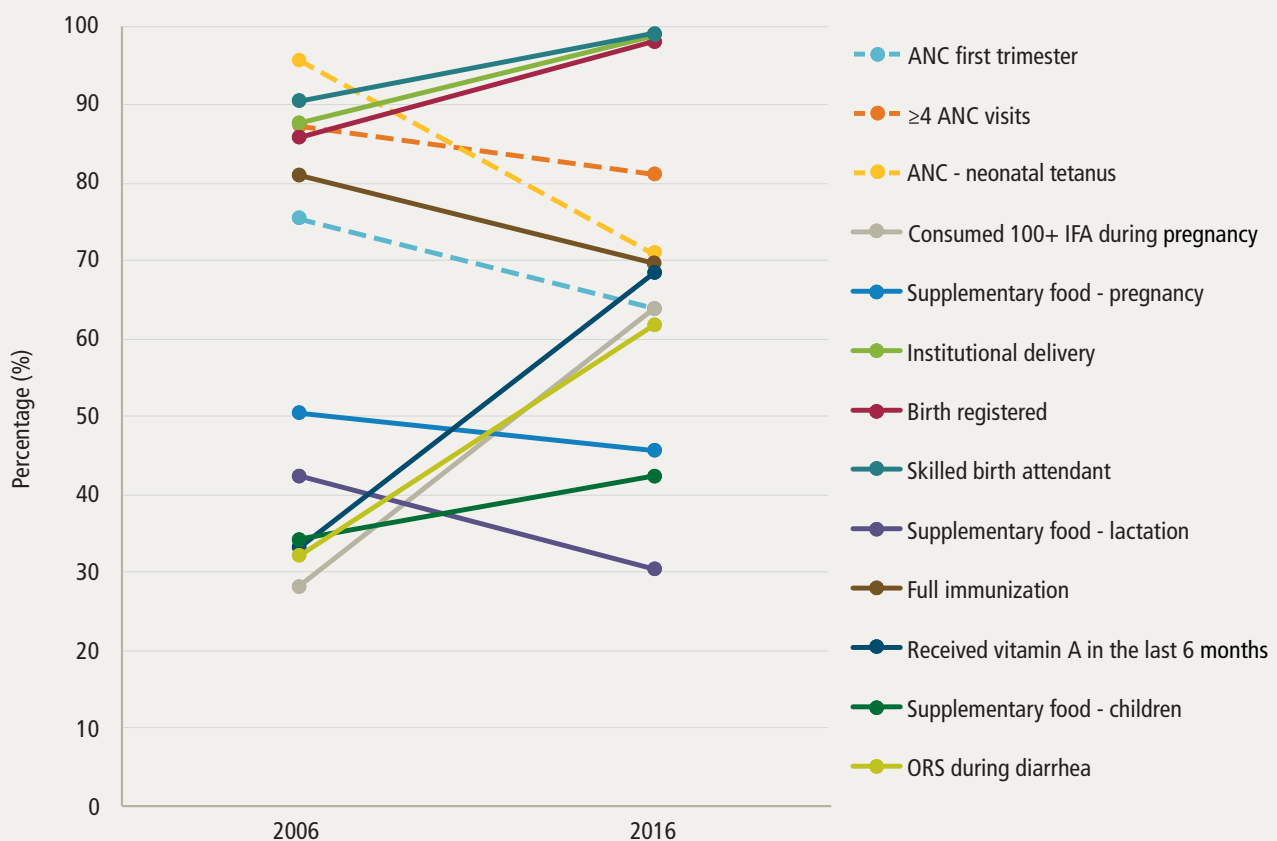
Changes in **nutrition-specific interventions** in Tamil Nadu are presented in Figure 3. The coverage of only some interventions improved during the last decade. During pregnancy, the proportion of women consuming iron-folic acid (IFA) supplements increased considerably between 2006 (28 percent) and 2016 (64 percent). However, other interventions related to care during pregnancy declined in the last decade. The proportion of women who received any antenatal care (ANC) during first trimester declined from 75 percent to 64 percent and those who received at least four ANC visits declined from 87 percent to 81 percent.

Nutrition-specific interventions related to delivery, such as institutional deliveries and proportion of women whose births were assisted by health professional

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


Source: NFHS-3 and NFHS-4.

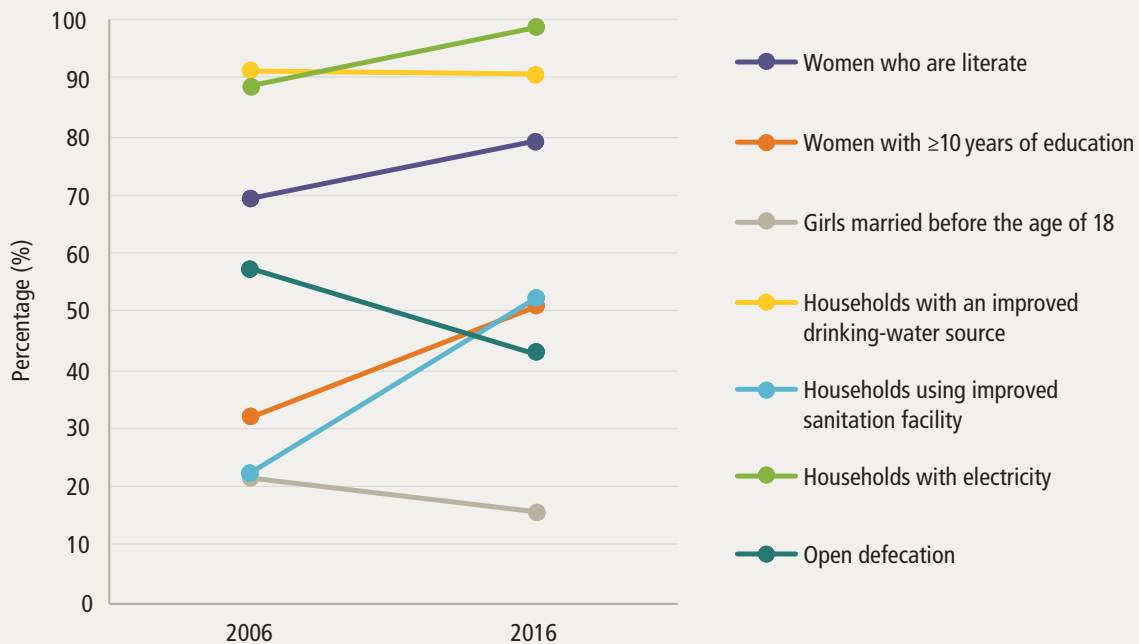
Note: ARI = Acute respiratory infection; Refer to endnotes for indicator definitions.

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



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

Note: Refer to endnotes for indicator definitions.

were high in 2006 but improved in the last decade. Coverage of food supplementation increased for children (from 34 percent to 42 percent) but declined for pregnant women (from 50 percent to 46 percent), and lactating women (from 43 percent to 31 percent) between 2006 and 2014. The proportion of children receiving vitamin A supplementation increased substantially from 33 percent to 68 percent, and the proportion of children with diarrhea who received oral rehydration salts (ORS) also increased from 32 percent to 62 percent. However, the proportion of children who were fully immunized declined considerably from 81 percent to 70 percent.

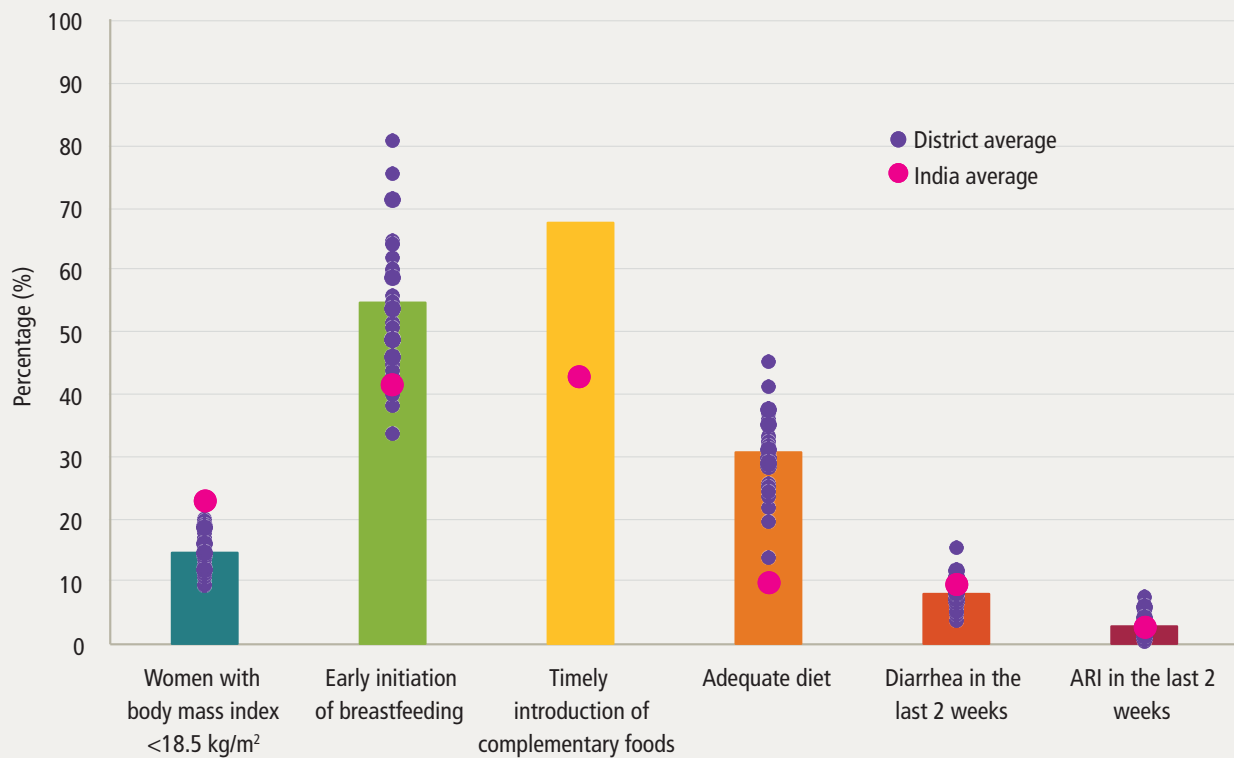
Changes in the **underlying determinants** of nutrition are presented in Figure 4. There has been an increase in the proportion of women who are literate (from 69 percent to 79 percent) and the proportion of women with more than 10 years of education (from 32 percent to 51 percent). Early marriage in girls has dropped considerably in the last decade from 22 percent in 2006 to 16 percent in 2016.

Infrastructure has improved in Tamil Nadu in the last decade. In 2016, more than 90 percent of households have access to improved drinking water, though this declined slightly from 92 percent in 2006. Access to electricity was high at 89 percent in 2006 and it continued to improve, reaching 99 percent in 2016. Use of improved sanitation facilities improved between 2006 and 2016 (from 22 percent to 52 percent of households). The proportion of households practicing open defecation has declined over time, but is still high at over 40 percent (RSoC 2013–14).

Inter-district variability in selected coverage of interventions in Tamil Nadu, in 2016

The 32 districts for which NFHS-4 data is available cover a range of agro-ecological and economic characteristics. As seen in Figures 5-7, among these districts there is a high degree of inter-district variability for some key determinants (that is, breastfeeding, coverage of ANC, consumption of IFA supplements, full immunization). In contrast, there is little to no inter-district variability for some

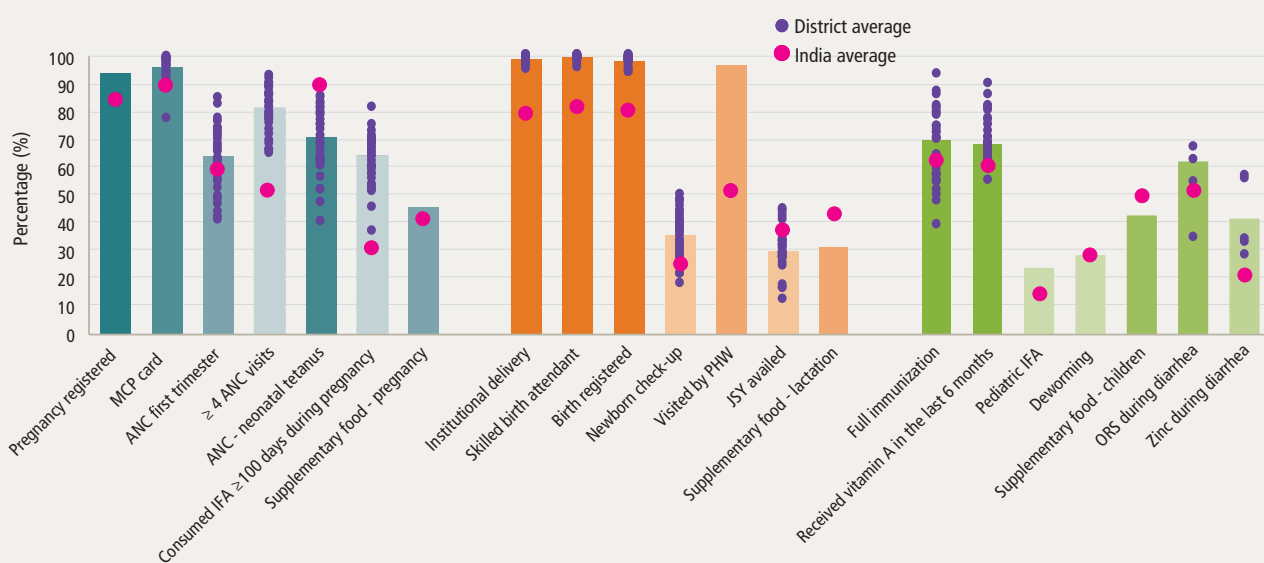
FIGURE 5 Inter-district variability in immediate determinants in Tamil Nadu, in 2016



Source: NFHS-4.

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

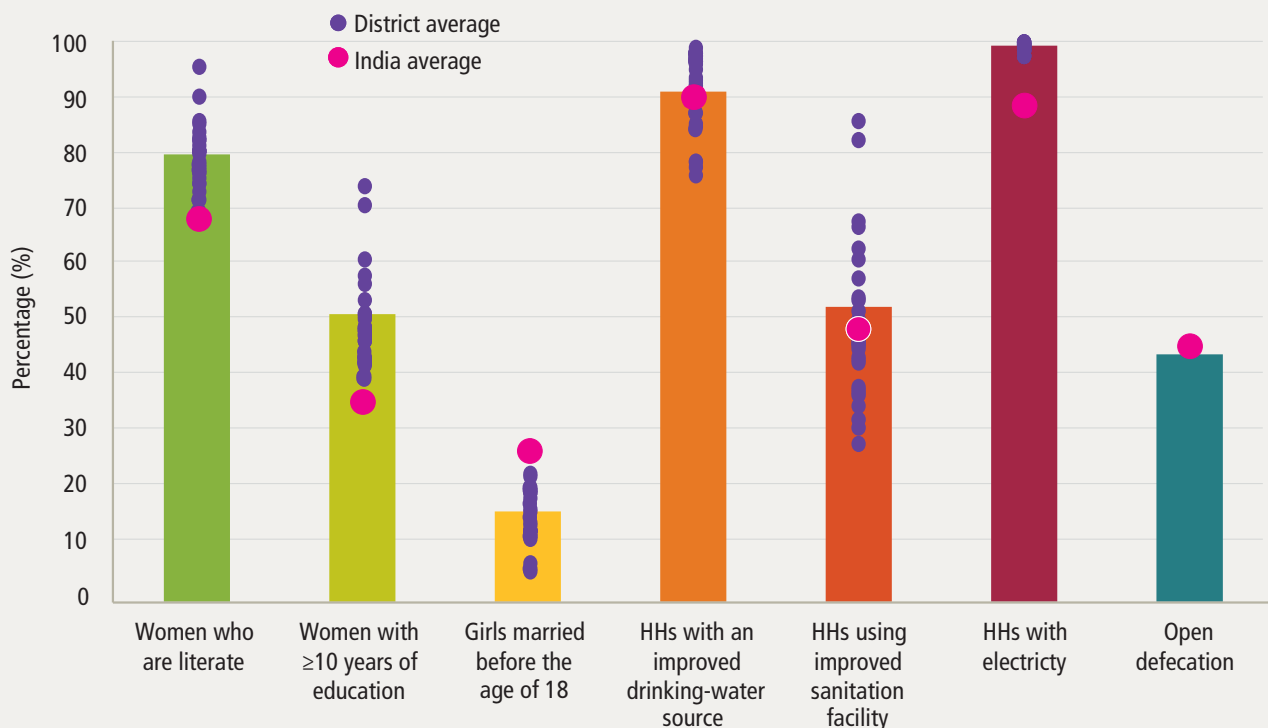
FIGURE 6 Inter-district variability in selected coverage of interventions in Tamil Nadu, in 2016



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 Tamil Nadu, 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.

other determinants, either because coverage is very high (for example, institutional delivery, births assisted by a health professional and birth registration, access to drinking water and electricity) or challenges in achieve coverage (for example, achieving adequate diet among children).

LOOKING FORWARD: IMPLICATIONS & RECOMMENDATIONS

In the era where India has now embraced the sustainable development goals, it is an opportune time for Tamil Nadu to set its own nutrition targets to be achieved by 2025 and to set in motion accelerated actions for improved nutrition. Overall, the state has been operating within the national programmatic framework and has historically also put in place several state-led innovations, of which some have inspired actions at the national level.

However, there are some clear challenges ahead for Tamil Nadu to address now on nutrition outcomes and determinants. In the absence of any progress in the last 10 years in the prevalence of anemia, which is above 50 percent in most districts in Tamil Nadu, special attention is needed to identify factors contributing to anemia and to put in place solutions to tackle this public health problem. Addressing anemia among women of reproductive age has the potential to improve low birth weight, which has also been stagnant at 17 percent in the last decade. The decline in the coverage of food supplementation during pregnancy requires further inquiry, and an all-out effort is needed to strengthen actions to support adequate infant and young child feeding practices, which have declined in the last decade. The decline in the coverage of antenatal care and full immunization in Tamil Nadu is a surprise, and one that warrants urgent attention, as these are basic

pillars of the health system. Furthermore, the high inter-district variability for some of the interventions (antenatal care, consumption of IFA supplements, full immunization) indicates the need to explore district-specific strategies.

Alongside investments in improving actions addressing early life nutrition, it is also important for Tamil Nadu to consider the challenges of non-communicable diseases. As Figure 8 below shows, nearly one-third of the women and men in Tamil Nadu are overweight or obese, which is much higher compared to the Indian average of 21 percent and 19 percent, respectively. The prevalence of high blood pressure and high blood sugar are also emerging challenges. This suggests that Tamil Nadu needs to develop a strong strategy to simultaneously address undernutrition and these emerging non-communicable diseases (NCD) related to nutrition.

NOTE

1. Indicator definitions, in alphabetical order:

Access to electricity: Percentage of households with electricity.

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.

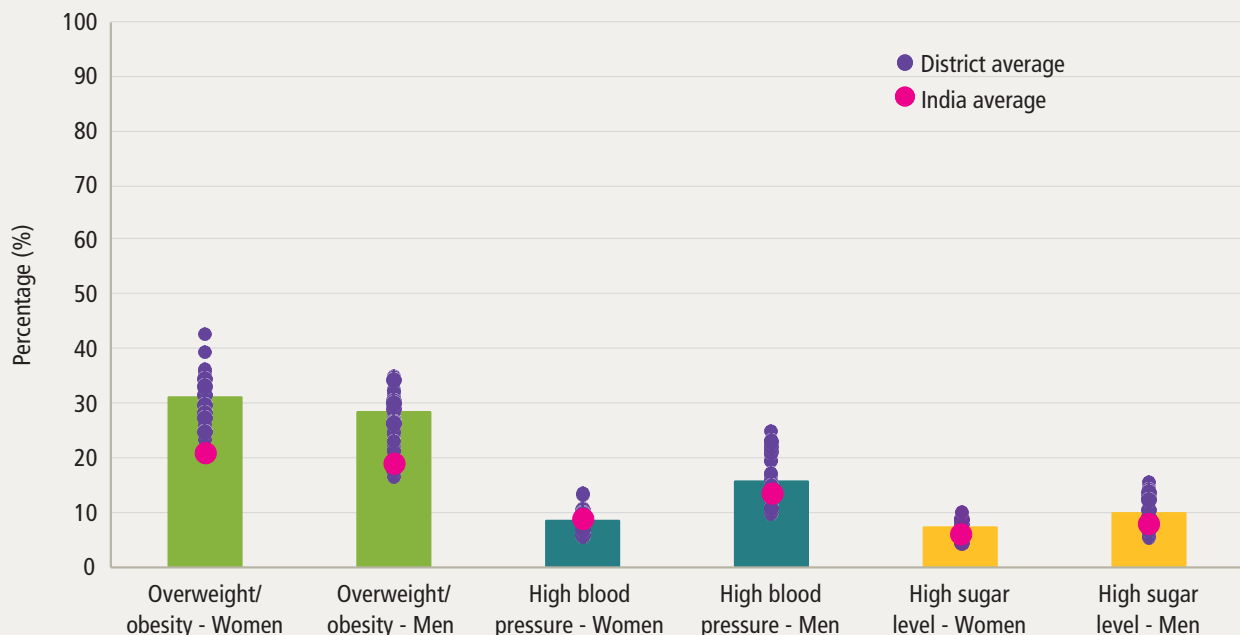
Anemia among women of reproductive age: Percentage of women 15–49 years old who are anemic (<12.0 g/dl for non-pregnant women and <11.0 g/dl for pregnant women).

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

Consumption of IFA supplements: 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.

FIGURE 8 Levels of non-communicable diseases in Tamil Nadu, in 2016



Source: NFHS-4.

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

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

High blood pressure: 15–49 year old men and women with systolic ≥ 140 mm of Hg and/or diastolic ≥ 90 mm of Hg.

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

Improved drinking water: Percent distribution of households with an improved drinking water source.

Improved sanitation: 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.

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 year old men and women with body mass index ≥ 25 kg/m².

Prevalence of acute respiratory infection (ARI): Percentage of children below 5 years of age with symptoms of ARI in 15 days preceding the survey.

Prevalence of diarrhea: Percentage of children below 5 years of age who had diarrhea in 15 days preceding the survey.

Severe wasting: Percentage of children 0–59 months old who are below < -3 SD 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 < -2 SD from median height for age of the WHO Child Growth Standards.

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

Supplementary food (lactation): Percentage of mothers with children under age 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 age 6 years in areas covered by an Anganwadi center (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.

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 below < -2 SD 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 schooling.

Women with low body mass index (BMI): Percentage of women 15–49 years old with BMI less than 18.5 kg/m².

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

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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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