

# TARINA District Fact Sheet on Maternal and Child Health

Soumya Gupta, Vanisha Sharma, Naveen Sunder, and Dhiraj Singh

## Introduction

This fact sheet presents results on the status of maternal and child health indicators for women of reproductive ages (WRA, 15–49 years old) and children (under age five) in four districts of India: Munger (Bihar), Maharajganj (Uttar Pradesh), and Kandhamal and Kalahandi (Odisha). These results are based on primary data collected from an agriculture–nutrition survey of 3,600 households, as part of the TCI-TARINA program (See Box 1).

Good nutrition is key for ensuring the well-being and productivity of all individuals. In India, malnutrition manifests itself as a major health problem for women and children. For non-pregnant and adolescent women, poor nutritional status impacts schooling outcomes, labor productivity, and health. For pregnant women, poor nutrition diminishes not only their own health but can also have intergenerational implications for the health and well-being of their children. Inadequate nutrition and care practices in the first 1,000 days of a child’s life are known to increase susceptibility to illness, reduce physical development, and negatively impact cognitive functioning and schooling outcomes. Further, poor nutritional status in childhood also has implications for achievements and well-being later in life as well.

In India, in the 2015 National Family Health Survey (NFHS) survey, nearly one-third of all children were either stunted or underweight, and one-fourth of all children under age five suffered from wasting. Among women, 23% were underweight,

## Box 1: The TARINA Program

The Technical Assistance and Research for Indian Nutrition and Agriculture (TARINA) is an initiative led by the Tata–Cornell Institute for Agriculture and Nutrition (TCI) at Cornell University. The TARINA Baseline Survey (TBS) was conducted in 2017. It collected extensive village-, household-, and individual-level metrics across 3,600 households in the four program districts (see Figure 1): Munger (Bihar), Maharajganj (Uttar Pradesh), Kalahandi and Kandhamal (Odisha). Data on household-level agricultural practices, seasonal food availability and access, and WASH was supplemented with individual-level dietary diversity for women, food frequency, IYCF, and anthropometry for women and children under age five.

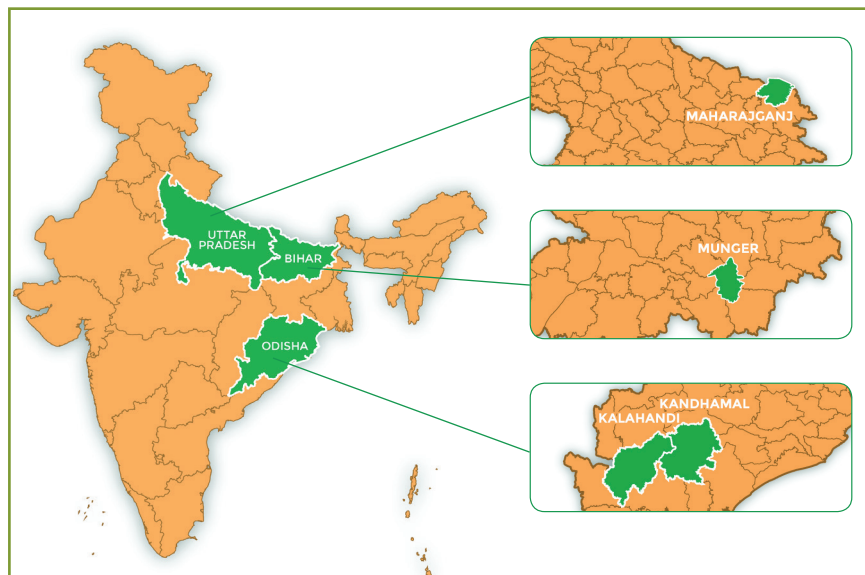


Figure 1. TARINA field locations: States and districts

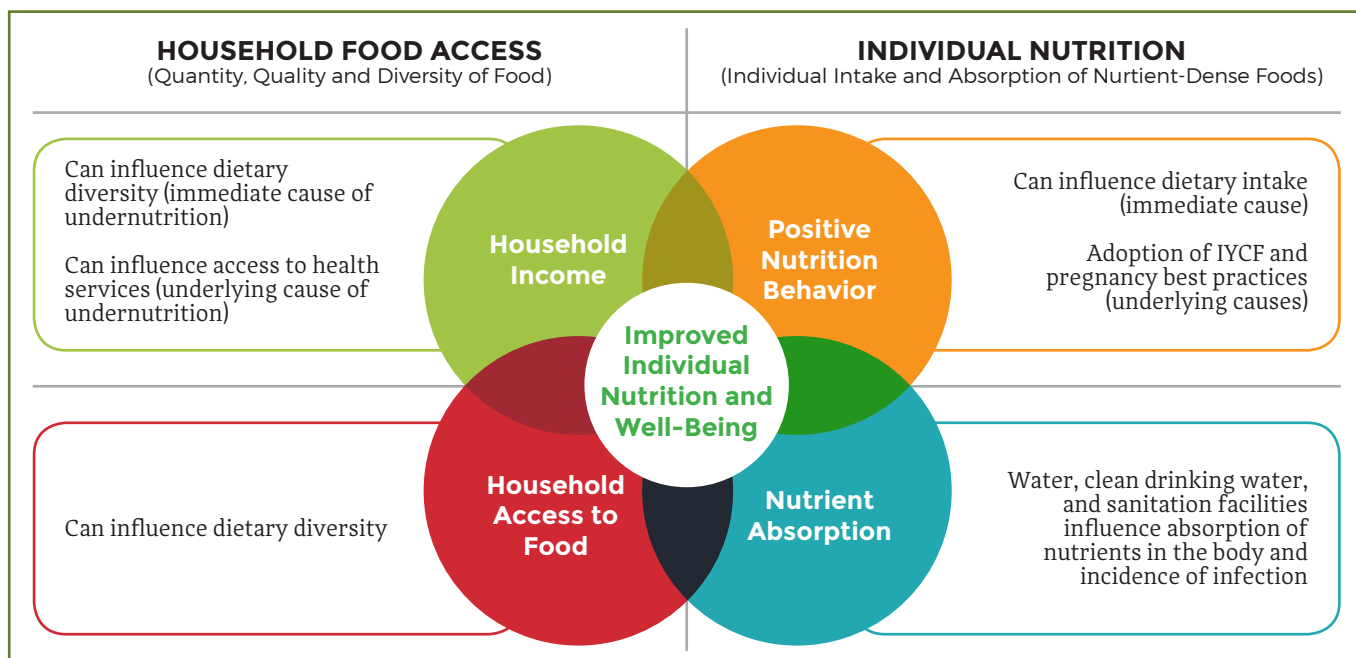


Figure 2. Factors affecting maternal and child nutritional outcomes

i.e., their body mass index (BMI) was lower than 18.5. The recognition of the complex nature of the problem and the urgency with which we need to address it is reflected in the importance given to women’s and children’s nutrition in the Sustainable Development Goals and, more recently, in the Indian government’s National Nutrition Mission Reports.

According to the UNICEF (1990) framework for malnutrition, there are two main immediate causes of malnutrition: inadequate dietary intake by, and disease burden of, an individual. These, in turn, are influenced by various household- and community-level, underlying factors, like Infant and Young Child Feeding (IYCF) practices; access to health services and health care (antenatal, postnatal); and Water, Sanitation and Hygiene (WASH). The basic causes of malnutrition operate at the societal level and include sociocultural norms, political will, and other environmental factors. In Figure 2, we present the immediate and underlying causes of malnutrition in terms of various household- and individual-level factors that influence nutritional outcomes. At the household level, income and access to food can determine the intake of diverse diets and, hence, household-level malnutrition. Non-food expenditures, such as those on health services,

are also key inputs into reducing malnutrition. At the individual level, positive nutrition behavior, dietary diversity, the adoption of best practices for IYCF, and antenatal and postnatal health care play important roles in reducing malnutrition of women and children. Furthermore, the health environment in which individuals live influences absorption of nutrients in the body. Transmission of diseases, due to poor quality of WASH services, can increase the severity of malnutrition.

In this fact sheet, we analyze women’s nutritional status by way of their BMI. For children, we analyze anthropometric outcomes for stunting, wasting, and underweight, together with their malnutrition status, as reflected by their mid-upper arm circumference (MUAC). These are described in detail below.

### Measurement of maternal and child nutritional status

Maternal Body Mass Index (BMI) defined as the ratio of weight (kg) to height (m<sup>2</sup>)

- Underweight: BMI < 18.5
- Normal: 18.5 < BMI < 25
- Overweight: BMI > 25
- Obese: BMI > 30

### Child Anthropometric Outcomes:

- Stunting: Low height-for-age. Stunting reflects chronic malnutrition.\*
- Wasting: Low weight-for-height. Wasting reflects acute malnutrition.\*
- Underweight: Low weight-for-age. Underweight reflects acute and chronic undernutrition.\*
- Mid-Upper Arm Circumference (MUAC):
- Severe Acute Malnutrition (SAM): MUAC < 11 cm
- Moderate Acute Malnutrition (MAM): MUAC is 11–12.5 cm
- Acute Malnutrition (AM): MUAC is 12.5–13.5 cm
- Well-nourished: MUAC > 13.5 cm

\*Z-scores that are below 2 standard deviations from the mean.

### Status of maternal and child nutrition

Triple burden of malnutrition - Poor nutrition status (i.e., malnutrition) can manifest itself as undernutrition (i.e., inadequate intake of calories), overnutrition (i.e., excessive intake of calories) or micronutrient malnutrition (i.e., deficiency of key minerals and vitamins). The coexistence of these three outcomes is referred to as the “triple burden of malnutrition.” Women and children in households are often more vulnerable to these nutrition-related burdens. In this section, we present the data on undernutrition and overnutrition from four districts.

- Munger and Maharajganj have more than 30% of children stunted, wasted, or acutely malnourished (Figure 3).
- In Kalahandi, nearly 10% of children suffer from SAM (Figure 4).
- Across states, 1 in 5 children have poor anthropometric outcomes (Figure 3).
- National Family Health Survey (NFHS) data overestimates prevalence of underweight and stunting in children, and underestimates prevalence of wasting (Figure 5).
- At least one-fifth of all women were underweight in the total sample.

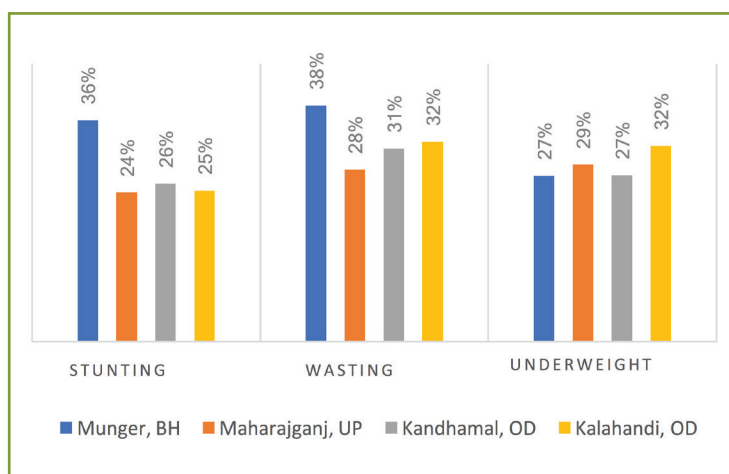


Figure 3. Child nutrition status

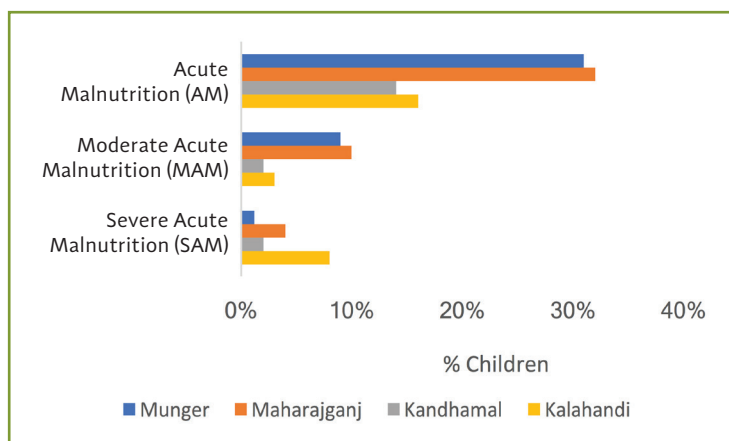


Figure 4. Child malnutrition status

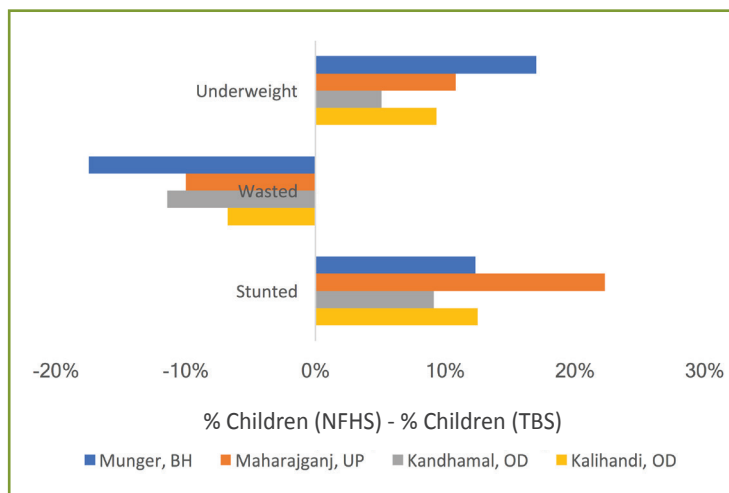


Figure 5. Comparison of child nutrition status between TARINA Baseline Survey data and National Family Health Survey data

- 1 in 3 women in Munger are underweight (Figure 6).
- In Maharajganj, 6% of all women are overweight (Figure 6).
- NFHS data overestimates the proportion of underweight women in all four districts (Figure 7).

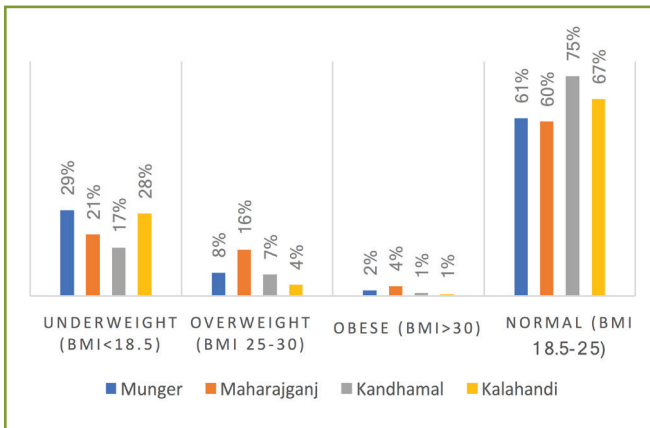


Figure 6. Maternal nutrition status based on BMI

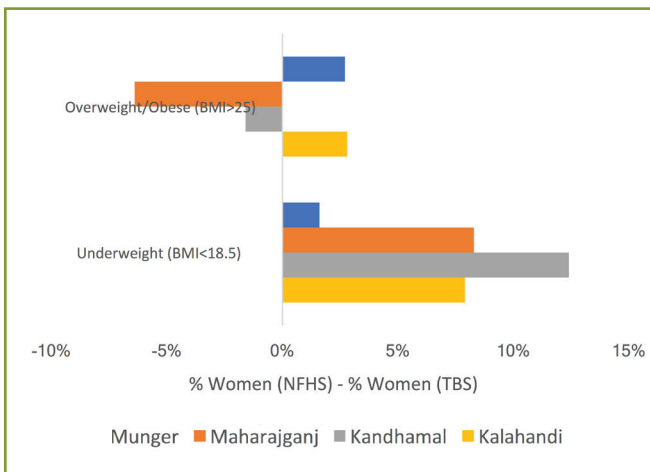


Figure 7. Comparison of maternal nutrition status between TARINA Baseline Survey data and National Family Health Survey data

### Immediate causes of undernutrition

Dietary intake and illness/infection - Inadequate dietary intake and recent illness/infection have been identified as the immediate causes of undernutrition. Inadequate dietary intake leads to poor health outcomes, both for mothers and children. Both quantity and the quality of diet has

effects on physical growth, cognitive functioning, and motor skills, as well as immunity to fight infection. Maternal dietary intake determines the nutritional status not only of mothers but also their children. The incidence of recent illness or infection can manifest in higher morbidity or mortality, and also inhibit the absorption of nutrients from the diet.

Women's dietary diversity - The Women's Dietary Diversity Score is a simple count of the number of food groups (out of 10) that a woman consumed in the previous 24 hours. A higher score reflects a more diverse diet.

Number of food groups consumed by women in 24 hours:

- Munger, Maharajganj: 4 out of 10 food groups
- Kalahandi, Kandhamal: 5 out of 10 food groups

The median score for women, across districts, was less than 4 food groups, reflecting low dietary diversity (Figure 8).

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30% or more women and children reported having been ill in the past 1 month across districts (Figure 9).

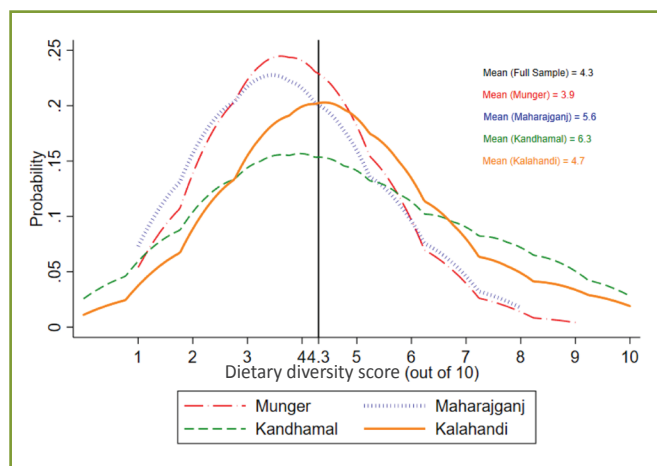


Figure 8. Distribution of women's dietary diversity scores across TARINA districts

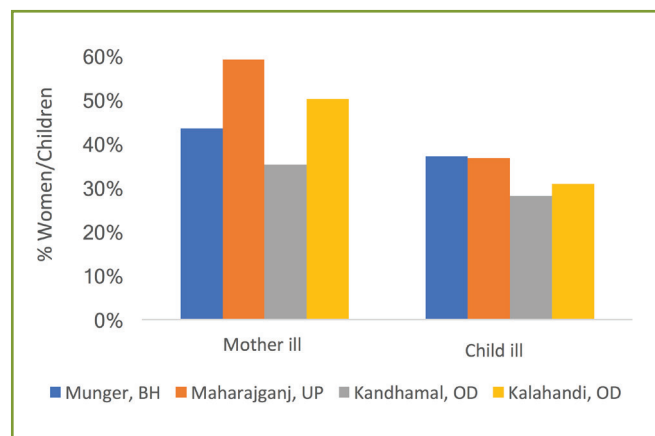


Figure 9. Mother and child illness in the past 1 month

### Underlying causes of undernutrition

Infant and young child feeding practices - Infant and Young Child Feeding (IYCF) practices have implications for child nutrition, immunity, mortality, and cognitive development. Recommended IYCF practices, such as early initiation of breastfeeding, exclusive breastfeeding

up to 6 months, and consumption of nutritionally adequate complementary foods, are a key component of ensuring child growth in the first 1,000 days.

- Almost all (99.4%) women breastfed their youngest child (Figure 10).
- 60-90% women initiated breastfeeding immediately (Figure 10).
- 60-90% women stopped breastfeeding after 6 months (Figure 10).
- NFHS underestimates the proportion of women who immediately or exclusively breastfed their children (Figure 12).

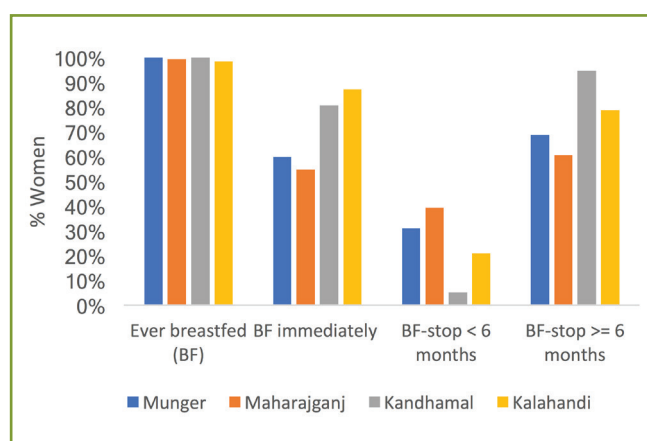


Figure 10. Breastfeeding

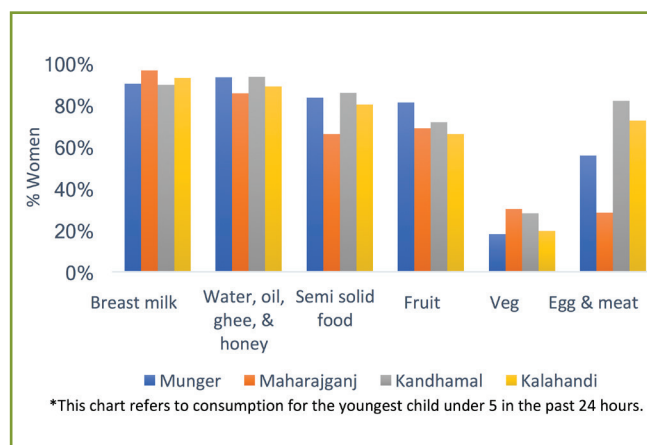


Figure 11. Complementary feeding

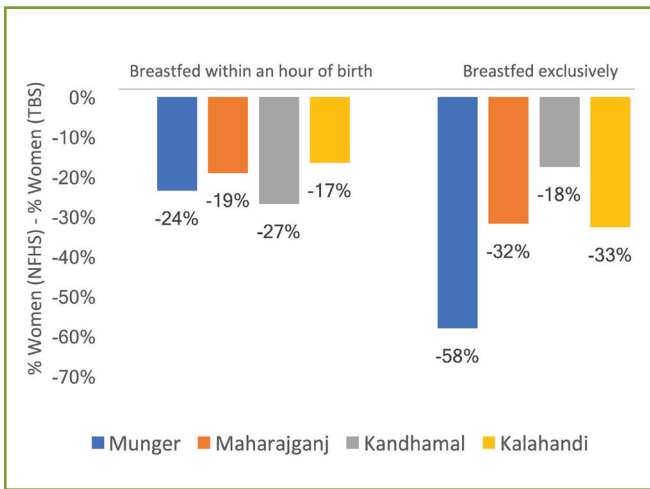


Figure 12. Comparison of breastfeeding statistics between TARINA Baseline Survey data and National Family Health Survey data

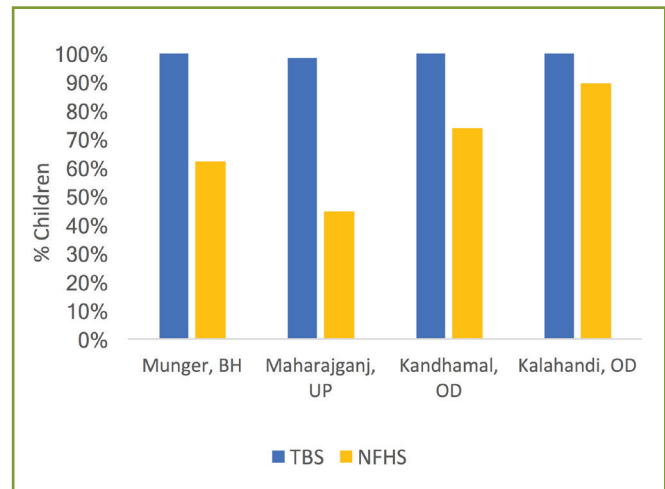


Figure 14. Proportion of children vaccinated

### Underlying causes of undernutrition

**Access to health services** - Access to health services (distance, time, cost) reflect the coverage of health infrastructure and the ability of communities to receive care services in a timely and affordable manner. The uptake of vaccinations is important for reducing mortality due to infectious diseases that are otherwise preventable (such as pneumonia, diarrhea, measles).

- Cost of healthcare is higher in Odisha (Rs. 550) than in Bihar and Uttar Pradesh (Rs. 300).
- Ease of access to health services (distance, time) is lower in Odisha relative to Bihar and Uttar Pradesh (Figure 13).
- NFHS data underreports the proportion of children vaccinated in Munger and Maharajganj (Figure 14).

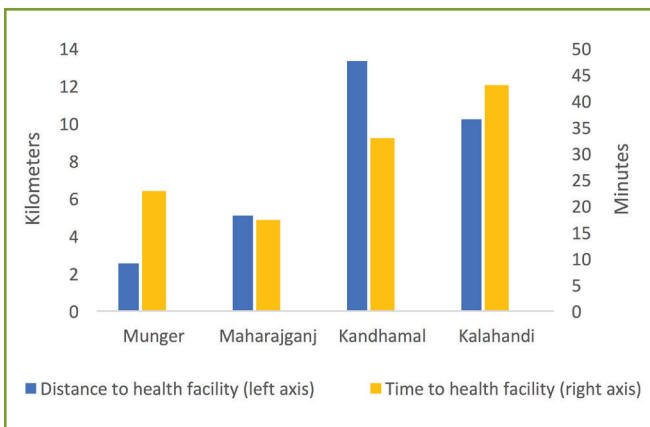


Figure 13. Access to health services

## Underlying causes of undernutrition

Access to antenatal and postnatal care - Access to antenatal services is important for the health and well-being of both mother and child. In India where maternal anemia is a public health concern, a key component is the awareness about and intake of Iron-Folic Acid (IFA) supplements. The place of delivery and postnatal support (e.g., source of information about breastfeeding) also determine maternal and child nutritional outcomes.

Institutional deliveries - On average, 69% of deliveries took place in a public hospital, 20% at home, and 11% in a private hospital. According to NFHS data, 42% of births took place in a public facility.

Access to iron-folic acid supplements - Thirty percent of women learned about iron-folic acid (IFA) supplements from a private source. Less than 10% of women had access to primary health care facilities, and 88% of women had access to an Auxiliary Nurse Midwife (ANM).

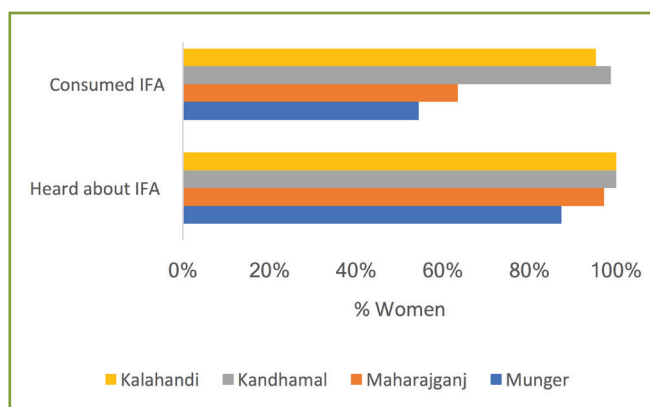


Figure 15. IFA supplements: Consumption and awareness

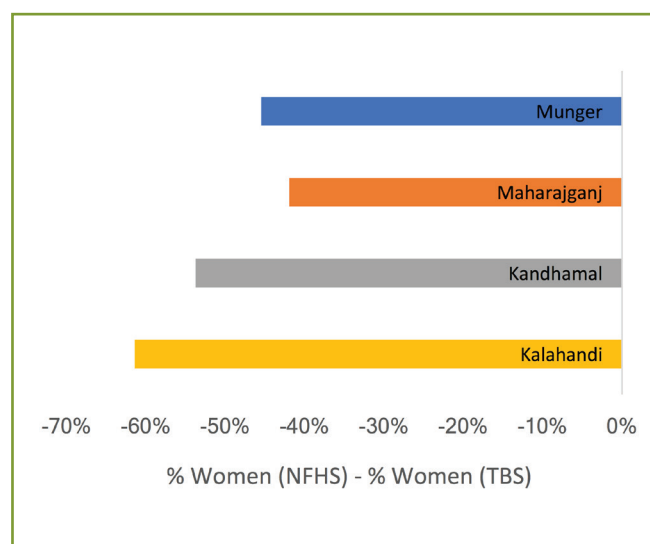


Figure 16. Comparison of women consuming IFA between TARINA Baseline Survey data and National Family Health

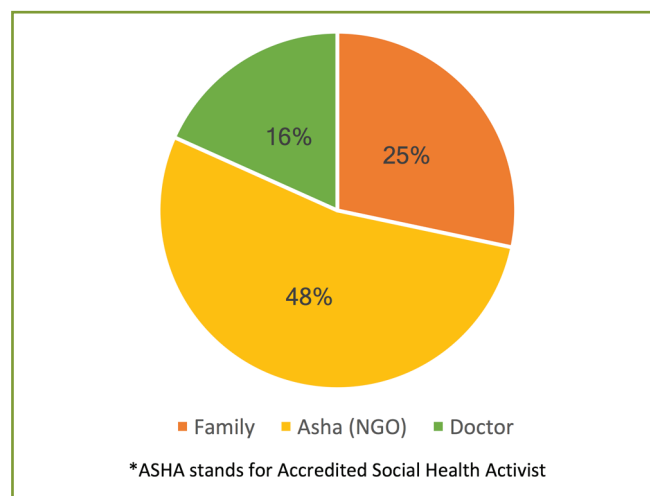


Figure 17. Sources of information about breastfeeding

## Underlying causes of undernutrition

### Role of water, sanitation, and hygiene (WASH) –

Access to clean drinking water, latrines in the household, proper handwashing practices, and a hygienic household environment can influence nutritional status by preventing the incidence of diseases like diarrhea and intestinal parasitic infections (roundworm, hookworm), as well as the transmission of fecal pathogens. Not only does an unhygienic environment directly cause illness, it can also hamper the process of nutrient absorption and thereby influence nutritional outcomes.

- In Maharajganj, less than 10% of all households had access to a latrine (Figure 18).
- Animal and human feces in the surrounding environment were observed in 40–50% of households in Kandhamal and Kalahandi. In Munger and Maharajganj, the proportion of households where animal feces was observed was around 25–30%.
- In Kandhamal and Kalahandi, more than 50% of households clean the water sourced from open wells, as compared to less than 30% of households in Munger and Maharajganj (Figure 20).

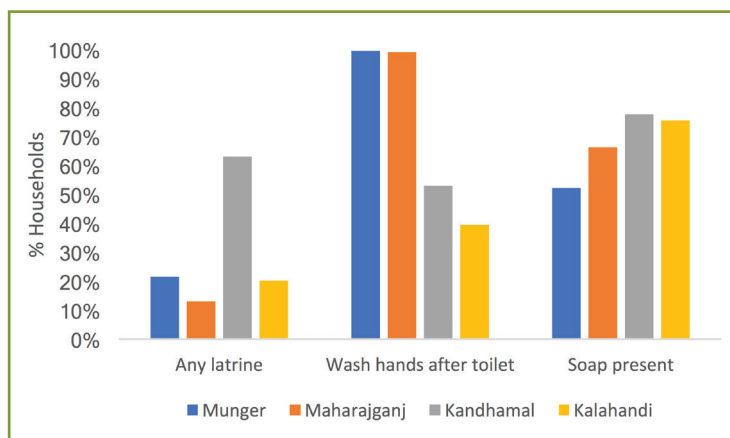


Figure 18. Sanitation and hygiene

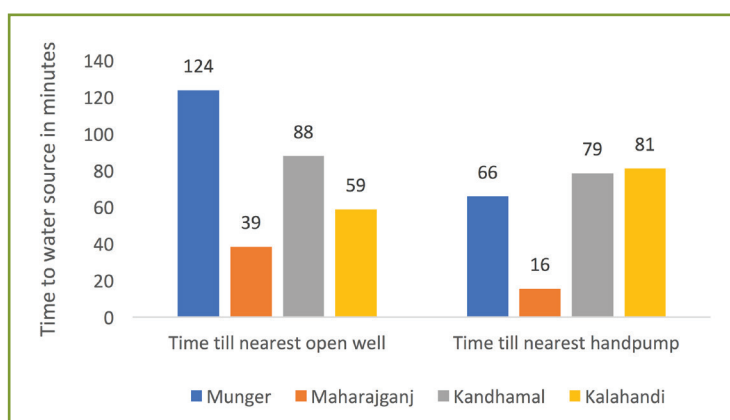


Figure 19. Access to clean source of drinking water

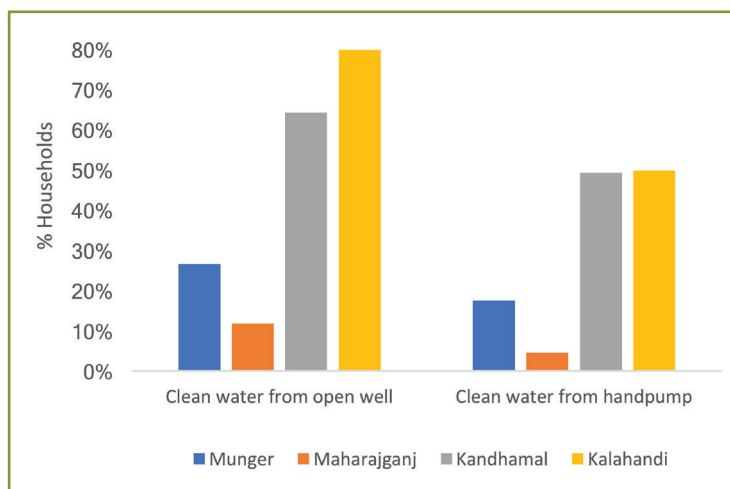


Figure 20: Practice of cleaning drinking water



## Key findings

1. Across states 1 in 5 children have poor anthropometric outcomes.
2. Almost 30% of children are stunted across the four TARINA districts. The proportion of acutely malnourished children in Bihar and Uttar Pradesh (31.4% and 31.8%, respectively) is double that of Odisha (15%).
3. 1 in every 5 women in the sample is underweight. The proportion of women underweight (BMI < 18.5) is largest in Bihar.
4. Women's intake of diverse diets is low across districts, although higher in Odisha (5 out of 10 food groups consumed), relative to Uttar Pradesh and Bihar (4 out of 10 food groups consumed).
5. Fewer women in Bihar and Uttar Pradesh breastfed immediately (60% and 55%, respectively). These two states also have a higher proportion of women who stopped breastfeeding before 6 months (31% and 39%, respectively).
6. Health services are difficult to access and less affordable in Odisha, as compared to Bihar and Uttar Pradesh. On average, the distance to the nearest health care facility is 20 km higher in Odisha than in Uttar Pradesh and Bihar.
7. Uttar Pradesh and Bihar have fewer households with latrines (21% and 13%, respectively), as compared to Odisha. However, Odisha has a 20% higher proportion of households with an unhygienic environment, as observed by our survey team.
8. NFHS data overestimates the poor nutritional status of women (underweight) and children (underweight, stunting). At the same time, it underestimates the proportion of women who breastfed immediately and/or exclusively, the proportion of children who received vaccinations, and women's consumption of IFA supplements during pregnancy. This needs to be viewed in light of differences in sample size, methodology, and time at which the survey was implemented, among other factors.

## Recommendations

### **Recommendation 1: Immediate causes of malnutrition**

1.1 Ensure adequate dietary intake for women and children - An adequate dietary intake for women and children can be ensured through food-based approaches like the ones outlined below:

- Dietary diversification: Increasing the demand for and consumption of a more diverse diet can address the problem of inadequate dietary intake.
- Production: Activities such as diversification of agricultural production and the promotion of homestead gardens and backyard livestock systems can ensure food availability, income for food purchases, and reduction of seasonal food deficits.
- Fortification/Supplementation: An adequate intake of key micronutrients can be ensured by the use of food fortificants or supplements (e.g., iodine fortification of salt, IFA supplements for pregnant women, Take Home Ration for women and children from Aanganwadi centers).

Behavior Change Communication interventions can inform communities about locally available foods, their nutrient content, and improved storage and cooking practices to ensure nutrient retention.

1.2 Reduce the disease burden - The incidence of illnesses or infections can be reduced by ensuring awareness about a hygienic living environment and access to health services.

### **Recommendation 2: Underlying causes of malnutrition**

2.1 Improve access to health services - Investment in rural health infrastructure is a first step in ensuring availability of and access to health services. This includes health infrastructure like health centers and investment in the training of health care workers, as well as investment in complementary infrastructure like roads and transportation. Further, access can be constrained by the cost of accessing a hospital and the cost of treatment and medicines.

2.2 Improve spread of WASH - There is a need to emphasize the importance of clean water, availability and use of latrines, and the habitual washing of hands with soap. This requires investment in infrastructure (e.g., taps/hand pumps, toilets); support for maintaining the infrastructure (e.g., water for toilets); and information and awareness about improved WASH methods (e.g., behavior change campaigns to address problems with open defecation, to provide information about ways to treat drinking water, etc.). Synergies in improved nutritional outcomes can be achieved if the various WASH interventions are viewed as complementary to one another.

2.3 Promote uptake of antenatal care practices and IYCF - Antenatal care: Ensuring that women have adequate numbers of antenatal health visits that track fetal growth and weight of mothers, are informed about the importance of IFA supplements with access to them, and have access to Take Home Rations/food supplements.

Antenatal care practices need to be supported by information about and means to ensure that all births take place at an institutional facility and that all births are registered.

IYCF: Providing women with support/information about breastfeeding and complementary feeding, the importance of deworming and vaccinations, and counseling on nutrition-related matters.

### **Recommendation 3: Addressing basic causes of malnutrition**

The basic causes of malnutrition are those that directly or indirectly influence underlying causes like the ones discussed in this fact sheet. These examples of basic causes of malnutrition should be addressed for improved nutritional outcomes by ensuring adequate access to productive resources, such as land, labor, and income; providing adequate education levels; and addressing women's status, with attention to the surrounding political and environmental climate.

### **Recommendation 4: Improved metrics/ data**

4.1 Inadequate data - Nationally representative surveys like the NSSO and NFHS in India collect data on a range of modules. Specifically, for malnutrition the use of modules like IYCF, antenatal care, and anthropometry seems fairly standardized. However, other determinants of malnutrition are often not featured in these surveys. One glaring example of this omission is the problem with data on dietary intake. While the NSSO collects food expenditure data at the household level, the NFHS (in its latest round) has collected dietary diversity data on diets of women, men, and children. The latter, however, uses a set of food groups that are not consistent with traditional food groups specified by FAO: this again restricts the extent to which dietary diversity data can be compared against such secondary data sets. A consistency across surveys, using a minimum set of nutrition-related metrics, will ensure that all key aspects of malnutrition and its causes are being investigated. Toward this end, the following additional indicators can be included (Pingali and Ricketts 2014):

- Indicators to complement anthropometry: biochemical assays like hemoglobin and retinol levels for anemia and vitamin A deficiency, respectively
- Indicators to complement dietary diversity scores: market diversity data that collects information on supply and prices of diverse foods, preferably using a monthly frequency
- Identification of other indicators of environmental health that can influence nutritional status, in addition to WASH

4.2 Frequency - The NFHS collects data every 5 years, and the most recent data are from 2015–16, whereas the TARINA data are from a baseline survey conducted in 2018. Therefore, it is hard to obtain accurate comparison measurements between data from different periods. The issue of frequency also becomes important from the point of view of seasonal variations in factors, which can influence malnutrition, for example, dietary intake and incidence of disease.

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*Soumya Gupta (sg672@cornell.edu) is an Economist and Dhiraj Singh (dks97@cornell.edu) is a Researcher & Data Analyst at the Tata-Cornell Institute's TARINA Center of Excellence in New Delhi.*

*Vanisha Sharma (vs453@cornell.edu) and Naveen Sunder (fn63@cornell.edu) are both Research Assistants for the Tata-Cornell Institute, based in Ithaca, NY.*