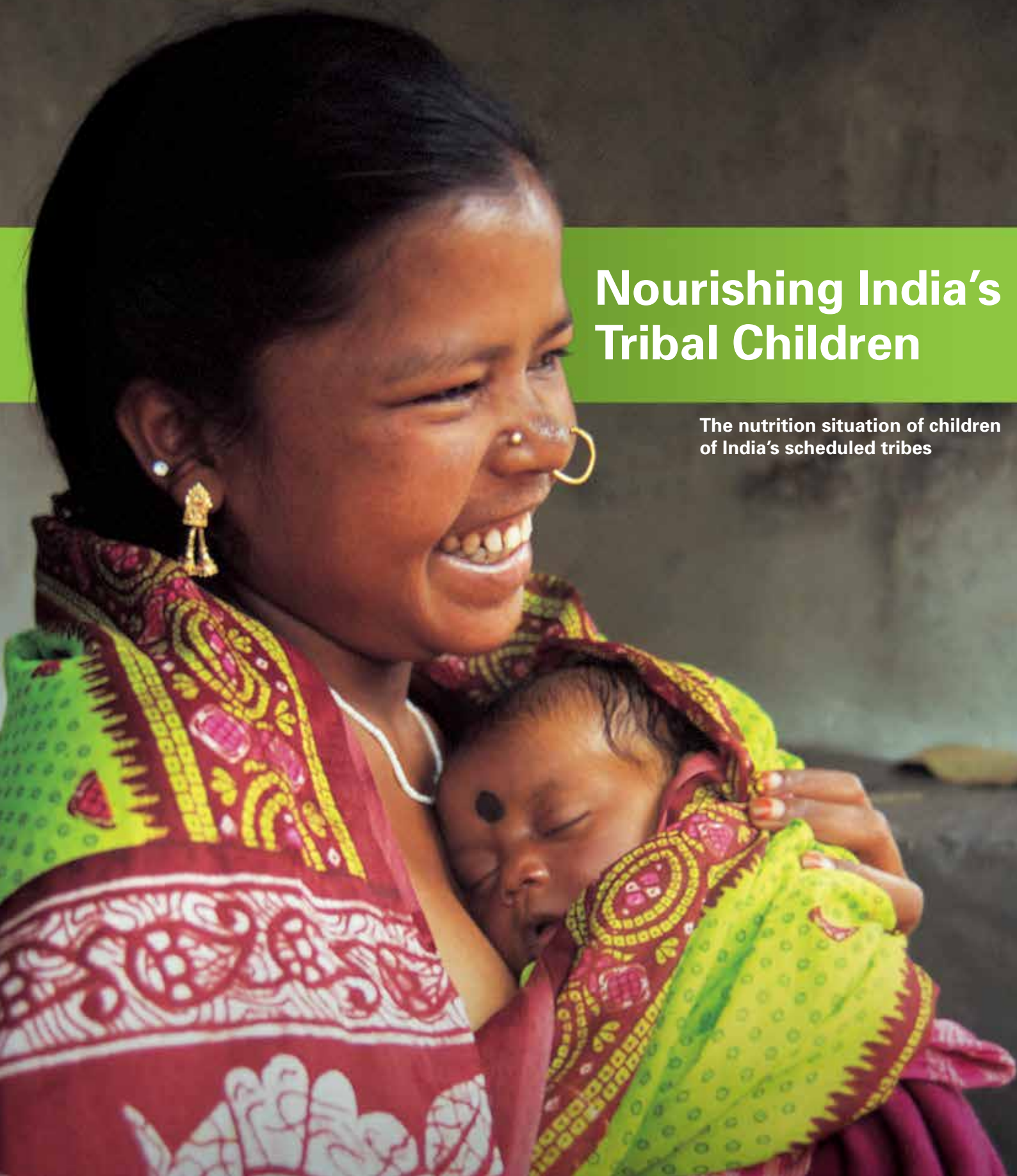


Nourishing India's Tribal Children

The nutrition situation of children
of India's scheduled tribes





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of India's scheduled tribes**

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Foreword

India's tribal communities continue to remain the most nutritionally deprived social groups in the country. It is undeniable that their deprivation is influenced by a cobweb of factors ranging from poverty and hunger due to loss of forest land and livelihood, poor re-habitation measures, poor reach and quality of essential food and nutrition services during critical periods of life, geographical remoteness, weak governance and inadequate accountability mechanisms.

More than half of tribal children under five years of age in India are stunted and fail to meet their potential for growth and development. Child stunting is potentially the biggest threat to children's growth and development. Stunted children have stunted bodies, stunted brains and stunted lives. Stunted children are more likely to fall ill, fall behind in class and when they start work, do not perform as well and earn less than their non-stunted peers.

At UNICEF, we are united in our belief that all children, the world over, have the same growth and development potential. We also firmly believe that each of us has a moral obligation to do more to support every child to realize his/her full development potential and more so to those who are most deprived.

UNICEF India is, therefore, marshalling a series of efforts to unmask, voice and address nutrition deprivation among India's tribal children. This publication, the first of its kind, is among these efforts and aims to re-open public discourse around drivers of nutrition disparities between tribal children and non-tribal children, synthesize affirmative action policies and national programmes, and present solutions.

Nourishing India's Tribal Children urges public servants and practitioners to make 'nutrition of tribal children' a priority, and encourages inter-ministerial coordination and accountability to ensure reach and coverage of essential nutrition interventions in tribal-dominated blocks/pockets, which couple livelihood with nutrition promotion, establish partnerships with grassroots organizations and community collectives, and use disaggregated tribal nutrition data. Importantly, the measures should include supporting strict vigilance against poor legislative enforcement protecting the land and forest of tribal communities, and investing in collective tribal leadership to give them a voice to safeguard their children's health and future.

I hope that this publication will encourage all stakeholders to support and adopt proven services and nutrition practices that will help tribal children grow and develop to their full potential.



Louis Georges Arsenault
Representative
UNICEF India



Executive summary

Introduction

India occupies a hot spot in the global map of childhood stunting as 61 million (37%) of the 165 million stunted children aged under five years globally are Indian children. Within India, stunting is highest (54%) among tribal children. Constitutionally referred to as 'scheduled tribes', tribal communities are among the poorest social groups in the country. Little is known about the determinants of stunting among tribal children and affirmative actions for their nutrition improvement. This study – among the first of its kind – describes levels, severity and determinants of stunting among India's tribal children and compares these with non-tribal children. Importantly, it synthesizes legislations, policies, programmes and 12 promising practices from Indian states for improving their nutrition situation and suggests a way forward.

Methods

The geographical scope of the study covers scheduled tribe children aged under five years residing in rural areas of 11 Indian states – united Andhra Pradesh*, Assam, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and West Bengal – where 85% of India's scheduled tribes live.

The study uses a mix of four analytical methods:

1. Secondary analysis of India's third National Family and Health Survey. The study sample comprised children under five years of age

(1,606 from scheduled tribe households and 6,108 from non-scheduled tribe households).

2. Desk review of published and unpublished literature to identify constitutional provisions, policies, government schemes/programmes and programmes of non-governmental organizations (n = 16) for improving nutrition of tribal children.
3. Interviews with key informants (n = 32) to supplement information from the desk review.
4. Case reports (n = 12) of promising practices in states.

Results and discussion

1. **Every second tribal child was stunted with the bulk of stunted tribal children severely stunted.**

Levels of mild and moderate stunting were similar in tribal and non-tribal children. However, severe stunting was 9 percentage points higher in tribal children compared to non-tribal children (29% vs. 20%) and the obvious reason for the nine-point difference in stunting (HAZ <-2SD) between tribal and non-tribal children (54% vs. 45%). Significant determinants of severe stunting in tribal children included: child's increasing age, birth order and gender, maternal factors (maternal stunting, age, pregnancy interval and illiteracy) and household poverty. Infant and young child feeding and sanitation practices were abysmally poor overall in the sample.

* Andhra Pradesh in this report refers to the united state before bifurcation. In June 2014, Andhra Pradesh was bifurcated into two states - Telangana and Andhra Pradesh.

Programme implication

Addressing severe stunting is imperative to achieve any gains in reducing stunting in tribal children. Given that severe stunting in tribal children is predicted by multiple factors, an integrated approach addressing nutrition, health, family planning, water, sanitation, poverty alleviation and care for women is needed. Evidence on implementation of such an integrated nutrition approach is still very nascent in India.

2. Focusing on the first year of a child's life is critical in tribal communities, as much of the (postnatal) damage has already occurred by 11 months of age.

The proportion of stunted tribal children increased with increasing age. One quarter of tribal children aged 0-5 months were stunted. Stunting and severe stunting doubled in the 6-11 months period and by 18 months, 75% tribal children were already stunted. With only 2% tribal children aged 6-11 months fed complementary foods in recommended quality and frequency, the decline in mean height-for-age Z (HAZ) score from 1.0 in 0-5 months to -1.5 in 6-11 months was not surprising. Importantly, one unit improvement in diet diversity (of complementary food fed) resulted in a 0.4 SD improvement in mean HAZ.

Programme implication

Improvement in complementary feeding practices for tribal children in the 6-11 months period can prevent a decline in mean HAZ. The desk review highlighted that approaches that work on-ground to improve the complementary food and feeding practices are repeated home counselling visits, group recipe demonstrations and feeding sessions by frontline workers, supported by mother support groups and crèches for children aged 6-36 months.

Given that supplementary food is already provided to children aged 6-36 months under the Integrated Child Development Services, addressing barriers hindering its access, quality and utilization will accelerate the above-mentioned efforts.

3. Improving maternal nutrition is key to reducing stunting in tribal children.

Maternal undernutrition emerged as a key determinant of stunting in tribal children. If the mother was stunted, the likelihood that the tribal child was stunted increased twofold. The reasons for high maternal undernutrition in tribal communities were obvious – 68% mothers were less than 20 years old, 48% mothers were undernourished themselves, 76% mothers were anaemic and birth orders ranged from 1-12 (mean (SD): 3.29 (0.25)).

The risk of severe stunting was nearly twofold higher for girls aged 6-23 months compared to boys indicating that gender could play a role in caring practices, even among tribal families.

Programme implication

Assuring adequate maternal nutrition prior to and after conception can reduce risk of stunting. Periodic nutrition assessments of newly wed and pregnant women during nutrition and health outreach sessions, followed by instituting corrective measures for those women identified as undernourished or at-risk is crucial. These measures could include enrolling undernourished women for special feeding, behaviour promotion and confidence building sessions. In these sessions, information on various schemes/entitlements can be provided and the harms of too early, too close and too many pregnancies can be emphasized.

Lessons can be learned from Andhra Pradesh and Chhattisgarh where community-run day care centres provide meals and counselling to pregnant women and breastfeeding mothers as well as link them to livelihoods, entitlements and essential nutrition and health services.

4. Nutrition programming for tribal children should not ignore their socio-economic deprivation.

Nearly 85% tribal children in the sample belonged to families in the two poorest wealth quintiles,

in which risk of severe stunting was three times higher compared to children in the two richest wealth quintiles. There is a tendency for trickling down nutrition schemes and overlooking nutrition action that cannot be decoupled from poverty and its core reasons. Land alienation, displacement and poor compensation, and rehabilitation provisions are reportedly core reasons for poverty among scheduled tribes. These are also the reported reasons for their trust deficit in government.

Programme implication

To eliminate undernutrition in tribal areas, linkage of livelihood promotion with nutrition programming is an absolute must as much as improving access to food and poverty alleviation measures. At the same time, nutrition programmes need to be extra sensitive and responsive to the reasons for the trust deficit that tribal communities have in government (which are largely due to governance and systemic failures), particularly in areas of conflict.

The desk review showed that in pockets affected by civil strife in Chhattisgarh and Andhra Pradesh where penetration of services is poor, partnership with livelihood promotion civil society organizations and faith-based organizations have worked to mainstream behaviour promotion and access to services. Such programming approaches deserve thorough documentation of impact and platforms for sharing the implementation modalities for the benefit of others.

5. Gender, beliefs, geographic distance and traditional healers affect care and referral in tribal communities.

Reliance of tribal communities on traditional remedies and healers even in life threatening situations delays them from seeking care. In addition, distance from facilities and opportunity cost, loss of wages, and cost of travel time to the facility and medicines are also core reasons why reliance on traditional medicine and healers remains high. Our analysis showed that median days for

seeking medical treatment/or care in tribal children with diarrhoeal infections was two days compared to one day for non-tribal children.

Presently, efforts to increase awareness and demand to access services among tribal communities are communicated in the local state official language. However, comprehending written and verbal communication of the local state official language remains a challenge for scheduled tribes, given that each tribe has a language of its own.

Programme implication

Communication respecting tribal beliefs, local festivals, customs, and traditional systems of medicine, diet and healers will be crucial while influencing their behaviours. Discourse should be folk-based, visually attractive and through trusted local women while engaging key influencers, importantly traditional healers.

6. Budgets are not a constraint in nutrition programming for tribal children.

The Planning Commission of India mandated apportioning funds by 28 central ministries and all state governments to tribal sub-plans (TSPs) in their annual plans. However, not all ministries and state plans apportion adequate funds for TSPs. The only state to legalize apportioning funds to TSP is Andhra Pradesh. Importantly, earmarking is done without considering priorities or purpose or track of the funds usage. Most TSP items are infrastructure focused with negligible nutrition-specific activities.

The Ministry of Tribal Affairs (MoTA), the nodal ministry for the welfare of scheduled tribes, has the power to convene inter-ministerial policy, planning and programme coordination for tribal children. So far, however, MoTA and its structures and coordinating bodies have never been tapped specifically for nutrition issues. Intersectoral liaising is a challenge with no designated officer

for scheduled tribes in line departments of states, except Andhra Pradesh where the Ministry of Health and Family Welfare (MHFW) has a health officer and senior government cadre officers in Integrated Tribal Development Agencies.

Programme implication

MoTA needs to move away from apportioning of funds to need-based budget allocation, which includes nutrition interventions and increased accountability mechanisms so that all related ministries earmark adequate funds for TSP. Formation of a tribal nutrition mission within existing missions or putting tribal nutrition as the first agenda point of intersectoral tribal task forces/committees will help to bring all related departments together to discuss strategies to reach out to tribal blocks with adequate budget pooling.

MoTA structures at block level need support to plan and anchor intersectoral effort. It is here that service non-governmental organizations (NGOs) and United Nations agencies can play a supportive role. A designated tribal office/unit in line ministries will give dedicated focus and support interdepartmental liaising for tribal children.

7. State governments have taken special initiatives to improve nutrition of tribal children but only few of these initiatives have been evaluated.

Line ministries have relaxed population norms in tribal pockets in various schemes related to nutrition, health, water, sanitation, food security and poverty alleviation. Mobile outreach services and free on-call referral transport services cover underserved tribal areas, and monetary and non-monetary incentives are provided to health personnel serving in remote tribal areas. Tribal communities in food insecure, drought prone hot spot zones also benefit from village grain banks.

Promising practices worth adapting in other states include hot cooked meals and nutrition promotion

for pregnant women by self-help groups and frontline workers (Andhra Pradesh), tag-tracking underweight tribal children by frontline workers and following them through extra home visits (Chhattisgarh), crèches for children aged 6-36 months (Maharashtra and Chhattisgarh), cash transfer for using primary health services (Maharashtra), partnership with service NGOs for service delivery in conflict areas (Chhattisgarh), social mobilization (Andhra Pradesh and Odisha) and setting up nutrition rehabilitation centres (Jharkhand). Efforts have also been made in Maharashtra for improving intersectoral coordination and accountability for nutrition action with focus on tribal children through an autonomous State Nutrition Mission.

However, remote tribal hamlets with poor road and transport connectivity make outreach and field monitoring challenging, which worsen in civil strife areas. Shortage of skilled human resource, high staff turnover and absenteeism are major problems in tribal areas, particularly in areas of conflict.

It is clear that differential programming for tribal communities is still not a practice as only one line ministry (MHFW) has a dedicated chapter for scheduled tribes in its plans and annual reports of line ministries only mention the proportion of budgetary allocation to TSP and do not mention any coverage, special schemes, allocations and expenditure for scheduled tribes. Most schemes targeting poor households assume that tribal concerns are tangentially addressed and only few state initiatives have been evaluated for nutrition impact.

Programme implication

Scope for experimentation, contractual postings of paramedical, technical and managerial staff, flexi-budget pools and hamlet-based calculations should be an inherent part of tribal programming. Each line ministry should be mandated to have a separate chapter for scheduled tribes in their annual plans, and its allocations, expenditures and activities for nutrition of scheduled tribes may be considered to be made available for public scrutiny.

The host of innovations being undertaken in states demonstrates that with political and bureaucratic will, experimental programming and intersectoral coordination for scheduled tribes is possible. Mechanisms for cross-learnings and platforms for sharing state innovations need to be created. At the same time, these initiatives need to be evaluated prior to scale up. A designated officer for scheduled tribes and/or Tribal Programme Management Unit in line ministries will give dedicated focus and support interdepartmental liaising for improved access to nutrition services in tribal pockets.

8. Partnerships with NGOs and organized community networks can improve outreach, particularly in inaccessible tribal pockets.

NGOs have set up secondary-level hospitals, outreach health service outposts and free referral transport in remote forested pockets. In partnership with government, NGOs run anganwadis, nutrition rehabilitation centres for treatment of children with severe acute malnutrition and primary health centres in the remotest locations. Nearly all NGOs are engaged in training field functionaries and forming and mentoring women's groups.

As livelihood is a major concern among the tribal poor, NGOs have also organized thrift and credit self-help groups and supported them with livelihood options. A few NGOs have started crèches as most women work for long hours outside the home in tribal communities. Community involvement to generate demand and participate in improving access to services is an inherent component of NGO programmes.

However, the number and geographical coverage of NGOs working on nutrition issues in tribal areas are limited, which reduce further in civil strife affected areas. Nonetheless, there is untapped scope of mainstreaming nutrition issues through the livelihood promotion thrift and credit networks, which have huge penetration in the tribal areas.

Programme implication

Creation of partners' forums for formal engagement, simplified and transparent process for applying for funds as well as incentives for working in hard-to-reach areas will encourage more organizations to work in tribal areas. This will also create a knowledge platform for sharing replication-worthy practices.

9. Deficiency in nutrition data on tribal communities have to be overcome.

Periodic representative tribal data on nutrition for all states are scanty. Evidence on the nutrition of scheduled tribes is available at the aggregated level, which fail to account for the disparity among scheduled tribe groups (schedule V and schedule VI of the Indian constitution) and scheduled tribe blocks.

Programme implication

Tribal nutrition surveys conducted by the National Nutrition Monitoring Bureau should be extended across the country. Block-centric dashboard monitoring of a few actionable indicators periodically through tribal research institutes and field units of the National Institute of Nutrition, Indian Council of Medical Research, can provide real and effective delivery of inputs against outcomes. Government programme reporting and evaluation systems must be able to provide disaggregated information for scheduled tribes and should be in public domain and open to public scrutiny. The need to evaluate what works and why is an absolute must. This is where local academic institutions, civil society partners and tribal research institutes can play a key role.

10. Investing in leadership and empowerment of organized tribal women collectives while promoting nutrition behaviours is important.

The federation of organizations working for tribal communities has not been as strong as federations for other social groups. Rather, most efforts in tribal

areas are led by non-tribal leaders, reiterating the lack of tribal leadership. Schemes, programmes and forums where scheduled castes and scheduled tribes are represented together unintentionally favour scheduled castes, given their collective voice and numbers in political space.

Nearly all promising state practices (described in section 3.3 of this report) with visible impact had a core component of formal engagement with tribal women's collectives and community organizing through women's thrift and credit groups and federations in a rights-based framework. This demonstrates the power of tribal communities to change their lives and those of their neighbours when they are formally engaged partners in the process of change.

Programme implication

Investing in strengthening leadership of organized tribal community networks over a staggered period to support service delivery, voice their needs, promote behaviour change and vigilance is critical.

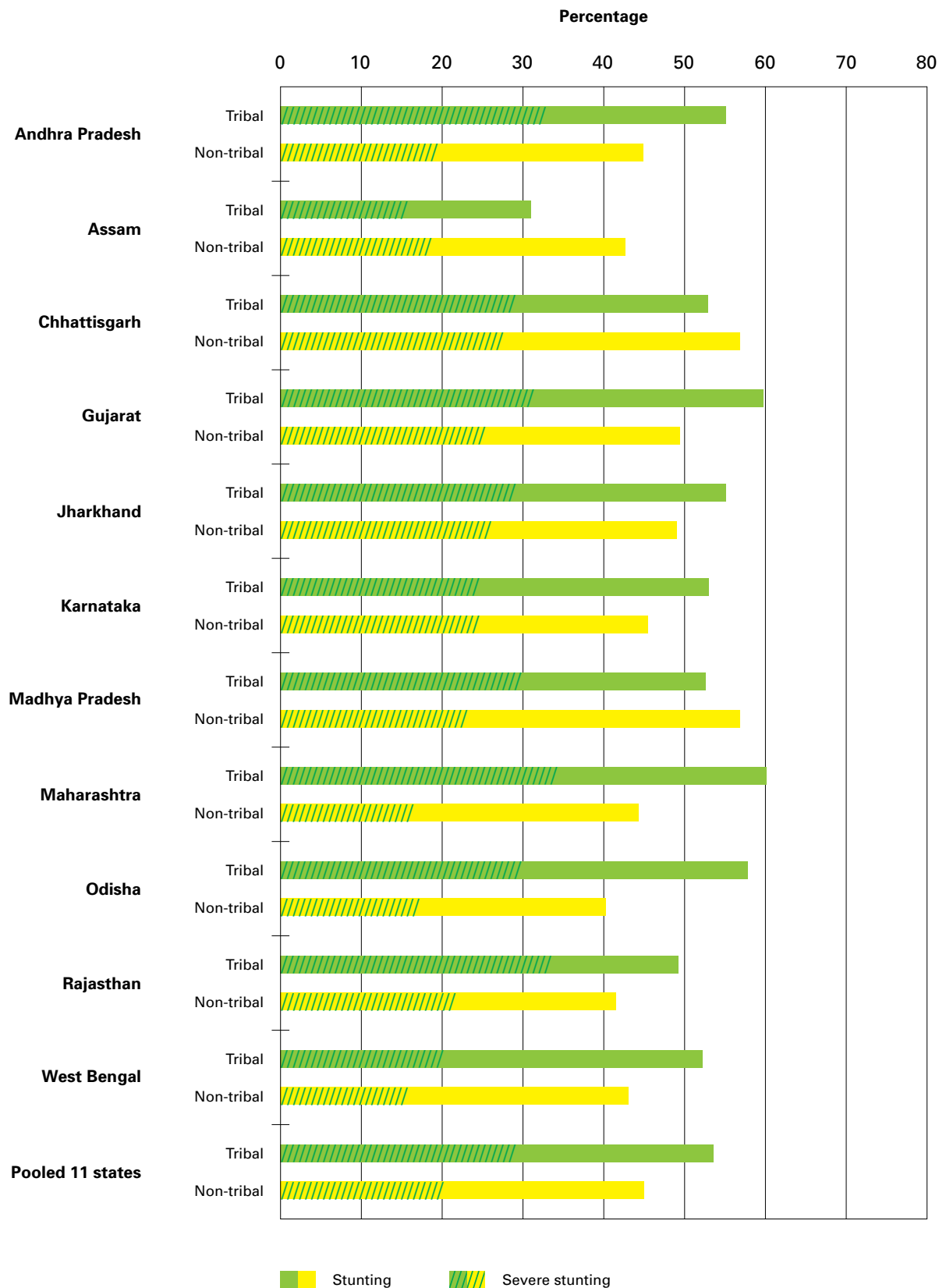
Conclusion

Addressing stunting among tribal children requires intersectoral coordination to focus on tackling underlying determinants of both stunting and severe stunting. Particular attention should be paid to:

1. Making 'nutrition of tribal children' a political and bureaucratic priority to stir dialogue, coordinated and differential planning, and better accountability for improving their nutrition. This can be initiated through a convening ministry such as MoTA or the Planning Department. A designated officer for scheduled tribes and/or Tribal Programme Management Unit in line ministries will give dedicated focus and support interdepartmental liaising for improved coverage and quality of nutrition services in tribal areas.

- 2. Creating a tribal nutrition forum** that will bring together all stakeholders working on tribal nutrition (including media), and ensure sharing of ideas and replication of worthy practices.
- 3. Reducing maternal undernutrition (before conception and during pregnancy) and improving quality and frequency of feeding complementary foods** in children aged 6-11 months is critical. Community nutrition and day care centres for pregnant women and breastfeeding mothers (Andhra Pradesh) and crèches for tribal children (Chhattisgarh) hold promise and should be tested and evaluated. Monthly pregnancy weight gain monitoring, identifying those at-risk and providing them a special care package is critical.
- 4. Linking livelihood promotion with nutrition promotion is important** as is focusing on identifying at-risk poor families and improving their access to food and poverty alleviation measures.
- 5. Collecting countrywide tribal nutrition data** by expanding the geographic scope of the National Nutrition Monitoring Bureau should be considered as well as building evidence on implementation of multisectoral coordinated approaches for improving nutrition of tribal children.
- 6. Forging partnerships and alliances with civil society, faith-based organizations and tribal women self-help group networks** to mainstream nutrition promotion, and support outreach penetration in the most inaccessible areas, especially those affected by civil strife. In tribal pockets where livelihood self-help federations are active, nutrition promotion can be mainstreamed with support of such federations.
- 7. Creating visually attractive communication based on the local belief system**, tapping local culture, beliefs and idols, and considering the low literacy level and poor comprehension of Hindi text in tribal communities will improve the impact of awareness campaigns.

Levels and severity of stunting in children in study sample by state (%)





1. Introduction

HIGHLIGHTS

01

There are 11.5 million scheduled tribe children under five years of age in India.

02

More than half (54%) of India's scheduled tribe children under five years of age are stunted.

03

Little is known about the determinants of stunting in tribal children in rural areas and the affirmative actions to improve their nutrition situation.

Undernutrition jeopardizes children's survival, growth and development. Stunting is among the worst and chronic forms of undernutrition¹. Simply stated, a stunted child is significantly shorter than would be expected for his or her age. According to the World Health Organization (WHO), children are considered stunted when their height is more than two standard deviations (SD) below the median height-for-age of the WHO Child Growth Standards².

Stunting in early childhood adversely affects children's survival and for those who survive, it causes lasting damage, including poor performance at school, reduced lean body mass, short adult stature, lower productivity, reduced earnings and – when accompanied by excessive weight gain later in childhood – a higher risk of chronic disease³. The main causes of stunting in children are intrauterine growth restriction during prenatal life, inadequate feeding to support rapid growth and development in infancy and early childhood, frequent infections due to unhealthy environments and poor access to essential health services^{1,3,4}.

India occupies a hot spot in the global map of childhood stunting as 61 million (37%) of the 165 million stunted children aged under five years globally are Indian children⁵. According to the latest available data, 48% of India's underfives are stunted. This figure is as high as 54% among the children of India's scheduled tribes⁶. They are among the poorest and most deprived social groups in the country⁷.

India's tribal population is commonly called *adivasi* (earliest dwellers), but also *vanya jati* (forest castes), *van vasi* (forest dwellers), *janjati* (folk communities), *girijan* (hill dwellers) and *adimjati* (primitive castes). However, constitutionally they are referred to as 'scheduled tribes'. The term 'indigenous' is not officially recognized in India since that would mean that the majority of Indians are non-indigenous, non-original inhabitants of the Indian territory.

Today, there are 104 million people⁸ from 705 distinct scheduled tribes⁹ (ranging from 44 Onges

to over 7 million Gonds) that represent 8.6% of India's population⁸. Within this population, 11.5 million are under the age of five years. More than half (54%), or 6.2 million of these tribal children are stunted in India⁸.

The majority of India's tribal population (90%) live in rural areas⁸. Tribal communities in rural areas are undisputedly the most deprived social groups in India with poverty rates (47%) similar to those found in the general population 20 years ago¹⁰. They live in hills, forests and difficult-to-reach geographical areas with limited access to public services. According to the Census of India 2011, only 14% of the tribal population in rural areas have a source of drinking water within their premises¹¹ and less than half (46%) have electricity in their households¹².

Studies between 2006-2012 in different states of India indicate that the prevalence of stunting among tribal children under five years of age, in rural areas, ranges between 50% and 60%¹³⁻¹⁹. However, little is known about the main determinants of stunting among tribal children and whether they differ from non-tribal children. Similarly, little systematic documentation is available about specific programmes and strategies to improve the nutrition situation of tribal children in rural India.

Study objectives

The objectives of this study are to:

1. assess the levels, severity and determinants of stunting and severe stunting among tribal children in rural India and compare them to non-tribal children;
2. review existing affirmative actions for improving nutrition of tribal children and discuss challenges impeding their implementation;
3. document promising state practices in nutrition programming for tribal children; and
4. suggest potential programme options to address stunting among tribal children in rural India.



2. Methods

HIGHLIGHTS

01

The study was conducted between April and December 2013.

02

The geographical scope covered scheduled tribe children aged under five years living in rural areas in 11 states.

03

The study used a mix of analytical methods including multivariate analysis, desk review, interviews and case reports.

This study was conducted between April and December 2013. The geographical scope of the study is scheduled tribe children residing in rural areas of 11 Indian states – united Andhra Pradesh^[1], Assam, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and West Bengal – where 85% of India's people belonging to scheduled tribes live⁸.

The study uses a mix of analytical methods including:

- **secondary data analysis** of India's National Family and Health Survey 2005-2006 (NFHS-3);
- **desk reviews** of published literature to identify constitutional provisions, policies, and government and non-government programmes aimed at improving nutrition of tribal children;
- **interviews with key informants** to supplement information from desk reviews; and
- **case reports** of 12 promising practices from eight Indian states aimed at improving access to nutrition information, counselling, support and services for tribal children and their mothers.

2.1. Levels, severity and determinants of stunting in tribal children in rural India

To assess the levels, severity and determinants of stunting and severe stunting among tribal children in rural India and compare them with their non-tribal counterparts, we analysed publicly available raw data of the National Family and Health Survey 2005-2006. NFHS-3 used a multi-stage cluster sampling design to collect nationally representative data on nutrition among other variables of maternal and child well-being. NFHS-3 methodology has been detailed elsewhere²⁰.

For the purpose of our analysis, we used NFHS-3 children's recode data set (n = 48,048). This data set contains one record for every child 0-59 months of age born to women of reproductive age (15-49 years) in the previous five years. From the children's recode data set, we selected the records of the last born children residing in rural areas in the 11 study states. Once the records

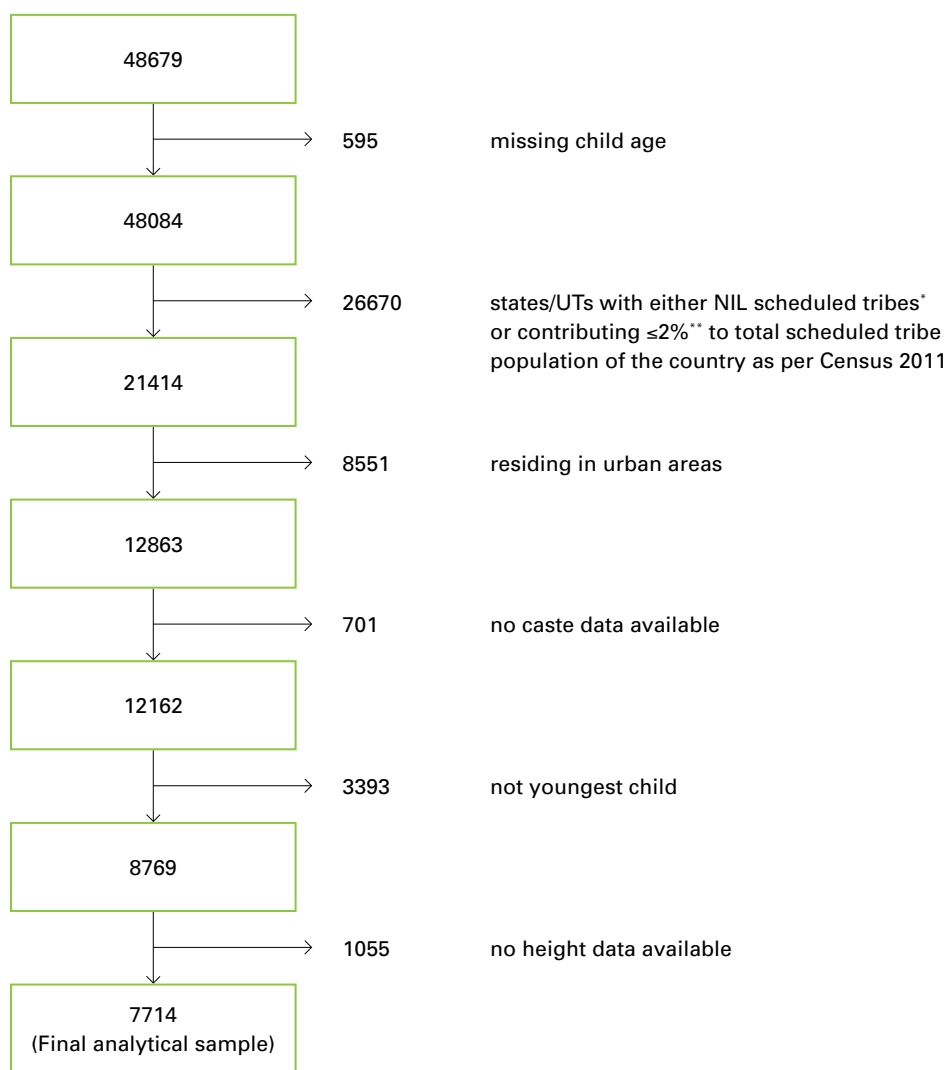
with missing data on social identity and/or stunting were excluded, the final data file used for the analysis included 7,714 records. NFHS-3 classified the *caste* variable as scheduled caste, scheduled tribe (ST), other backward caste and general caste.

We have used the term 'tribal' to connote 'scheduled tribes' depending on content flow.

For the purpose of our analysis, we operationalized the *caste* variable in two categories: tribal (which included ST households only) and non-tribal (which included scheduled caste, other backward caste and general caste households). Thus, the data file used for the analysis included: 1,606 children from ST households i.e., tribal, and 6,108 children from non-ST households i.e., non-tribal (see Figure 2.1).

^[1] Andhra Pradesh in this report refers to the united state before bifurcation. In June 2014, Andhra Pradesh was bifurcated into two states - Telangana and Andhra Pradesh.

Figure 2.1. Analytical sample and sample size used in the study, NFHS-3, 2005-2006



*Five states/union territories (UTs): Chandigarh, Delhi, Haryana, Pondicherry and Punjab

**19 states/UTs: Andaman and Nicobar Islands, Arunachal Pradesh, Bihar, Dadra and Nagar Haveli, Daman and Diu, Goa, Himachal Pradesh, Jammu and Kashmir, Kerala, Lakshadweep, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and Uttarakhand.

Four main sets of variables were included in the analysis:

1. Child characteristics: gender, caste, age, birth order, weight, height and reported birth weight of children who were weighed at birth.

2. Maternal characteristics: age, height, weight, body mass index, haemoglobin concentration, formal education, employment in the past 12 months, birth interval of last born child, number of prenatal visits during pregnancy, age at first

birth, autonomy in the use of the money earned for own use, smoking and tobacco use.

- 3. Household characteristics:** number of usual members, exposure to media and household wealth. In NFHS-3, household wealth was operationalized in the form of a wealth index created using principal components analysis (PCA) related to the possession of 33 assets or household characteristics. For our analysis, the cut-offs based on the wealth index were calculated for the analytical sample using PCA and households were divided into quintiles.
- 4. Feeding practices:** for the assessment of infant and young child feeding practices (IYCF), eight age-specific core indicators and one optional indicator recommended by the World Health Organization were used²¹ (see Box 2.1).

These four sets of variables were first compared between ST (tribal) and non-ST (non-tribal) children. In order to assess the determinants of stunting and severe stunting, data were analysed using bivariate and multivariate analyses. We used two binary outcome variables: i) stunted (i.e., HAZ<-2 / stunted =1, otherwise = 0); and ii) severely stunted (i.e., HAZ<-3 / severely stunted =1, otherwise = 0). Independent variables were chosen based on the theoretical and empirical literature²¹⁻²⁶ and categorized under following four domains: child characteristics, maternal characteristics, household characteristics and infant and young child feeding practices in the first two years of life.

As a first step, we ran cross-tabulations of the independent variables under each domain with each of the outcome variables and tested Pearson's chi-squared test for significance. The independent variables that were found to be statistically significant ($p < 0.05$) were then subjected to multivariate binary logistic regression adjusting for the covariates from the same and other domains that could influence the outcomes.

For the multivariate models, we operationalized two models. Model 1 included children under

five years of age and the first three domains (child characteristics, maternal characteristics, household characteristics) and Model 2 included children 6-23 months of age and all four domains (child characteristics, maternal characteristics, household characteristics and infant and young child feeding practices in the first two years of life). Finally, we also ran linear regressions, with Model 1 and 2, separately wherein height-for-age Z (HAZ) score was a dependent variable to test the association of independent variables with linear growth.

We used the svy technique to account for the complex survey structure of the NFHS-3, including survey strata and survey sampling weights. All analyses were conducted using STATA 12.1, StataCorp, Texas. All tests were two-tailed and presented either as Odds Ratio (95% CI) for dichotomous outcomes and beta-coefficient (95% CI) for continuous outcomes. Statistical significance was considered at $p < 0.05$.

We used NFHS-3 2005-2006 data set as it is publicly available, provides nationally representative sample size and a pool of variables for data analysis required to assess predictors of stunting among tribal children in rural India.

We chose to study stunting as an indicator of child undernutrition in the present study rather than underweight for two reasons, despite the latter being used for government reporting of child undernutrition in India. First, stunting captures linear growth, which is more indicative of nutrition in the intrauterine environment and of subsequent dietary quality, and second, stunting is considered a better indicator than underweight because it reflects a cumulative and intergenerational growth deficit, which cannot be reversed when children continue to remain in an environment marked by poverty, a scenario in which tribal communities continue to live^{22,27}.

Box 2.1. Infant and young child feeding indicators used in the analysis

| | |
|--|--|
| Early initiation of breastfeeding | Proportion of children under five years of age who were breastfed within one hour of birth. |
| Exclusive breastfeeding under six months | Proportion of children under six months of age who had consumed nothing other than breast milk in 24 hours preceding the survey. |
| Continued breastfeeding at one year | Proportion of children 12-15.99 months of age who were breastfed in the 24 hours preceding the survey. |
| Timely introduction of solid, semi-solid or soft foods | Proportion of children 6-8.99 months of age who received solid, semi-solid or soft foods at least once in 24 hours preceding the survey. |
| Minimum dietary diversity | Proportion of children 6-23.99 months of age who received four or more of seven food groups in 24 hours preceding the survey. Food groups were summed to generate a diet diversity score of the number of food groups consumed by the child. The seven food groups were infant formula, milk other than breast milk, cheese or yogurt or other milk products; foods made from grains or roots, including porridge or gruel, fortified baby food; vitamin A-rich fruits and vegetables; other fruits and vegetables; eggs; meat, poultry, fish, shellfish or organ meats; green beans, peas, lentils or nuts; and foods made with oil, fat, ghee or butter. |
| Minimum meal frequency | Proportion of children 6-23.99 months of age who were fed a minimum recommended number of times each day (age specific) in the 24 hours preceding the survey. |
| Minimum acceptable diet | A summary variable for children 6-23.99 months of age who met age-specific minimum recommended diet diversity and minimum recommended meal frequency and consumed a source of dairy (or were breastfed). |
| Consumption of iron-rich or iron-fortified foods | Children 6-23.99 months of age who received iron-rich/iron-fortified foods in the 24 hours preceding the survey. Iron-rich foods include meat and organ meats, fish, poultry and eggs. |
| Optional indicators | |
| Continued breastfeeding at two years of age | Children 21-23.99 months who were still breastfed. |

2.2. Review of affirmative nutrition actions for India's tribal children

To review existing affirmative actions for improving nutrition of tribal children and discuss challenges impeding their implementation, we conducted a literature search and interviews with key informants. The literature search was conducted in two stages. In stage 1, provisions within the Constitution of India, 12th National Five-Year Plan, 2007-2012, and national programmes aimed at improving the nutrition situation of tribal children – directly or indirectly – were searched.

In stage 2, initiatives for improving nutrition of tribal children by state governments and non-governmental organizations (NGOs) in the 11 study states were searched. Search engines such as Google Advanced, PubMed and JSTOR were used. The terms 'tribal', 'adivasi', 'nutrition', 'undernutrition', 'mothers', 'children', 'stunting', 'wasting', 'social welfare' and 'women and child department' were used – alone or in combination – as key words in the basic search strategy. Top 10 pages through this search with titles matching the study's objectives were included. Experts were contacted to facilitate access to unpublished data. The search timeline spanned January 2002 to September 2013.

For the constitutional provisions regarding tribal children, we searched the Constitution of India website (<http://indiacode.nic.in>) and included provisions either because of their exclusivity or on account of being pro-poor or pro-nutrition. Within the most recent five-year development plan (2012-2017), we reviewed the provisions and budget allocations related to 'Social Sectors' and within them those concerning 'Social Inclusion', 'Women's Agency and Child Rights' and 'Health'. We also searched the Ministry of Tribal Affairs (MoTA) website (<http://tribal.nic.in>) for plans and programmes for tribal children, given that this ministry is the nodal ministry for policy, planning and programme coordination for scheduled tribes.

In our search for special provisions and entitlements for tribal children in programmes and schemes run by other ministries working directly or indirectly on nutrition, we included five ministries:

1. Ministry of Health and Family Welfare (<http://nrhm.gov.in>), where the Tribal Reproductive and Child Health chapter under the National Rural Health Mission Programme Implementation Plans 2013-2014 for the 11 states was scanned;
2. Ministry of Women and Child Development (<http://wcd.nic.in>);
3. Department of Consumer Affairs, Food and Public Distribution (<http://fcamin.nic.in>) for information on food security initiatives;
4. Ministry of Rural Development (<http://www.rural.nic.in>) for information on sanitation and livelihood initiatives in tribal-dominated areas; and
5. Ministry of Drinking Water and Sanitation (<http://www.mdws.gov.in>) for information on access to and coverage of drinking water in tribal communities.

The state department websites of the above-mentioned ministries were also searched for any state initiatives. In order to keep the mapping of government initiatives manageable and coherent, the choice of ministries was limited to the above-mentioned five ministries, although it is acknowledged that nutrition is also influenced by other factors such as education, agriculture and social protection^{21,28}.

In addition, United Nations (UN) reports on poverty and/or exclusion²⁹⁻³¹, budget analyses of tribal sub-plans by researchers³² and planning commission evaluation of special central assistance to tribal sub-plans³³, Integrated Child Development Services (ICDS)³⁴ and total sanitation³⁵ were reviewed.

To understand nutrition programmes and initiatives for tribal children run by non-governmental/

Box 2.2. Organizations included in the review

| | |
|----------------|---|
| Andhra Pradesh | Society for Elimination of Rural Poverty Nature, Visakhapatnam district |
| Chhattisgarh | Jan Swasthya Sahyog, Bilaspur Ramakrishna Mission Ashram, Narainpur Christian Fellowship-Shore, Rajnandgaon State Health Systems Resource Centre, Jabalpur |
| Gujarat | Vasudhara Dairy Cooperative Union, Chikli Society for Education, Welfare and Action-Rural, Jhagadia |
| Jharkhand | Ekjut, West Singhbhum |
| Madhya Pradesh | Real Medicine Foundation, Jabalpur |
| Maharashtra | Society for Education Action and Research in Community Health, Gadchiroli |
| Odisha | Ekjut, Keonjhar Women Organization for Socio-Cultural Awareness, Keonjhar |
| Rajasthan | Action Research and Training for Health, Udaipur |
| Multi-states | Professional Assistance for Development Action Srijan World Vision India |

See Annex 7 for website addresses

civil society organizations, we first mapped non-governmental organizations implementing community-based programmes directly or indirectly influencing the immediate, underlying and basic causes of undernutrition in tribal children in the 11 study states. This initial mapping was shared with the UNICEF state nutrition specialists working in the 11 study states for validation and additions as relevant. Through this exercise, we shortlisted for detailed review the work of 16 non-governmental/government-aided organizations with an established record in working with tribal populations of at least 100,000. Having their work published in either peer reviewed journals or on their websites was considered to be a plus. These 16 organizations are listed in Box 2.2.

In addition, we conducted telephonic interviews and face-to-face interviews with 32 key informants directly or indirectly involved in implementation of programmes for tribal populations at the grassroots level to seek their perspectives, challenges and solutions to address undernutrition among tribal children. These key informants included UNICEF programme specialists handling the state nutrition portfolio (n = 4), UNICEF nutrition specialists handling national portfolio (n = 2), staff from the 16 shortlisted non-governmental or government-aided organizations (n = 13) and academicians/experts (n = 13). Names and affiliations of key informants are detailed in Annex 8.

2.3. Promising practices in states

To document promising practices in nutrition programming for tribal children in the 11 study states, the UNICEF lead nutrition specialist in each of the study states was requested to identify, in consultation with their respective lead state nodal government department partner, promising practices in: a) improving access to and use of essential nutrition services by tribal children and their mothers; or b) implementing nutrition programmes specifically directed at tribal children.

We defined a 'promising practice' as one which:

1. adds value and/or addresses gaps in the state flagship programmes for maternal and child nutrition;
2. is implemented at scale or with 'scalability' as part of its design; and/or
3. has shown results with qualitative/quantitative evidence of positive change³⁶.

Using these three criteria, 12 promising practices were identified. For each promising practice, the following information was compiled through an email questionnaire followed by face-to-face or telephonic interviews with the nutrition specialists: a description of the problem or situation that served as the trigger to initiate action; the action taken, timeline, geographical location, population group, key actors involved, implementation strategy, results, lessons learned, challenges and way forward. The promising practice was written in consultation with the lead nutrition specialist and validated by the state government partner before inclusion as a case report.



3. Results

HIGHLIGHTS

01

The bulk of stunted tribal children were severely stunted.

02

Maternal stunting and interpregnancy interval were key predictors of stunting and severe stunting in tribal children.

03

Maternal illiteracy, birth order, gender and poverty increased the odds of severe stunting in tribal children.

3.1. Levels, severity and determinants of stunting in tribal children of 11 states: An analysis of the National Family Health Survey 2005-2006

A total of 7,714 children under five years of age formed the analytical sample. Of these, 1,606 were tribal children and 6,108 were non-tribal i.e., from non-scheduled tribes. Background characteristics of the analytical sample are described in Table 1. Briefly, the sampled children were from six-member households, where poverty was high (60% households were in bottom two wealth quintiles) and open defecation was common (74%). Birth order of the children ranged from 1-12. Mothers of many of the children were under the age of 20 years (63%), anaemic (66%) and illiterate (52%). Weak contact with service providers was evident as 67% mothers of the children had not received any antenatal check-up while pregnant.

For most sample characteristics, tribal children fared worse compared to non-tribal children. For example, maternal indicators (education, anaemia and irregularity of employment) were 1.2-1.5 times poorer in children of tribal families compared to non-tribal children. Worryingly, nearly 85% tribal households were in the two poorest wealth quintiles (compared to 55% non-tribal households), and the proportion of children who had a bout of diarrhoea in past two weeks (11%) and not seeking any medical treatment/advice was higher for tribal children compared to non-tribal children (58% vs. 47%).

The infant and young child feeding practices in the sample are described in Table 2. Although exclusive breastfeeding was better in tribal children compared to non-tribal children (60% vs. 47%), complementary feeding was of particular concern. Only 16% children aged 6-23 months were fed the minimum recommended types of complementary foods (a proxy of recommended minimum diet

diversity), with this indicator being nearly three times lower in tribal children than in non-tribal children (10 vs. 28%).

Five key results are discussed in this section.

1. What were the levels and severity of stunting in tribal children?

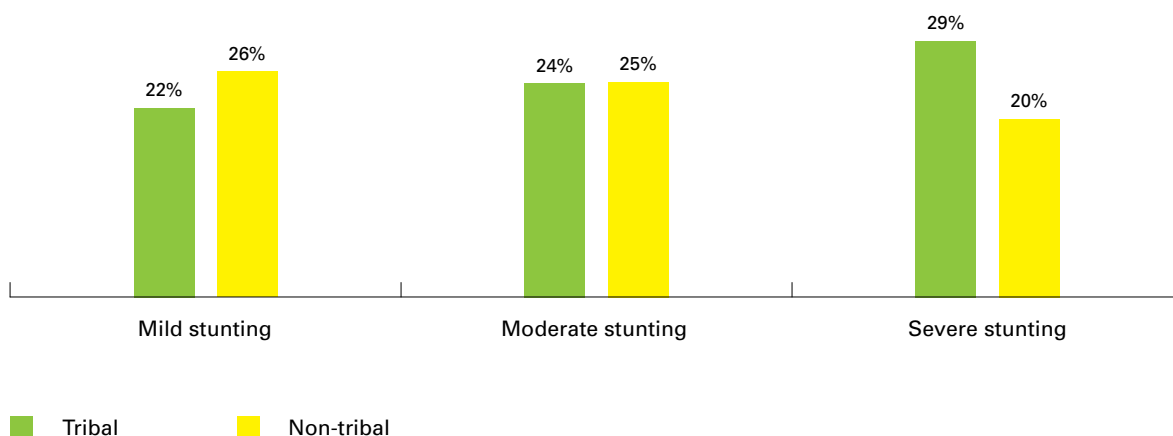
Prevalence of mild, moderate and severe stunting in sampled children is described in Table 3. Mild stunting was not significantly different between tribal and non-tribal children (22% vs. 26%). Moderate stunting was also ~25% in both tribal and non-tribal children. However, severe stunting was nine percentage points higher in tribal children compared to non-tribal children (29% vs. 20%) and also the obvious reason to account for the nine-point difference in overall stunting (HAZ <-2SD) between tribal and non-tribal children (54% vs. 45%) (see Figure 3.1). As the age of the child increased mean HAZ worsened and moved below -2SD in the 18 months and above age groups (see Figure 3.2).

2. What were the determinants of stunting in tribal children?

Determinants of stunting (HAZ <-2SD) in tribal children were ascertained through bivariate and multivariate logistic regression analyses (see Tables 4 and 5). Bivariate analysis showed that stunting in tribal children was high (~50%) across genders and birth orders (see Table 4.1).

Not surprisingly, the proportion of stunted tribal children was higher in all age groups compared to non-tribal children. The condition was worse if the child was from a poorer family (see Figure 3.3).

Figure 3.1. Severity of stunting in children under five years of age in study sample (%)



Prevalence of stunting among tribal children was significantly higher among those whose mothers were stunted, younger and with a narrower pregnancy interval. The odds of stunting increased twofold if a mother was stunted (Adjusted OR 2.0 CI, 1.1 to 3.5) or had a pregnancy interval less than two years (Adjusted OR 2.0 CI, 1.2 to 3.6).

Households that were poorer and practised open defecation had higher proportion of stunted children in bivariate analysis (see Table 4.3). However, both these factors were not statistically significant in regression analysis (see Table 5.1).

Given that complementary feeding practices have strong potential to impact stunting²², the association between complementary feeding and stunting for children aged 6-23 months was assessed, although the coverage of recommended complementary feeding practices was abysmally low. Bivariate analysis showed that stunting among tribal children aged 6-8 months was higher among children who were not initiated complementary

foods compared to those who were initiated complementary food (36% vs. 24%) (see Table 4.4). However, even among those few children aged 6-23 months who were fed complementary foods in minimum quality and frequency (6%), stunting was quite high (60%), indicating that much of the insult had already taken place to this age group.

Thus, three factors emerged as key predictors of stunting in tribal children:

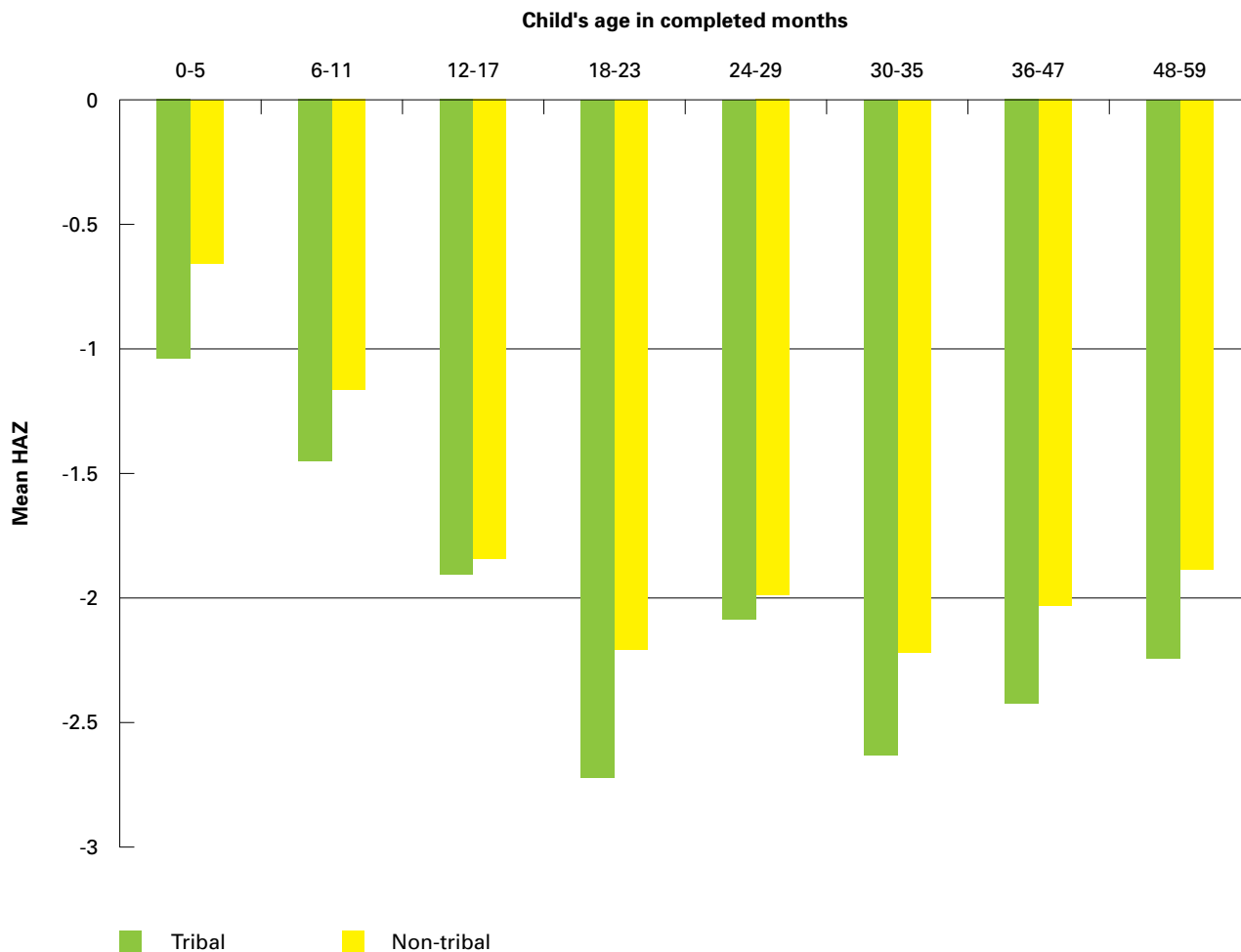
- Child's increasing age
- Maternal stunting
- Pregnancy interval less than two years

Additionally, tribal households that were poorer, practised open defecation and had not initiated complementary foods (to their infants aged 6-8 months) had higher proportion of stunted children.

3. What were the determinants of severe stunting in tribal children?

Given that the difference in overall stunting (HAZ <-2SD) between tribal and non-tribal children was

Figure 3.2. Mean HAZ in children in study sample by age (%)



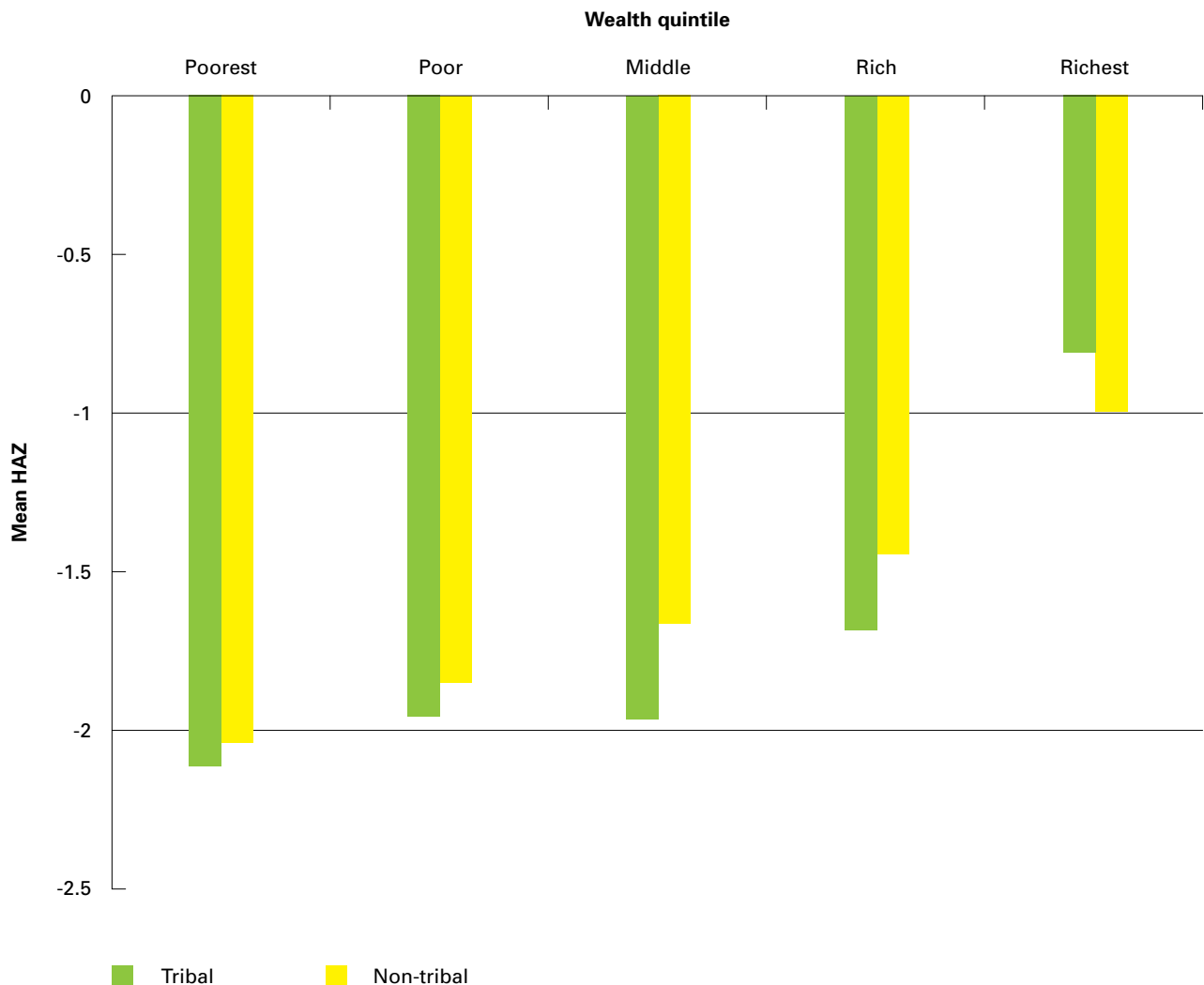
determined by severe stunting (HAZ <-3SD), we also assessed determinants of severe stunting in tribal children using bivariate and multivariate regression analyses. Results showed that the proportion of severely stunted tribal children increased with age, from 10% in children aged 0-5 months to 45% in children aged 18-23 months (see Tables 4 and 5).

Children with birth order 4 or more were nearly two times at higher risk of severe stunting (Adjusted OR 1.5 CI, 1.1 to 2.2) compared to the firstborn child. More girls compared to boys were severely stunted

(31% vs. 27%), with girls aged 6-23 months at 1.7 times higher risk of severe stunting compared to boys (Adjusted OR 1.7 CI, 1.2 to 2.4).

Maternal stunting and pregnancy interval of less than two years also predicted severe stunting in tribal children, just like they predicted stunting. The odds of being severely stunted was 1.8 times higher in tribal children if their mothers were stunted (Adjusted OR 1.8 CI, 1.2 to 2.7), 1.4 times higher if their mothers' pregnancy interval was less than two years (Adjusted OR 1.4 CI, 1.0 to 1.8) or were illiterate (Adjusted OR 1.4 CI, 1.0 to 2.0).

Figure 3.3. Mean HAZ in children in study sample by wealth quintile (%)



Household poverty influenced severe stunting. Odds of severe stunting increased by 3.4 times if the child was from a household in the bottom two wealth quintiles compared to a child in the top two wealth quintiles (Adjusted OR 3.4 CI, 1.3 to 9.0).

Among IYCF practices, bivariate analysis showed that prevalence of severe stunting in tribal children was twice lower among infants aged 6-8 months who were introduced complementary foods

compared to those who were not (11% vs. 21%, $p = 0.1$) and also slightly lower in children aged 6-23 months who were fed a minimum acceptable diet (30% vs. 37%, $p = 0.3$) (see Table 4.4).

Thus, severe stunting in tribal children was predicted by seven factors:

- Child's increasing age
- Birth order
- Gender
- Maternal stunting

Box 3.1. Summary of significant predictors of stunting and severe stunting in the sample

| Independent variables that emerged as significant predictors in the multivariate analyses (Tables 5 and 6) | Stunting (HAZ <-2SD) | | Severe stunting (HAZ <-3SD) | |
|--|----------------------|------------|-----------------------------|------------|
| | Tribal | Non-tribal | Tribal | Non-tribal |
| Maternal stunting | ✓ | ✓ | ✓ | ✓ |
| Pregnancy interval <2 years | ✓ | ✓ | ✓ | ✓ |
| Child's increasing age | ✓ | ✓ | ✓ | ✓ |
| Being the 4th or later born child* | | | ✓ | ✓ |
| Being a girl | | | ✓ | ✓ |
| Younger the age of mother (continuous) | ✓ | ✓ | | ✓ |
| Maternal illiteracy (no formal schooling) | | ✓ | ✓ | ✓ |
| Bottom two wealth quintiles compared to top two | | ✓ | ✓ | ✓ |
| Minimum diet diversity (4 or more food groups)* | | ✓ | | ✓ |
| Maternal smoking* | | ✓ | | |

*in children aged 6-23 months

- Pregnancy interval
- Maternal illiteracy
- Household poverty

4. Were determinants of stunting in tribal children different from non-tribal children?

Box 3.1 summarizes information on significant determinants of stunting and severe stunting that emerged from the regression analysis (see Tables 5 and 6). Child's increasing age, maternal stunting and pregnancy interval of less than two years emerged as significant predictors of stunting and severe stunting in both tribal and non-tribal children. Additionally, being the fourth

or later born child or being a girl, coming from a poorer family and maternal illiteracy increased the odds of severe stunting in both tribal and non-tribal children.

It should not be interpreted otherwise that poverty did not predict overall stunting in tribal children; rather, the inference is that because nearly 85% of the tribal sample were in the bottom two wealth quintiles, the stunting disparities were significantly different only when the stunting was severe. A similar analogy can be drawn for maternal smoking, open defecation and minimum dietary quality, where narrow intra-group disparities reduced the odds from being significant in regression analyses.

5. What were significant determinants of height-for-age Z score in tribal children?

The linear regression model assessing association between various child, maternal and household characteristics and feeding practices and mean HAZ is summarized in Table 6. The linear regression model predicted that as the diversity score (continuous), pregnancy interval and maternal height increase by 1 point, HAZ value improves by at least one point, in tribal as well as non-tribal children. Each unit improvement in diet diversity, as a continuous variable, improves mean HAZ by the same unit. This translates to a difference of ~0.4 SD between a child with diet diversity of 7 and a child with diet diversity of 1 (Table not shown), both in tribal and non-tribal children. It also shows that as the child's age, birth order and poverty increase by one unit, the HAZ (continuous) unit decrease is 0.7-0.9.

Programme implications

Five important inferences and programme implications can be drawn from the results.

1. Every second tribal child was stunted with the bulk of stunted tribal children severely stunted.

In tribal populations such as the study sample, levels of severe stunting in children would be alarming (~30%) and stunting disparities between tribal and non-tribal children would be determined to a large extent by severe stunting. Is this sample unique or is this a situation in which most rural Indian tribal children live? The latter is true as National Nutrition Monitoring Bureau (NNMB) surveys¹⁹ conducted in 120 tribal blocks across nine states in 1998-1999 and 2007-2008 have also showed that severe stunting among children aged 1-5 years have not changed significantly (from 31% in 1998-1999 to 28% in 2007-2008).

Our multivariate analysis showed that severe stunting in tribal children was influenced by a cobweb of factors including child's increasing age, birth order and gender, maternal factors (maternal stunting, age, pregnancy interval and illiteracy) and household poverty. Given that open defecation was a norm, it may not, therefore, have emerged as a significant predictor of severe stunting in tribal children. Similarly, infant and young child feeding practices were, overall, very poor.

Programme implication

Nutrition programming for tribal children needs to focus on addressing determinants of severe stunting for any gains in reducing stunting in tribal children. For this to happen, an integrated approach needs to be taken, addressing issues related to women empowerment, family planning, poverty alleviation, in addition to food, health, water and sanitation, and infant and young child feeding promotion interventions. Evidence on implementation of integrated programmes for tribal children is still very nascent, however, in India.

2. Focusing on the first year of a child's life is critical in tribal communities, as much of the (postnatal) damage has already occurred by 11 months of age.

We know that the 'window of opportunity' for reducing stunting is the period from conception until the first two years of life²², thus making the first two years after birth crucial. In tribal children, stunting doubled by 6-11 months of age, and by 18-23 months of age, 75% tribal children were already stunted. With only 2% tribal children aged 6-11 months fed a minimum acceptable diet, the decline in mean HAZ from 1.0 in 0-5 months to -1.5 in 6-11 months is not surprising. Linear regression analysis shows that the mean HAZ and diet diversity score was inversely related by 0.4 SD, but dichotomizing the diet diversity variable could not reflect this association.

Programme implication

Addressing the abysmally poor infant feeding practices among tribal children after 6 months of age is critical to prevent a decline in mean HAZ. Improving quality, uptake and utilization of already provided supplementary food to children after the age of 6 months in India's ICDS programme can play a critical role in this effort. Approaches that work on-ground to improve complementary feeding practices after 6 months of age are repeated home counselling visitations, group recipe demonstration sessions and crèches for children aged 6-36 months. Our analyses support that diet diversity influences HAZ⁵⁵ and argue against classifying the adequacy of diets using a binary categorical variable while examining its relationship with stunting, as this will result in low statistical power (resulting from random within-person error)⁵⁶.

3. Improving maternal nutrition is key to reducing stunting in tribal children.

Maternal stunting increased the odds of stunting and severe stunting in children by twofold. The reasons for maternal stunting in the sample are obvious – 68% mothers were less than 20 years old, 48% mothers were themselves undernourished, pregnancy intervals were narrow and birth orders ranged from 1-12.

Programme implication

To reduce stunting in tribal children, assuring adequate maternal nutrition prior to conception^{22,28}, good care during pregnancy, especially during first trimester, and preventing pregnancies – too early, too close and too many – are essential. Studies on different tribes across India show that 49%-64% tribal women are undernourished^{19,37-44}. Unlike children, regular nutrition assessment in women, especially pre-pregnancy and pregnancy weight monitoring, is not routinely done at field level.

Grassroots-level workers as part of health and nutrition days should do periodic assessment of undernutrition among women of reproductive age.

Corrective/mitigation measures for women identified as undernourished need to be instituted. These could include providing an additional food supplement to such women (on similar lines as being done for severely underweight children), enrolling undernourished women for behaviour promotion plus self-confidence enhancement sessions, improving their linkage to food subsidy and poverty alleviation programmes since they often come from food insecure and poor families, while continuing to simultaneously address maternal and gender education, and family planning.

4. Nutrition programming for tribal children should not ignore their socio-economic deprivation.

Nearly 85% tribal children belonged to families in the two poorest wealth quintiles. Stunting was 1.5 times higher and severe stunting was nearly 3 times higher in tribal children from families in the lowest two wealth quintiles. Several analyses⁴⁵⁻⁴⁹ show that household socio-economic status is by far the most robust single predictor of nutritional well-being; it is also the conventional view that higher undernutrition of tribal children is explained by their poverty status.

Poverty restricts number and quality of meals as well as cooking methods. Milk, fruit and sugar are almost absent from tribal diets^{19,41}. Indebtedness, poverty-induced food insecurity, starvation and hunger related deaths among tribal households have been reported a number of times, particularly in desert/drought prone areas^{16,50-54}. Land alienation, displacement and poor compensation, and rehabilitation provisions are often reported as core reasons for poverty in tribal families⁵⁰ as these adversely affect traditional food habits, livelihood and overall living conditions.

Programme implication

To eliminate stunting in tribal children, linkage of livelihood promotion to nutrition programming is an

absolute must, as is focusing on identifying at-risk poor families and improving their access to food and various poverty alleviation measures.

5. Gender, beliefs, geographic distance and traditional healers affect care and referral in tribal communities.

Traditionally, tribal societies are known for better gender indicators⁷. However, the finding that stunting was higher for girls than boys at age 6-23 months shows that gender could play a role in caring practices, even among tribal families. Denial of land rights to women⁵⁰ and polygamy in tribal pockets reinforce the need to address gender issues.

Alcoholism, tobacco and smoking, even during pregnancy, is culturally accepted and often used as a way to avoid meals⁵⁷ in tribal communities. Reliance on traditional remedies and healers even in life threatening situations delays tribal communities from seeking care. In addition, distance from facilities and opportunity cost, loss of wages, and cost of travel time to the facility and medicines are also core reasons why reliance on traditional medicine remains high.

Our analysis showed that median days of seeking medical treatment/care in tribal children

who were affected with diarrhoeal infections were two days as compared to one day for non-tribal children. Owing to a small sample affected by diarrhoea (n = 115), morbidities were not considered in multivariate analysis. However, it has long been recognized that infections can cause linear growth retardation. Open defecation was also a norm and practised by 90% of tribal families.

Nevertheless, there are some good practices, which remain untapped in programme communication. To name a few, wild food plants and coarse grains form an important part of tribal diets. Bhile tribes in Madhya Pradesh give wheat porridge cooked with jaggery (a palm sugar), coconut and desi ghee (milk fat) to women for the first few days after delivery. Many tribes adopt the practice of wiping washed utensils with leaves of a local plant to kill all disease-causing agents and maintaining a clean cooking area to remove any evil spirit.

Programme implication

It is essential in nutrition programming to understand traditions, culture and social norms in the tribal communities. Communication respecting their beliefs and tapping upon traditional systems of medicine, diet and healers will be crucial as it is a part of their culture and traditions.

3.2. Affirmative nutrition actions for tribal children – legislations, policies and programmes

The Government of India has taken several affirmative actions for the protection and welfare of scheduled tribes⁵⁹. However, with every third tribal child under five years of age suffering from severe stunting, it clear that they have not benefited from these actions nutritionally. Discussed below are eight key findings that emerged from the desk review and key informant interviews on affirmative nutrition actions – policies and programmes – for tribal children and their implementation constraints.

1. India's constitutional provisions and legislations protect rights of tribal children to good nutrition.

The Constitution of India protects the rights of tribal children to good nutrition both directly and by addressing its determinants such as food, land and livelihood security, and empowerment through articles 11, 21, 39, 46, 47, 243(d), 275(1), 330 to 342 and 366(25)⁵⁹. In accordance with Article 244(1) of the fifth schedule of the Indian constitution, economically backward administrative blocks in nine states where there is a preponderance of tribal population¹²¹ are declared as 'scheduled areas' and provided additional assistance, even though scheduled tribes may be an overall minority in that state⁶⁰.

Article 244(2) of the sixth schedule protects the administrative autonomy of scheduled tribes in tribal majority states – Assam, Meghalaya, Tripura and Mizoram⁵⁹ – through privileges of formation of district or regional autonomous councils with legislative, judicial and executive powers. Legislations such as the Panchayats (Extension to Scheduled Areas) Act (PESA) 1996⁶¹ and Scheduled Tribes and Other

Traditional Forest Dwellers Act 2006⁶² give power to tribal communities to protect, manage and control sale of their land, forest and natural resources, thus protecting their livelihood and food security.

The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013⁶³ promises fair compensation to land taken by the state for development purposes. The excise policy 1975⁶⁴ prevents any commercial vending of liquor in tribal areas and the draft tribal policy 2006⁶⁵, though yet to acquire legal legitimacy, is in public domain and aims at improving public accountability for scheduled tribes.

However, the problem is that land grabbing takes place regardless of legislations – through marriage or fraud by contractors/lenders as a means to recover debt from tribal families. Acquisition of forestland for development by the government is also crippled by problems of inadequate compensation, poor resettlement and livelihood arrangements, increasing indebtedness and poverty.

Many non-timber minor forest produce are of high value and are prone to commercial exploitation. Poorly implemented existing vigilance mechanisms have continued their market valorisation and mercantilism⁶⁶, keeping the share of tribal communities abysmally low. The state, the protector of the vulnerable, has been the biggest violator too. To augment revenue, commercial vending of liquor in tribal areas still persists in many states (in spite of its illegality).

Failure to protect the interests of tribal communities (despite legislation) has been perceived by them as the government's indifference and insensitivity to

¹²¹ Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha and Rajasthan

their needs and the distress caused to them through displacement (loss of land, livelihood, collective identity, culture and control over local resources).

How many in tribal communities even know there is a government? Their only experience of the state as being with police, contractors and real estate 'enforcers' has also been cited by authors⁵⁰. The fact that 32 out of 76 civil strife affected districts in the country are PESA districts^{66,67} shows that poor legislative enforcement is one of the core reasons for fuelling mistrust and civil strife⁶⁷. Civil strife results in massive internal displacements with community members forced to take sides between the state and the Maoists, and also leads to governance, administration and service delivery lock-jams⁵⁰.

Programme implication

There has been a tendency for trickling down of nutrition schemes and programmes, overlooking that any nutrition action cannot be delinked from the trust deficit that tribal communities have in government and broader systemic and governance failures. Nutrition programmes should also be extra sensitive to the needs of tribal communities and live up to promises so that they do not feel deceived each time they see government intruding in their spaces. Children residing in pockets affected by civil strife are most vulnerable and differential programming models in such areas need to be planned, with commensurate budget.

2. Budgets are not a constraint for nutrition programming for tribal children.

India's five-year plans have reiterated the need for area-specific planning for tribal areas time and again. Budgets are also not a constraint for programming for tribal areas. Since the fifth five-year plan (1974-1975), a separate tribal sub-plan (TSP) within the umbrella of the overall state plan has been in existence. TSP provides non-divertible and non-lapsable funds for welfare and development of

scheduled tribes⁶⁸ to specific administrative blocks where tribal population is 50% or more (see Annex 1). These blocks are called Integrated Tribal Development Projects/Agencies (ITDAs).

Each ITDA is headed by a project administrator and assisted by a special officer(s). District annual plans for each ITDA are to be prepared with participation of each sectoral department, approved by a district project level committee and forwarded to the State Department of Scheduled Castes and Scheduled Tribes (SC/ST) for consolidation and approval from the state planning department. Broadly, funds provided to TSP in the state plan budget have to be at least equal to the proportion of the scheduled tribe population of each state or union territory⁶⁸. Funds received are spent by sectoral departments in respective ITDAs.

The Department of SC/ST in TSP states also receives central funds. The Ministry of Tribal Affairs – the nodal ministry for tribal welfare – provides funds under the special area programmes of Special Central Assistance (SCA) to TSP and grants under Article 275(1) of the Indian constitution (see Box 3.2). SCA is a top-up fund provided primarily for income generating schemes to be implemented in TSP blocks. Article 275(1) funds are to meet costs of ITDA, administration and infrastructure, including educational infrastructure such as residential schools.

Additionally, a total of 28 central ministries and departments (see Annex 2) have an obligation through the Planning Commission of India for earmarking plan outlay funds for TSP in their annual plans, which are at least equal to the percentage of ST population in the country. The Ministry of Institutional Finance and bilateral agencies also provide funds for TSP blocks for specific programmes.

Finally, there are about 2,474 identified forest villages in 12 states, which are managed by State Forest Departments. Most of the inhabitants in these villages belong to scheduled tribes. Grants under SCA to TSP are also given for development

**Box 3.2. Releases under SCA to TSP and grant in aid under Article 275(1), 2009-2014
(in millions INR)**

| Year | SCA to TSP | Grant in aid under Article 275(1) |
|-----------|------------|-----------------------------------|
| 2009-2010 | 4812.4 | 3991.0 |
| 2010-2011 | 9016.9 | 9998.8 |
| 2011-2012 | 9623.4 | 10848.3 |
| 2012-2013 | 8112.9 | 8200.0 |
| 2013-2014 | 10499.9 | 10971.4 |

of these forest villages. But no funds were released in 2012-2013 and 2013-2014. Seven of the 11 study states have forest villages: Assam (n = 499), Chhattisgarh (n = 425), Gujarat (n = 199), Jharkhand (n = 24), Madhya Pradesh (n = 893), Odisha (n = 20) and West Bengal (n = 170).

A Coordination Committee has been set up under the chairmanship of the Secretary (Tribal Affairs) with representatives of various line ministries including Departments of Health and Family Welfare, School Education and Literacy, Drinking Water Supply, and Rural Development besides the Planning Commission to ensure adequate investment in basic amenities for scheduled tribes. The Committee met four times during the financial year 2013-2014.

However, the problem is that ITDAs do not necessarily convene need-based planning before submitting their sub-plans to the district project level committee. Often this sub-plan is prepared at district or state level. While the 12th five-year plan 2013-2017 mentions that nutrition interventions are to be reflected as a part of TSP, most TSP budget items are infrastructure focused and miss out on soft components, such as basic nutrition and health related outreach services. On the other hand, the TSP infrastructure budget also remains untapped for establishing primary health centres and nutrition rehabilitation centres, or for providing crèches and toilets in remote tribal areas. Most state and central ministry plans do not apportion funds to TSP according to the ST proportion.

Importantly, earmarking is done without considering priorities, purpose or even tracking the allocation usage⁶⁵. In 2012-2013, this earmarking was as low as 3.3% for Assam, 4.9% for Karnataka and 6.4% for Maharashtra⁶⁶. In 2013-2014, the average percentage of funds earmarked by the 11 study states did not show improvement (Annex 3). While the 28 central ministries earmarked funds in the years 2012-2013 and 2013-2014, the total funds earmarked was less than 6% of plan funds (see Annex 2). In many states, instead of resulting in additional resources as top-up, the state allocation is switched with the central allocation and hence the size of the resource pot, under TSP, is kept almost unchanged.

In addition, TSP is based on the assumption that spending money will automatically lead to development of scheduled tribes. This assumption underplays the role of effective enforcement of legislations to protect the interests of the tribal population (such as rights over land, forest and minor forest produce)⁶⁵.

The SCA to TSP also has its own set of problems. The proportion of SCA allocation to TSP by the central government has been less than 5% of the total TSP allocation in most states (except Assam), and coupled with huge paper work. Also, although meant for critical gap-filling, critical gaps are not identified and the SCA is transferred to the state scheduled tribe finance and development corporations for providing subsidy to the bank-linked income generating schemes, which are not, in any way, linked with the

sectoral schemes being implemented by the state governments under the TSP³³. As things stand, no publicly available data allow one to reliably track budgetary allocation and expenditure of nutrition programmes for scheduled tribes.

Programme implication

Plans need to move away from normative patronage of apportioning budget to tribal sub-plans to a need-based budget, which includes nutrition interventions. Plans and expenditures for scheduled tribes need to be publicly available and open to social audit. A block-centric plan designed by multiple stakeholders (including communities) needs to be experimented in its true spirit as envisaged in TSP. There are various schemes, including but not limited to TSP, that envisage multi-stakeholder cooperation and coordination. For this, ITDA needs strengthening, resources and support to anchor such an initiative. It is here that development agencies (NGOs and UN) can play a supportive role to facilitate decentralized planning and assuring tribal communities themselves are included in the planning process.

3. Ministry of Tribal Affairs structures and coordinating bodies remain untapped to address nutrition issues.

The Ministry of Tribal Affairs is the nodal ministry for convening, coordinating and reviewing intersectoral efforts for scheduled tribes. However, the primary responsibility for implementing nutrition programming for scheduled tribes rests with respective sectoral ministries. MoTA also financially supplements the efforts of sectoral ministries and their state departments through grants under SCA, Article 275 (1), and flexi-grants to socio-economically backward ITDAs for need-based projects⁶⁸. MoTA gives grant-in-aid to voluntary organizations e.g., for running 10 or more bedded hospitals and mobile dispensaries in tribal backward blocks.

The 17 Tribal Research Institutes of MoTA across the country support trainings, research and evaluations related to tribal communities. State tribal advisory

councils in various states (the fifth schedule states and Tamil Nadu, Uttarakhand and West Bengal), national and state commissions for scheduled tribes⁶⁹, national council for tribal welfare, and national commission and state commissions (in Maharashtra)⁷⁰ for denotified, nomadic and semi-nomadic tribes have been set up to monitor schemes and legislations, and ensure service safeguards for scheduled tribes.

However, the problem is that despite the presence of such bodies and MoTA, intersectoral coordination for nutrition action for tribal children has been negligible. Moreover, not all constituted bodies have met. For example, a meeting of the national council for tribal welfare was yet to take place during the study period. Absence of a vertical cadre, lean structure of ITDAs and a forum in which all sectoral ministries can periodically meet and work through coordinated actions for tribal children either does not exist or is not optimally utilized. With no designated officer for scheduled tribes in line departments of most states (except Andhra Pradesh where MHFW has a tribal health officer), intersectoral liaising for scheduled tribes is a challenge.

Programme implication

Nutrition indicators reviewed should be discussed in a manner such that they are disaggregated by tribal and non-tribal blocks as the burden of undernutrition is higher in tribal blocks. Activating the dormant tribal council and/or formation of a tribal nutrition task force/mission within existing task forces/missions will help to bring together all related departments to discuss common strategies to reach out to the tribal blocks comprehensively. A designated officer for scheduled tribes and/or Tribal Programme Management Unit in line ministries will give dedicated focus and support interdepartmental liaising for the welfare of tribal children.

4. Line ministries have relaxed norms and preferential inclusion of scheduled tribes in various programmes. However, programme coverage is still low.

Under the Integrated Child Development Services and National Rural Health Mission (NRHM) – flagship

Box 3.3. Relaxed population norms in tribal areas

| Population norms | Rural area | Tribal/desert/riverine/hilly |
|-------------------------|------------|------------------------------|
| Anganwadi centre | 1:400-800 | 1:300-800 |
| Mini-anganwadi centre | 1:150-400 | 1:150-300 |
| Sub-centre | 1:5000 | 1:3000 |
| Primary health centre | 1:30,000 | 1:20,000 |
| Community health centre | 1:120,000 | 1:80,000 |

nutrition and health programmes of the Ministries of Women and Child Development (MWCD) and Health and Family Welfare – population norms for setting up anganwadi centres (government child and maternal care centres), health sub-centres, primary health centres and community health centres are much lower in tribal areas (see Box 3.3), and education norms while recruiting supervisory and frontline work force in tribal areas are relaxed. Tribal areas are also given priority while setting up crèches under MWCD schemes, given that most tribal women work for long hours outside home^{71,72}.

Some other strategies have been adopted by MHFW for tribal areas. First, a separate chapter is devoted to scheduled tribes in annual plans (called 'Tribal Reproductive and Child Health'). Second, 47 high-burden tribal districts are entitled to receive at least 30% additional resource allocation in NRHM annual plans. Third, mobile outreach health and free on-call referral transport services cover underserved tribal areas, and fourth, monetary and non-monetary incentives (transport, residential facility, credits in promotions and admissions to postgraduate medical courses) are provided to health personnel serving in remote tribal areas. The research wing of MHFW, the Indian Council of Medical Research, conducts various studies on tribal communities through its tribal health research forum and regional, tribal and desert research centres.

Tribal children also benefit from the National Food Security Act 2013, as also other poor populations,

which legitimizes food, feeding and maternity entitlements to approximately two thirds of India's people. The Public Distribution System (PDS), supplementary feeding under ICDS, mid-day meals through the Ministry of Education and maternity benefit scheme of MWCD provide additional grains/food to select population groups as legal entitlements. Tribal communities in food insecure, drought prone zones benefit from village grain banks set up by the Ministry of Consumer Affairs, Food and Public Distribution⁷³.

Rural livelihood security schemes of the Ministry of Rural Development such as the Mahatma Gandhi National Rural Guarantee Act and National Rural Livelihood Mission⁷⁴ in an overarching sense include scheduled tribes, as preference is given to the poor (majority of whom are tribal communities). Incentives provided for individual and community household water connections and latrine units are also higher for the poor residing in hilly and difficult geographical terrains (where majority of the tribal population reside) in programmes of the Ministry of Drinking Water and Sanitation (National Rural Drinking Water Programme, Nirmal Bharat Abhiyan, Nirmal Gram Puraskar and Swachchhata Doot).

However, the problem is that the reach of the above-mentioned schemes/services to tribal children and their families still remains low. Data show that as many as 47% of the tribal population in rural areas are still below the poverty line (see Annex 4)⁷⁶. Less than

20% tribal children of rural households had a drinking water source and a toilet facility in their premises in 2011 (see Annex 5). The data are substantiated by the results in section 3.1, and a NNMB survey (2009) in nine states that showed that 55% tribal children aged 12-59 months were stunted and as many as half the women suffered from acute undernutrition (see Annex 6)⁷⁷. There are four major causes for poor service coverage and quality in tribal areas. First, remote tribal locations and hamlets, with poor road and transport connectivity, make outreach and field monitoring challenging for service providers, especially during rainy season. Civil unrest and paramilitary search operations also compel most government workers to stay away from such regions.

Second, shortage of skilled human resource, high staff turnover and absenteeism are major problems in tribal areas. While tribal candidates are preferred, it is difficult to find those who match the qualification criteria used in recruitment. Postings in tribal areas are perceived, generally, as 'punishment postings' that are assigned to non-performers. Measures taken from time to time to incentivize service providers have failed to change the situation. The reasons being centralized human resource policies that often do not specify the duration of tribal postings and insufficient hardship allowances for serving in difficult terrains (such as transportation, board and lodging allowances and promotions).

Third, reaching out to tribal communities requires differential programming, which presently is not done. For example, when service provision calculations are made population-wise or village-wise many tribal hamlets (dispersed pockets within the village) are still left out. Maternity benefit schemes are not well thought out from the perspective of tribal communities even when they are rolled out e.g., there is a maternity benefit scheme providing INR6,000³¹ (about US\$100) to mothers in three instalments in 53 districts across the country. In tribal areas with weak

banking penetration and literacy norms, opening bank accounts and fulfilling the criteria to receive the cash are difficult. Similarly, alternative methods to enable tribal communities to call upon free emergency referral transport where mobile and satellite connectivity is a challenge is not considered in the planning process.

Fourth, it is clear that differential programming for tribal children is still not a practice as only one line ministry (MHFW) has a dedicated chapter for scheduled tribes in its plans and annual reports of the line ministries only mention the proportion of budgetary allocation to TSP and do not mention any coverage and constraints or special provisions for scheduled tribes. Most schemes targeting poor households assume that tribal concerns are tangentially addressed since scheduled tribes are over-represented when the 'poor' is the target group.⁷⁸

Programme implication

There needs to be a shift from population-based to hamlet-based norms for tribal pockets. Operational guidelines for schemes should have separate flexible modalities for tribal pockets. Scope for experimentation, contractual postings of paramedical, technical, nursing and managerial staff, and flexi-pools should be an inherent part of tribal programming including but not limited to infrastructure. For example, satellite phones may be considered where on-call mobile phone-linked referral transport is a challenge, and in areas where the vacancy load is high, a contractual community nutrition education coordinator/nurse per 10 villages in high burden tribal districts may be explored. Investment in skills and professional development of tribal youth and then recruiting them in the advertised positions should be encouraged.

Each line ministry should also be mandated to have a separate chapter for scheduled tribes in their plans. Formal tie-ups with service NGOs can generate demand for positive behaviours and increase outreach to tribal communities in the most inaccessible areas. Making tribal postings rotational with attractive

³¹ US\$1 = INR59 (June 2014)

salaries, hardship allowance and linking postings with dual professional degree/credits will attract young talent to serve in these areas. A corpus of tribal paramedical professionals (e.g., the experimental three-year rural medical practitioners scheme now being re-started in Chhattisgarh) could also fill the paramedical service provider gap.

5. State governments have taken special initiatives to improve nutrition of tribal children, but only few of these initiatives have been evaluated.

Some of the 11 study states have taken special initiatives to improve access to nutrition services among tribal children. Andhra Pradesh is the first state to legalize earmarking funds by each line department for TSP through the Scheduled Castes Sub-plan and Tribal Sub-plan Act⁷⁹. Andhra Pradesh's Department of Health and Family Welfare is also one of the first state departments to set up a separate state tribal programme management unit.

Mainstreaming feeding and nutrition promotion through women self-help federations engaged in thrift and credit and livelihood initiatives has also been experimented since 2007 across 4,200 villages of Andhra Pradesh (half of which are in tribal districts affected by civil strife)⁸⁰. These federations provide pregnant and lactating women two hot cooked meals a day in their community-managed nutrition cum day care centres set up for every 1,000 persons. For this, each centre receives a one-time grant of INR300,000 (US\$5,000) and a recurring annual grant as partial cost for the meals. About one third of the meal cost is paid by the women (INR10 (US\$0.16) out of INR35 per person per day) and to ensure they can pay this amount, they are encouraged to join the network of self-help groups and undertake safe livelihood activities, which enable them to earn about INR800-1,000 per month (US\$13-16).

Subsequent to an independent assessment, which showed better health outcomes among women associated with such centres, the Andhra

Pradesh government adapted this model and started a free 'one full meal' scheme⁸¹ across some 26,000 anganwadis (30% of total in state). Some 7,600 (29%) of these anganwadis are located in hard-to-reach tribal-dominated villages.

Eggs (a source of animal protein and part of tribal diets) have been introduced in the ICDS supplementary nutrition programme in Andhra Pradesh, Chhattisgarh, Karnataka, Kerala and Tamil Nadu.

Chhattisgarh's PDS⁸² is unique in its inclusion of pulses, shifting the management of fair price shops from private licensees to community-based organizations and delivering food items directly to the doorstep of ration shops, benefiting the population as a whole including tribal families. Doorstep delivery⁸³ of PDS commodities to fair price shops in tribal drought prone areas at government cost is also being implemented in states such as Maharashtra.

Tag-tracking underweight children and following them through extra home visits (equivalent to eight hours of contact per week per child)⁸⁴ by either a government frontline worker or a community volunteer has been undertaken in Chhattisgarh since March 2012 in 340 tribal-dominated gram panchayats, or village councils (4% of the total).

Efforts have also been made to set up crèches in tribal areas. A total of 300 crèches⁸⁵ have been recently established in six tribal districts of Maharashtra. Each crèche is manned by two young local women who are paid a monthly honorarium. The estimated annual cost of running a crèche is approximately INR100,000 (US\$1,700). The district administration of a predominantly tribal district, Surguja, in Chhattisgarh, in partnership with the gram panchayat, runs 300 crèches managed by mothers' groups who are given grants to run them.

There have also been efforts to improve service delivery in conflict areas through partnership with faith-based organizations. A noteworthy example is the Department of Women and Child Development in

Chhattisgarh, which has entrusted the Ramakrishna Mission Ashram with the responsibility to run 85 anganwadis in the forested and civil strife affected Abhujmarh region. Partnerships also have been sought to work with non-governmental organizations to map tribal families in left-out pockets and improve demand generation through social mobilization (Odisha) and run nutrition rehabilitation centres in MoTA-funded hospitals in tribal areas (Jharkhand).

Another noteworthy initiative is the Nav Sanjeevani scheme⁹⁶ of the Health and Family Welfare Department in Maharashtra launched in 1995-1996. The scheme strengthens health and nutrition service delivery in 15 tribal districts where infant and maternal mortality is highest. Some of the important initiatives under the scheme are: i) equipping rural district hospitals and primary health centres with medical equipment and needed infrastructure; ii) filling up vacancies of medical and paramedical staff; iii) identifying severely undernourished and sick children by mobile medical squads, providing them medical care at home and if required shifting them to the nearest primary health centre; and iv) cash incentives of INR35 (US\$0.60) for pregnant tribal women for using complete antenatal care at government health centres, and cash and meals to caretakers when a sick child is brought to a health facility.

Another worthy experiment was carried out in Maharashtra when hunger deaths were reported among tribal families from Thane region in 2005. The office of the chief minister brought together multiple stakeholders and technical experts to stimulate long-term coordinated and intersectoral action for reducing undernutrition in the state, with focus on tribal children. This gave rise to a nutrition mission – an independent autonomous intersectoral coordination body – formed directly under the chief minister with a clear mandate and deliverables.

The mission focused on the affected tribal-dominated region first where priority was given to improve the coverage and quality of existing government nutrition and health services, filling staff vacancies in these

programmes at all levels, incentivizing personnel to work in tribal-dominated areas, training frontline functionaries on monthly growth monitoring and counselling mothers, robust monitoring and increasing accountability of all line departments for nutrition of tribal children. The mission today covers the entire state and an independent survey in 2012 showed that there has been a significant reduction of stunting in Maharashtra among tribal children aged under two years from 53% in 2006 to 28% in 2012.

However, the problem is that most state initiatives on nutrition have not been evaluated for its impact, except the Maharashtra Nutrition Mission. Evaluation of which state model is better than the other has not been done. For example, different models of day care are operational in tribal pockets – worker model crèches vs. crèches managed by women's groups – have yet to be evaluated. Historically, the poor nutrition situation of tribal children still continues to grab political and bureaucratic attention subsequent to starvation and hunger deaths among tribal children as a response to media, public outrage and litigations by social activists.

Programme implication

The host of innovations being undertaken in states demonstrates that with political and bureaucratic will differential and experimental/flexible tribal programming is possible. However, the success stories, the innovations and the replication-worthy practices are lost in the din of bad news or no news in mainstream media, which has made tribal deprivation invisible unless it is a stand-off in a mining conflict, or starvation or malnutrition deaths in tribal areas.

Mechanisms for cross-learning and platforms for sharing state innovations need to be created. This is where intersectoral coordination mechanisms such as committees/councils within MoTA and other line ministries can play a critical role so that mistakes are not repeated and a culture of cross learning and healthy competition is encouraged. At the same time, these initiatives need to be evaluated prior to scale up or replication.

6. Partnerships with NGOs and organized community networks can improve outreach, particularly in inaccessible tribal pockets.

Non-governmental and faith-based organizations included in this review focused on delivering low-cost basic preventive and clinical services to tribal populations residing in remote forested villages and, at the same time, involved the community to generate demand for improving access to services and change behaviours. Their areas of intervention are described in Table 7 and briefly discussed here.

To address health referral and outreach, five organizations set up secondary-level hospital campuses providing free or subsidized out- and inpatient, laboratory and dispensary services in deeply forested areas. Some of them have also built hospital structures appropriate to tribal life, with community engagement and contribution.

Organizations (n = 6) have also set up outreach health service outposts and/or mobile vans and free referral on-call transport to first outreach posts (n = 2). In partnership with government, the organizations (n = 3) run anganwadi centres, nutrition rehabilitation centres and a primary health centre. Many organizations run training centres (n = 7) and nearly all are engaged in training field functionaries, development professionals and women's groups.

As livelihoods are a major concern among the tribal poor, organizations have also worked towards organizing communities into thrift and credit groups or working with such groups and linking them to livelihood options. Notable among them are Pradan, working across seven poorest Indian states and Srijan, working across four Indian states. Both Pradan's and Srijan's strategy revolves around nurturing thrift and credit groups, fostering dairy, sericulture, farming and poultry cooperatives and providing them a seed grant to start livelihood initiatives. In tribal areas, emphasis is given to forest and tree-based livelihoods, resource-based management, and fruit and vegetable growing.

World Vision India, a faith-based organization working across 24 Indian states, identifies and focuses on a socio-economically unreached geographical area (20,000 to 100,000 population) and then works with communities to co-design and co-implement projects for improving agriculture, and food and water security.

Given that there are long gaps between meal timings and adolescent siblings had to drop out of school to care for their younger siblings, a few organizations (Jan Swasthya Sahyog and Women Organization for Socio-Cultural Awareness) have started community-based crèches at timings and places suitable to the community.

In both these organizations, crèches are run by trained village women who are paid a monthly honorarium. There are 78 crèches run by Jan Swasthya Sahyog, Chhattisgarh, which has one worker for every 10 children, and pays the worker a monthly honorarium of INR1,000 (US\$17). Children are given one hot cooked meal including egg twice weekly and two snacks that are purchased from women's groups in one cluster of villages. The cost per crèche is INR12 (US\$0.20) per child per day.

Most organizations (n = 11) have worked on community demand generation and behaviour promotion by identifying and building capacity of local women as community volunteers or workers, and promoting positive behaviours through home and group counselling visits. These organizations also engage with key influencers such as traditional birth attendants, spiritual healers and service providers.

The Women Organization for Socio-Cultural Awareness (WOSCA), Keonjhar, is among the few organizations that train male health volunteers in behaviour promotion. Efforts have also been made to engage with the local panchayat to run information centres in 59 gram panchayats (Christian Fellowship-Shore Chhattisgarh). With funding support from UNICEF in Valsad (Gujarat), milk unions have mainstreamed nutrition behaviour promotion through their network of village-based dairy cooperatives.

Research has not been the forte of most organizations. However, four organizations (ARTH, Ekjut, SEARCH, SEWA-rural) have demonstrated through rigorous randomized trials the impact of periodic prenatal and postnatal home visits by trained community workers on reducing maternal and/or neonatal mortality over a 3-4 year period. During home counselling visits, visually stimulating aids were used by community workers in counselling the mother and family members. The home counselling was complemented by community activities such as group meetings, sensitization of traditional birth attendants, mothers-in-law and folk media, and video shows.

SEARCH's model also included village workers conducting home-based case management of neonatal infections and low birth weight, and activities to prevent malaria such as distributing impregnated mosquito nets at subsidized cost, training families in Gappi fish breeding (which breeds on mosquito larvae), regular and timely insecticide sprays and advice to communities to prevent water stagnation.

In addition, ARTH has initiated efforts to strengthen first referral-level facilities, with a 24*7 emergency transport service to ensure timely referral of sick newborns.

Ekjut in Odisha and Jharkhand has demonstrated how monthly participatory learning meetings (which vary between 20-24) guided by a local facilitator (one for 10-13 groups) for health promotion stimulate communities to identify problems, and craft and implement their solutions⁹⁷, which can improve positive maternal and child health outcomes, including neonatal mortality reduction. Facilitation methods used are questioning, street plays, puppetry and visual storytelling and not just giving messages, aimed at stimulating thinking and discussion on behaviours in an understandable language.

However, the problem is that the number and geographical coverage of NGOs and faith-based organizations working in tribal-dominated areas are limited, which reduce further in civil strife affected

areas. Most of these organizations have focused on mobilization at community and household level and linkage with service providers has not been significant. Only few service NGOs working in tribal-dominated areas work with ITDAs to support TSP planning. Only four organizations have tested and published the impact of their interventions using rigorous research methods.

Programme implication

It is clear that formal tie-ups with grassroots non-governmental organizations can help in penetration in tribal-dominated areas, generate demand and increase outreach in the most inaccessible areas. It is also clear that organizations engaging with tribal communities and supporting them improve livelihoods are better accepted. More service NGOs need to be encouraged to work with systems, especially to support ITDA in bottom-up planning of preparation plans for TSPs (only two NGOs were engaged in this exercise).

Creation of platforms for formal engagement of NGOs and simplifying the process for them applying for funds as well as incentivizing them for working in hard-to-reach areas will encourage more organizations to work in tribal areas. Focus needs to be put on basic low-cost models as well as an evaluation of impact and costs before scale up. Creating a partners forum for tribal nutrition will encourage mutual sharing and create platforms for dissemination.

7. The inherent shyness, language barrier and lack of collective voice of tribal communities prevent them from reaching a critical mass to demand services.

There have been various efforts to increase the demand for services and entitlements among tribal communities through print and electronic media as well as folklore and social mobilization efforts.

However, the problem is that awareness among tribal communities about various developmental programmes, their rights and concessions remains weak. Literacy and comprehending communication

text of the state's official language still remains a challenge for them, given that each tribe has a language of its own. The inherent shyness and lack of collective voice of tribal communities to demand their entitlement(s) means that they never reach a critical mass to create positive pressure on the government to change the nature of response.

As child stunting is a normalized definition among tribal communities, stimulating them to address it is also a challenge. Schemes, programmes and forums in which scheduled castes and scheduled tribes are represented together inherently favour scheduled castes because of their stronger collective and political voice and larger numbers. Federations of organizations working for tribal communities have not been as strong unlike federations for other social groups^{88,89}. Most civil society organizations working in tribal areas are led by non-tribal leaders (though many invest in tribal youth leadership), reiterating the lack of tribal leadership and collective voice.

Programme implication

Communication through local festivals, culture and customs, folk songs and folk media has positively influenced behaviours of tribal communities⁶⁵. Discourse needs to be interpersonal, visually attractive and engaging, which stimulates thinking and dialogue through trusted local women as agents of change while ensuring mothers-in-law and family are looped in. Traditional healers/practitioners have a unique position in tribal communities and they should also be engaged, taken into confidence while initiating dialogue with tribal communities. Investing in tribal leadership over a staggered period to lead – behaviour promotion, service delivery and vigilance mechanisms – will provide a new direction to tribal discourse and planning.

8. Despite large scale nutrition surveys, tribal nutrition data are deficient.

The National Nutrition Monitoring Bureau reports on tribal population provide information on select nutrition indicators.

However, the problem is that the reports are limited to only nine states. In large scale surveys, often the sample size representing scheduled tribes is not large enough, increasing the margin of error while disaggregating tribal data. The potential of various tribal research institutes to conduct periodic block specific large scale tribal nutrition surveys remains untapped. Further, poor general governance and other failures in implementation and delivery, both in quantity and quality, are significant across flagship programmes. It is therefore imperative, but very difficult, to distinguish the effects of these factors from others that negatively influence service delivery in tribal areas.

Monitoring and evaluation systems are not disaggregated by tribal blocks to assess real and effective delivery of inputs as well as their quality. All tribal communities are not equally vulnerable. Deprivation and service access issues in tribal domains vary in schedule V and schedule VI states, with the former often being more deprived. However, evidence on the nutrition of scheduled tribes from large scale surveys is available at the aggregated level, which fail to account for the disparity between schedule V and schedule VI states and masks the overall deprivation in tribal communities.

Programme implication

Tribal nutrition surveys conducted by NNMB should be extended across the country. Periodic dashboard monitoring of few actionable indicators or from sentinel sites across ITDAs through tribal research institutes can provide real and effective delivery of inputs against outcomes. Government programme reporting and expenditures systems providing information for scheduled tribes on various programme indicators should be open to public scrutiny for increased accountability of the systems. Undoubtedly, the need for evaluating what works and why in tribal settings and initiating work on intersectoral action for tribal children is an absolute must.

3.3. Case reports of promising practices in the states



Andhra Pradesh

Tribal women receive daily nutritional boost from 'One Full Meal' programme

Despite Andhra Pradesh’s thriving economy, the National Nutrition Monitoring Bureau (NNMB) 2012 survey data indicated that one third of women of reproductive age in rural areas were chronically undernourished. The same survey showed that the diets of over one third of pregnant women and breastfeeding mothers were deficient in energy and protein while the diets of 97% of women were deficient in iron⁷⁶. Such poor diets can be a major cause of maternal undernutrition and anaemia, with devastating consequences for women and children, including intrauterine growth restriction, low birth weight, and stunted growth and development in infancy and early childhood.

The state’s Integrated Child Development Services (ICDS) programme run by the Department of Women and Child Development provides daily take-home rations to pregnant women and breastfeeding mothers. These rations contain about 600 kcal of energy and 18-20 grams of protein and essential vitamins and minerals according to ICDS norms. Simultaneously, the Department of Health and Family Welfare delivers iron and folic acid supplements to pregnant women and breastfeeding mothers as part of prenatal and postnatal care services. However, women’s uptake of these services has remained traditionally low.

In view of this situation, the Government of Andhra Pradesh launched in January 2013 ‘One Full Meal’, a programme that aims at improving the nutrient intake of pregnant women and breastfeeding mothers, and reducing the prevalence and severity of maternal anaemia. The programme reaches over 350,000 pregnant women and breastfeeding mothers across some 26,000 anganwadi centres (about 30% of ICDS projects in the state) located in villages where undernutrition rates are high. Some 7,600 (29%) of these anganwadi centres are located in hard-to-reach tribal-dominated villages. ‘One Full Meal’ entitles pregnant women and breastfeeding mothers to receive a free nutritious meal every day between 11 am and 2 pm at the village anganwadi centre, 25 days per month.

Andhra Pradesh

| | |
|---|--------------|
| Total population* | 79.9 million |
| Tribal population* | 5.9 million |
| Stunted tribal children (rural) aged under five years**, % | 55.1% |
| Severely stunted tribal children (rural) aged under five years**, % | 32.6% |
| Tribal children (rural) below poverty line#, % | 30.5% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

Hot meal boosts women’s nutritional intake

The hot cooked meal – prepared daily by the anganwadi helper – contains 125 grams of cereal, 30 grams of pulses, 50 grams of green leafy vegetables, 50 grams of egg and 200 ml of milk, and provides 1,052 kilocalories, 33 grams of protein and about 500 mg of calcium (i.e., about 40% of the daily requirement of these nutrients). Adequately iodized salt is used in the cooking of the meal.

After the meal, the women who participate in the programme receive on-the-spot iron and folic acid supplements for the control of iron deficiency and anaemia, are counselled by the anganwadi worker on how to improve their dietary intake and nutrition, and are encouraged to use the services provided at the monthly Village Health and Nutrition Day. The anganwadi worker keeps a record of the women who are enrolled in the programme, the services they receive, the weight they gain during pregnancy and the weight of their children at birth.

Each ICDS project officer enters into a memorandum of understanding with the three parties that supply the raw ingredients to the anganwadi centre for the programme: i) the Civil Supplies Corporation, which provides cereals, pulses and cooking oil; ii) the local dairy corporation, which supplies packaged milk; and iii) the women

self-help group federations, which purchase eggs, vegetables and condiments locally. Over 5,100 federations of women self-help groups have been engaged to support the implementation of the One Full Meal programme. Each ICDS project gives a quarterly grant to the federations that are involved in the implementation of the programme.

In each anganwadi centre, a five-member committee is constituted to supervise the implementation of the programme. The committee, chaired by a representative of the local self-help group federation, includes another federation representative, one pregnant woman, one breastfeeding mother and the anganwadi worker. The committee designs the menus, mobilizes women to come for the meal each day, supervises meal consumption, administers the iron and folic acid supplements, ensures that the women's weight is monitored, maintains participation records, reviews programme progress and submits accounts to the ICDS project officer monthly.

Political will and close monitoring improve reach of services

Programme data show that as of August 2013, 96% of eligible women were receiving a meal and iron and folic acid tablets at least 21 days per month. In the 7,600 anganwadi centres located in predominantly tribal communities, over 66,200 (97%) eligible women were being provided a meal, a counselling session and iron and folic acid supplements regularly.

The unit cost of the One Full Meal programme is INR15 (US\$0.25) per woman per day. This cost is borne by the state government through additional allocations to the Department of Women and Child Development (Supplementary Nutrition Programme). The scheme, reviewed monthly at the state level, has set an exclusive '104' telephone line to address grievances.

The experience in Andhra Pradesh demonstrates that nutrition services can be successfully and equitably delivered to tribal women and children when a political decision is made to reach out to the most vulnerable members of society and when civil society groups are involved in the design, implementation and supervision of these initiatives.



Chhattisgarh

Partnership with local civil society organization improves access to nutrition services in regions affected by civil strife

Chhattisgarh is home to 25.5 million people; 31% are in scheduled tribes, making Chhattisgarh the state with the largest proportion in India⁸. Delivering nutrition services to tribal children and women is a challenge as the districts where they live are often remote and affected by left wing extremism. India's latest National Family Health Survey indicated that 52% of tribal children under five years of age have stunted growth due to chronic undernutrition. The survey also showed that only 56% of children participated regularly in growth promotion sessions, indicating poor access to and use of Integrated Child Development Services (ICDS), the flagship programme for the delivery of child nutrition and development services⁶.

Chhattisgarh's Abhujmarh region is a hilly and forested tribal setting where access to basic government services due to civil unrest is a challenge. Abhujmarh – which in Hindi means 'unknown highlands' – houses a tribal population of 34,000 in 233 far-flung villages spread across an area of 4,000 square kilometres. Civil unrest and paramilitary search operations have compelled most government workers to stay away from this region and have led to a breakdown in the delivery of government-run basic health and nutrition programmes. Orchha block, which comprises 209 villages in the Abhujmarh region, has been the worst affected. In response to this situation, the state government decided to outsource the implementation of ICDS in Orchha to the Ramakrishna Mission Ashram, a respected and well-accepted faith-based organization.

A field assessment conducted in 2009 revealed that the number of anganwadi centres in Orchha – 85 in total – was grossly inadequate to provide timely and quality information, counselling, support and services to the children and women living in the 209 villages. Furthermore, for some 40% of these villages, the nearest health facility was up to 20 kilometres away. To address this situation, a partnership was signed in April 2011 among the Government of Chhattisgarh's Departments

Chhattisgarh

| | |
|---|--------------|
| Total population* | 25.5 million |
| Tribal population* | 7.8 million |
| Stunted tribal children (rural) aged under five years**, % | 52.9% |
| Severely stunted tribal children (rural) aged under five years**, % | 28.9% |
| Tribal children (rural) below poverty line#, % | 54.7% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

of Women and Child Development and Health and Family Welfare, the Ramakrishna Mission Ashram and UNICEF to improve the coverage and quality of the services provided by ICDS.

Innovations introduced to improve counselling

The partnership established that the Government of Chhattisgarh would continue to transfer funds to the Ramakrishna Mission Ashram for the implementation of ICDS, the Ramakrishna Mission Ashram would improve the coverage and quality of ICDS and UNICEF would build the technical and programmatic capacity of the staff at the faith-based organization to: i) protect, promote and support optimal feeding practices for children under two years old to prevent child undernutrition; and ii) establish Nutrition Rehabilitation Centres to provide therapeutic care for severely undernourished children.

Thirty-two state-level trainers who were fluent in the local language were identified and trained to build the capacity of 135 anganwadi workers and anganwadi helpers on how to deliver information, counselling, support and services on infant and young child feeding, nutrition and care. Additionally, 157 community volunteers, at least one per village, were identified and trained to support the anganwadi workers in mobilizing communities to

demand and use the services provided through the improved ICDS programme.

A number of innovations were introduced to counsel mothers and track mother-child pairs. In each village, a timetable for home visits by anganwadi workers and community volunteers was developed and both anganwadi workers and volunteers were equipped with pictorial tools and job aids to support their counselling sessions. Monthly Village Health and Nutrition Days were systematically organized at the anganwadi centres where health and nutrition services were provided and community growth monitoring and counselling sessions were held.

In addition, intensive immunization and awareness raising drives were conducted in 97 hard-to-reach villages using the weekly village *haats* (markets). Finally, efforts were initiated to provide therapeutic care for children with severe acute malnutrition in six Nutrition Rehabilitation Centres, including free transportation and in-kind compensation to mothers.

Essential interventions reach the most vulnerable children

Programme data indicate that as of May 2013, all anganwadi centres in Orchha block organize monthly Village Health and Nutrition Days, the growth of 72% of underfives is monitored monthly, and 61% of mothers receive information, counselling and support on infant and young child feeding. A total of 741 children with severe acute malnutrition had been admitted to the six Nutrition Rehabilitation Centres between May 2011 and May 2013.

Although there is still room for improvement, the experience in Chhattisgarh proves that partnering with local civil society organizations that are trusted by the communities they serve and building their capacity to deliver information, counselling, support and services to families and communities can significantly improve the delivery of essential nutrition interventions to tribal children and women, particularly those who live in hard-to-reach locations or are affected by civil strife.



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Chhattisgarh

**Food and supervised care for tribal children
in community-managed crèches**

Chhattisgarh is home to 25.5 million people. Three quarters of its population reside in rural areas with tribal communities comprising 37% of the population within these areas. Seven of its 27 districts have over 50% tribal population. One such district is Surguja, which is 90% rural and forested with a population of 1.9 million, 55% of whom live in tribal communities. Most of them (90%) depend on agriculture, collection and sale of forest produce and manual labour. Women are also engaged in work outside the home, resulting in long meal gaps for the child left back home due to lack of on-site crèches.

The Integrated Child Development Services (ICDS) – India’s flagship nutrition programme – provides take-home rations to children aged 6-36 months. However, poor information and time constraints to cook the take-home rations at home is a problem. To address this problem, in 2012, the district administration of Surguja partnered with the gram panchayat (local self-government) and State Health Systems Resource Centre (an autonomous body of the Department of Health and Family Welfare) to start community-managed crèches in the district for children aged 6-36 months to provide two hot cooked meals daily to the children as well as pregnant women and breastfeeding mothers of infants aged 0-6 months.

Mothers join hands to run crèches

Locally called *fulwaris*, the formation and functioning of these community crèches rest on community participation. They are operationalized only in those habitations where parents/mothers agree to run it by contributing their time. Habitations with poorer communities are prioritized first. The community takes its decision over two to three habitation-level meetings facilitated by State Health System Resource Centre’s trainers and community volunteers called *mitanins*. The community also decides the place for setting up the *fulwari*, which is usually part of a house of a resident, voluntarily given for this purpose.

Chhattisgarh

| | |
|---|--------------|
| Total population* | 25.5 million |
| Tribal population* | 7.8 million |
| Stunted tribal children (rural) aged under five years**, % | 52.9% |
| Severely stunted tribal children (rural) aged under five years**, % | 28.9% |
| Tribal children (rural) below poverty line#, % | 54.7% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

Fulwaris are manned and managed by a group of mothers whose children attend the crèche, supported by the *mitanin*, who plays a crucial role in bringing the group of mothers together. Where the community agrees, gram panchayat representatives and community pass a resolution and send a demand note to the block panchayat, which is forwarded to the district panchayat for approval. The district panchayat provides an average fund of INR50,000 (US\$850) per annum per habitation to run the *fulwari* (assuming an average of 10 children in the age group 6 months to 3 years at INR6 (US\$0.10) per child per day and three pregnant/breastfeeding women at INR15 (US\$0.25) per woman per day per *fulwari*).

The grant is given to the gram panchayat, which in turn issues it to the mothers’ group in instalments through its village health, nutrition and sanitation committee. At least 80% of the grant in the first year are meant to be utilized to provide wholesome hot cooked food to children. The rest is utilized to equip the *fulwari* with essential utensils, toys, mosquito nets, durries, etc. The district panchayat pools and utilizes flexi-funds from various sources for *fulwaris* received from the Ministry of Tribal Affairs, state government and corporations (as a part of corporate social responsibility).

There is no provision for a paid worker in the *fulwari*. The groups of mothers form a

three-member executive committee, which decides the timing, duty chart and menus, and maintains expenditure and records of the centre. The menu includes pounded rice, pulses, vegetables and oil with egg provided four days a week. In addition, the ICDS take-home ration is also cooked and fed to the children in the *fulwari* as a mid-morning snack. On rotation two mothers volunteer each day to take care of children at the *fulwari* for 6-7 hours, have meals there and let other mothers go to work while leaving their 6-month to 3-year-old children there.

The groups of mothers attending the *fulwari* are encouraged to engage in collective savings activities, and poultry rearing and vegetable gardening so that they can save their grant money, make a profit and the *fulwari* can produce diverse foods. Twice a month, counselling and demonstration meetings are also held with all mothers. Children are monitored for morbidities and referred by the *mitanin* to a nearby health centre.

Scale up based on positive results

Presently, there are 300 *fulwaris* benefiting 3,700 children and 650 pregnant women in Surguja district. Surveys conducted in February 2013 (by UNICEF) and August 2013 (by independent academic institutions) show that *fulwari* habitations started with higher proportions of underweight children (45%) compared to non-*fulwari* habitations (43%). But within 4-6 months of intervention, the proportion was the same at 43%.

Between February and August 2013, mean weight gain among children aged 6-23 months was 0.5 to 1.0 kg more for *fulwari* than non-*fulwari* habitations. Based on these encouraging results, in 2013-2014, the state government extended *fulwaris* to all 85 tribal blocks of the state. Programme reports show that 2,000 of the 2,850 sanctioned *fulwaris* were functional by December 2013.



Gujarat

Partnership with dairy cooperatives improves maternal and infant care in tribal communities

Gujarat has a tribal population of 8.9 million⁸. An estimated 90% of the tribal population live in rural areas⁹ and over one third (35%) live below the official national poverty line^{7,3}. India's latest National Family Health Survey indicated that 61% of Gujarat's tribal children have stunted growth due to chronic undernutrition⁶. Reaching out to tribal women and children with nutrition information, counselling, support and services is a challenge as the number and capacity of the frontline workers who serve in tribal communities are often limited. The hilly and forested nature of the terrains where tribal communities live is also a major challenge for the effective delivery of services to tribal communities.

In light of this situation, the district administration of Valsad, the district Vasudhara Dairy Cooperative and UNICEF established a partnership to pilot test the involvement of village-based dairy farming self-help groups – known as *doodh mandlis* – in the delivery of nutrition services, counselling and support to tribal women and families. *Doodh mandlis* are present in almost every village and most rural women are active members of these self-help groups.

Village *doodh mandlis* are linked to the block dairy cooperative societies, which in turn are linked to the district cooperative society. District cooperative societies come together in the Gujarat State Milk Marketing Federation, which processes milk and dairy products, and supplies and distributes them across India. The district cooperative societies train members of the *doodh mandlis* on milk production, offer them loans to start-up their milk production activities, give them remunerative prices for the milk they produce and organize thrift and credit groups. Women manage more than 70% of the district cooperative societies and federations.

Women groups step forward to improve community practices in Valsad

One of India's 40 poorest districts, Valsad is home to 1.7 million people, 55% of whom live in tribal

| Gujarat | |
|---|--------------|
| Total population* | 60.4 million |
| Tribal population* | 8.9 million |
| Stunted tribal children (rural) aged under five years**, % | 59.8% |
| Severely stunted tribal children (rural) aged under five years**, % | 31.0% |
| Tribal children (rural) below poverty line#, % | 34.7% |
| Source: *Census of India 2011; **Study sample; #NSSO 2004-2005 | |

communities. The district is characterized by hilly rugged terrain, uncertain rainfall and large tracts of forestland. When the partnership was initiated, the Vasudhara Dairy Cooperative had a network of 500 dairy cooperative societies, and almost 2,000 *doodh mandlis* that were active in 416 of the 460 villages in the district. In these 416 villages, a participatory planning exercise was conducted to build consensus in these communities about the causes of the children's poor nutrition situation.

Importantly, four women from each *doodh mandli* who were willing to work voluntarily for the well-being of the community were identified at these meetings. These women, referred to as village volunteers, were trained to counsel mothers on infant and young child feeding and maternal nutrition, and inform them and their families about when and where to access nutrition services provided by the state flagship programmes for women and children. Additionally, a project coordinator, four block coordinators and 40 resource persons from the Vasudhara Dairy Cooperative were trained to support and supervise the work of the village volunteers.

The village volunteers used their monthly *doodh mandli* meetings to promote good feeding, care and nutrition practices for infants, young children and mothers among village women. They also

encouraged women in their neighbourhoods to demand and use the government health and nutrition services provided at the monthly Village Health and Nutrition Day. Additionally they paid home visits to women and families who were less inclined to adopt the improved practices or use the services available and gave them additional information and counselling to 'bring them over'.

Village volunteers did not receive any monetary incentive as they were selected on the basis of their self-motivation to be agents of positive change in their communities. Not surprisingly, the three most important reasons mentioned by the village volunteers to remain engaged with the programme were: self-drive and personal commitment, access to new information and ideas, and the support by their family members, including husbands.

Valsad model to expand to other districts

The findings of the 2007 to 2010 Gujarat Multiple Indicator Cluster Surveys indicated significant improvements in feeding, care and nutrition practices for children and women in Valsad.

To mention but three, after three years of programme implementation, the proportion of pregnant women who attended at least three antenatal check-ups increased from 65% to 84%, the proportion of infants aged 6-8 months who were timely fed complementary foods while they continued to be breastfed increased from 42% to 71%, and the proportion of caregivers washing their hands before feeding their young children increased from 40% to 51%.

By June 2013, the initiative was reaching over 22,400 pregnant women and breastfeeding mothers and 55,000 children aged 6-36 months. The annual cost of Valsad's initiative is estimated at INR5 million (US\$85,000), at an average cost of INR66 (US\$1.10) per child/mother. The Vasudhara Dairy Cooperative covers half the cost.

The district administration has recognized the potential of this partnership to reach out to women and children, particularly those who, like scheduled tribes, live in hard-to-reach communities. A scale up plan has been developed and shared with the state government for the future expansion of the model to other districts in the state.



Jharkhand

Malnutrition treatment centres bring services for severely undernourished children closer to tribal communities

Jharkhand's 8.6 million tribal inhabitants represent 26% of the state's population. Data indicate that 40% of tribal children under five years of age are wasted due to acute undernutrition, 55% have stunted growth due to chronic undernutrition and 83% of tribal children aged 6-24 months are fed foods that do not meet the minimum quantity and quality requirements recommended for infants and young children⁶.

The State Department of Tribal Welfare is the nodal administrative agency for the implementation of welfare schemes for the tribal population. Much of this department's work focuses on nine tribal-dominated districts where scheduled tribes represent half or more of the total population and socio-development indicators are among the poorest in the state. These nine districts – Dumka, East Singhbhum, Jamtara, Khunti, Lohardaga, Pakur, Ranchi, Sahibganj and Saraikela – receive special funds from the Department of Tribal Welfare for the improvement of basic amenities and infrastructure, particularly roads, hospitals, schools and electrical systems, in the hard-to-reach areas where tribal communities live.

The Department of Tribal Welfare has a network of 14 secondary-level hospitals called meso-hospitals across the state. These 50-bed hospitals are run by non-governmental organizations and provide free inpatient and outpatient services such as antenatal, delivery, postnatal and paediatric care as well as free access to essential medicines. Staffed with medical officers, nurses, auxiliary nurse midwives and visiting physicians and surgeons, meso-hospitals are the closest health referral point for tribal populations. In addition, meso-hospitals conduct regular health promotion camps to increase access to and demand for essential health services among tribal communities who live in hard-to-reach areas.

NGOs play significant role

Initially, meso-hospitals were not equipped with a Malnutrition Treatment Centre (MTC) to provide

Jharkhand

| | |
|---|--------------|
| Total population* | 33.0 million |
| Tribal population* | 8.6 million |
| Stunted tribal children (rural) aged under five years**, % | 55.1% |
| Severely stunted tribal children (rural) aged under five years**, % | 28.7% |
| Tribal children (rural) below poverty line#, % | 54.2% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

therapeutic care for children with severe acute malnutrition (SAM). However, an evaluation of the effectiveness of Jharkhand's MTC programme in providing therapeutic care for children with SAM across the state (1 July 2009 - 30 June 2011) indicated that 55% of the children admitted to Jharkhand's MTCs were tribal children, suggesting that the burden of SAM was particularly high in tribal communities and confirming previous survey data showing that 12% of tribal children under five years of age in the state suffered from severe wasting.

In response to this situation, Jharkhand's Department of Tribal Welfare, Department of Health and Family Welfare and UNICEF signed a memorandum of understanding in 2012 for the establishment of MTCs in nine meso-hospitals to provide care for children with SAM – particularly tribal children – using the protocols and guidelines by India's Ministry of Health. The hospitals selected are run by four NGOs and located in nine of the poorest and hardest-to-reach administrative blocks, often hard hit by civil strife: Arki, Behragoda, Jonha, Kathikund, Kuchai, Littepara, Nala, Parsadih and Pathna.

Accordingly, MTCs were established and equipped in the nine meso-hospitals and their staff was trained in the use of India's national guidelines and

protocols for the management of SAM in children. Anganwadi workers who serve in these blocks identified severely wasted children in their villages – either as part of the monthly growth monitoring and promotion sessions or during special community drives for the early detection of children with SAM – and referred them to the nearest MTC.

Once at the MTC, children were provided medical care and fed locally prepared therapeutic milks and semi-solid foods until they were discharged. Once the children were discharged, Integrated Child Development Services (ICDS) and National Rural Health Mission (NRHM) frontline workers ensured that they benefited from the ICDS Supplementary Nutrition Programme and that they were taken back for three follow-up visits to the MTC during the six weeks following discharge.

Good results propel expansion with commensurate budget

Between January and December 2012 – the initial one-year phase of the initiative – 537 children with SAM under five years of age were admitted to the newly created MTCs in the nine meso-hospitals. Most of the children admitted (71%) were from scheduled tribes. Importantly, since 2013, the MTCs are completely run by the four civil society organizations that are in charge of the administration and management of the nine meso-hospitals.

Given that this partnership can help reach out to the most vulnerable children, the Departments of Tribal Welfare and Health and Family Welfare are developing a roll-out strategy with adequate budget lines in their respective annual programme implementation plans to establish additional MTCs in blocks with a high concentration of tribal children. Simultaneously, they are equipping ICDS and NRHM frontline workers in the catchment area of these nine hospitals with the capacity, knowledge and skills to promote improved maternal and child nutrition, with a particular focus on the most vulnerable: all children under two years of age and their mothers, particularly among those who belong to tribal communities.



Jharkhand

Women's groups vital allies to bridge gap in service delivery and nutrition counselling

Jharkhand's 8.6 million tribal inhabitants represent 26% of the state's total population⁸. Half of Jharkhand's tribal population live below the poverty line⁷⁶ and every second tribal child has stunted growth due to chronic undernutrition⁶. Socio-cultural practices and norms, persistent vacancies among Integrated Child Development Services (ICDS) and National Health Rural Mission (NRHM) staff, lack of access to safe drinking water, sanitation and electricity services, poor transportation systems and road infrastructure, and security threats due to civil strife largely explain the poor nutrition indicators among Jharkhand's tribal children.

Evidence shows that where delivery systems are weak, village-based women's groups can be vital allies to bridge the gap between service demand and supply. In 2001, the Government of Jharkhand launched the Dular programme. The initial phase of Dular was implemented in six districts – East Singhbhum, Khunti, Kkharsawan, Ranchi, Saraikela and West Singhbhum – where the presence of scheduled tribes ranges from 30% to 65%, and 9,100 anganwadi centres provide services to some 2.8 million tribal inhabitants.

Community engagement heart of strategy

Dular ('to love and care' in Hindi) is a strategy to build the capacity of village women to support anganwadi workers. Community participation and community engagement are at the heart of Dular. Anganwadi workers introduce Dular in the community through a two-day village contact drive to initiate community dialogue on maternal and child nutrition and stimulate the need for collective action.

Community mapping is a key component of the drive. Through this exercise, the members of the community that participate in the drive draw a map of their village and identify the households where there is a pregnant woman or a mother with a child under three years of age as well as the areas of the village where the coverage of the services provided by ICDS and NRHM is poor. The map serves as an

| Jharkhand | |
|---|--------------|
| Total population* | 33.0 million |
| Tribal population* | 8.6 million |
| Stunted tribal children (rural) aged under five years**, % | 55.1% |
| Severely stunted tribal children (rural) aged under five years**, % | 28.7% |
| Tribal children (rural) below poverty line#, % | 54.2% |
| Source: *Census of India 2011; **Study sample; #NSSO 2004-2005 | |

effective visual tool to: i) discuss the geographical spread and concentration of undernutrition in the village; ii) agree on the barriers to service delivery and service uptake; and iii) divide the village into geographic clusters.

Another key component of the drive is the identification by the community of six to eight local women – the Local Resource Group – who know the realities of their community and are willing to serve as community counsellors on infant and young child feeding, nutrition and care in support of the village anganwadi worker. Each of the women in the Local Resource Group is entrusted with a cluster of about 15 households as her catchment area.

After a two-day training to acquire knowledge and skills on infant and young child feeding and maternal nutrition, the women of the Local Resource Group, equipped with pictorial counselling aids, start their work in the community. Each woman in the Local Resource Group identifies all pregnant women and mothers with a child under three years of age in her catchment area, visits them weekly in their homes, and provides them with information, counselling and support on how to feed and care for their children and for themselves.

In addition to the weekly home visits, the Local Resource Group encourages pregnant women

and breastfeeding mothers to use the nutrition and health services delivered during the monthly Village Health and Nutrition Day. Since most women in the local resource group were also members of thrift and credit groups, they use their monthly meetings to disseminate information on maternal and child nutrition to other women.

To keep these sessions enjoyable, nutrition messages tuned to folk songs are sung and video shows are organized using *Amma ji kehti hai* ('mother-in-law says so'), a series of entertainment education videos developed with technical support by UNICEF to facilitate community dialogue around maternal and child feeding, nutrition and care. The block, district and state monitoring teams in charge of the implementation of Dular conduct monthly reviews and periodic field visits to assess progress on the ground.

Increased knowledge in nutrition and child care

The evaluation of Dular in the five districts indicated that the programme brought about an increase

in the number of contacts with mothers and families, improved family satisfaction with the functioning of the anganwadi centre and increased knowledge about child feeding, nutrition and care. In Dular villages, pregnant women were more likely to receive prenatal check-ups than in non-Dular villages (94% vs. 71%). Similarly, mothers in Dular villages were three times more likely than mothers in non-Dular villages to avoid prelacteal feeds in the first three days of life (53% vs. 17%), and feed colostrum to their newborns (95% vs. 21%).

Encouraged by this evidence, the Government of Jharkhand decided in 2011 to scale up Dular statewide under the name of Anganwadi Sashaktikaran Abhiyan ('anganwadi strengthening'). This was part of the initiative to strengthen ICDS and support anganwadi workers in bringing nutrition information, counselling, support and services to all children, starting with tribal children and those who live in deprived and hard-to-reach areas.



Maharashtra

Improved nutrition governance reduces stunting among tribal children

The state of Maharashtra – India’s second most populous – is home to 10.5 million tribal inhabitants who represent about 9.4% of the state’s population⁸. Nearly 60% of them live below the national poverty line⁷⁶. The poor nutrition situation of tribal children grabbed public attention in 2005, when media reported that 718 children had died due to undernutrition in four predominantly tribal districts in the Thane region – 96% of the children who died were from tribal families. The worrisome nutrition situation of Maharashtra’s tribal children was further confirmed by India’s National Family Health Survey in 2006, which indicated that 58% of tribal children under five years of age had stunted growth due to chronic undernutrition⁶.

A Public Interest Litigation by a group of social activists led to the formation of a special committee comprising representation from government, academia, development partners and civil society. This committee was given the mandate to develop a roadmap to address undernutrition among tribal children in the state. As a result of this consultative process, the State Nutrition Mission was established in February 2005 to coordinate interdepartmental efforts to reduce child undernutrition in five districts – Amravati, Gadchiroli, Nandurbar, Nasik and Thane – where over 70% of the population lived in tribal communities and the prevalence of child undernutrition was highest.

In its initial phase (2005), the work of the State Nutrition Mission focused on improving the coverage and quality of the services delivered through the Integrated Child Development Services and National Rural Health Mission, the national flagship programmes for child nutrition, health and development. The priority was to fill the existing vacancies in these programmes, particularly those concerning frontline workers and supervisors, and improve their knowledge, skills and motivation to deliver relevant nutrition information, counselling, support and services to mothers, families and communities in a timely manner.

| Maharashtra | |
|---|---------------|
| Total population* | 112.3 million |
| Tribal population* | 10.5 million |
| Stunted tribal children (rural) aged under five years**, % | 60.2% |
| Severely stunted tribal children (rural) aged under five years**, % | 33.7% |
| Tribal children (rural) below poverty line#, % | 56.6% |
| Source: *Census of India 2011; **Study sample; #NSSO 2004-2005 | |

Three indicators reviewed monthly

All children under six years of age were surveyed and registered at their home. Their weight was monitored monthly at the anganwadi centre, children’s weight-for-age was recorded, and mothers were counselled on how to improve the way they fed and cared for their children. The data on children’s nutritional status were analysed monthly. All underweight children were tracked and the villages and blocks with high child undernutrition rates were given priority attention. Equal emphasis was placed on monitoring women’s pregnancy weight gain at every antenatal visit and counselling women on how to arrive at adequate weight gain during pregnancy.

Three indicators were reviewed monthly at every anganwadi centre:

1. Coverage: the proportion of children under six years of age enrolled in the anganwadi centre.
2. Weighing efficiency: the proportion of children under six years of age who were weighed monthly.
3. Prevalence of underweight: the proportion of children under six years of age with a weight-for-age below an acceptable minimum.

District performance was measured as the ability of the district to demonstrate progress on these

three indicators. Communication mechanisms were put in place to provide feedback to the district and state stakeholders on the information resulting from the monthly review so that they could tailor appropriate responses.

Nutrition mission paves the way

The programme coverage figures in these five tribal districts increased from 48% to 88% between 2005 and 2007; similarly, weighing efficiency improved from 39% to 86%. Encouraged by these positive results, the scope of the State Nutrition Mission was extended in 2007 to 10 additional districts with a significant concentration of tribal population. Finally in 2008-2009, the Mission was extended statewide to cover all the rural and tribal blocks spread across the 33 districts of the state. Incentives were provided to medical officers and nurses who accepted to serve in tribal communities.

Starting in 2011, the State Nutrition Mission entered its second phase with emphasis on improving the nutrition situation of children under two years of age and their mothers in line

with global evidence, indicating the centrality of the 1,000-day 'window of opportunity' – from conception to age two years – to prevent child undernutrition, particularly among the most vulnerable population groups.

In 2012, the Government of Maharashtra commissioned an independent statewide nutrition survey to assess progress and identify areas for future action. The survey indicated that the prevalence of stunting in children aged under two years had declined from 39% in 2005 to 23% in 2012, a decrease of 16% points over a seven-year period. Importantly, among tribal children, the prevalence of stunting declined from 53% in 2006 to 28% in 2012, a decrease of 25% points.

The State Nutrition Mission has demonstrated that political and bureaucratic will can stir coordinated intersectoral effort with a focus on the most vulnerable children and can bring about significant reductions in child stunting among the tribal population at scale. Maharashtra is paving the way on how the challenge of child stunting among tribal communities can be addressed in Indian states.



Odisha

Tribal women's self-help groups inculcate toilet use in Koraput district

Odisha is home to 9.6 million tribal inhabitants, the third highest tribal population in India (after Madhya Pradesh and Maharashtra) and constituting almost a quarter of the state's total population. The majority, live in abject poverty and abysmal conditions in rural areas. Most fight to survive below the poverty line and only 5% of households have a drinking water source and toilet facility on their premises. In this society every second tribal mother and every child is stunted.

Food and feeding practices among tribal households are poor and less than a quarter of children under three years old receive diets that are adequate in calories and protein. In addition to an inadequate dietary intake, open defecation and poor hygiene contribute to adverse nutritional outcomes by increasing the likelihood of diarrhoea and gastro-intestinal disorders including tropical sprue or environmental enteropathy. While many factors contribute to undernutrition, new evidence from the World Bank in Cambodia shows that "in communities where all households defecate in open, children under age of five are 2 to 3.6 cm shorter than children living in communities where no one defecates openly"⁷⁵.

While the Government of Odisha has been making efforts to promote and incentivize tribal households to build and use a toilet, difficulties in changing traditional and societal norms is perceived as the main barrier to inculcating toilet use in these communities. Of 30 districts in the state, household toilet use is at its lowest in Koraput district. Koraput is one of the poorest districts and has the highest burden of child undernutrition.

Tapping on community's knowledge and active networks

To address the issue, the Government of Odisha has looked upon the best use of one of the state's existing social structures. A huge network of women's self-help groups (in Koraput alone, there are 12,500 groups comprising 150,000

| Odisha | |
|---|--------------|
| Total population* | 41.9 million |
| Tribal population* | 9.6 million |
| Stunted tribal children (rural) aged under five years**, % | 57.9% |
| Severely stunted tribal children (rural) aged under five years**, % | 29.3% |
| Tribal children (rural) below poverty line#, % | 75.6% |
| Source: *Census of India 2011; **Study sample; #NSSO 2004-2005 | |

members) was already involved in savings, credit and livelihood activities. Many of these groups are official partners in the state-facilitated supplementary food scheme under the Integrated Child Development Services. In 2010, in an effort to improve community demand for household toilets, the Koraput District Water and Sanitation Division (Ministry of Rural Development), with technical support from UNICEF, partnered with the self-help group network to mobilize households to demand and construct toilets.

Forty-two women's self-help groups from 42 villages (three per administrative block) were selected to drive the intervention. Their engagement was formalized through the signing of a memorandum of understanding between the key stakeholders. Each self-help group received a fund of INR50,000 (US\$850) from the district water and sanitation authority towards the construction of 18-20 household toilets to trigger the process. Self-help group members were trained in hygiene education, toilet design options, cost calculations and the process of managing and monitoring accounts. A local team of masons was identified and trained to serve the block.

Self-help group members, with the support of village-level government frontline workers,

initiated dialogue with different community stakeholders and motivated households to construct a household toilet. They also monitored the construction of toilets by the masons prior to district-level verification upon completion, thus allowing a utilization certificate to be issued so that the fund could be cleared.

Importantly, the self-help group members keenly promoted hygiene and sanitation messages through interpersonal and group-based communication activities. Promoting the importance of using a toilet, the safe disposal of children's stools, handwashing with soap and safe household drinking water practices ensured that knowledge was shared with other women to help bring about attitudinal change in the community.

Formalized partnership boosts scale up

Programme monitoring data showed that in less than a two-year period, 612 household toilets were constructed across the 42 intervention villages. The majority were built in tribal households. While the numbers are still relatively low, the proof of concept was established; tribal households demand toilets when the communication and funding model is right. Subsequently the Government of Odisha in the context of 'Nirmal Bharat Abhiyan' formalized its official collaboration with women's self-help groups to expand the approach across the state. Furthermore, the state's implementation guidelines for sanitation, *Nirmal Odisha Abhiyan*, developed with technical support by UNICEF, now reflects this approach as one of its key implementation modalities.



Odisha

Conditional cash transfer brings nutrition services and support to tribal women during pregnancy and lactation

In Odisha, 45% of underfives have stunted growth due to chronic undernutrition⁶. Global evidence indicates that conditional cash transfers to women can have a positive impact in reducing stunting in children by increasing access to and use of essential nutrition and health services. Aware of this, the Government of Odisha launched in September 2011 a statewide conditional cash transfer programme named Mamata ('mother's affection'), spearheaded by the State Department of Women and Child Development.

Mamata provides an INR5,000 (US\$85) cash incentive to pregnant women for their first two live births. The incentive is transferred to the woman's bank account in four instalments. The woman receives the first instalment of INR1,500 (US\$25) at the end of the second trimester of pregnancy if she has registered her pregnancy in time and has received at least one antenatal check-up, one tetanus-toxoid vaccination and iron and folic acid supplements, and has attended at least one monthly counselling session at the anganwadi centre.

The woman receives the second instalment of INR1,500 three months after delivery if she has registered the childbirth, weighed her child at least twice in the previous three months, ensured that the child has received all age-appropriate vaccinations and attended at least two infant feeding counselling sessions at the anganwadi centre.

The third instalment of INR1,000 (US\$17) is given to the mother when her infant is six months old and she has practised exclusive breastfeeding for the first six months, introduced complementary foods on completion of the six-month exclusive breastfeeding period, weighed her child at least twice in the previous three months, attended at least two counselling sessions on infant feeding and completed all the required immunizations.

The mother receives the final instalment of INR1,000 when the child turns nine months

Odisha

| | |
|---|--------------|
| Total population* | 41.9 million |
| Tribal population* | 9.6 million |
| Stunted tribal children (rural) aged under five years**, % | 57.9% |
| Severely stunted tribal children (rural) aged under five years**, % | 29.3% |
| Tribal children (rural) below poverty line#, % | 75.6% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

old, has received the first vitamin A dose with the measles vaccine, is fed age-appropriate complementary foods and has been weighed at least twice in the previous three months. The cash instalments are transferred electronically to the women upon fulfilment of the transfer conditionalities, which is verified through the Mother and Child Protection Card, the pictorial counselling and entitlement card used by the Integrated Child Development Services and National Rural Health Mission.

Acceleration plan addresses poor banking literacy and penetration

By December 2011, three months after the initiation of Mamata, 70% of the eligible women had been enrolled in the programme and their bank accounts opened across the 30 districts of Odisha. However, in the eight most disadvantaged districts – Gajapati, Kandhamal, Koraput, Mayurbhanj, Malkangiri, Nabarangapur, Rayagada and Sundargarh – the proportion was only 44%. In these districts, 50% to 60% of the inhabitants live in tribal communities, 75% of them live below the poverty line, and most tribal inhabitants had neither identity and residential proof nor banking access and literacy to open and use a bank account and benefit from Mamata's conditional cash transfer scheme.

In January 2012, an acceleration plan was devised to address the poor coverage of the programme in these districts. Five rural banks, in addition to the nationalized banks, were persuaded to start electronic fund transferring in their branches. Simultaneously, 53 Mamata awareness and enrolment camps were held by the banks to help eligible women open a bank account on the spot with a simple identity and residence certification by their village head. In addition, all anganwadi centres were provided with new weighing scales and Mother and Child Protection Cards to ensure that programme supplies and services were in place.

The planning process for the monthly Village Health and Nutrition Days was strengthened and special Village Health and Nutrition Days were organized in an additional 112 villages to reach out to women and children, largely from tribal communities, who were often left behind. Social mobilization drives were organized in the eight districts in partnership with a well-known local civil society organization to encourage tribal women, families and communities to use the new services that were made available to them.

Enrolment numbers triple

By June 2013 – 18 months after the initiation of the acceleration plan – the number of women enrolled in the eight districts had almost tripled (from some 105,000 to almost 280,000), the number of women enrolled who had a bank account was almost five times higher (from 46,000 to 222,000), and the proportion of enrolled women with an open bank account had doubled from 44% to 80%.

As a result of the monthly state programme reviews by the Departments of Women and Child Development and Health and Family Welfare to improve the quality and coverage of the Village Health and Nutrition Days, over 95% of Village Health and Nutrition Days were being held as planned. Importantly, the number of bank branches with electronic cash transferring facilities had increased from 418 to 641.

By June 2013, over 70% of the women enrolled in the programme had received at least the first and second cash transfers, demonstrating that political will, innovative programme design, and careful planning and monitoring can increase access to and use of nutrition services among tribal women and children.



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Odisha

Partnership with grassroots NGOs improves coverage of life-protecting vitamin A supplementation among tribal children

The Departments of Health and Family Welfare and Women and Child Development of the Government of Odisha have been delivering preventive vitamin A supplements to children aged 6-59 months biannually since 1999. At each vitamin A supplementation round, children are brought to the anganwadi centre where the auxiliary nurse midwife provides them with the vaccinations and/or vitamin A supplements they require while the anganwadi worker counsels mothers on how to improve the vitamin A content of their children's diet.

However, survey data collected in 2006 indicated that the vitamin A supplementation coverage in underfives was a low 21% and as low as 17% among tribal children. In response to this situation, the Government of Odisha devised a three-pronged strategy to accelerate the coverage of the vitamin A supplementation programme in the general population:

1. Timely procurement and distribution of vitamin A supplements.
2. Mobilize communities and families to generate demand for vitamin A supplementation services.
3. Monitor programme delivery in hard-to-reach areas, particularly in tribal communities, to improve programme equity and impact.

In 2009, the Coverage Evaluation Survey indicated that the proportion of underfives who had received a vitamin A supplement in the six months preceding the survey had increased to 65%. In 2011, to accelerate progress towards universal vitamin A supplementation coverage, the 18 districts with the lowest coverage – which also had the highest underfive mortality rates – were requested to report vitamin A supplementation coverage disaggregated by caste, gender and health sub-centre catchment area, each of ~5,000 population. This effort helped understand that the vast majority of the unreached children lived in 40 blocks that were located across the 10 districts where 60% of Odisha's 9.6 million tribal inhabitants live.

Odisha

| | |
|---|--------------|
| Total population* | 41.9 million |
| Tribal population* | 9.6 million |
| Stunted tribal children (rural) aged under five years**, % | 57.9% |
| Severely stunted tribal children (rural) aged under five years**, % | 29.3% |
| Tribal children (rural) below poverty line#, % | 75.6% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

Grassroots NGOs support government efforts

In 2012, in light of this situation, the State Department of Health and Family Welfare partnered with UNICEF and 10 local NGOs that had established grassroots presence and credibility in these 10 districts (one NGO in each district). The partners signed a memorandum of understanding that outlined the role of each party in the implementation of a social mobilization campaign around vitamin A supplementation in the 40 blocks: NGOs as the implementing partners, UNICEF as the technical partner and Department of Health and Family Welfare as the lead and funding partner.

In consultation with the block medical officers, the NGOs mapped the villages and hamlets where vitamin A supplementation coverage was poor. Social mobilization efforts were then concentrated in these villages and hamlets. The communication campaign included community mobilization through rallies, loud speakers and drum beating and community gatherings the day before the supplementation round to inform mothers, fathers and extended families about the benefits of vitamin A supplementation for children as well as the time and venue of the vitamin A supplementation round. The support of local women's self-help

groups was sought to spread the message and persuade mothers of eligible children to come to the supplementation booth.

In the 40 blocks, the block medical officers were supported to develop block-wide plans to ensure that the areas previously unreached were now covered through the allotment of additional supplementation sites and staff. This was followed by joint orientation sessions for all auxiliary nurse midwives and anganwadi workers about their roles in preparing the lists of eligible children and ensuring that no child was left unreached. In addition, a partnership was established with the state medical colleges to support planning sessions, guide programme managers, supervise the supplementation rounds and facilitate stakeholder review meetings after the supplementation round.

Coverage reaches record high

The initiative was branded as Shishu Swaathya Au Pushti Saadhan Maas ('Children Health and Nutrition Month'), and wall paintings and radio and television spots were used to raise community awareness and demand for services. As a result of this concerted effort, the full vitamin A supplementation coverage – two vitamin A doses

per child per year – in these 10 districts reached 86% in 2012. In the first semester of 2013, the coverage of the vitamin A supplementation round among tribal children reached an all-time high of 96%.

Odisha's experience with Shishu Swaathya Au Pushti Saadhan Maas demonstrates that social programmes can adopt an equity approach to ensure the delivery of support and services to the children who need them most by understanding who these children are, where they live, what prevents them from accessing essential services and support, and by allocating additional staff and financial resources to reach them.



Rajasthan

Political will stirs concerted action for severely undernourished tribal children in drought prone districts

Rajasthan’s 9.2 million tribal inhabitants represent about 13% of the state’s population. They live in dispersed clusters, often in arid rural areas that are prone to drought and food insecurity. Furthermore, about one third of Rajasthan’s tribal population live below the national poverty line. The district of Baran – home to 1 million people, of whom 23% live in tribal communities – has experienced severe droughts since 2002. In Baran, the blocks of Kishanganj and Shahabad, regarded as malnutrition hot spots, are home to 93% of the state’s Saharias, Rajasthan’s particularly vulnerable tribal group.

In September 2012, Baran became the focus of unprecedented public attention when print and electronic media ran headlines reporting: *Malnutrition kills 3 in Baran*. The three children who died were from scheduled tribes and one of them was a Saharia. Interviews with frontline workers indicated that the parents of these three children were advised to take their children to the nearest Malnutrition Treatment Centre (MTC) to seek therapeutic care and support.

At that point in time, there were three MTCs in Baran, one in the district hospital and two at Kishanganj and Shahabad’s block Community Health Centres. However, these three children were not taken to the MTC. The reasons given by the frontline workers were: perception by the parents that there was no need to go to the MTC, long distance from the children’s community to the MTC, and/or perception by the parents that the duration of the stay at the MTC was too long.

The state government provided the district administration of Baran with an additional budget of INR6 million (US\$101,000) to scale up an immediate response to prevent additional undernutrition deaths. Rajasthan’s chief secretary, who oversees the work of all state government departments and reports to the chief minister, called an emergency meeting with all the secretaries of the nodal departments, concerned development partners and civil society

| Rajasthan | |
|---|--------------|
| Total population* | 68.6 million |
| Tribal population* | 9.2 million |
| Stunted tribal children (rural) aged under five years**, % | 49.3% |
| Severely stunted tribal children (rural) aged under five years**, % | 33.1% |
| Tribal children (rural) below poverty line#, % | 32.6% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

organizations working in Baran to coordinate an immediate response to this nutrition emergency.

Treatment brought closer to children

Treatment services for children with severe undernutrition were brought closer to the communities through a two-pronged strategy. Firstly, the bed capacity of the MTC in Baran’s district hospital was expanded from 12 to 20 while that of Shahabad and Kishanganj MTCs increased from 6 to 12. Secondly, new MTCs were established in the remaining six blocks: Anta, Atru, Baran, Chhabra, Chhipabarod and Mangrol.

Furthermore, in addition to the INR135 (US\$2.30) per day for every child staying at the MTC, the state government approved two additional allocations: i) INR65 (US\$1.10) per day to provide food to the children’s caregivers during their stay at the MTC; and ii) INR100 (US\$1.70) to the frontline workers for every severely undernourished child they referred to the MTC.

In February 2013, all staff – medical officer, nurse, auxiliary nurse midwife and lady health visitors – were quickly positioned in the newly established MTCs. Staff were then trained using the 2011 national guidelines for the management of severe acute malnutrition (SAM) in children issued by the

Ministry of Health and Family Welfare. In addition, approximately 3,000 accredited social health activists Sahoginis, the frontline workers of the Department of Health, were trained to identify children with severe acute malnutrition.

Two nutrition counsellors were appointed to build the capacity of the District Health Department to implement the nutrition response and analyse MTC records and reports. Additionally, an institutional partnership was established with the Department of Home Sciences in Jaipur to monitor the timeliness and quality of the services delivered by the MTCs. Every Monday, a meeting chaired by the district collector assessed the progress achieved in programme implementation and identified corrective actions when and where needed.

Community-based screening scaled up

Programme data indicate that in the first quarter of programme implementation (April-July 2013), 366 children (69%) out of the 532 children admitted to Baran's nine MTCs were from scheduled tribes and 336 of the them (92%) were Saharias. No deaths were recorded during the children's stay at the MTCs, a key result as the primary objective of MTCs is to reduce case fatality among the children

admitted. Moreover, 77% of the children admitted completed the required stages in the MTC. By the time of discharge, 36% of the children had gained at least 15% of their initial weight.

With some room for improvement, particularly in reducing default rates and improving children's weight gain, these encouraging results led to the decision to scale up community-based screening and referral of children with SAM to MTCs across the state. In order to reduce the incidence of SAM in children, a special strategy was designed to be piloted in 20 districts, including Baran. This strategy focuses on the 1,000 days from conception to age two years as the 'window of opportunity' to prevent undernutrition in children through the provision of proven nutrition interventions and the adoption of positive family practices, particularly those related to feeding, care and hygiene, for children under two years and their mothers.

The experience in Baran shows how concerted action among the state government, development partners and non-governmental organizations can stir large scale action and turn an emergency situation into an opportunity for maternal and child nutrition for the most vulnerable tribal children and communities.



West Bengal

Community nutrition care and counselling sessions help tribal mothers learn from and support each other

West Bengal, India's most densely populated state, is home to 5.3 million tribal inhabitants who represent about 6% of the state's population. Social indicators among tribal communities are among the poorest in the state⁸. According to the National Family Health Survey in 2006, one fifth (21%) of tribal children were wasted due to acute undernutrition and as many as 59% had stunted growth due to chronic undernutrition⁶.

In response to this situation, the Government of West Bengal decided to scale up the integration of Nutrition Care and Counselling Sessions in the package of services delivered by anganwadi workers. Nutrition Care and Counselling Sessions intend to make child undernutrition visible to mothers, families and communities by weighing children under three years of age monthly and plotting their weights on colour-coded growth charts that help them to understand visually whether the children are growing. Through this community-witnessed child growth monitoring exercise, community members understand who the children are whose growth is faltering and therefore require special attention and care.

While community growth monitoring is certainly a key component of the state's Nutrition Care and Counselling Sessions, growth monitoring without promoting child growth would be meaningless to children's well-being. Thus, in order to improve counselling to mothers and families on child feeding, nutrition and care, anganwadi workers – with the support of their supervisors and community women leaders – conducted a community enquiry to identify the child feeding and care practices, beneficial or harmful, that prevailed in the community.

The enquiry put emphasis on identifying and understanding the practices followed by poor families who despite poverty manage to have well-nourished children. These families, referred to as *positive deviants*, help the community understand that poverty is not the only determinant of child undernutrition.

West Bengal

| | |
|---|--------------|
| Total population* | 91.3 million |
| Tribal population* | 5.3 million |
| Stunted tribal children (rural) aged under five years**, % | 52.3% |
| Severely stunted tribal children (rural) aged under five years**, % | 20.0% |
| Tribal children (rural) below poverty line#, % | 42.4% |

Source: *Census of India 2011;
**Study sample; #NSSO 2004-2005

Mothers learn to cook nutritious food

Mothers of children identified as being undernourished at the community child growth monitoring sessions are invited to attend a 12-day Nutrition Care and Counselling Session. Each day the anganwadi worker facilitates a one-hour session in which she teaches mothers to prepare nutritious complementary foods for their children using the supplementary food provided by the Integrated Child Development Services for children aged 6-36 months.

Nutrition Care and Counselling Sessions encourage participating mothers and the community at large to contribute pulses, vegetables, fruits, dairy products, condiments and other food ingredients for the preparation of complementary foods for the children enrolled in the session and thus, strengthen community ownership.

Once the cooking demonstration is completed, mothers feed their children the food that has been prepared using a spoon and an individual bowl to improve hygiene and ensure that the child consumes her/his portion. These child-feeding sessions take place under the supervision of the anganwadi worker, who teaches mothers to feed their children responsively and patiently, encouraging children to eat while avoiding forced feeding.

Nutrition Care and Counselling Sessions encourage mothers to learn from each other and discuss how to prepare low cost nutritious foods hygienically and how to feed their young children successfully. They also promote proven practices to improve children's nutrition, disseminate information about the existing nutrition and health services in the community and encourage mothers, families and communities to use them.

The mothers of well-nourished children and the members of women's self-help groups also support and motivate the mothers who participate in the Nutrition Care and Counselling Sessions to practise the recommended (improved) behaviours. Children are weighed on the first and last day of the Nutrition Care and Counselling Session. At the end of day 12, the mothers and caregivers who have attended the sessions are encouraged to practise the improved behaviours at home for the remaining 18 days of the month with supportive follow-up by the anganwadi worker through regular home visits.

Collective learning sessions help lower prevalence of underweight

An evaluation by the National Institute of Nutrition among children under three years of age showed that mothers in the intervention areas where Nutrition Care and Counselling Sessions were taking place were more likely to receive nutrition

and health education than the mothers who lived in areas where the intervention was yet to be rolled out (69% vs. 27% in intervention and comparison areas, respectively). Importantly, the prevalence of underweight among children aged 12-17 months was significantly lower in the areas where Nutrition Care and Counselling Sessions were happening (46% vs. 63%), as was the prevalence of stunting (27% vs. 32%).

Given these encouraging results, the Nutrition Care and Counselling Sessions were further scaled up in nine districts with funding by the State Department of Health and Family Welfare. Presently, Nutrition Care and Counselling Sessions are implemented in some 20,000 anganwadi centres in hard-to-reach locations that are home to over 60% of the state's scheduled tribes, with some of the worst socio-economic indicators in the state.



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4. Conclusion

HIGHLIGHTS

01

There is an urgent need to address severe stunting and its determinants as the study revealed that the bulk of tribal children who were stunted were actually severely stunted.

02

Particular attention has to be paid to seven critical areas in policy, programmes, partnerships, nutrition data, linking livelihood to nutrition promotion, communication and community-based nutrition care.

03

Tribal communities must be central partners influencing their own change in programmes.

In conclusion, the study revealed that the bulk of tribal children who were stunted were actually severely stunted. Hence, to address stunting among tribal children, focus should be on addressing severe stunting and all its determinants – nutrition, health, family planning, water, sanitation, poverty alleviation and care for women. Particular attention needs to be given to seven areas:

1. Policy space for 'nutrition of tribal children'

MoTA, the nodal ministry for scheduled tribes, can convene the effort to make 'nutrition of tribal children' a political and bureaucratic priority to stimulate policy dialogue and coordinated action. Clear roles, accountabilities, need-based budgeting and performance incentives will ensure all sectors play their part. A designated officer for scheduled tribes in line ministries will support interdepartmental liaising, and instituting vigilance mechanisms and public scrutiny will bring seriousness to this effort.

2. Programme flexibility

Scope for experimentation, contractual staff, hardship allowances, partnerships and flexi-pools should be an inherent part of nutrition programming for tribal children. The host of innovations being undertaken in states demonstrates that with political and bureaucratic will differential programming for tribal children is possible. Creation of tribal nutrition discourse forums will help bring together all stakeholders working on tribal nutrition (including media), and cross-fertilize ideas including replication-worthy practices. This is where MoTA can play a convening role.

3. Partnerships are key

Civil society and faith-based organizations with established grassroots presence and credibility can increase outreach penetration, generate

community demand, and create a cadre of trained foot soldiers to reach out to mothers with timely information, counselling and support on periodic basis in the most inaccessible areas with hilly rugged terrains, especially those affected by civil strife. Creation of platforms for simplified and transparent process for applying for funds as well as incentives for working in inaccessible areas will encourage more NGOs to work in tribal areas.

All promising practices with visible impact had a core component of formal community engagement. Tribal women self-help federations have ably reached out to mothers with timely information, counselling and support, and mobilized communities to come and receive monthly services. They have run day care centres, feeding programmes and managed grants. This demonstrates that communities do come forward to change their lives and those of their neighbours when they are formal partners in the process of change.

4. Countrywide tribal nutrition data

Given that National Nutrition Monitoring Bureau conducts tribal nutrition surveys periodically, but focuses only on selected states and ITDA blocks, the same survey may be extended across all ITDAs with involvement of all academic/tribal research institutes. Dashboard monitoring of a few actionable indicators from centile sites can provide real-time data on inputs vs. outcomes.

5. Link livelihood promotion with nutrition promotion

Given that nearly 85% tribal children belonged to families in the two poorest wealth quintiles, linkage of livelihood promotion and skill development with nutrition programming is an absolute must, as is focusing on identifying at-risk poor families and improving their access to food and poverty alleviation measures. Nutrition

promotion can be mainstreamed with support of livelihood self-help federations in tribal pockets where they are active.

6. Communication methods matter

Given the low literacy level and poor comprehension of Hindi/text, discourse needs to be interpersonal, visually attractive, respecting and tapping local culture, beliefs and idols, and communicated through community influences, particularly traditional healers, to have better impact on influencing change.

7. Improve care for pregnant women and children of working mothers

It is clear that to prevent stunting in tribal children, reducing maternal undernutrition and improving complementary feeding practices in infants aged 6-11 months is critical. For this to happen, two approaches can be tested.

First, periodic nutrition assessments of newly wed and pregnant women during outreach

Nutrition and Health Days, followed by instituting corrective measures for women identified as undernourished or at-risk. Community nutrition and day care centres to provide meals to pregnant and breastfeeding mothers, counselling and linkage to savings groups and livelihood options appear promising.

Second, to improve complementary feeding in addition to home and group counselling visits, community-managed crèches (through women's groups or paid workers based on context) where children are fed hot cooked meals responsively hold promise and should be encouraged, tested and evaluated.

The unending saga of nutrition deprivation amongst scheduled tribes must end and this calls for a re-thinking on differential programming strategies, budget and government accountability mechanisms. New rules, new optics and new frameworks need to be co-designed in which tribal communities are not just informants but partners and influencers in their own change.

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Statistical tables

Table 1. Sample characteristics

| | Tribal (N=1606) | Non-tribal (N=6108) | Total (N=7714) |
|--|----------------------------|--------------------------------|---------------------------|
| Child characteristics | | | |
| Female, % | 51.2 | 53.2 | 52.8 |
| Birth order, Mean (SE) | 3.29 (0.25) | 2.68 (0.12) | 2.2 (0.11) |
| Maternal characteristics | | | |
| Age | | | |
| Mean (SE) | 26.7 (0.2) | 25.6 (0.1) | 25.8 (0.1) |
| Age <20 years, % | 67.9 | 61.9 | 63.0 |
| Age <18 years, % | 5.4 | 4.9 | 5.0 |
| Height <145 cms, % | 11.0 | 9.3 | 9.6 |
| BMI <18.5 kg/m ² , % | 48.1 | 41.5 | 42.8 |
| Anaemia (Hb <12 g/dl), % | 75.9 | 63.1 | 65.5 |
| Education (illiterate), % | 72.9 | 47.2 | 52.1 |
| Seasonal/occasional/no employment, % | 73.8 | 47.9 | 52.9 |
| No autonomy on use of money earned, % | 73.6 | 71.9 | 72.3 |
| Smokes cigarette/tobacco, % | 26.3 | 10.4 | 13.5 |
| Household (HH) characteristics | | | |
| Using unprotected drinking water source*, % | 34.7 | 20.4 | 23.2 |
| No exposure to newspaper/radio/television, % | 57.2 | 35.4 | 39.6 |
| Open defecation, % | 90.1 | 68.8 | 73.8 |
| Poverty (wealth index quintile), % | | | |
| Poorest | 61.2 | 28.2 | 34.5 |
| Poor | 22.7 | 26.4 | 25.7 |
| Middle | 11.6 | 23.3 | 21.0 |
| Rich | 3.6 | 16.1 | 13.7 |
| Richest | 1.0 | 6.0 | 5.0 |
| Number of HH members, Mean (SE) | 6.4 (0.1) | 6.7 (0.1) | 6.6 (0.1) |
| Access to services | | | |
| No antenatal check-up during pregnancy, % | 81.5 | 63.6 | 67.1 |
| Diarrhoea in past 2 weeks | 11.7 | 11.3 | 11.3 |
| Continued breast feeding | 77.0 | 66.0 | 68.0 |
| Received ORS | 28.0 | 28.0 | 28.0 |
| Did not receive any medical treatment/advice | 58.0 | 47.0 | 48.6 |
| Median (min-max) days of seeking medical treatment | 2 (0-15) | 1 (0-30) | 1 (0-30) |

Tribal = scheduled tribes.

Non-tribal = scheduled castes, other backward castes and general caste.

ORS = oral rehydration salt.

* Protected drinking water = piped water into dwelling/yard, public tap/standpipe, tube well or bore well, protected dug well, protected spring/rain water/bottle water.

Table 2. Infant and young child feeding practices in the sampled children

| Indicators, % | Tribal (N=1606) | Non-tribal (N=6108) | Total (N=7714) |
|---|----------------------------|--------------------------------|---------------------------|
| Children under age five years who were breastfed within one hour of birth | 25.7 | 28.8 | 28.2 |
| | <i>N=197</i> | <i>N=696</i> | <i>N=893</i> |
| Children aged 0-<6 months exclusively breastfed* | 59.9 | 47.1 | 49.7 |
| | <i>N=893</i> | <i>N=601</i> | <i>N=739</i> |
| Children aged 12-15.99 months who were breastfed* | 49.7 | 92.8 | 93.8 |
| | <i>N=143</i> | <i>N=427</i> | <i>N=570</i> |
| Children aged 6-8 months receiving any solid/semi-solid food and breast milk* | 42.9 | 52.6 | 50.4 |
| | <i>N=666</i> | <i>N=2466</i> | <i>N=3132</i> |
| Children aged 6-23 months fed minimum dietary diversity* | 9.7 | 28.1 | 15.5 |
| Children aged 6-23 months fed minimum recommended frequency | 43.0 | 40.7 | 41.1 |
| Children aged 6-23 months fed as minimum acceptable diet* | 5.9 | 10.3 | 9.5 |
| Children aged 6-23 months fed food rich in iron* | 9.6 | 12.5 | 11.9 |
| <i>Optional indicators</i> | | | |
| | <i>N=136</i> | <i>N=449</i> | <i>N=585</i> |
| Continued breastfeeding at age 20-23 months | 85.0 | 79.1 | 80.5 |

Tribal = scheduled tribes.

Non-tribal = scheduled castes, other backward castes and general caste.

* in last 24 hours

Table 3. Levels and severity of stunting in sampled children aged under five years

| Severity of stunting | Tribal (N=1606) | Non-tribal (N=6108) | Total (N=7714) |
|---|----------------------------|--------------------------------|---------------------------|
| Mild stunting, % (HAZ <-1 and ≥-2SD) | 21.7 | 25.7 | 24.9 |
| Moderate stunting, % (HAZ <-2 and ≥-3SD) | 24.4 | 24.6 | 24.6 |
| Severe stunting, % (HAZ <-3SD) | 29.2 | 20.4 | 22.1 |
| | 53.6 | | 46.7 |
| Mean Z-score (CI) | -2.04 (-2.15, -1.95) | -1.75 (-1.8, -1.7) | -1.80 (-1.85, -1.76) |

Tribal = scheduled tribes.

Non-tribal = schedule castes, other backward castes and general caste.

HAZ = height-for-age Z score.

Table 4.1. Bivariate distribution of HAZ <-2SD and HAZ <-3SD by child characteristics (Domain 1)

| Child characteristics | Tribal (row%) | | | Non-tribal (row%) | | | Total (row%) | | |
|-----------------------|---------------|--------|--------|-------------------|--------|--------|--------------|--------|--------|
| | n | HAZ | | n | HAZ | | n | HAZ | |
| | | <-2SD | <-3SD | | <-2SD | <-3SD | | <-2SD | <-3SD |
| Gender | | | | | | | | | |
| Male | 785 | 52.8 | 27.2 | 2860 | 44.2 | 19.3 | 3645 | 45.9 | 20.8 |
| Female | 821 | 54.4 | 31.0 | 3248 | 45.7 | 21.4 | 4069 | 47.3 | 23.2 |
| <i>p</i> | | 0.5 | 0.09 | | 0.23 | 0.05 | | 0.20 | 0.02 |
| Birth order | | | | | | | | | |
| 1 | 331 | 50.6 | 26.9 | 1604 | 40.4 | 17.7 | 1935 | 42.0 | 19.1 |
| 2 | 347 | 52.8 | 24.8 | 1834 | 43.7 | 18.7 | 2181 | 45.0 | 19.5 |
| 3 | 306 | 51.2 | 25.9 | 1151 | 46.2 | 20.1 | 1457 | 47.2 | 21.2 |
| >=4 | 622 | 56.8 | 34.5 | 1519 | 50.9 | 25.9 | 2141 | 52.6 | 28.3 |
| <i>p</i> | | 0.3 | 0.004 | | <0.001 | <0.001 | | <0.001 | <0.001 |
| Age in months | | | | | | | | | |
| 0-5 | 197 | 25.4 | 10.1 | 696 | 20.1 | 8.9 | 893 | 21.2 | 9.1 |
| 6-11 | 247 | 35.1 | 19.4 | 866 | 30.0 | 10.3 | 1113 | 31.0 | 12.2 |
| 12-17 | 207 | 54.0 | 27.7 | 887 | 48.2 | 21.3 | 1094 | 49.2 | 22.4 |
| 18-23 | 212 | 74.9 | 45.4 | 713 | 55.7 | 28.5 | 925 | 59.8 | 32.1 |
| 24 and above | 743 | 61.0 | 33.2 | 2946 | 51.6 | 23.8 | 3689 | 53.3 | 25.5 |
| <i>p</i> | | <0.001 | <0.001 | | <0.001 | <0.001 | | <0.001 | <0.001 |

Tribal = scheduled tribes.

Non-tribal = schedule castes, other backward castes and general caste.

HAZ = height-for-age Z score.

p = Pearson's chi-square p value.

Table 4.2. Bivariate distribution of HAZ <-2SD and HAZ <-3SD by selected *maternal characteristics* (Domain 2)

| Maternal characteristics | Tribal (row%) | | | Non-tribal (row%) | | | Total (row%) | | |
|-----------------------------------|---------------|---------|--------|-------------------|--------|--------|--------------|--------|--------|
| | n | HAZ | | n | HAZ | | n | HAZ | |
| | | <-2SD | <-3SD | | <-2SD | <-3SD | | <-2SD | <-3SD |
| Height | | | | | | | | | |
| >=145 cms | 1403 | 51.7 | 27.7 | 5427 | 42.9 | 19.1 | 6830 | 44.5 | 20.7 |
| <145 cms | 172 | 69.5 | 41.4 | 564 | 65.4 | 32.4 | 736 | 66.3 | 34.4 |
| <i>p</i> | | <0.0001 | 0.001 | | <0.001 | <0.001 | | <0.001 | <0.001 |
| Education | | | | | | | | | |
| Secondary | 268 | 43.2 | 16.8 | 2084 | 36.7 | 14.0 | 6830 | 44.5 | 20.7 |
| Primary | 182 | 57.6 | 29.1 | 1174 | 46.2 | 21.0 | 736 | 66.3 | 34.4 |
| Illiterate | 1156 | 55.2 | 31.9 | 2907 | 50.7 | 25.0 | 4063 | 51.9 | 26.8 |
| <i>p</i> | | 0.03 | <0.001 | | <0.001 | <0.001 | | <0.001 | <0.001 |
| Employment | | | | | | | | | |
| Regular | 421 | 45.8 | 24.8 | 3130 | 41.0 | 17.6 | 3551 | 41.5 | 18.4 |
| Seasonal/Occasional | 1132 | 56.8 | 30.8 | 2834 | 49.3 | 23.2 | 3966 | 51.3 | 25.2 |
| None | 52 | 47.0 | 28.7 | 140 | 51.0 | 27.1 | 192 | 50.0 | 27.5 |
| <i>p</i> | | 0.001 | 0.07 | | <0.001 | <0.001 | | <0.001 | <0.001 |
| Autonomy over money earned | | | | | | | | | |
| Yes | 449 | 54.6 | 28.8 | 1207 | 49.2 | 21.3 | 1656 | 50.5 | 23.2 |
| No | 150 | 59.7 | 31.3 | 439 | 54.9 | 29.8 | 589 | 56.1 | 30.1 |
| <i>p</i> | | 0.32 | 0.6 | | 0.05 | 0.001 | | 0.03 | 0.02 |
| Smoking | | | | | | | | | |
| No | 1145 | 51.7 | 28.7 | 5401 | 43.9 | 20.3 | 6546 | 45.2 | 21.7 |
| Yes | 461 | 58.9 | 30.4 | 706 | 54.3 | 21.2 | 1167 | 56.0 | 24.6 |
| <i>p</i> | | 0.01 | 0.53 | | <0.001 | 0.58 | | <0.001 | 0.03 |
| Mother's age | | | | | | | | | |
| >=20 years | 131 | 51.9 | 30.2 | 5582 | 44.9 | 20.1 | 7057 | 46.6 | 21.8 |
| <20 years | 1475 | 53.8 | 29.1 | 526 | 45.9 | 23.7 | 657 | 47.0 | 24.9 |
| <i>p</i> | | 0.7 | 0.7 | | 0.71 | 0.07 | | 0.87 | 0.009 |
| Preceding birth interval | | | | | | | | | |
| First child | 331 | 50.6 | 26.9 | 1604 | 40.4 | 17.7 | 1935 | 42.0 | 19.1 |
| >=2 years | 1005 | 52.5 | 28 | 3436 | 44.7 | 20.3 | 4441 | 46.3 | 21.9 |
| <2 years | 268 | 61.3 | 36 | 1062 | 52.6 | 24.5 | 1330 | 54.2 | 26.7 |
| <i>p</i> | | 0.03 | 0.03 | | <0.001 | <0.001 | | <0.001 | <0.001 |

Tribal = scheduled tribes.

Non-tribal = schedule castes, other backward castes and general caste.

HAZ = height-for-age Z score.

p = Pearson's chi-square *p* value.

Table 4.3. Bivariate distribution of HAZ <-2SD and HAZ <-3SD by selected household characteristics (Domain 3)

| Household characteristics | Tribal (row%) | | | Non-tribal (row%) | | | Total (row%) | | |
|----------------------------------|---------------|--------|--------|-------------------|--------|--------|--------------|--------|--------|
| | n | HAZ | | n | HAZ | | n | HAZ | |
| | | <-2SD | <-3SD | | <-2SD | <-3SD | | <-2SD | <-3SD |
| Exposure to any media | | | | | | | | | |
| Yes | 714 | 49.6 | 23.8 | 3956 | 42.5 | 17.7 | 4670 | 43.5 | 18.5 |
| No | 892 | 56.6 | 33.2 | 2152 | 49.6 | 25.3 | 3044 | 51.5 | 27.5 |
| <i>p</i> | | 0.008 | | | <0.001 | | | <0.001 | <0.001 |
| Wealth quintile | | | | | | | | | |
| Rich/Richest | 73 | 37.1 | 9.5 | 1280 | 34.0 | 12.1 | 1353 | 34.1 | 12.0 |
| Middle | 178 | 50.6 | 24.2 | 1375 | 41.2 | 18.2 | 1553 | 42.2 | 18.8 |
| Poor | 344 | 52.3 | 26.2 | 1652 | 48.3 | 21.3 | 1996 | 48.9 | 22.2 |
| Poorest | 1011 | 55.9 | 32.6 | 1801 | 53.7 | 27.8 | 2812 | 54.4 | 29.5 |
| <i>p</i> | | 0.02 | <0.001 | | <0.001 | <0.001 | | <0.001 | <0.001 |
| Improved toilet facility* | | | | | | | | | |
| Yes | 75 | 34.3 | 12.1 | 1195 | 36.4 | 13.6 | 1270 | 36.3 | 13.5 |
| No | 1454 | 54.5 | 29.7 | 4433 | 48.3 | 22.5 | 5887 | 49.7 | 24.2 |
| <i>p</i> | | <0.001 | 0.001 | | <0.001 | <0.001 | | <0.001 | <0.001 |
| Drinking water source | | | | | | | | | |
| Improved | 975 | 53.4 | 23.3 | 4382 | 45.6 | 20.2 | 5357 | 46.9 | 21.1 |
| Not improved | 556 | 54.2 | 24.6 | 1251 | 45.6 | 21.3 | 1807 | 48.1 | 25.4 |
| <i>p</i> | | 0.77 | 0.69 | | 0.98 | 0.48 | | 0.43 | 0.02 |
| Open defecation | | | | | | | | | |
| No | 168 | 42.3 | 22.0 | 1853 | 37.4 | 15.3 | 2021 | 37.8 | 15.7 |
| Yes | 1436 | 54.8 | 29.9 | 4250 | 48.5 | 22.8 | 5686 | 50.0 | 24.4 |
| <i>p</i> | | <0.001 | 0.04 | | <0.001 | 0.001 | | <0.001 | <0.001 |

Tribal = scheduled tribes.

Non-tribal = schedule castes, other backward castes and general caste.

HAZ = height-for-age Z score.

p = Pearson's chi-square *p* value.

* flush/pour flush to piped sewer system or septic tank or pit latrine, ventilated improved pit latrine/biogas latrine, pit latrine with slab, twin pit, composting toilet.

Table 4.4. Bivariate distribution of HAZ <-2SD and HAZ <-3SD with complementary feeding practices (Domain 4)

| IYCF practice | Tribal (row%) | | | Non-tribal (row%) | | | Total (row%) | | |
|--|---------------|-------|-------|-------------------|-------|-------|--------------|-------|-------|
| | n | HAZ | | n | HAZ | | n | HAZ | |
| | | <-2SD | <-3SD | | <-2SD | <-3SD | | <-2SD | <-3SD |
| Introduction of solid, semi-solid or soft foods at 6-8 months | | | | | | | | | |
| Yes | 65 | 23.9 | 11.3 | 230 | 21.5 | 7.9 | 295 | 22.0 | 8.6 |
| No | 78 | 35.5 | 20.8 | 197 | 30.2 | 11.1 | 275 | 31.6 | 13.6 |
| <i>p</i> | | 0.1 | 0.16 | | 0.05 | 0.29 | | 0.02 | 0.07 |
| Minimum dietary diversity at 6-23 months | | | | | | | | | |
| Yes | 67 | 60.5 | 32.3 | 425 | 39.8 | 14.4 | 492 | 42.4 | 16.6 |
| No | 599 | 53 | 30.1 | 2041 | 44.8 | 20.6 | 2640 | 46.5 | 22.5 |
| <i>p</i> | | 0.28 | 0.71 | | 0.08 | 0.007 | | 0.12 | 0.006 |
| Minimum meal frequency at 6-23 months | | | | | | | | | |
| Yes | 305 | 54.3 | 31.8 | 1050 | 44.5 | 20 | 1355 | 46.5 | 22.2 |
| No | 361 | 53.3 | 28.4 | 1416 | 43.6 | 18.8 | 1777 | 45.4 | 20.8 |
| <i>p</i> | | 0.81 | 0.37 | | 0.68 | 0.456 | | 0.59 | 0.3 |
| Minimum acceptable diet at 6-23 months | | | | | | | | | |
| Yes | 42 | 60.4 | 29.9 | 270 | 44.9 | 20.1 | 312 | 46.8 | 22.1 |
| No | 624 | 53.3 | 36.5 | 2196 | 43.9 | 14.9 | 2820 | 45.8 | 17.5 |
| <i>p</i> | | 0.48 | 0.37 | | 0.76 | 0.04 | | 0.11 | 0.06 |

Tribal = scheduled tribes.

Non-tribal = schedule castes, other backward castes and general caste.

HAZ = height-for-age Z score.

p = Pearson's chi-square *p* value.

Table 5.1. Associations from binary logistic regression models between stunting and child, maternal, household and infant and young child feeding characteristics controlling for all covariates

| Independent variables | Tribal | | | | Non-tribal | | | | Total | | | |
|--------------------------------|----------|--------------|----------|-------------|------------|-------------|----------|-------------|----------|-------------|----------|-------------|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Age of child (months) | | | | | | | | | | | | |
| 6-11 vs. 0-5 | 2.223*** | [1.46,3.40] | 0.254*** | [0.17,0.39] | 2.643*** | [2.12,3.30] | 0.441*** | [0.36,0.53] | 2.519*** | [2.07,3.06] | 0.399*** | [0.34,0.47] |
| 12-23 vs. 0-5 | 8.933*** | [5.22,15.29] | - | | 5.706*** | [4.41,7.38] | - | | 6.087*** | [4.86,7.62] | - | |
| 24-59 vs. 0-5 | 4.735*** | [3.05,7.34] | - | | 4.744*** | [3.77,5.97] | - | | 4.653*** | [3.81,5.69] | - | |
| Birth order | | | | | | | | | | | | |
| 2/3 vs. first | 0.909 | [0.64,1.28] | 0.84 | [0.50,1.42] | 0.98 | [0.82,1.17] | 1.11 | [0.85,1.45] | 0.966 | [0.83,1.13] | 1.067 | [0.85,1.35] |
| 4 or more vs. first | 1.318 | [0.90,1.92] | 0.829 | [0.44,1.56] | 1.131 | [0.94,1.37] | 1.382* | [1.02,1.87] | 1.171 | [0.99,1.38] | 1.258 | [0.97,1.64] |
| Wealth quintile | | | | | | | | | | | | |
| Middle vs. rich/richest | 1.223 | [0.68,2.20] | 1.77 | [0.59,5.33] | 1.232* | [1.03,1.48] | 1.205 | [0.91,1.60] | 1.246* | [1.05,1.48] | 1.242 | [0.94,1.64] |
| Poor/poorest vs. rich/ richest | 1.344 | [0.73,2.47] | 2.12 | [0.80,5.65] | 1.745*** | [1.44,2.11] | 1.634*** | [1.24,2.15] | 1.734*** | [1.45,2.08] | 1.690*** | [1.30,2.19] |
| Open defecation | | | | | | | | | | | | |
| No vs. yes | 1.134 | [0.75,1.72] | 1.1 | [0.62,1.95] | 1.077 | [0.92,1.26] | 1.159 | [0.93,1.45] | 1.094 | [0.94,1.27] | 1.169 | [0.95,1.43] |
| Maternal employment | | | | | | | | | | | | |
| Irregular/no vs. regular | 1.159 | [0.88,1.53] | 1.397 | [0.91,2.15] | 1.028 | [0.91,1.17] | 1.108 | [0.91,1.34] | 1.071 | [0.95,1.20] | 1.169 | [0.98,1.39] |
| No vs. regular | 0.786 | [0.41,1.52] | 0.624 | [0.20,1.94] | 1.295 | [0.88,1.91] | 1.822 | [0.99,3.36] | 1.15 | [0.82,1.62] | 1.46 | [0.84,2.52] |
| Maternal education | | | | | | | | | | | | |
| None vs. any | 1.369 | [0.95,1.98] | 1.649 | [0.93,2.93] | 1.341*** | [1.16,1.55] | 1.558*** | [1.25,1.94] | 1.349*** | [1.18,1.54] | 1.550*** | [1.29,1.94] |
| Maternal stunting | | | | | | | | | | | | |
| <145 cm vs. 145 cm or more | 2.010*** | [1.38,2.93] | 2.004* | [1.14,3.53] | 2.287*** | [1.88,2.78] | 2.375*** | [1.75,3.22] | 2.231*** | [1.88,2.65] | 2.346*** | [1.80,3.06] |

Table 5.1. (cont.)

| Independent variables | Tribal | | | | Non-tribal | | | | Total | | | |
|-------------------------------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Maternal smoking | | | | | | | | | | | | |
| Yes vs. no | 1.255 | [0.98,1.61] | 1.054 | [0.72,1.55] | 1.238* | [1.04,1.47] | 1.138 | [0.84,1.54] | 1.264** | [1.10,1.46] | 1.15 | [0.91,1.45] |
| Maternal age (continuous) | 0.975* | [0.95,1.00] | 1.001 | [0.95,1.05] | 0.982* | [0.97,1.00] | 0.970** | [0.95,0.99] | 0.981** | [0.97,0.99] | 0.975* | [0.96,0.99] |
| Minimum diet diversity | | | | | | | | | | | | |
| <4 years; 4-7 food groups | - | | 0.608 | [0.31,1.18] | - | | 1.232 | [0.94,1.61] | - | | 1.153 | [0.90,1.47] |
| Minimum meal frequency | | | | | | | | | | | | |
| State dummies | - | | 1.176 | [0.80,1.74] | - | | 0.987 | [0.82,1.19] | - | | | |
| Yes | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Observations | 1570 | | 658 | | 5976 | | 2436 | | 7546 | | 3094 | |

Exponentiated coefficients; 95% confidence intervals (CI) in brackets. Apart from mother's age, which is a continuous variable, rest of variables are binary variables.

Model 1: Child, maternal and household characteristics (includes all children).

Model 2: Child, maternal and household characteristics + minimum diet diversity + minimum meal frequency (includes children aged 6-23 months).

*p<0.05 **p<0.01 ***p<0.001.

Table 5.2. Associations from binary logistic regression models between severe stunting and child, maternal, household and infant and young child feeding characteristics controlling for all covariates

| Independent variables | Tribal | | | | Non-tribal | | | | Total | | | |
|--------------------------------|----------|-------------|----------|--------------|------------|-------------|----------|-------------|----------|-------------|----------|-------------|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Age of child (months) | | | | | | | | | | | | |
| 6-11 vs. 0-5 | 2.198* | [1.20,4.04] | 0.395*** | [0.25,0.62] | 1.136 | [0.81,1.58] | 0.291*** | [0.23,0.38] | 1.334 | [1.00,1.78] | 0.317*** | [0.25,0.39] |
| 12-23 vs. 0-5 | 5.457*** | [3.14,9.48] | - | | 3.399*** | [2.51,4.60] | - | | 3.736*** | [2.87,4.87] | - | |
| 24-59 vs. 0-5 | 4.618*** | [2.68,7.96] | - | | 3.457*** | [2.53,4.72] | - | | 3.627*** | [2.77,4.75] | - | |
| Birth order | | | | | | | | | | | | |
| 2/3 vs. first | 0.978 | [0.66,1.44] | 1.017 | [0.59,1.75] | 0.953 | [0.78,1.17] | 0.994 | [0.72,1.37] | 0.951 | [0.80,1.14] | 1 | [0.76,1.32] |
| 4 or more vs. first | 1.546* | [1.08,2.22] | 1.041 | [0.60,1.82] | 1.276* | [1.03,1.57] | 1.985*** | [1.42,2.78] | 1.340** | [1.12,1.60] | 1.700*** | [1.28,2.26] |
| Sex | | | | | | | | | | | | |
| Female vs. male | 1.223 | [0.98,1.53] | 1.692** | [1.17,2.44] | 1.118 | [0.97,1.28] | 1.377** | [1.10,1.72] | 1.145* | [1.02,1.29] | 1.447*** | [1.20,1.74] |
| Wealth quintile | | | | | | | | | | | | |
| Middle vs. rich/richest | 2.643 | [0.96,7.27] | 12.52* | [1.56,100.2] | 1.526** | [1.18,1.97] | 1.414 | [0.94,2.13] | 1.575*** | [1.24,2.00] | 1.548* | [1.05,2.28] |
| Poor/poorest vs. rich/ richest | 3.420* | [1.30,9.02] | 17.98** | [2.41,134.2] | 2.150*** | [1.67,2.77] | 1.863** | [1.26,2.75] | 2.275*** | [1.80,2.87] | 2.202*** | [1.53,3.18] |
| Open defecation | | | | | | | | | | | | |
| No vs. Yes | 0.868 | [0.52,1.46] | 0.65 | [0.35,1.22] | 1.036 | [0.85,1.26] | 1.175 | [0.86,1.61] | 1.015 | [0.85,1.22] | 1.103 | [0.83,1.46] |
| Maternal employment | | | | | | | | | | | | |
| Irregular/No vs. regular | 0.999 | [0.75,1.34] | 1.436 | [0.86,2.40] | 1.001 | [0.86,1.16] | 1.048 | [0.81,1.35] | 1.035 | [0.91,1.18] | 1.164 | [0.94,1.45] |
| No vs. regular | 0.875 | [0.46,1.68] | 2.013 | [0.66,6.15] | 1.381 | [0.92,2.08] | 1.653 | [0.81,3.38] | 1.267 | [0.90,1.79] | 1.696 | [0.93,3.11] |
| Maternal education | | | | | | | | | | | | |
| None vs. any | 1.409* | [1.02,1.95] | 1.592 | [0.98,2.59] | 1.272** | [1.07,1.51] | 1.264 | [0.96,1.67] | 1.321*** | [1.14,1.54] | 1.357* | [1.06,1.73] |

Table 5.2. (cont.)

| Independent variables | Tribal | | | | Non-tribal | | | | Total | | | |
|---|---------|-------------|---------|-------------|------------|-------------|----------|-------------|----------|-------------|----------|-------------|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI |
| Maternal stunting <145 cm vs. 145 cm or more | 1.809** | [1.22,2.68] | 2.097** | [1.20,3.67] | 1.899*** | [1.52,2.37] | 2.058*** | [1.44,2.95] | 1.875*** | [1.55,2.27] | 2.139*** | [1.59,2.88] |
| Maternal smoking Yes vs. no | 0.969 | [0.75,1.26] | 0.757 | [0.50,1.15] | 0.873 | [0.71,1.08] | 0.705 | [0.48,1.03] | 0.946 | [0.80,1.11] | 0.784 | [0.59,1.04] |
| Maternal age (continuous) | 0.983* | [0.96,0.99] | 1.006 | [0.96,1.05] | 0.978* | [0.96,0.99] | 0.946*** | [0.92,0.97] | 0.980** | [0.97,0.99] | 0.958*** | [0.94,0.98] |
| Preceding birth interval <2 years vs. first birth/>=2 years | 1.364* | [1.01,1.84] | 1.576 | [0.97,2.55] | 1.232* | [1.04,1.46] | 1.079 | [0.81,1.45] | 1.258** | [1.09,1.46] | 1.206 | [0.94,1.55] |
| Minimum diet diversity <4 years; 4-7 food groups | - | [0.35,1.26] | 0.659 | [0.35,1.26] | - | | 1.702** | [1.18,2.45] | - | | 1.487* | [1.09,2.03] |
| Minimum meal frequency State dummies | - | [0.86,2.06] | 1.336 | [0.86,2.06] | - | | 1.112 | [0.90,1.37] | - | | 1.167 | [0.97,1.40] |
| Observations | 1570 | | 658 | | 5976 | | 2436 | | 7546 | | 3094 | |

Exponentiated coefficients; 95% confidence intervals (CI) in brackets. Apart from mother's age, which is a continuous variable, rest of variables are binary variables. Model 1: Child, maternal and household characteristics (includes all children). Model 2: Child, maternal and household characteristics + minimum diet diversity + minimum meal frequency (includes children aged 6-23 months).

* p<0.05 ** p<0.01 *** p<0.001.

Table 6. Associations from linear logistic regression models between mean HAZ and child, maternal, household and infant and young child feeding characteristics controlling for all covariates

| Independent variables | Tribal | | | | Non-tribal | | | | Total | | | |
|-------------------------------------|----------|-------------|---------|-------------|------------|-------------|----------|-------------|----------|-------------|----------|-------------|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI |
| Age of the child | | | | | | | | | | | | |
| Age of the child (squared) | 1.001*** | [1.00,1.00] | 0.993* | [0.99,1.00] | 1.001*** | [1.00,1.00] | 1.004* | [1.00,1.01] | 1.001*** | [1.00,1.00] | 1.002 | [1.00,1.01] |
| Birth order | | | | | | | | | | | | |
| 2/3 vs. first | 1.038 | [0.80,1.36] | 1.119 | [0.73,1.70] | 0.993 | [0.88,1.13] | 0.933 | [0.77,1.13] | 1.003 | [0.90,1.12] | 0.949 | [0.79,1.14] |
| 4 or more vs. first | 0.784 | [0.58,1.06] | 0.883 | [0.53,1.46] | 0.93 | [0.81,1.07] | 0.755* | [0.60,0.96] | 0.893 | [0.79,1.01] | 0.783* | [0.63,0.97] |
| Sex | | | | | | | | | | | | |
| Female vs. male | 0.829 | [0.69,1.00] | 0.716 | [0.51,1.01] | 0.983 | [0.90,1.08] | 0.882 | [0.76,1.02] | 0.957 | [0.88,1.04] | 0.846* | [0.74,0.97] |
| Wealth quintile | | | | | | | | | | | | |
| Middle vs. rich/richest | 0.926 | [0.62,1.38] | 1.096 | [0.53,2.28] | 0.828* | [0.71,0.97] | 0.904 | [0.71,1.14] | 0.822* | [0.71,0.95] | 0.883 | [0.70,1.11] |
| Poor/poorest vs. rich/richest | 0.861 | [0.57,1.30] | 0.93 | [0.49,1.77] | 0.691*** | [0.59,0.81] | 0.713** | [0.57,0.89] | 0.696*** | [0.60,0.81] | 0.709** | [0.57,0.88] |
| Open defecation | | | | | | | | | | | | |
| No vs. yes | 0.93 | [0.63,1.36] | 1.137 | [0.67,1.92] | 0.932 | [0.82,1.06] | 0.909 | [0.75,1.10] | 0.932 | [0.82,1.05] | 0.932 | [0.78,1.12] |
| Maternal employment | | | | | | | | | | | | |
| No vs. yes | 1.052 | [0.86,1.29] | 1.056 | [0.74,1.51] | 0.976 | [0.89,1.07] | 0.999 | [0.86,1.16] | 0.979 | [0.90,1.07] | 1.007 | [0.87,1.16] |
| Maternal education | | | | | | | | | | | | |
| None vs. any | 0.881 | [0.69,1.12] | 0.829 | [0.56,1.23] | 0.861** | [0.77,0.96] | 0.806* | [0.68,0.96] | 0.849** | [0.77,0.94] | 0.794** | [0.68,0.93] |
| Maternal height (continuous) | 1.004*** | [1.00,1.01] | 1.005** | [1.00,1.01] | 1.005*** | [1.00,1.01] | 1.005*** | [1.00,1.01] | 1.005*** | [1.00,1.01] | 1.006*** | [1.00,1.01] |

Table 6. (cont.)

| Independent variables | Tribal | | | | Non-tribal | | | | Total | | | |
|---|-------------|--------------|------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI | B-coef | 95% CI |
| Maternal smoking | | | | | | | | | | | | |
| Yes vs. no | 0.988 | [0.80, 1.22] | 1.095 | [0.78, 1.53] | 0.963 | [0.84, 1.10] | 0.894 | [0.72, 1.11] | 0.952 | [0.85, 1.07] | 0.953 | [0.79, 1.16] |
| Maternal age (continuous) | 1.016 | [0.99, 1.04] | 1.03 | [0.98, 1.09] | 0.998 | [0.99, 1.01] | 1.012 | [0.99, 1.03] | 1.002 | [0.99, 1.01] | 1.014 | [0.99, 1.04] |
| Preceding birth interval (continuous) | 1.011** | [1.00, 1.02] | 1.011* | [1.00, 1.02] | 1.006*** | [1.00, 1.01] | 1.006** | [1.00, 1.01] | 1.007*** | [1.00, 1.01] | 1.007*** | [1.00, 1.01] |
| No. of food groups (continuous) | - | - | 1.074 | [0.93, 1.24] | - | - | 1.182*** | [1.11, 1.26] | - | - | 1.162*** | [1.10, 1.23] |
| Meal frequency | | | | | | | | | | | | |
| State dummies | Yes | | Yes | | Yes | | Yes | | Yes | | Yes | |
| Observations | 1267 | | 481 | | 4471 | | 1663 | | 5738 | | 2144 | |

Exponentiated coefficients; 95% confidence intervals (CI) in brackets.
 Model 1: Child, maternal and household characteristics (includes all children).
 Model 2: Child, maternal and household characteristics + diet diversity + meal frequency (includes children aged 6-23 months).

* p<0.05 ** p<0.01 *** p<0.001.

Table 7. Mapping intervention areas of non-governmental organizations

| Organization (District, State) | Intervention areas | | | |
|---|---|--------------------------------|-----------------|----------------------------------|
| | Secondary-level inpatient, OPD services | Primary/mobile health services | Training centre | PPP with government ¹ |
| 1. Jan Swasthya Sahayog (Bilaspur, Chhattisgarh) | ✓ | ✓ | | |
| 2. Christian Fellowship (Rajnandgaon, Chhattisgarh) | ✓ | ✓ | ✓ | |
| 3. Ramakrishna Mission (Narainpur, Chhattisgarh) | ✓ | ✓ | | ✓*^\$ |
| 4. SEWA-rural (Jhagadia, Gujarat) | ✓ | ✓ | ✓ | ✓# |
| 5. Ekjut (W. Singhbhum, Jharkhand, Keonjhar, Odisha) | | | | |
| 6. SEARCH (Gadchiroli, Maharashtra) | ✓ | ✓ | ✓ | |
| 7. WOSCA (Keonjhar, Odisha) | | | ✓ | |
| 8. ARTH (Udaipur, Rajasthan) | | ✓ | ✓ | |
| 9. Real Medicine Foundation (five districts, Madhya Pradesh) | | | | ✓\$ |
| 9. Real Medicine Foundation (five districts, Madhya Pradesh) | | | | ✓\$ |
| 10. Pradan (7 states) | | | ✓ | |
| 11. Srijan (4 states) | | | ✓ | |
| 12. World Vision (105 districts, 24 states) | | | | |
| 13. Vasudhara Dairy (Valsad district, Gujarat) | | | | |
| 14. Nature (Vishakapatnam, Andhra Pradesh) | | | | |

¹ Public-private partnerships (PPP) include fair price shops, anganwadi centres (AWCs) and public health centres (PHCs).

² Includes thrift and credit and livelihood promotion.

³ Carried out through community volunteers and workers.

* PDS; ^AWC; \$NRC; #PHC.

| Intervention areas | | | | |
|--------------------|-------------------------------------|----------------------------------|-----|----------------------|
| Crèche | Community organization ² | Behaviour promotion ³ | CRT | Others |
| ✓ | | | | |
| | ✓ | ✓ | | |
| | | ✓ | | |
| | ✓ | ✓ | ✓ | |
| | | ✓ | ✓ | |
| | | ✓ | ✓ | Malaria prevention |
| ✓ | ✓ | ✓ | | Support to ITDA |
| | | ✓ | ✓ | |
| | | | | |
| | ✓ | | | |
| | ✓ | | | |
| | ✓ | ✓ | | Water and sanitation |
| | ✓ | ✓ | | |
| | ✓ | ✓ | | Support to ITDA |

CRT = cluster randomized trial
 ITDA = Integrated Tribal Development Agency
 NRC = Nutrition Rehabilitation Centre
 OPD = outpatient department
 PDS = Public Distribution System



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Annexes

Annex 1. Areas and particularly vulnerable tribal groups in tribal sub-plan areas and states having scheduled area and tribes advisory councils

| State | Number of | | | |
|----------------------------------|---------------------|------------|-----------|-----------|
| | ITDPs/ITDAs Pockets | MADA | Clusters | PTGs |
| 1. Andhra Pradesh | 8 | 41 | 17 | 12 |
| 2. Assam | 19 | - | - | - |
| 3. Bihar | - | 7 | - | 9** |
| 4. Chhattisgarh [#] | 19 | 9 | 2 | ** |
| 5. Gujarat [#] | 9 | 1 | - | 5 |
| 6. Himachal Pradesh [#] | 5 | 2 | - | - |
| 7. Jammu and Kashmir | - | - | - | - |
| 8. Jharkhand [#] | 14 | 34 | 7 | ** |
| 9. Karnataka | 5 | - | - | 2 |
| 10. Kerala | 7 | - | - | 5 |
| 11. Madhya Pradesh [#] | 31 | 30 | 6 | 7** |
| 12. Maharashtra [#] | 16 | 44 | 24 | 3 |
| 13. Manipur | 5 | - | - | 1 |
| 14. Odisha [#] | 21 | 46 | 14 | 13 |
| 15. Rajasthan [#] | 5 | 44 | 11 | 1 |
| 16. Sikkim | 4 | - | - | - |
| 17. Tamil Nadu [§] | 9 | - | - | 6 |
| 18. Tripura [*] | - | - | - | 1 |
| 19. Uttar Pradesh | 1 | 1 | - | 2** |
| 20. Uttarakhand | - | - | - | ** |
| 21. West Bengal [§] | 12 | - | 1 | 3 |
| Union Territory | | | | |
| 22. Andaman and Nicobar Islands | 1 | - | - | 5 |
| 23. Daman and Diu | 1 | - | - | - |
| All India | 192 | 259 | 82 | 75 |

*There are no ITDPs in Tripura, where there are Tripura Tribal Autonomous Districts Councils as the provision of the Sixth Schedule was extended to Tripura w.e.f. 1985 by the 49th Amendment of the Constitution as informed by the State Government of Tripura vide letter No. F. 15-2/Part-I/TW/SP/2004/14648 dated 03.10.2006.

** The PTG for Bihar and Jharkhand, Madhya Pradesh and Chhattisgarh and Uttar Pradesh and Uttarakhand are common.

[#]States having Scheduled Areas and Tribes Advisory Councils (TACs).

[§]State having only TACs.

ITDP = Integrated Tribal Development Programme

ITDA = Integrated Tribal Development Agency

MADA = Modified Area Development Approach

PTG = particularly vulnerable tribal group

Source: Annual Report 2012- 2013, Ministry of Tribal Affairs

Annex 2. Ministry-wise percentage of funds earmarked under tribal sub-plan (TSP) for annual plan 2012-2013 and 2013-2014 as per Gross Budget Estimate Statement-21A#

| Ministry/Department | % of funds earmarked under TSP | |
|---|--------------------------------|-----------|
| | 2012-2013 | 2013-2014 |
| 1. Ministry of Agriculture | | |
| Department of Agriculture and Co-Operation | 8.0 | 8.0 |
| Department of Agricultural Research and Education | 3.43 | 3.60 |
| 2. Ministry of Coal | 7.45 | 8.20 |
| 3. Ministry of Communications and Information Technology | | |
| Department of Telecommunications | 0.25 | 0.25 |
| Department of Information Technology | - | - |
| 4. Ministry of Consumer Affairs, Food and Public Distribution | | |
| Department of Food and Public Distribution | 4.05 | 2.42 |
| 5. Ministry of Culture | 2.0 | 2.0 |
| 6. Ministry of Environment and Forests* | 0.81 | 0.66 |
| 7. Ministry of Health and Family Welfare | | |
| Department of Health and Family Welfare | 8.20 | 8.20 |
| Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy | 2.0 | 2.0 |
| Department of AIDS Control** | 8.20 | 8.20 |
| 8. Ministry of Housing and Urban Poverty Alleviation | 1.82 | 2.4 |
| 9. Ministry of Human Resource Development | | |
| Department of School Education and Literacy | 10.7 | 10.7 |
| Department of Higher Education | 7.5 | 7.52 |
| 10. Ministry of Labour and Employment | 8.31 | 8.20 |
| 11. Ministry of Micro, Small and Medium Enterprises | 8.31 | 8.20 |
| 12. Ministry of Mines | 2.62 | 2.08 |
| 13. Ministry of Road Transport and Highways | 3.14 | 3.40 |
| 14. Ministry of Panchayati Raj | 4.61 | 7.51 |
| Department of Rural Development | 5.34 | 5.98 |
| Department of Land Resources | 10.0 | 10.0 |
| 15. Ministry of Drinking Water and Sanitation | 10.0 | 10.0 |
| 16. Ministry of Science and Technology | | |
| Department of Science and Technology | 1.01 | 2.5 |
| 17. Ministry of Textiles | 1.2 | 1.2 |
| 18. Ministry of Tourism | 2.5 | 2.5 |
| 19. Ministry of Tribal Affairs | 100 | 100 |
| 20. Ministry of Water Resources | 2.69 | 1.3 |

Annex 2. (cont.)

| Ministry/Department | % of funds earmarked under TSP | |
|---|---------------------------------------|------------------|
| | 2012-2013 | 2013-2014 |
| 21. Ministry of Women and Child Development | 8.83 | 8.2 |
| 22. Ministry of Youth Affairs and Sports | 8.23 | 8.26 |
| 23. Ministry of Social Justice and Empowerment | - | 0.69 |
| GRAND TOTAL | 5.9 | 5.87 |

*Not mandated to compulsory earmark TSP funds.

**The percentage earmarked for Ministry of Health and Family Welfare.

*According to the recommendations of the Task Force as accepted by the Planning Commission and mandated for Ministries/Departments.

Source: Expenditure Budget Volume I, 2013-2014.

Annex 3. Status of tribal sub-plans formulated by study states for 2012-2013 and 2013-2014

| State | % of TSP to annual plan | | % ST in state |
|----------------|-------------------------|-------------|---------------|
| | 2012-2013 | 2013-2014 | |
| Andhra Pradesh | 7.3 | 6.9 | 6.6 |
| Assam | 3.3 | 3.8 | 12.4 |
| Chhattisgarh | 31.3 | 30.8 | 31.8 |
| Gujarat | 13.1 | 12.0 | 14.8 |
| Jharkhand | 50.4 | 50.4 | 26.3 |
| Karnataka | 4.9 | 5.0 | 6.6 |
| Madhya Pradesh | 22.0 | 19.2 | 20.3 |
| Maharashtra | 6.4 | 7.8 | 8.9 |
| Odisha | 25.0 | 23.9 | 22.1 |
| Rajasthan | 12.8 | 12.8 | 12.6 |
| West Bengal | 6.3 | 7.2 | 5.5 |
| Average | 16.6 | 16.3 | 15.3 |

TSP = tribal sub-plan
ST = scheduled tribe

Source: Annual Report 2013-2014, Ministry of Tribal Affairs

Annex 4. Census of India 2011 population data and Planning Commission poverty estimates for selected 11 study states

| Census of India 2011 | | Overall population | | | Scheduled tribes (numbers) | | | Scheduled tribes (proportion %) | | | Scheduled tribes (rural) Below Poverty Line* (%) |
|----------------------|-----------------|--------------------|-------------------|-----------------|----------------------------|------------------|------------|---------------------------------|------------|-------------|--|
| | | Urban | Rural | Total | Urban | Rural | Total | Urban | Rural | Total | |
| Andhra Pradesh | 23578175 | 56311788 | 79889963 | 685944 | 5232129 | 5918073 | 2.9 | 9.3 | 7.4 | 30.5 | |
| Assam | 4388756 | 26780516 | 31169272 | 218966 | 3665405 | 3884371 | 4.9 | 13.7 | 12.0 | 14.1 | |
| Chhattisgarh | 5936538 | 19603658 | 25540196 | 591820 | 7231082 | 7822902 | 9.9 | 36.9 | 31.0 | 54.7 | |
| Gujarat | 25712811 | 34670817 | 60383628 | 895326 | 8021848 | 8917174 | 3.5 | 23.1 | 15.0 | 34.7 | |
| Jharkhand | 7929292 | 25036946 | 32966238 | 776892 | 7868150 | 8645042 | 9.8 | 31.4 | 26.0 | 54.2 | |
| Karnataka | 23578175 | 37552529 | 61130704 | 819196 | 3429791 | 4248987 | 3.5 | 9.1 | 7.0 | 23.5 | |
| Madhya Pradesh | 20059666 | 52537899 | 72597565 | 1039910 | 14276874 | 15316784 | 5.2 | 27.2 | 21.0 | 58.6 | |
| Maharashtra | 50827531 | 61545441 | 112372972 | 1504136 | 9006077 | 10510213 | 2.9 | 14.6 | 9.4 | 56.6 | |
| Odisha | 6996124 | 34951234 | 41947358 | 595789 | 8994967 | 9590756 | 8.5 | 25.7 | 23.0 | 75.6 | |
| Rajasthan | 17080776 | 51540236 | 68621012 | 545411 | 8693123 | 9238534 | 3.2 | 16.9 | 13.0 | 32.6 | |
| West Bengal | 29134060 | 62213676 | 91347736 | 441838 | 4855115 | 5296953 | 1.5 | 7.8 | 5.8 | 42.4 | |
| India | 10461872 | 833463448 | 1210193422 | 10461872 | 93819162 | 104281034 | 2.8 | 11.3 | 8.6 | 47.3 | |

*Planning Commission poverty estimates 2009-2010⁶

Annex 5. Census of India 2011 population data and selected indicators for selected 11 study states (rural)

| State | Total no. of households | % HH with electricity | % HH having drinking water sources in premises | % HH with drinking water sources near premises | % HH with drinking water source away from premises | % HH with latrine facility |
|----------------|--------------------------------|------------------------------|---|---|---|-----------------------------------|
| Andhra Pradesh | 1324737 | 78.01 | 14.98 | 48.68 | 36.33 | 10.32 |
| Assam | 814320 | 23.05 | 45.36 | 29.91 | 24.73 | 38.83 |
| Chhattisgarh | 1612124 | 54.28 | 6.76 | 58.87 | 34.37 | 12.52 |
| Gujarat | 1525331 | 77.74 | 21.29 | 50.92 | 27.79 | 14.92 |
| Jharkhand | 1542273 | 23.80 | 4.23 | 51.53 | 44.24 | 3.74 |
| Karnataka | 711110 | 81.01 | 17.97 | 50.65 | 31.38 | 15.64 |
| Madhya Pradesh | 2969095 | 51.80 | 6.20 | 51.15 | 42.65 | 5.27 |
| Maharashtra | 1871703 | 50.15 | 23.36 | 49.48 | 27.16 | 21.09 |
| Odisha | 2090443 | 12.58 | 4.62 | 50.16 | 45.22 | 5.34 |
| Rajasthan | 1703895 | 36.07 | 7.12 | 49.37 | 43.51 | 3.53 |
| West Bengal | 1116320 | 25.74 | 15.20 | 45.85 | 38.95 | 18.32 |
| India | 20142434 | 46.20 | 14.13 | 49.48 | 36.39 | 15.79 |

HH = households

Annex 6. National Nutrition Monitoring Bureau 2009 data for scheduled tribes (rural)

| State | Proportion of stunted children aged 0 - <12 months as per WHO standard | Proportion of stunted children aged 12 - 59 months as per WHO standard | *BMI of women <18.5 | Average intake of nutrients (per day) among women (sedentary) aged 16 years and above | | | | |
|------------------------------------|--|--|---------------------|---|---------------|--------------|-------------|----------------------|
| | | | | Protein (g) | Energy (kcal) | Calcium (mg) | Iron (mg) | Free folic acid (ug) |
| Andhra Pradesh | 50.7 | 52.1 | 48.8 | 43.2 | 1767 | 292 | 8.0 | 37 |
| Assam | - | - | - | - | - | - | - | - |
| Chhattisgarh | - | - | - | - | - | - | - | - |
| Gujarat | 45.7 | 53.8 | 36.5 | 62.6 | 1884 | 309 | 16.4 | 64 |
| Jharkhand | - | - | - | - | - | - | - | - |
| Karnataka | 25.8 | 39.4 | 50.5 | 39.1 | 1801 | 265 | 9.5 | 50 |
| Madhya Pradesh | 28.4 | 63.6 | 45.9 | 42.2 | 1503 | 194 | 12.1 | 40 |
| Maharashtra | 44.0 | 60.7 | 62.6 | 43.8 | 1695 | 278 | 12.7 | 43 |
| Odisha | 41.0 | 64.6 | 52.3 | 42.5 | 1839 | 402 | 10.9 | 58 |
| Rajasthan | - | - | - | - | - | - | - | - |
| West Bengal | 22.2 | 45.9 | 55.7 | 44.9 | 2126 | 227 | 10.4 | 63 |
| Pooled data of 9 states | 34.6 | 54.7 | 49.9 | 41.9 | 1722 | 297 | 10.5 | 49 |
| Recommended daily allowance | | | | 50 | 1875 | 400 | 30.0 | |

*BMI according to WHO cut-off – states not covered in the NNMB report, 2009

Source: NNMB Report No. 25. Diet and Nutritional Status of Tribal Population and Prevalence of Hypertension among Adults, 2009

Annex 7. Websites of organizations included in Box 2.2

| | |
|---|--|
| Action Research and Training for Health | www.arth.in |
| Ekjut | www.ekjutindia.org |
| Jan Swasthya Sahyog | www.jssbilaspur.org |
| Professional Assistance for Development Action | www.pradan.net |
| Ramakrishna Mission Ashram | www.rkmnarainpur.org |
| Real Medicine Foundation | www.realmedicinefoundation.org |
| Society for Education Action and Research in Community Health | www.searchgadchiroli.org |
| Society for Education, Welfare and Action-Rural | www.sewarural.org |
| Society for Elimination of Rural Poverty | www.serp.ap.gov.in |
| Srijan | www.srijanindia.org |
| State Health Resource Centre | www.shsrc.org |
| Women Organization for Socio-Cultural Awareness | www.wosca.in |
| World Vision India | www.worldvision.in |

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Despite 65 years of affirmative action policies and programmes, every second tribal child in India continues to remain chronically undernourished. This study – among the first of its kind – describes levels, severity and determinants of stunting and severe stunting among India's tribal children; compares them with non-tribal children; synthesizes affirmative action policies, national programmes and promising practices in the states; and suggests a way forward.



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