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**EFFECT OF THE MAHATMA GANDHI NATIONAL RURAL  
EMPLOYMENT GUARANTEE ACT ON INFANT MALNUTRITION:  
A MIXED METHODS STUDY IN RAJASTHAN, INDIA**

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# EFFECT OF THE MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GUARANTEE ACT ON INFANT MALNUTRITION: A MIXED METHODS STUDY IN RAJASTHAN, INDIA

MANISHA NAIR, GREEN TEMPLETON COLLEGE, SUBMITTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY, TRINITY TERM – 2013

## **Abstract**

### **Background**

Malnutrition is a major risk factor of infant mortality in India. Policies targeting poverty and food insecurity may reduce infant malnutrition. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), a wage-for employment policy of the Indian Government, targets deprivation and food insecurity in rural households. MGNREGA could prevent infant malnutrition by improving household food security or increase the risk of malnutrition by reducing the time devoted to infant care if mothers are employed. This study analyzed the effect and the pathways of effect of households' and mothers' participation in MGNREGA on infant malnutrition.

### **Methods**

A community based mixed methods study using cross-sectional survey and focus group discussions (FGDs) was conducted in Dungarpur district of Rajasthan, India. Cross-sectional study included 528 households with 1,056 participants who were infants 1 to <12 months and their mothers/caregivers. Selected households were divided into MGNREGA-households and non-MGNREGA-households based on participation in MGNREGA between August-2010 and September-2011. Anthropometric indicators of infant malnutrition—underweight, stunting, and wasting (WHO criteria) were the outcomes. Eleven FGDs with 62 mothers were conducted.

### **Results**

Of 528 households, 281 participated in MGNREGA (53%). Mothers were employed in 51 (18%) households. Prevalence of wasting was 39%, stunting 24%, and underweight 50%. Households participating in MGNREGA were less likely to have wasted infants (OR 0.57, 95% CI 0.37–0.89;  $p=0.014$ ) and underweight infants (OR 0.48, 95% CI 0.30–0.76;  $p=0.002$ ) than non-participating households. Stunting did not differ significantly between groups. Although MGNREGA reduced starvation, it did not confer food security to the participating households because of lower than standard wages and delayed payments. Results from path analysis did not support an effect through household food security and infant feeding, but suggested a pathway of effect through birth-weight. Mothers' employment had no significant effect on the outcomes in the cross-sectional study, but the qualitative study indicated that it could compromise infant feeding and care.

### **Conclusion**

Participation in MGNREGA was associated with reduced infant malnutrition possibly mediated indirectly via improved birth-weight rather than improved infant feeding. Providing child care facilities at worksites could mitigate the negative effects of mother's participation in MGNREGA. Further, improving mothers' knowledge of appropriate feeding practices in conjunction with providing employment (to address deprivation and food insecurity) is key in the efforts to reduce infant malnutrition.

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# Chapter 1

## Introduction

In India, where one in three of the world's malnourished children live, more than 60 million children under five years of age are malnourished (Black et al., 2008). According to the 2012 World Health Statistics of the World Health Organisation (WHO) and the World Bank's report, 'India's undernourished children', India has the highest proportion of underweight (low weight-for-age) children under five years of age (World Health Organization, 2012b), almost double that of Sub-Saharan Africa (Gragnotati et al., 2005). Between 2005 and 2011, the proportion of underweight children (under five) in India was 43.5% and the proportion of stunted (low height-for-age) children was almost 48% (World Health Organization, 2012b). Stunting is a measure of chronic malnutrition (De Onis et al., 1993), wasting (low weight-for-height) is a measure of acute malnutrition (World Health Organisation and Unicef, 2009) and underweight is suggested to be a composite indicator of acute and chronic malnutrition (De Onis et al., 1993).

Malnutrition is a major cause of infant<sup>1</sup> and child<sup>2</sup> mortality (Claeson et al., 2000, Visaria, 1988, Jones et al., 2006). Globally 53% of the deaths among children in these age groups are attributed to malnutrition (Caulfield et al., 2004). In India, malnutrition is suggested to be the underlying cause of about 45% of all infant and child deaths due to measles, 57% of the deaths due to malaria, 52% due to pneumonia and 61% of the deaths due to diarrhoea (Gragnotati et al., 2005). A study that assessed the sensitivity and specificity of the

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<sup>1</sup> Children less than 12 months of age

<sup>2</sup> Here 'children' refers to the age group of one to five years

anthropometric indicators of malnutrition<sup>3</sup> in predicting the risk of infant mortality showed that in India severe underweight at six weeks of age was associated with increased risk of death at six months, and wasting at six months was associated with an increased risk of death between 6 to 12 months (Vesel et al., 2010). The effect of malnutrition on infant mortality is multiplicative rather than additive due to the risk of infections (Pelletier, 1994, Deshmukh et al., 2009). A review of 28 prospective community-based studies showed that infant mortality was inversely associated with the three traditionally used anthropometric indicators of nutritional status – underweight, wasting and stunting (Pelletier, 1994). Furthermore, various studies globally have indicated that mild-to-moderate malnutrition, as opposed to severe malnutrition, is the major underlying cause of mortality among infants and children under five (Pelletier et al., 1995, Caulfield et al., 2004, Bhagowalia et al., 2011). However, globally malnutrition seldom gets reported as the cause of infant mortality because death certificates generally only record the immediate cause at the time of death and not the underlying or predisposing conditions (Meegama, 1980, United Nations, 1954a, Visaria, 1988).

In addition to being a risk factor of mortality among infants, malnutrition increases the risk of childhood infections, impairs physical, cognitive and social development during infancy and early childhood (Gragmolati et al., 2005, Wachs et al., 1993, Nassar et al., 2012) and may consequently have adverse effects on economic productivity during adulthood (Victora et al., 2008). In India, stunting, severe wasting and low birth-weight contributed to an estimated 25 million disability-adjusted-life-years (DALYs) in children less than five years of age (Black et al., 2008).

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<sup>3</sup> Anthropometric indicators underweight, wasting and stunting were derived using the World Health Organisation growth reference standards.

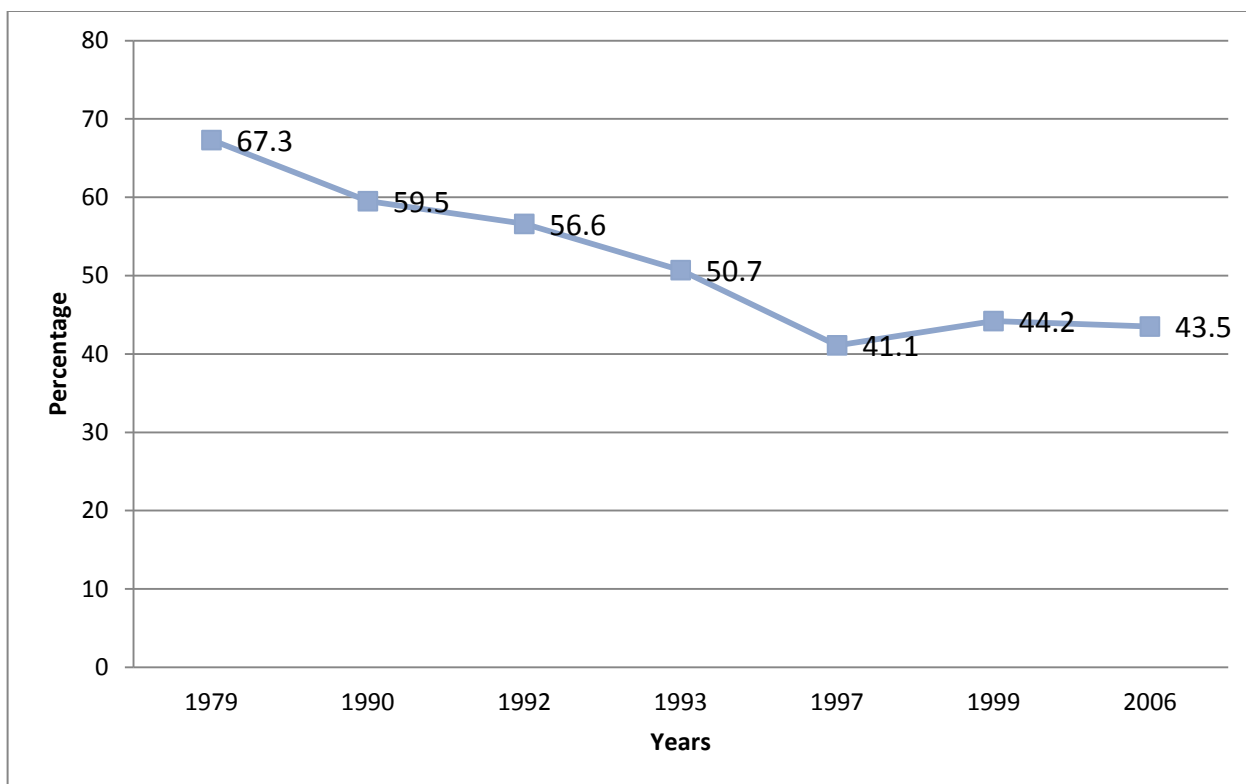
## 1.1: The persisting problem of infant and child malnutrition in India

The second National Family Health Survey (NFHS-II) reported that in India as a whole, 54% of the children less than three years of age were underweight in 1998-99 and only 3% met the international standards of adequate nutrition (Bhat and Zavier, 1999). In 2005-06, the prevalence of underweight, wasting and stunting among children less than three years in India was reported to be 40%, 23% and 45%, respectively. It was reported that the prevalence of underweight and stunting among children decreased by 3% and 6%, respectively between the 1998-99 NFHS-II and 2005-06 NFHS-III surveys in India, but the prevalence of wasting increased by 3% (International Institute for Population Sciences (IIPS) and Macro International, 2007). The explanation provided for increase in the prevalence of wasting (low weight-for-height) in the NFHS-III report is ‘greater improvements in height-for-age compared to weight-for-age’ (International Institute for Population Sciences (IIPS) and Macro International, 2007). However, the differences may be due to methodological artefact. These demographic and health surveys do not sample the same population or villages over time, in addition, the growth reference standards used to calculate underweight, stunting and wasting were different for the two surveys<sup>4</sup>. Martorell and Young (2012) using the NFHS-III data from India showed that the calculated prevalence of wasting and stunting among children under five years was higher with the 2006 WHO reference standards compared with the 1976 National Center for Health Statistics (NCHS) reference standards. This difference was strikingly higher for wasting than stunting in the age group of 0 – 5 months in which the prevalence of wasting increased by more than three times from 8% to 30% (Martorell and Young, 2012). The study did not report the

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<sup>4</sup> NFHS-III conducted in 2005-06 used the 2006 WHO reference standards which was not available during the NFHS-II surveys conducted in 1998-99.

differences for underweight. Therefore, it is likely that the reported increase in wasting between the 1998-99 and 2005-06 national surveys is due to the difference in standard reference population used in the two tools. The same methodological constraints apply to the graphical presentation of the trends in the prevalence of underweight among children less than five years of age from 1979 to 2006 shown in figure 1.1. Nevertheless, the graph gives the idea that the decline in underweight has been slow after 1997. The patterns and trends in the prevalence of malnutrition also vary across the states in India and according to the demographic, socioeconomic and geographical characteristics of the population within each state (Gragnotati et al., 2005). Four states - Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan account for more than 40% of the burden of under five malnutrition and a similar pattern of stagnancy is observed in each of these states (Gragnotati et al., 2005). Within states, the prevalence of malnutrition among children has been noted to be driven by socioeconomic inequalities such that the burden is concentrated in the rural areas and among the poor (Pathak and Singh, 2011, Svedberg, 2008).



**Figure 1.1: Prevalence of underweight among children < 5 years in India**

(Source of data: World Development Indicators (The World Bank))<sup>5</sup>

## 1.2: Risk factors of infant and child malnutrition in India

There are several factors that contribute to the high prevalence of infant and child malnutrition in India. While these factors are discussed in detail in chapter 2, an overview is

<sup>5</sup> **Year 2006:** Age 0 to 5 years; National family health survey (NFHS-3), 2005-06: India: Volume I. Demographic and Health Surveys. Mumbai, India: IIPS, 2007 (and additional analysis).

**Year 1999:** Age 0 to <3 years; National family health survey (NFHS-2) 1998-99. Demographic and Health Surveys. Mumbai, India, 2000 (and additional analysis).

**Year 1997:** Age 0 to <5 years; Diet and nutrition situation in rural India. Indian Journal of Medical Research 1998;108:243-253 (and additional analysis).

**Year 1993:** Age 0 to <4 years; National family health survey, India 1992-93. Demographic and Health Surveys. Bombay, India, 1995 (and additional analysis).

**Year 1992:** Age 0 to <5 years; National Nutrition Monitoring Bureau, 1991-92 (8 States pooled data). Hyderabad, India; 1993 (data reanalyzed for WHO).

**Year 1990:** Age 0 to <5 years; National Nutrition Monitoring Bureau, 1988-90 (8 States pooled data). Hyderabad, India; 1993 (data reanalyzed for WHO).

**Year 1979:** Age 0 to <5 years; National Nutrition Monitoring Bureau, 1974-79 (8 States pooled data). Hyderabad, India; 1993 (data reanalyzed for WHO).

presented in this section. The high prevalence of infectious diseases such as diarrhoea, pneumonia, malaria, measles and other vaccine preventable diseases is reported to be the immediate risk factor of malnutrition among children (International Institute for Population Sciences (IIPS) and Macro International, 2007, Jain, 1968). In addition, several studies conducted in different parts of the country have demonstrated the feeding practices (such as initiation of breastfeeding, exclusive breastfeeding and weaning) to be inadequate (Bawdekar and Ladusingh, 2008, Rajaram et al., 2007, Patel et al., 2012) either due to lack of knowledge of mothers and caregivers or due to the prevalent cultural practices that interfere with appropriate feeding (Chandrasekhar, 1959, Patel et al., 2012, Visaria, 1988).

Furthermore, socioeconomic inequalities have resulted in a higher risk of underweight, stunting and wasting in children belonging to the lower socioeconomic classes. Both national and regional surveys in India demonstrate a higher prevalence of childhood malnutrition among the Schedule caste and Schedule Tribe social groups compared to other social classes (Bawdekar and Ladusingh, 2008, Das, 2008). Scheduled castes are those 'whose members have suffered the greatest burden of deprivation within the caste system and were regarded as untouchables' (Chitnis, 1997). Scheduled tribes include approximately 700 officially recognized social groups that have historically been geographically and socially isolated from the rest of India (Galanter, 1984). It is suggested that illiteracy and poverty among these social classes are the main underlying causes for the observed inequality (Bawdekar and Ladusingh, 2008). Poverty<sup>6</sup> (Bawdekar and Ladusingh, 2008, Mishra et al., 1999, Bharati et al., 2008, Gaiha and Kulkarni, 2005, Mishra and Retherford,

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<sup>6</sup> Although poverty can have various dimensions, here the studies mainly refer to income poverty.

2000, Rajaram et al., 2007), lack of household food security<sup>7</sup> (Sethuraman et al., 2006) and low level of maternal education (Mishra and Retherford, 2000, Mishra et al., 1999, Bharati et al., 2008, Rajaram et al., 2007) are other important risk factors of infant and child malnutrition consistently demonstrated by studies across the country. Thus, the risk of malnutrition among children in India is multi-factorial, while the effects of infectious diseases and lack of adequate feeding are apparent, the social and economic factors are the underlying risk factors that predispose the infants and young children to malnutrition.

### 1.3: Nutritional policies and programmes to address malnutrition

There are several nutrition programmes in India with suggested potential impact on child malnutrition, but no comprehensive strategy to address this persistent problem (Von Braun et al., 2008). The Integrated Child Development Services (ICDS) scheme implemented in 1975 is the national nutrition programme and is the largest in the world in terms of beneficiaries and costs (Awofeso and Rammohan, 2011). ICDS provides a package of health and nutrition services which includes supplementary nutrition, immunization, health check-ups, referral services, nutrition and health education for women, and pre-school education for children (Kapil, 2002, Kapil et al., 1992). The beneficiaries include children less than six years of age, pregnant women and lactating mothers, and women in the age group of 15-44 years (Kapil, 2002). The services are provided through local village ICDS centres known as the 'Anganwadi'<sup>8</sup> centres (Kapil, 2002). Although the programme aims to address the problem of child malnutrition in India through a multi-faceted approach, the emphasis is

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<sup>7</sup> In this paper, the authors described food insecurity as lack of food availability at household level which was measured using variables such as frequency of food purchases by the household, days without food in the past week/month and food production/farming. However, no reference to any standard definition or tools for measuring food insecurity was provided. SETHURAMAN, K., LANSDOWN, R. & SULLIVAN, K. 2006. Women's empowerment and domestic violence: the role of sociocultural determinants in maternal and child undernutrition in tribal and rural communities in South India. *Food Nutr Bull*, 27, 128-43.

<sup>8</sup> Meaning courtyard

mainly on food supplementation (Grag nolati et al., 2005). Moreover, children under three years who are most susceptible to malnutrition, although included as beneficiaries, do not receive the desired focus within this scheme (Grag nolati et al., 2005). The emphasis of this scheme is on providing pre-school education and supplementary nutrition to children between four and six years of age at the expense of programmes directed to the younger age group (such as providing support and education to mothers for adequate feeding and care) (Grag nolati et al., 2005). Although ICDS is reported to have achieved some success (Avsm et al., 1995), lack of focus on the vulnerable age group is suggested to be one of the reasons for the programme not being able to have a major impact on infant and child malnutrition despite its existence for about four decades (Grag nolati et al., 2005, Awofeso and Rammohan, 2011, Bose et al., 2007). Other mismatches between programme targeting and risk factors of malnutrition have also been reported including low coverage of children belonging to the poor, and Schedule Caste and Schedule Tribe households, and less than adequate funding for states that have the highest proportion of malnourished children (Grag nolati et al., 2005). While poverty and mortality rates came down by 50% and fertility rate by 40% between 1970 and 2005, the reduction in malnutrition among children less than five years of age was about 20% (Ramachandran, 2007). Although this is quite a substantial reduction, it is not known how much of this decline in child malnutrition could be attributed to the ICDS since decrease in poverty and fertility rates could themselves have facilitated the nutritional improvements.

In addition to the ICDS scheme, there are about eight nutrition programmes implemented in India since 1962 (Kapil et al., 1992). The 'Mid-day-Meal programme' launched in 1962 provides supplementary nutrition to children (6-11 years) in schools (Kapil et al., 1992). The

‘Special Nutrition Programme’ (SNP) which started in 1970-71 provides supplementary nutrition to pre-school children in the age group of six months to six years and special high calorie nutritional supplements to malnourished children, pregnant women and lactating mothers belonging to the lower socioeconomic sections of the society (Kapil et al., 1992). Other nutrition supplementation programmes targeting the poor households and marginalised social classes are the ‘Wheat Based Supplementary Nutrition Programme’ (WNP) implemented in 1986 and the ‘Balwadi Nutrition Programme’ (BNP), both targeting pre-school children (Kapil et al., 1992). The WNP was initially implemented to provide nutritional supplementation to the pre-school children, pregnant and lactating women not covered by the ICDS, but since 1990 the programme is limited to the beneficiaries covered under the central sector project of the ICDS (i.e. funded by the central government only) (Kapil et al., 1992, Mamata and Sarada, 2009). The BNP was implemented in 1970-71 to provide supplementary feeding to children 3-5 years through the ‘Balwadi’ centres (the pre-schools and the day-care centres) so that each child receives at least 300 calories and 12.5 grams of protein per day, but at present the funding for this programme has been curtailed by the government (Kapil et al., 1992, Mamata and Sarada, 2009). In addition, there are three micro-nutrient supplementation programmes operational in India – the National Programme for Prevention of Nutritional Blindness due to Vitamin A Deficiency (launched in 1970), the National Nutritional Anaemia Prophylaxis Programme (launched in 1970) and the National Goitre Control Programme (launched in 1962) that concentrate on administration of Vitamin A doses to children six months to five years, iron and folate supplements to children 1-5 years and pregnant women, and providing iodized salt, respectively (Kapil et al., 1992). While the short term goal of these micro-nutrient

supplementation programmes is nutritional supplementation, their long term goals include broad dietary interventions to improve the intake of foods rich in Vitamin A, iron and iodine, and surveillance to monitor micro-nutrient deficiency in the population (Mamata and Sarada, 2009).

Although most programmes primarily focus on meeting the nutrient requirement of children, pregnant women and lactating mothers through direct supplementation, the Applied Nutrition Programme (ANP) implemented in 1973 had a broader scope and is considered to be the best conceived nutrition programme to date (Kapil et al., 1992). The approach of this programme was based on improving 'self reliance' and its objectives apart from nutrition supplementation were to make people aware of their nutritional needs and enable them to produce nutritious foods locally for their consumption (Kapil et al., 1992). However, due to the government's preferential focus on direct food provision and/ or supplementation policies, the Applied Nutrition Programme has received low priority and is not being expanded (Kapil et al., 1992, Mamata and Sarada, 2009).

Irrespective of several large scale nutritional programmes in India for more than 40 years, the decline in infant and child malnutrition has been slow and almost stagnant since 1997 (figure 1.1). This warrants the need to look beyond the nutritional interventions to find a solution for this persistent public health and nutrition challenge in India.

#### 1.4: Role of social and economic policies in addressing infant malnutrition

Various studies globally have suggested that nutritional interventions at the community level or income growth at household level in isolation are not effective in reducing malnutrition, but a combination of both is required (Alderman et al., 2006, Haddad et al., 2003, Bhutta et

al., 2008, Martorell and Ho, 1984). In a review examining the effects of nutritional interventions (such as programmes promoting breastfeeding and complementary feeding, micronutrient supplementation programmes, disease prevention strategies, and general nutrition support strategies such as cash-transfer programmes) on stunting among children under three years using published studies from 36 low and middle income countries, it was found that existing nutritional interventions could reduce stunting by 36%; mortality by about 25%; and disability-adjusted life-years associated with stunting, severe wasting, intrauterine growth restriction, and micronutrient deficiencies by about 25% (Bhutta et al., 2008). The authors suggested that to eliminate malnutrition in the longer term, these interventions should be supplemented with those aiming to mitigate the underlying determinants of malnutrition, such as poverty, poor education, disease burden, and lack of women's empowerment (Bhutta et al., 2008).

Others have suggested that the focus ought to be on globalization and inequalities as determinants of malnutrition and have argued that in addition to the effects of nutritional supplementation policies and programmes, it is important to study the effects of the national policies, the market and trade corporations on child malnutrition (Latham and Beaudry, 2001). A randomised controlled trial conducted in the urban slums of Delhi, India, in which four month old infants were assigned to one of the four study groups (food supplementation, nutrition counselling group, home visits to assess morbidity alone and no intervention) and followed until 12 months of age showed that none of the interventions had a significant impact on the nutritional status of the infants. Instead there was a negative effect observed on breastfeeding with high incidence of fever and diarrhoeal diseases in the food supplementation group (Bhandari et al., 2001). The authors concluded that in order for such

nutritional interventions to work, it is important that the barriers with regards to adopting optimal feeding practices in the community are removed (Bhandari et al., 2001).

The nutritional interventions in India implemented since 1962 to combat malnutrition among infants and children are perhaps not by themselves able to fully alleviate the burden of malnutrition. As discussed above, these need to be supported with interventions that address the underlying risk factors of malnutrition. There is a clear role of social and economic policies, particularly those addressing the upstream determinants of infant and child malnutrition such as poverty and food insecurity. Hunger<sup>9</sup> and inadequate intake of food at individual level, and food insecurity at the household and societal levels as defined by the Food and Agricultural Organisation (1996)<sup>10</sup> are identified as major causes of malnutrition in developing countries (WHO Working Group, 1986). The Millennium Development Goal -1 focuses on ‘eradicating extreme poverty and hunger’ and includes three targets to be achieved by 2015 -

- reduce by half between 1990 and 2015, the proportion of people living on less than a dollar a day;
- achieve full and productive employment and decent work for all, including women and young people; and
- reduce by half the proportion of people who suffer from hunger (United Nations Development Programme).

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<sup>9</sup> Hunger is a term used to refer to the ‘discomfort associated with lack of food’. INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE, CONCERN WORLDWIDE, WELTHUNGERHILFE & GREEN SCENERY 2012. *2012 Global Hunger Index*, Cologne, Germany, DFS Druck.

<sup>10</sup> Household food security is defined as a state in which ‘all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life’. FOOD AND AGRICULTURAL ORGANISATION. 1996. *World Food Summit; Rome 1996* [Online]. Rome: FAO. Available: <http://www.fao.org/docrep/003/w3613e/w3613e00.HTM> [Accessed 16 February 2011].

Although it is difficult to empirically assess ‘hunger’, prevalence of underweight among children less than five years of age is taken as one of the indicators to measure the progress in reducing hunger (United Nations Development Programme).

Studies that used data from the three National Family Health Surveys - NFHS I (1992-93), II (1998-99) and III (2005-06) and econometric models showed that reduction in deprivation (measured in terms of households’ access to basic amenities – drinking water, electricity, cooking fuel etc.) and hunger (indicated by a measure of the mother’s body mass index (BMI) below 18.5 Kg/m<sup>2</sup>) among the population in India has not kept pace with its commendable growth in Gross National Income which the authors suggest to be a major cause for the persistence of malnutrition among children in India (Von Braun et al., 2008, Ray and Mishra, 2012, Svedberg, 2008). According to the Global Hunger Index, an instrument developed by the International Food Policy Research Institute to measure ‘hunger’ (based on three indicators – undernourishment<sup>11</sup> child underweight<sup>12</sup> and child mortality (International Food Policy Research Institute et al., 2012)), India ranked 65th among 79 countries in 2012 (International Food Policy Research Institute et al., 2012). Irrespective of the economic growth, India fared worse than most of the South Asian countries (International Food Policy Research Institute et al., 2012). This was mainly attributable to the child underweight data which ranked the country second last below Ethiopia, Niger, Bangladesh and Nepal with only Timor-Leste faring worse (International Food Policy Research Institute et al., 2012).

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<sup>11</sup> Proportion of undernourished people (as percentage of total population) defined by the Food and Agricultural Organisation as people who ‘consume less than 1,800 kilocalories per day – the minimum that most people require to live a healthy and productive life’. INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE, CONCERN WORLDWIDE, WELTHUNGERHILFE & GREEN SCENERY 2012. *2012 Global Hunger Index*, Cologne, Germany, DFS Druck.

<sup>12</sup> Proportion of children under five years who are underweight (low weight-for-age) *ibid*.

There are several policies and programmes implemented in India to alleviate poverty (income poverty), hunger and food insecurity<sup>13</sup> (Shariff and Krishnaraj, 2007, Gaiha, 1991). Such policies and programmes are considered as indirect instruments for long term institutional and structural changes which are required to combat the persistent and multi-faceted problem of malnutrition in the country (Ministry of Human Resource Development; Government of India, 1993). The government has been continually investing resources in food distribution programmes such as the Public Distribution Schemes<sup>14</sup> (Planning Commission; Government of India, 2002), nutrition supplementation programmes (nine programmes including ICDS, discussed above) and Food for work Programmes (e.g. the National Food for Work Programme) (Planning Commission; Government of India, 2002). The primary determinants of poverty and lack of food security in India, as identified by the Planning Commission are ‘underemployment and lack of productive employment’ (Planning Commission; Government of India). Thus, the focus of anti-poverty programmes in India is mainly on employment and livelihood security (Radwan, 1995) and include schemes such as – Training of Rural Youth for Self-Employment (TRYSEM), Supply of Improved Toolkits to Rural Artisans (SITRA) and wage employment programmes, such as the Jawahar Rozgar Yojana (JRY), Employment Assurance Scheme (EAS) and Million Wells Scheme (MWS) (Planning Commission; Government of India, Kakwani and Subbarao, 1990, Gaiha, 1991). However, evaluation studies show that these programmes have not had their desired impact

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<sup>13</sup> The terms hunger and food security were mainly used to indicate lack of food availability at individual and household level, respectively in the included papers. SHARIFF, A. & KRISHNARAJ, M. 2007. State, markets and inequalities: Human development in rural India(Introduction). *In: SHARIFF, A. & KRISHNARAJ, M. (eds.) State, markets and inequalities: Human development in rural India.* New Delhi: Orient Longman Private Limited, GAIHA, R. 1991. Poverty Alleviation Programmes In Rural India: An Assessment. *Development and change*, 22, 117-154.

<sup>14</sup> Public Distribution System facilitates the supply of food grains to the poor households at a subsidised price in India. PLANNING COMMISSION; GOVERNMENT OF INDIA 2002. Tenth Five Year Plan: 2002-2007. New Delhi: Planning Commission of India.

mainly due to their failure to reach the intended beneficiaries (Shariff and Krishnaraj, 2007, Kakwani and Subbarao, 1990, Gaiha, 1991, Centre for Science and Environment; New Delhi, 2008, Gaiha, 2000).

Nevertheless, unemployment being a central cause of poverty in India (Planning Commission; Government of India) and, arguably, a key upstream determinant of infant and child malnutrition (Mamabolo et al., 2004, Reyes et al., 2004), programmes that target employment and livelihood security could in theory lead to improvements in infant nutrition. Despite challenges in governance (Raabe et al., 2010, Reddy et al., 2010) and implementation (Institute of applied manpower research, Uppal, 2009), at present, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), is an improvement over all previous employment programmes with regards to both provision and delivery (Jha et al., 2009, Ministry of Rural Development; Government of India, 2010, Roy and Samanta, 2009) and thus, provides the scope for scientific exploration. The following sections describe MGNREGA, and the possible role of employment in general and MGNREGA in specific in addressing the determinants of infant malnutrition, leading to the research questions and the aims and objectives of this study.

### 1.5: Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)

All employment programmes in India (described in table 1.1), including MGNREGA are successors of the Maharashtra state's Employment Guarantee Scheme (EGS) implemented in 1972 (Centre for Science and Environment; New Delhi, 2008) and is based on the policy of participation income, which is paying people for a socially useful work, as a form of 'workfare' (Atkinson, 1996, Besley and Coate, 1992). MGNREGA is a landmark programme in India because it guarantees employment to households in rural areas and

lawfully recognises the right of people to receive employment (MacAuslan, 2008). The National Rural Employment Guarantee Act, 2005 later amended as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2009 (India. *The National Rural Employment Guarantee Act 2009*) is ‘an Act to provide for the means of livelihood security of the households in rural areas of the country by providing at least one hundred days of guaranteed wage employment in every financial year to every household whose adult members volunteer to do unskilled manual work’ (India. *The National Rural Employment Guarantee Act 2005*). The Act which came into effect on 2 February 2006 has been extended in a phased manner to all the states in India (Ministry of Rural Development; Government of India, 2010, India. *The National Rural Employment Guarantee Act 2007*) and is presently implemented in all districts in the country (Ministry of Rural Development; Government of India, 2010).

**Table 1.1: Rural wage-for-employment programmes in India**

<b>Year</b>	<b>Names of programme and their primary objective (s)</b>
1980	National Rural Employment Programme (NREP) used unemployed and underemployed workers to build community assets
1983	Rural Landless Employment Guarantee (RLEG) was implemented to provide 100 days of guaranteed employment to one member of each rural and landless household
1989	Jawahar Rozgar Yojana was launched combining NREP and RLEG
1993	Employment Assurance Scheme (EAS) targeted provision of employment during the lean agricultural season
1999	Jawahar Gram Samridhi Yojana (JGSY) was dedicated to the development of demand driven rural infrastructure
2001	Sampurna Gramin Rozgar Yojana (SGRY) was launched merging EAS and JGSY
2004	National Food for Work Programme (NFFWP) was implemented to generate additional supplementary wage employment and to create assets
2005	National Rural Employment Guarantee Act (NREGA) now MGNREGA

Sources: Centre for Science and Environment; New Delhi, 2008, Department of Rural Development; Ministry of Agriculture; Government of India, 1986

India is mainly an agrarian economy and income from agricultural produce is the main source of livelihood for people living in the rural areas of the country, which constitutes 72.2% of the population (Census 2001(Government of India)). Each year ecological crises such as flood and drought affect agriculture which is mainly rain-fed, leading to hunger and deprivation in many parts of the country. Therefore, the objective of MGNREGA is to address the immediate crises of deprivation and food insecurity in many parts of India through cash transfer in the form of daily wages for work undertaken to create local assets to address the chronic causes of ecological crisis such as drought, deforestation and soil erosion (Menon, 2008, Centre for Science and Environment, 2006, Centre for Science and Environment; New Delhi, 2008, Ministry of Rural Development; Government of India, 2012). The mechanism of targeting in MGNREGA is through the process of ‘self-selection’ (Besley and Coate, 1992, Braun et al., 1991), such that employment is provided to adult members of all households in rural areas conditioned on their willingness for doing unskilled manual work in projects set up by the Gram Panchayats<sup>15</sup> (Government of India, 2007). However, Schedule II of the Act mentions that the allocation of jobs at the Gram Panchayat level should be such that at least one-third of the beneficiaries are women who registered and requested work under MGNREGA (India. *The National Rural Employment Guarantee Act 2005*).

According to the 2012 national report, MGNREGA had generated more than 11 billion person-days of employment between 2006 and December 2011, and the workforce

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<sup>15</sup> Panchayats are three-tier local self-government in rural areas within each state in India, endowed with power and authority for mainly designing and implementing village development projects and schemes. The three levels include village, block (administrative unit constituted of a number of villages) and district, and each level has a Panchayat body termed as Gram (means village) Panchayat, Block Panchayat and District Panchayat respectively. ALAGH, Y. 1999. Panchayati Raj and Planning in India: Participatory Institutions and Rural Roads. *Transport and Communications Bulletin for Asia and the pacific*, 69, 1-25.

participation of women for the same period was 40-48% (Ministry of Rural Development; Government of India, 2012). In the financial year 2012-13 (from April 2012 up to March 2013) MGNREGA is estimated to have provided employment to almost 48 million households in the rural areas across the country and generated 1.9 billion person-days of work (Ministry of Rural Development; Government of India, 2005). Of the total person days of employment, 52% were provided to women and about 38% to people belonging to the Schedule Caste and the Schedule Tribe social classes (Ministry of Rural Development; Government of India, 2005). Besides providing employment to rural households, 1.4 million rural development works were reported to be completed in 2012-13 and a further eight million projects underway (Ministry of Rural Development; Government of India, 2005).

The intended benefits of this Act extend from individuals to households to villages to special communities and include:

Individual and household level benefits: Employment and income (through wage for work) (India. *The National Rural Employment Guarantee Act 2005*)

Community level/ village level benefits: Creation of assets to prevent drought, deforestation and soil erosion, and improve agricultural productivity through creation of agricultural canals and land development, improve village connectivity through construction of roads (India. *The National Rural Employment Guarantee Act 2005*) and construction of ‘Village Knowledge Resource Centres’ (Bharat Nirman Rajiv Gandhi Sewa Kendra) and offices for the Gram Panchayats (Government of India, 2009).

Benefits to under-served population within the community/ village: Provision of irrigation facilities, horticulture plantation and land development facilities on land owned by

households belonging to the Schedule Caste and the Schedule Tribe social classes, families below the poverty line<sup>16</sup>, beneficiaries of land reforms and beneficiaries under the ‘Indira Awaas Yojana’<sup>17</sup> of the Government of India (Government of India, 2007).

The wide range of intended benefits makes MGNREGA’s outcomes difficult to evaluate (Webb, 1995). The direct outcomes of such programmes range from employment effects (number of jobs created, person-days of works and income benefits), distributional outcomes (benefits for target population, impact on rural poverty) to asset creation or environment conservation (increase in the total hectares of cultivable land and impact on agricultural production)(Webb, 1995). However, some have suggested that the best way to evaluate effectiveness of employment provision programmes is to measure their impact on intra-household food security and their role in combating hunger and malnutrition (Drèze, 2007, Rukuni and Eicher, 1991). There are several studies that have evaluated the implementation and governance of employment programmes and a few of them have analysed their impact on household food security and malnutrition, but none have studied the mechanisms or the pathways through which such programmes could affect infant nutrition. There appears to be a gap in understanding the processes through which such policies may have an effect on infant nutrition, especially considering that these are not health or nutrition policies.

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<sup>16</sup> The Planning Commission of India defines ‘Below Poverty Line’ households as households (average 5 family members) with per capita consumption expenditure of INR 672.8 on a monthly basis in rural areas and INR 859.6 in urban areas at prices prevailing in 2009-10. PLANNING COMMISSION; GOVERNMENT OF INDIA 2012. Press Note on Poverty Estimates, 2009-10.

<sup>17</sup> Indira Awaas Yojana is a scheme of the Government of India launched in May 1985 that provides grant to Schedule Caste/Schedule Tribe and non-Schedule Caste/Schedule Tribe below poverty line population, and freed bonded labours for construction of houses. GOVERNMENT OF INDIA 1986. Indira Awaas Yojana. *In*: DEPARTMENT OF RURAL DEVELOPEMENT (ed.). New Delhi.

## 1.6: Effect of employment provision on infant nutrition

The concept of employment guarantee such as the obligation of state to provide employment and rights of citizens to employment and secured livelihood dates back to the 1817 Poor Employment Act of Great Britain (Flinn, 1961). The underlying goals of such employment guarantee programmes which may be in the form of wage for work or food for work are to address under-employment or seasonal-unemployment in the agrarian economies of Asia and Africa by mainly targeting the poor and the landless (Radwan, 1995, Braun, 1995, Braun et al., 1991). There was an upsurge of employment programmes in these two continents between the 1970s and 1990s (Braun et al., 1991). A review conducted by Braun, Teklu and Webb (Braun et al., 1991) in 1991 in 13 African countries, three countries in Asia – China, Bangladesh and India, and a case study in Latin America inferred the following key outcomes of the employment programmes –

- i. Long term programmes linked to public works and natural resource conservation were found to be sustainable and have positive impact on household income.
- ii. Increased household income led to food security.
- iii. Creation of assets, whether public works, infrastructure or natural resource conservation, resulted in a positive impact on reducing poverty at community level.

However, the authors highlight the lack of understanding of the impact of such programmes on actual food consumption and nutrition of the target population. Moreover, they fail to consider the ‘social cost’ of women’s participation, in terms of positive and negative consequences to child care and nutrition (Braun et al., 1991).

A review of studies on the Maharashtra state's Employment Guarantee Scheme, which is considered the prototype of MGNREGA, showed that the Employment Guarantee Scheme over a period of 10 years reduced unemployment among rural workers by 2.5%, decreased rural poverty by 20% (between 1977/78 to 1983), and provided a sustained source of livelihood during the lean agricultural season and the drought years. This led to increase in household income and food security, minimised economic shocks and distress, and mitigated seasonal malnutrition among all members of the households participating in the programme (Dev, 1995). The programme was also known as the 'women's programme' and played an important role in enhancing economic independence and security among women, which compared to men is considered to have an important role in improving the intra-household nutritional status of children (Dev, 1995).

At present, two working papers, one review (Dev, 2011) and another from a panel study (Uppal, 2009), suggest a positive impact of MGNREGA on the well-being (Dev, 2011) and nutrition of children 5-6 years of age (Uppal, 2009), respectively. The review paper was based on working papers, grey literature, newspaper articles and discussions with a group of 20 members of a farmers' welfare organisation; Kisan Seva Samiti (Dev, 2011). The author suggested that MGNREGA can have potential beneficial effects on nutrition, health and education of children through three key impacts, (i) increased household income and livelihood security leading to decreased risks and economic vulnerability, (ii) indirect effects of women's employment and (iii) direct effects of crèches and child care facilities provision in MGNREGA (Dev, 2011). In the other study, Uppal used econometric methods and data of 1,000 children (aged 5-6 years of age) from a prospective longitudinal study (Young Lives) in Andhra Pradesh, India to analyse the effect of MGNREGA on malnutrition (Uppal,

2009). He demonstrated improved z-scores of height-for-age using two different econometric models for children whose parents were employed through MGNREGA against their baseline measurements (taken before implementation of MGNREGA in the study sites) with some statistical significance ( $p < 0.1$ ) (Uppal, 2009).

The deleterious effects of unemployment on families and on the mental and cognitive development of children (Marmot et al., 2006, Marmot and Wilkinson, 1999, Marmot and Wilkinson, 2003) as well as the life-course impacts of childhood socioeconomic adversities (Poulton et al., 2002, Power, 2002, Marmot and Wilkinson, 1999, Marmot and Wilkinson, 2003) are well documented. The Commission on the Social Determinants of Health describes employment as an important determinant and has a separate knowledge network called Employment Conditions Knowledge Network (EMCONET) dedicated to gathering and translating knowledge to evidence-based action on the role of work and employment as a social determinant of health (Benach et al., 2006). So far, EMCNET recognises the effects of unemployment and different types of employment conditions on adults and the mental and physical stress factors related to various work environments (Employment Conditions Knowledge Network (EMCONET), 2007). Another knowledge network created under the auspices of the Commission on the Social Determinants of Health in 2005 is the Measurement and Evidence Knowledge Network (MEKN), the objective of which is to generate knowledge on existing methodologies for evaluating policies and interventions directed towards addressing the social determinants of health (Bonney et al., 2007). MEKN recognizes that the major challenge in the existing knowledge is in understanding the causal pathways through which the socioeconomic and biological factors interact

(Bonney et al., 2007, Kelly et al., 2006, Measurement and Evidence Knowledge Network (MEKN), 2007).

An understanding of the causal pathway is important to target and tailor interventions in an efficient and cost-effective manner (Bonney et al., 2007, Kelly et al., 2006, Measurement and Evidence Knowledge Network (MEKN), 2007). Thus, evidence-based approaches are required to analyse the role of public policies in addressing the socioeconomic adversities that determine health conditions (Bonney et al., 2007). Some work has been done with regards to this and examples include, 'Health impact assessment of the Ferrier housing estate regeneration project' in United Kingdom (Bonney et al., 2007), 'Health impact assessment of agriculture, food and nutrition policies' in Slovenia (Lock et al., 2003), 'Impact of Food for education programme' in Bangladesh (Baker, 2002) and the impact of PROGRESA, a conditional cash transfer programme in Mexico, to promote child health and prevent illness (Gertler, 2004). However, no published studies were found on the role of employment provision through wage-for-employment policies in addressing the urgent, but modifiable problem of infant malnutrition.

Although employment policies would not be expected to have a direct effect on infant malnutrition, they are likely to function through other determinants such as poverty and food security. Thus, it is important to understand the inter-relationships between such policies and the various determinants of infant malnutrition. While there is extensive literature examining the discrete effects of various factors on infant and child malnutrition, there are not many studies assessing the inter-relationships between them. Two cross-sectional studies were found that empirically analysed the inter-relationships between the various determinants of child malnutrition. One study among children in rural Kelantan in Malaysia explored the

relationship between malnutrition and factors grouped as the biological, behavioural and environmental determinants (Cheah et al., 2010). However, the authors did not disentangle the inter-relationships between the risk factors within each broad group to delineate the pathways of their effect (Cheah et al., 2010). Another study examined the interrelationships between a number of determinants of infant malnutrition (such as income, mother's employment, birth weight and length, age at weaning, and illness) and analysed their effects on the weight and length of infants during their first year of life (Brush et al., 1993). However, the study was limited to a small number of determinants and the sample size was small (96 infant-mother pairs) (Brush et al., 1993).

Some authors suggest that policies (health, economic and social policies) should be considered as part of the complex pathways impacting on health outcomes (Spencer, 2003, Bonnefoy et al., 2007). While such pathways of impact of health and non-health policies have been theoretically envisaged in the ecosocial theory of Krieger (Krieger, 2001) and the conceptual framework of the Commission on Social Determinants of Health (World Health Organisation, 2010b), studies empirically demonstrating the pathways of impact of wage-for-employment and other social and economic policies on infant nutrition through the various socioeconomic, behavioural and biological determinants were not found from published literature.

### 1.7: Research questions

Social and economic policies targeting the upstream risk factors of infant malnutrition such as poverty, household food security, employment, education etc., in theory could lead to improved infant nutrition, but there are various other intervening factors (such as socioeconomic status, infant feeding practices, illness etc.) that could alter their effects.

Thus, the actual effect of policies, especially non-health policies are not known. MGNREGA being a wage-for-employment policy cannot directly affect infant malnutrition, but could act by influencing other determinants of infant malnutrition. Therefore, not only is it important to analyse the effect of MGNREGA on infant malnutrition, but also understand the mechanisms and pathways through which it asserts that effect. This research addresses the following questions:

1. What is the effect of MGNREGA on infant malnutrition?
2. What are the pathways through which MGNREGA affects infant malnutrition?

### 1.8: Aim & objectives of the study

The aim of this study was to analyse the effect of the wage-for-employment policy, MGNREGA, in addressing infant malnutrition and to understand the pathways through which the effects are transmitted.

#### 1.8.1: Primary objectives

- i. Measure the effects of MGNREGA on the anthropometric indicators of malnutrition (wasting, stunting and underweight) among infants (<12 months of age).
- ii. Qualitatively and quantitatively delineate the pathways through which MGNREGA affects infant malnutrition.

#### 1.8.2: Secondary objectives

- i. Measure the effect of mothers' employment through MGNREGA on infant malnutrition.

- ii. Identify policy entry points in the delineated pathways for addressing the persistent problem of infant malnutrition in India.

### 1.9: Outline of the thesis

A theoretical conceptual framework of effect of MGNREGA on infant malnutrition was developed which guided the methods used to answer the research questions. Chapters 2 to 6 present the conceptual framework, methods, results, discussion and the conclusion. A brief description of the chapters is given below:

**Chapter 2** describes the construction of the conceptual framework used in this study, and the hypothesised mechanisms and pathways of effect of MGNREGA on infant malnutrition. It introduces the mixed methods (quantitative and qualitative) approach used to answer the research questions.

**Chapter 3** presents the details of the quantitative methods used to analyse the effect of MGNREGA on the anthropometric indicators of infant malnutrition. The results of the quantitative study and their discussions are focused to answer the first research question. It also presents a discussion of the measured effect of mothers' employment through MGNREGA on infant malnutrition which is one of the secondary objectives of this study.

**Chapter 4** includes the details of the qualitative methods used to explore the hypothesized mechanisms of effect of MGNREGA on infant malnutrition. In addition, the findings explain the observed quantitative effects of MGNREGA on the anthropometric indicators of infant malnutrition.

**Chapter 5** triangulates the findings of the quantitative and the qualitative study to reconstruct the hypothesized pathways of effect of MGNREGA on infant malnutrition. Data from the quantitative study was then used to estimate the pathways of effect of MGNREGA on infant malnutrition. The results are further explained using the findings of qualitative study to answer the second research question.

**Chapter 6** wraps up the study. It presents the identified policy entry points in the empirical pathways of effect of MGNREGA on infant malnutrition, thus fulfilling the other secondary objective of this study. It includes recommendations for MGNREGA and justifications for further studies.

## Chapter 2

### Conceptual framework

#### 2.1: Overview of the chapter

In order to analyse the effect and to delineate the pathways of effect of MGNREGA on infant malnutrition, the first step was to develop a theoretical conceptual framework. The known determinants of infant malnutrition were combined with the evidence of effects of wage-for-employment programmes on these determinants. This chapter first reviews the known determinants of infant malnutrition and their inter-relationships, and then develops the hypothetical pathways of effects of MGNREGA on infant malnutrition. The chapter also presents the study hypotheses and introduces the methods used to test the hypotheses.

#### 2.2: Method

A thorough literature review was conducted to identify the determinants of infant malnutrition and to understand their inter-relationships. The determinants were then combined with the available evidence of impacts of wage-for-employment programmes on socioeconomic factors, such as income and household food security, to develop two hypothetical pathways of effect of MGNREGA on infant malnutrition. The pathways were then combined to construct a theoretical framework.

The search engines Medline, Scopus, Web of Science, LISTA (Library, Information Science & Technology Abstracts), Library of Congress and Google Scholar were used with the key words, ‘malnutrition’, ‘undernutrition’, ‘underweight’, ‘wasting’, ‘stunting’, ‘determinants’, ‘risk factors’ and ‘causes’. This led to 2,812 hits in total. After reading the title and

discarding duplicates 179 abstracts were reviewed, of which 82 were found to match the set inclusion and exclusion criteria (given below). Finally, the full-texts of 82 articles, two reports and two book chapters (86 in total) were reviewed to identify the determinants and understand their inter-relations (the list is provided in appendix 2.1). The citations were managed using EndNote X5.

**Inclusion criteria:** Although the original plan was to restrict the review of the determinants to infants (0-12 months of age) and India, not many published papers could be found. Thus, the inclusion criteria were widened to include infants and children less than five years of age and all low and middle income countries as defined by the World Bank (The World Bank). The review was restricted to papers published in English from the inception of the databases until April 2013.

**Exclusion criteria:** Studies that used micro-nutrients as the variables to indicate malnutrition, sample from high income countries (The World Bank) and children more than five years were excluded. Further, studies that focused on malnutrition among diseased infants (such as malnutrition in HIV-infected infants etc.) were also excluded from the review.

### 2.3: Malnutrition

Before discussing the determinants of infant malnutrition, it is important to define malnutrition. Federico Gómez and his colleagues in 1955 defined malnutrition as '*a pathological condition of varying degrees of severity, and diverse clinical manifestations, resulting from the deficient assimilation of the components of the nutrient complex*' (page 1275, Gómez 2000). Although the primary cause of malnutrition is considered to be

deficient intake of food, pathological conditions that lead to poor absorption, increased excretion and increased requirements could also lead to malnutrition (Gómez, 2000). Three population level parameters – wasting, stunting and underweight have been tested and validated as measures of inadequate nutrition or malnutrition since the latter half of the twentieth century as seen in the earlier works of Gomez and Waterlow (Gómez et al., 1955, Waterlow, 1972, Waterlow, 1973, Gómez et al., 1954) and in the more recent works of De Onis (De Onis, 2000, De Onis et al., 1993). Wasting reflects body proportion and is measured by weight-for-height/ length. It is an indicator of ‘*current nutritional status*’ and is an established measure of acute malnutrition (World Health Organisation and Unicef, 2009, Waterlow, 1972). Stunting is a measure of linear growth (height/ length-for-age) and reflects prolonged growth faltering (De Onis et al., 1993), and underweight; measured as weight-for-age is an indicator of both linear growth and body proportion (De Onis et al., 1993).

Although there are other measures of malnutrition (such as mid upper-arm circumference for age), the scope of this study was limited to the three traditional indicators – wasting, stunting and underweight. It is acknowledged that the measurement of these indicators of malnutrition in the studies included in this review were based on a variety of reference population – country specific, the National Centre for Health Statistics (Fryar CD et al., 2012) and the WHO’s Multi-centre Growth Reference Study (World Health Organization, 2006). Therefore, it is possible that the observed effects of the identified determinants on infant and child malnutrition could be influenced by the methodological discrepancies in the measurement of malnutrition. In addition, some studies showed a differential effect of the identified determinants on wasting, underweight and stunting (discussed below).

## 2.4: Determinants of infant malnutrition

Based on their proximity to the outcome, the determinants of infant malnutrition were grouped as (i) proximal determinants comprising of the biological risk factors, (ii) intermediate determinants encompassing the behavioural and socio-cultural factors and (iii) distal determinants which included the structural factors.

### 2.4.1: Biological factors (Proximal determinants)

These include the traditionally identified risk factors of infant and child malnutrition - diarrhoeal diseases or gastro-intestinal infections, and acute respiratory tract infection (Adair et al., 1993, Bardosono et al., 2007, Bloss et al., 2004, Bomela, 2009, Das and Rahman, 2011, Kamiya, 2011, Madzingira, 1995, Martorell and Ho, 1984, Vella et al., 1995, Wamani et al., 2006). In general the studies showed that diarrhoea and respiratory tract infections increased the risk of all the three indicators of malnutrition – wasting, stunting and underweight (Bardosono et al., 2007, Martorell and Ho, 1984, Vella et al., 1995, Wamani et al., 2006), but two cross-sectional studies showed that respiratory infections were more likely to be associated with stunting (Bloss et al., 2004) and diarrhoea with wasting (Bloss et al., 2004) and underweight (Bomela, 2009). The Lao Multiple Indicator Cluster Survey presented a contrasting finding, in which diarrhoea was found to be a significant risk factor for stunting but not for wasting and underweight (Kamiya, 2011) and the 1988 demographic and health survey of Zimbabwe showed an association of diarrhoea with stunting and underweight, but not wasting (Madzingira, 1995). However, some studies did not show a significant effect of diarrhoea and respiratory infections on the nutritional status of children (Engebretsen et al., 2008, Moy et al., 1994, Vella et al., 1992, Casapia et al., 2007). In addition, helminthic infections and vaccine preventable diseases such as, diphtheria, measles

and whooping cough are shown to exacerbate malnutrition, particularly wasting (Jain, 1968, Casapia et al., 2007, Fernandez et al., 2002, Martorell and Ho, 1984). Studies in India and other low and middle income countries showed an inverse relationship between immunisation against the vaccine preventable diseases and the anthropometric indicators of malnutrition – underweight, wasting and stunting (Sethuraman et al., 2006, Bloss et al., 2004, Caputo et al., 2003, Lamontagne et al., 1998, Rahman and Chowdhury, 2007).

#### 2.4.2: Behavioural risk factors (Intermediate determinants)

Some of the main behavioural risk factors found to be associated with infant and child malnutrition were inadequate infant feeding practices, lack of hygiene, poor health seeking for mother and the child, and lack of mother's knowledge and/ or misinformed attitudes towards child care and feeding.

*2.4.2.1: Infant feeding practices and hygiene:* Malnutrition, irrespective of its degree (mild, moderate or severe) increases the susceptibility of infants and young children to infections (Martorell and Ho, 1984) and it is suggested that exclusive breast-feeding in the first six months of life is the best defence against gastro-intestinal infections (Jones et al., 2006, Adair et al., 1993). Thus, early termination of exclusive breast feeding or prolonged breastfeeding and late weaning (after 11 months) increases the risk of malnutrition (Abdel Sayed et al., 1995, Blaney et al., 2009, Bloss et al., 2004, Das and Rahman, 2011, Engebretsen et al., 2008, Lomperis, 1991, MacCorquodale and de Nova, 1977, Madzingira, 1995, Magnani et al., 1993, Rajaram et al., 2007, Vella et al., 1992, Victora et al., 1984). The prevalence of infectious diseases is highest between 7 and 15 months of age when breast feeding alone is insufficient to meet the nutritional requirement of the infants, and insufficient nutrients in the supplementary food further adds to nutritional vulnerability

(Assis et al., 2008, Getaneh et al., 1998, Lamontagne et al., 1998, Martorell and Ho, 1984).

The national surveys in India demonstrate that a very low proportion of infants in the age group of 6-23 months receive appropriate complementary feeding - 9.2% receive minimum acceptable diet<sup>18</sup>. About 55% of the infants in the age group of 6-8 months received timely introduction of complementary feeding<sup>19</sup> (Patel et al., 2012).

Giving clean and boiled water to children (> 6 months of age), hand washing and proper disposal of infant faeces have been associated with reduced risk of malnutrition among children (Ahmed et al., 1993, Haggerty et al., 1994, Glewwe, 1999). Studies show that behaviour change interventions directed towards educating mothers and caregivers to adopt clean and hygienic child care practices and to improve personal and domestic hygiene protects children from infectious diseases, particularly diarrhoeal diseases and thereby reduces the risk of malnutrition (Haggerty et al., 1994, Aziz et al., 1990).

*2.4.2.2: Health seeking behaviour:* Health seeking behaviour in terms of utilisation of antenatal care and institutional delivery services for the mother, and medical advice sought from healthcare providers for children's illness are considered important behavioural determinants of malnutrition. Poor maternal and child health seeking behaviour was found to be associated with increased risk of infant and child malnutrition in India and other low and

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<sup>18</sup> The WHO guidelines on Infant and Young Child Feeding Practices define appropriate complementary feeding in terms of the 'proportion of children 6-23 months who received a Minimum Acceptable Diet, apart from breast milk'. Minimum acceptable diet is a composite indicator that combines 'minimum dietary diversity' and 'minimum meal frequency'. Minimum dietary diversity is the 'proportion of children 6-23 months who receive foods from 4 or more food groups (grains, roots, tubers; legumes, nuts; dairy products; meat, poultry; eggs; vitamin A rich fruits and vegetables; other fruits and vegetables)'. Minimum meal frequency is the 'proportion of breastfed and non-breastfed children 6-23 months who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times (2 times for breastfed infants 6-8 months; 3 times for breastfed children 9-23 months; 4 times for non-breastfed children 6-23 months) or more'. WORLD HEALTH ORGANISATION 2008. *Indicators for assessing infant and young child feeding practices. Part 1 Definitions*, Geneva, Switzerland, WHO Press.

<sup>19</sup> Defined by the WHO as the 'proportion of infants 6-8 months of age who receive solid, semi-solid or soft foods'. Ibid.

middle income countries (Sethuraman et al., 2006, Charmarbagwala et al., 2004, Das and Rahman, 2011, Kamiya, 2011). These studies used different variables to quantitatively measure healthcare seeking behaviour. The common indicators for maternal healthcare seeking were antenatal care and institutional delivery and it was observed that non utilization of these healthcare services (particularly hospital/ health centres for child birth) was associated with increased risk of child malnutrition (Charmarbagwala et al., 2004, Das and Rahman, 2011, Kamiya, 2011). Sethuraman and colleagues in a cross-sectional study of 820 mother-child pairs in India used measures such as willingness and capability of families to obtain resources for children's healthcare to assess healthcare seeking for children (Sethuraman et al., 2006). They showed that families that invested in children's health by raising credit from any source were less likely to have a child (6-24 months) that was underweight or stunted (Sethuraman et al., 2006). These variables (antenatal care, institutional delivery, willingness and capability to obtain resources for healthcare) may not completely reflect health seeking behaviour of households, but they all suggest a common direction of effect on child malnutrition. Moreover, number of previous child deaths per mother, considered an important indicator of health seeking behaviour in the households, was found to be directly related to increased risk of malnutrition (Charmarbagwala et al., 2004, Thaver et al., 1990).

*2.4.2.3: Mother's knowledge and attitude towards infant care and feeding:* Mother's knowledge (also termed as mother-craft (Chandrasekhar, 1959)) and her attitude towards infant care and feeding were not only direct risk factors of malnutrition, but also influenced the other behavioural determinants (Engebretsen et al., 2008, Paul et al., 2011, Reyes et al., 2004, Glewwe, 1999). Mother's knowledge about adequate breastfeeding, weaning,

cleanliness and hygiene, early warning signs of acute respiratory infections and care during gastro-intestinal infections not only protects infants from the infectious diseases of infancy and childhood (Arabi et al., 2012), but also prevents malnutrition. Studies in different parts of India have found mothers' knowledge about child nutrition and care to be inadequate which in turn was associated with increased risk of malnutrition among children (Abbi et al., 1988, Patel et al., 2012). Rita Abbi and colleagues surveyed 2,618 mothers of children under six years of age from the tribal communities in the state of Gujarat to assess their knowledge about child feeding and nutritional requirements using a set of nine questions (which included questions on breastfeeding, complementary feeding, management of diarrhoea, causes of malnutrition, ability to read child's growth charts and mother's perception of the child's nutritional status) (Abbi et al., 1988). The mean z-scores for weight-for-age, height-for-age and weight-for-height were found to increase with the increase in the total 'nutrition knowledge scores' computed from these questions, however, these are crude effects that have not accounted for potential confounders (Abbi et al., 1988) and thus need to be interpreted with caution. Patel et al. (2012) used the NFHS-3 data of 20,108 children aged 0 to 23 months to draw links between adequate feeding practices (as per WHO's indicators for Infant and Young Child Feeding Practices) and mothers' level of education and exposure to information sources (such as television, radio and health workers). A mother is considered to be the immediate agent through whom other socioeconomic factors act to safeguard the health and nutrition of infants (United Nations, 1954b). Mother's attitudes toward infant care such as vaccinating children, purifying drinking water etc., and her ability to provide adequate care (mostly determined by her knowledge about the need for vaccinating children, purifying water and management of diarrhoeal and respiratory diseases) were shown to be of

utmost importance irrespective of her level of education (Glewwe, 1999, Burchi, 2010). Although, the studies included in this review used various indicators to estimate mothers' knowledge about feeding and child care, it ought to be acknowledged that 'mothers' knowledge' as a quantitative variable is difficult to measure and may not reflect their actual knowledge.

#### 2.4.3: Socio-cultural factors (Intermediate determinants)

The socio-cultural factors influencing infant malnutrition were found to be social class and gender discrimination, cultural practices related to infant feeding, and social-status of women.

*2.4.3.1: Social class inequalities:* The Indian Demographic and Health Surveys showed a significantly higher risk of wasting, stunting and underweight among infants and children belonging to the Schedule Tribe and Schedule Caste social groups compared with other social groups (Das, 2008, Bawdekar and Ladusingh, 2008). Sibabrata Das (2008) conducted a logistic regression analysis using the data from NFHS-2 (1998-99) for six states in central India (Bihar, Maharashtra, Odishya, West Bengal, Gujarat and Madhya Pradesh) and found that after controlling for potential confounders, the likelihood of stunting and underweight was higher among children belonging to the Schedule Tribe and Schedule Caste social groups in all states except Gujarat, but the difference among the social groups for wasting was not significant except in Bihar. Bawdekar and Ladusingh (2008) examined the association between underweight and social class in rural Maharashtra among 15,390 children under six years using the second District Level Household Survey data (2002-04) and demonstrated a 37% and 14% higher likelihood of underweight among children

belonging to the Schedule Tribe and Schedule Caste groups, respectively, compared to other social classes.

*2.4.3.2: Gender discrimination:* While a number of cross-sectional studies in the African countries of Uganda, Nigeria, Congo and Kenya showed a higher risk of stunting among boys (Engebretsen et al., 2008, Esimai et al., 2001, Kandala et al., 2011, Masibo and Makoka, 2012), a longitudinal study in Mali did not find any difference in the prevalence of underweight, stunting and wasting between the two sexes (Bouvier et al., 1995). A meta-analysis of the determinants of child malnutrition found mixed and inconclusive results for gender difference in malnutrition in the pooled estimates of data from three countries in Asia (Pakistan, Philippines and Vietnam), despite reported discrimination against girls in many cultures that bias provision of care and food towards boys (Charmarbagwala et al., 2004). In India, although reports of female infanticide have been available since 1901 (Chandrasekhar, 1959), the National Family Health Surveys and other large cross-sectional studies did not report any gender differences in the prevalence of malnutrition (Mishra and Retherford, 2000, Mishra et al., 1999, Bharati et al., 2008, Gaiha and Kulkarni, 2005). However, a few studies (one in West Bengal and another in Rajasthan) showed that the prevalence of all the three anthropometric indicators of malnutrition (underweight, stunting and wasting) was higher among girls than boys in the age group of 0 to 5 years (Singh et al., 2006, Bose et al., 2007). No studies were found that reported a higher prevalence of malnutrition among boys in India.

*2.4.3.3: Cultural practices:* Misconceptions about child feeding such as use of herbal mixture, introducing heavy solid food early in life (at 3 months of age) to help the infant's digestive system function well were found to be prevalent as part of cultural practices and

beliefs in India (Whyte and Kariuki, 1991, Chandrasekhar, 1959, Jain, 1968, Mamabolo et al., 2004) and in countries such as Kenya and South Africa (Whyte and Kariuki, 1991, Chandrasekhar, 1959, Jain, 1968, Mamabolo et al., 2004). These practices were shown to be associated with increased risk of malnutrition among infants and young children (Whyte and Kariuki, 1991, Chandrasekhar, 1959, Jain, 1968, Mamabolo et al., 2004) and influences mothers' knowledge and attitude towards infant feeding and care (Cosminsky et al., 1993, Kabir et al., 2012, Mwangome et al., 2010). In certain tribal communities such as the Gonds and Bhills in rural Maharashtra, mothers do not breastfeed the newborn until three days after delivery (Bawdekar and Ladusingh, 2008). During these first three days the baby is fed diluted honey or water, either with a soft cloth or by hand, under unhygienic conditions, which in turn increases the risk of infections (Bawdekar and Ladusingh, 2008). Another practice that intervenes with exclusive breast feeding is giving 'gutti', a herbal concoction given with ghee or honey or castor oil which is believed to cleanse the infant's alimentary system (Visaria, 1988). In addition, the types of complementary food given to the infants are also influenced by food taboos and beliefs. A study in Bangladesh found that lack of dietary diversity in infants' diets was related to the social beliefs and attitudes of mothers and caregivers to complementary feeding (Kabir et al., 2012). The mothers and carers mostly believed that the children will transition to family foods on their own with age and once they have all their primary dentition (Kabir et al., 2012). Further, it was believed that certain foods such as oils, eggs and fats would harm the infants and young children (food taboo) which limited the food diversity (Kabir et al., 2012).

*2.4.3.4: Social status of women:* A meta-analysis of studies from Africa, Latin America and Asia demonstrated that households where women were involved in decision making had

better child health and nutrition outcomes (Charmarbagwala et al., 2004). Studies in India have also showed maternal autonomy, mother's position in the household and her involvement in decision-making as important determinants of malnutrition among infants and children (Sethuraman et al., 2006, Shroff et al., 2009, Shroff et al., 2011).

#### 2.4.4: Structural factors (Distal determinants)

The distal determinants of child malnutrition include structural factors such as household income, employment, food security, parental education, household environment and access to healthcare services.

*2.4.4.1: Household economic status:* Numerous studies have found that infants and children (less than five years) are more likely to suffer from malnutrition in poorer households compared to their more affluent counterparts even after controlling for other known risk factors (Mishra et al., 1999, Bairagi, 1980, Assis et al., 2008, Bawdekar and Ladusingh, 2008, Bharati et al., 2008, Bomela, 2009, Das and Rahman, 2011, de Menezes et al., 2011, Delpeuch et al., 2000, Esimai et al., 2001, Gaiha and Kulkarni, 2005, Kandala et al., 2011, Masibo and Makoka, 2012, Menegolla et al., 2006, Mishra and Retherford, 2000, Mostafa, 2011, Oliveira Assis et al., 2008, Rahman and Chowdhury, 2007, Rajaram et al., 2007). However, a case-control study among infants 6-12 months of age in south India did not find a significant association between underweight and the socioeconomic status of the households measured using three proxy indicators – ‘inability to buy food, type of house and number of square meals per day’ (Anoop et al., 2004). Another study in Kenya also did not find any relationship between socioeconomic status of the household and child malnutrition (Bloss et al., 2004).

*2.4.4.2: Employment:* Employment has been linked to poverty and food security in India (Planning Commission; Government of India) and is an important determinant of infants' nutritional status. A longitudinal study in South Africa showed that infants whose parents were unemployed had a higher risk of malnutrition (Mamabolo et al., 2004). Apart from unemployment, 'underemployment' or 'seasonal employment' has also been shown to be an important risk factor of chronic malnutrition in children (Reyes et al., 2004). While the association between fathers' employment and nutritional status of children was observed to be in general beneficial (Engle, 1993, Vella et al., 1992), the effects of mothers' employment were found to be variable. Observational studies in India and other low and middle income countries showed that the relative risk of malnutrition was higher among younger children (0-3 years) of working mothers compared to non-working mothers after controlling for household income and mother's age (Abbi et al., 1991, Choudhary et al., 1986, Sethuraman et al., 2006, Lamontagne et al., 1998). However, a study in Panama showed mothers' employment to be protective against acute malnutrition among children 3-5 years of age (Tucker and Sanjur, 1988). Another study in Philippines showed that mothers' employment had a context specific effect – in rural areas it increased the risk of malnutrition among infants <12 months of age, but in urban areas it had a protective effect (Ricci and Becker, 1996).

*2.4.4.3: Household food security:* Household food security is defined as a state in which '*all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life*' (Food and Agricultural Organisation, 1996). Food insecurity and lack of dietary diversity in households were found to be associated with increased risk of malnutrition among infants

and children in India and other low and middle income countries (Sethuraman et al., 2006, Frongillo et al., 1997, Frongillo and Hanson, 1995, Lomperis, 1991, Magnani et al., 1993, Mwadime and Baldwin, 1994). However, a study in Central Africa failed to show a significant effect of the level of household food security on the nutritional status of children (0-59 months of age) (Blaney et al., 2009). Moreover, a cross-sectional study among children 5-59 months in Indonesia in 1999-2000, did not show a significant effect of household dietary diversity on underweight, wasting or stunting, but adequate household food availability (measured in terms of appropriate purchasing power and food habits) was shown to have a beneficial effect (Bardosono et al., 2007).

*2.4.4.4: Education level of parents:* Literacy is often used as an indicator of social advancement and a means to improve infant health. Maternal literacy is more frequently associated with infant health and nutrition than paternal (Charmarbagwala et al., 2004, Glewwe, 1999). Most studies show a significant inverse association between the level of maternal education and child malnutrition after accounting for other socioeconomic and demographic characteristics (Mishra et al., 1999, Bairagi, 1980, Bharati et al., 2008, Bomela, 2009, Burchi, 2010, Casapia et al., 2007, Das and Rahman, 2011, de Menezes et al., 2011, Delpeuch et al., 2000, Kandala et al., 2011, Lomperis, 1991, Marins and Almeida, 2002, Masibo and Makoka, 2012, Menegolla et al., 2006, Mishra and Retherford, 2000, Rajaram et al., 2007, Wamani et al., 2006). However, some studies have not found any association between mothers' level of formal education and children's nutritional status (Bloss et al., 2004, Engebretsen et al., 2008, Kamiya, 2011) and suggest that this factor mainly acts through mothers' knowledge and attitude towards infant care and feeding (Charmarbagwala et al., 2004). The impact of fathers' education on child malnutrition apart

from its influence through occupation and income is not well understood (Glewwe, 1999, Kabir et al., 2012, Kandala et al., 2011).

*2.4.4.5: Household environment:* The biological risk factors of infant and child malnutrition are closely associated with crowding, improper sanitation and generally poor housing conditions. Household density was found to be an important determinant of infant and child malnutrition (Assis et al., 2008, Bomela, 2009, de Menezes et al., 2011, Menegolla et al., 2006, Oliveira Assis et al., 2008, Vella et al., 1995). It is suggested that the effect of household density depends on the composition of the household such that if a household has more dependants per earning member, the earnings may not be enough to provide the adequate quantity and quality of food to all members of the family including children (Charmarbagwala et al., 2004, Gaiha and Kulkarni, 2005). However, studies in Morocco and Uganda did not find any association between household size and child nutrition (Glewwe, 1999, Engebretsen et al., 2008).

While several studies show lack of access to clean water and proper sanitation as important risk factors of malnutrition (Bomela, 2009, Fernandez et al., 2002, Gaiha and Kulkarni, 2005, Getaneh et al., 1998, Larrea and Kawachi, 2005, Marins and Almeida, 2002, Masibo and Makoka, 2012, Menegolla et al., 2006, Mostafa, 2011, Mwadime and Baldwin, 1994, Wamani et al., 2006), some studies including a meta-analysis of studies from Africa, Asia and Latin America did not show a significant effect of these factors (Charmarbagwala et al., 2004, de Menezes et al., 2011, Magnani et al., 1993, Menegolla et al., 2006, Oliveira Assis et al., 2008). It was suggested that perhaps water and sanitation function through their impact on the proximal determinant – infectious diseases (Charmarbagwala et al., 2004).

Poor housing conditions have been shown to be associated with child malnutrition (Getaneh et al., 1998, Larrea and Kawachi, 2005). Khan (1988), in his study conducted in a cohort of 600 infants in rural Uttar Pradesh demonstrated that houses with concrete roof and floor provided better protection against cold and thus the incidence of respiratory illness was low in such houses compared to mud houses with thatched roofs. However, it is likely that households with concrete roof and floor were in general better-off socioeconomically than those with thatched roofs which could have resulted in better nutritional status of children.

*2.4.4.6: Healthcare services:* Availability of healthcare services in the community was in general considered to have a favourable impact on infant and child nutrition (Blaney et al., 2009, Frongillo et al., 1997, Frongillo and Hanson, 1995, Larrea and Kawachi, 2005, Rajaram et al., 2007, Vella et al., 1995). However, there are studies in India and other low and middle income countries that have not found a significant association of this factor with the nutritional status of children (Bawdekar and Ladusingh, 2008, Engebretsen et al., 2008, Menegolla et al., 2006).

#### *2.4.5: Demographic factors*

Urban-rural differentials, age of mother and infant, birth order and birth weight are the known demographic determinants of infant malnutrition. Infants and children living in rural areas are generally found to be more susceptible to malnutrition compared to those living in urban areas (Charmarbagwala et al., 2004, Bharati et al., 2008, Kandala et al., 2011, Madzingira, 1995, Masibo and Makoka, 2012). Several studies in India and other low and middle income countries showed that the risk of malnutrition (underweight, wasting and stunting) increased with increase in the age of the mother, age of the child and order of birth of the child (Mishra et al., 1999, Bairagi, 1980, Bawdekar and Ladusingh, 2008, Bloss et al.,

2004, Bomela, 2009, Casapia et al., 2007, Das and Rahman, 2011, Gaiha and Kulkarni, 2005, Lomperis, 1991, MacCorquodale and de Nova, 1977, Madzingira, 1995, Mishra and Retherford, 2000, Mostafa, 2011, Rahman and Chowdhury, 2007, Rajaram et al., 2007, Vella et al., 1992, Vella et al., 1995). However, a few studies have not found any association of these factors with infant malnutrition (Charmarbagwala et al., 2004, Lomperis, 1991, Masibo and Makoka, 2012). Low birth-weight is an important predictor of malnutrition among infants and children (Anoop et al., 2004, Bomela, 2009, de Menezes et al., 2011, Delpuch et al., 2000, Fernandez et al., 2002, Madzingira, 1995, Masibo and Makoka, 2012, Menegolla et al., 2006) that lowers the trajectory of growth during infancy and childhood (Ramachandran, 2007, Binkin et al., 1988, Marins and Almeida, 2002). However, a study in Uganda among infants 0-11 months did not find a significant association between low birth-weight and the anthropometric indicators of malnutrition (Engebretsen et al., 2008).

**Table 2.1: Determinants of infant malnutrition**

<b>Proximal</b>	<b>Intermediate</b>		<b>Distal</b>
<u>Biological risk factors</u> 1. Gastrointestinal infections 2. Acute respiratory infections 3. Vaccine preventable diseases (such as measles, diphtheria etc.) and helminthic infections	<u>Behavioural factors</u> 1. Infant feeding practices and hygiene 2. Health seeking behaviour 3. Mother's knowledge and attitude towards infant care and feeding	<u>Socio-cultural factors</u> 1. Discrimination (social and gender) 2. Cultural practices related to infant feeding and care 3. Social status of women	<u>Structural factors</u> 1. Household economic status 2. Employment (father's and mother's) 3. Household food security 4. Parents' education 5. Household environment (household density, access to safe water and proper sanitation) 6. Access to healthcare services

## 2.5: Inter-relationships between the determinants of infant malnutrition

As was suggested by a meta-analysis of 61 published studies (between 1980 and 2003) from three regions - Africa, Latin America and Asia (Charmarbagwala et al., 2004), the effect of most of the determinants (summarised in table 2.1) were found to be heterogeneous and inter-related in a complex manner. Infectious diseases during infancy (such as diarrhoeal diseases, respiratory and helminthic infections, measles, diphtheria and whooping cough) are important biological risk factors of malnutrition (Adair et al., 1993, Bardosono et al., 2007, Bloss et al., 2004, Bomela, 2009, Das and Rahman, 2011, Kamiya, 2011, Madzingira, 1995, Martorell and Ho, 1984, Vella et al., 1995, Wamani et al., 2006). Malnutrition in turn affects the immune system of the body; particularly the T-cell mediated immune responses, which further increases the susceptibility to infection (Martorell and Ho, 1984), thus creating a vicious cycle . Infectious diseases being the proximal risk factors mediate the effects of the intermediate and distal factors. A cross-sectional study conducted in Indonesia among children 5-59 months of age showed that infectious diseases mediated the effects of food availability in the households on the nutritional status of children (Bardosono et al., 2007). Despite 60% of the sampled households being estimated as having appropriate food availability and about 45% as having sufficient food production, the high prevalence of infectious diseases such as diarrhoea, fever and respiratory diseases were the key determinants of wasting among the children (Bardosono et al., 2007).

The risk of infections is in turn aggravated by inappropriate feeding practices (Abdel Sayed et al., 1995, Blaney et al., 2009, Bloss et al., 2004, Das and Rahman, 2011, Engebretsen et al., 2008, Lomperis, 1991, MacCorquodale and de Nova, 1977, Madzingira, 1995, Magnani et al., 1993, Rajaram et al., 2007, Vella et al., 1992, Victora et al., 1984), lack of personal

and domestic cleanliness and hygiene (Haggerty et al., 1994, Aziz et al., 1990), lack of mothers' knowledge about adequate care and feeding (Engebretsen et al., 2008, Paul et al., 2011, Reyes et al., 2004) and poor health seeking behaviour of parents and caregivers (Sethuraman et al., 2006, Charmarbagwala et al., 2004, Das and Rahman, 2011, Kamiya, 2011). These intermediate behavioural factors on the one hand can alter the effects of the biological risk factors on infant malnutrition and on the other hand act as mediators of the more distal structural factors. A study in Ghana suggested that adequate feeding and care could mitigate the negative effects of poverty and low levels of maternal education on child nutrition (Ruel et al., 1999).

The behavioural factors are themselves inter-linked, and are influenced by socio-cultural and structural factors. Studies show that mother's knowledge about child care and feeding is related to adequate feeding practices and child's nutrient intake (Burchi, 2010, Patel et al., 2012, Kabir et al., 2012, Wijndaele et al., 2009), and to practices of cleanliness and hygiene (Glewwe, 1999). However, often mothers' knowledge and their attitude towards infant care and feeding are influenced by the prevalent cultural practices in the society (Cosminsky et al., 1993, Kabir et al., 2012, Mwangome et al., 2010). Further, adequate infant feeding also depends on the economic status of the households and food availability (Patel et al., 2012, Mwangome et al., 2010), and mothers' knowledge is influenced by their level of education. A survey of 590, 570 families in Indonesia and 395, 122 families in Bangladesh showed that higher level of mothers' education was associated with lower odds of stunting among children less than five years of age and this protective effect was mainly mediated through better health seeking and care giving practices (such as completed vaccination, Vitamin A supplementation, use of iodized salt and proper hygiene practices) among mothers with

higher education compared to mothers with lower educational status (Semba et al., 2008). However, other studies suggest that mother's knowledge about infant care and feeding is independent of her level of education (Charmarbagwala et al., 2004, Burchi, 2010), but depends on the socioeconomic contexts (Burchi, 2010). For example, a large cross-sectional study among pre-school children in Mozambique showed that mothers' level of education had a positive effect on the nutritional status of children in households belonging to the higher socioeconomic status, but in poor households it was mothers' knowledge about nutrition and health rather than their level of formal education that had a positive effect (Burchi, 2010).

Social and gender discriminations are other important socio-cultural risk factors of infant malnutrition in India (Das, 2008, Bawdekar and Ladusingh, 2008, Singh et al., 2006, Bose et al., 2007). Although, there was mixed evidence with regards to increased risk of malnutrition among girls compared to boys in India, some studies suggested that societal bias towards boys leads to their better care and feeding often at the cost of the girls in many Indian households (Gupta, 1987, Singh et al., 2006, Bose et al., 2007). However, the mechanism through which social class inequality poses threat to the nutritional status of infants is unclear. Some researchers in India have attributed the higher risk among Schedule Caste and Schedule Tribe social groups to poverty, lack of hygiene, food habits and food taboos (Bawdekar and Ladusingh, 2008).

Studies both in India and globally suggest that poverty and household income are important upstream determinants of infant malnutrition (Mishra et al., 1999, Bairagi, 1980, Assis et al., 2008, Bawdekar and Ladusingh, 2008, Bharati et al., 2008, Bomela, 2009, Das and Rahman, 2011, de Menezes et al., 2011, Delpeuch et al., 2000, Esimai et al., 2001, Gaiha and

Kulkarni, 2005, Kandala et al., 2011, Masibo and Makoka, 2012, Menegolla et al., 2006, Mishra and Retherford, 2000, Mostafa, 2011, Oliveira Assis et al., 2008, Rahman and Chowdhury, 2007, Rajaram et al., 2007). These factors in turn trigger a cascade of structural and behavioural factors (such as housing and living conditions, household food security, access to clean water, proper sanitation and healthcare, and infant feeding practices) that influence the proximal biological risk factors of infant malnutrition. Socioeconomic status of household is considered a central factor determining the child's nutritional status mainly through its impact on household food availability (Charmarbagwala et al., 2004). Income is also related to 'class' and social status (Chandrasekhar, 1959).

In addition to the determinants listed in table 2.1, demographic factors such as mother's age may function through her knowledge and attitude towards infant care (Caputo et al., 2003, Larrea and Kawachi, 2005), birth order showed association mainly due to lack of adequate care and early weaning of older infants and due to competition for the limited resources among siblings with less age difference (Charmarbagwala et al., 2004, Kandala et al., 2011). Again the increased risk of malnutrition with increase in age of the infant could be due to inadequate weaning and prolonged breastfeeding (Bawdekar and Ladusingh, 2008).

### 2.5.1: Effects of employment

Employment determines household income and food security (Mamabolo et al., 2004, Reyes et al., 2004). As discussed in the previous section, fathers' employment in general is associated with improved nutritional status of infants, but complexity of mothers' employment distorts the linear relationship between increased income and infant nutrition. Studies as early as in the 1970s explored the relationship between mothers' participation in the labour market and implications on child nutrition (Popkin and Solon, 1976).

Observational studies mainly demonstrated that mother's employment was detrimental to child nutrition (Abbi et al., 1991, Choudhary et al., 1986, Sethuraman et al., 2006, Lamontagne et al., 1998) due to compromises in the quality of feeding and time devoted to care (Popkin and Solon, 1976, Brush et al., 1993). Mothers' employment was associated with increased risk of childhood illnesses (such as worm infestation, measles and diarrhoea) (Abbi et al., 1991, Brush et al., 1993) and incomplete vaccination (Abbi et al., 1991) which are the proximal risk factors of infant malnutrition. However, effects were reported to vary with the baseline socioeconomic status of the households such that the effects of mothers' employment on child care and nutrition was found to be negative in lower socioeconomic status households, but positive in households that had a higher baseline socioeconomic status (Popkin and Solon, 1976, Bennett, 1988).

The trade-off between mother's time spent in earning for the family and time spent in child care are also conditioned by other factors such as availability of other carers, amount earned and her ability to access and utilize her own earnings (Bennett, 1988, Abbi et al., 1991, Lamontagne et al., 1998). Further, the effect on breastfeeding of infants of working mothers was found to be determined by the distance of the work place from home (Popkin and Solon, 1976). Apart from a positive effect on income, mothers' employment could lead to improvements in infant nutrition by improving their status within the households and the society. A study in Guatemala showed that women who were working and earned money had a greater say in household decision making (Engle, 1993) which is suggested to be an important social determinant of infant malnutrition (Sethuraman et al., 2006, Shroff et al., 2009, Shroff et al., 2011).

Thus, the literature review identified several factors that determine infant malnutrition which could be classified as proximal, intermediate or distal determinants, but these are interconnected and present as a '*complex web*' (Krieger, 1994).

## 2.6: Conceptual framework of the effect of MGNREGA on infant malnutrition

There are various determinants that could affect the nutritional status of infants; however, their interrelationship is complex and difficult to disentangle. The United Nations Children's Fund (UNICEF) provides a conceptual framework to describe the inter-relationship between the various determinants. UNICEF's conceptual framework divides the determinants of infant malnutrition into immediate, underlying and basic causes described in box-1 (UNITED NATIONS CHILDREN'S FUND (UNICEF), 1990).

### Box-1: UNICEF's conceptual framework

- **Immediate causes** which include dietary intake and health status (diseases such as diarrhoea).
- **Underlying causes** encompassing factors such as household food security, care of children and women, health services and household environment.
- **Basic causes** which could influence the underlying and the immediate causes such as education (particularly mother's), adequate information, household income and social and economic policies (related to income and resource distribution etc.).

A similar framework was described by Caputo et al. (2003) in which the determinants of wasting and stunting were divided into three groups based on their position within the dependence chain, described in box-2.

Box-2: Determinants of malnutrition, framework by Caputo et. al. (2003)

- **Immediate factors** – ill health mainly diarrhoea and respiratory infections, food and protein.
- **Intermediate factors** – initiation and duration of breastfeeding, prenatal care and birth attendance, vaccination, source of drinking water and toilet facilities.
- **Underlying factors** - age, sex, birth order, number of household members, total children ever born, children who have died, age of mother, house quality, goods, partners' education, mothers' education and type of employment.

In addition to the above two frameworks, the conceptual framework for this study was also guided by Millard's framework for child mortality in which the determinants are ordered as the proximal biological factors, intermediate behavioural factors related to child care that influences the biological factors, and the distal societal, public administration and socio-cultural factors (Millard, 1994).

From the review of the inter-relationships between the determinants of infant malnutrition and the conceptual frameworks described above, it can be suggested that the wage-for-employment policy, MGNREGA, could influence and act as a trigger for several pathways leading to infant malnutrition. It is suggested that MGNREGA is one among the several initiatives of Government of India to address the social determinants of health (Marmot et

al., 2011). A cross-sectional study conducted in 2007-08 in three states of India (Andhra Pradesh, Maharashtra and Rajasthan) showed that MGNREGA was associated with a significant positive impact on both macro-nutrient (protein, calorie) and micro-nutrient (iron, calcium, riboflavin etc.) intake in rural households in these states (Jha et al., 2010). Another monitoring report found that people were using the MGNREGA wages to buy food which helped families to increase their dietary diversity (Samrathan–Centre for Development Support, 2007).

A recently published study that looked at the impact of a cash-for-work programme, ‘The Chars Livelihood Programme’ among Char-dwellers (large islands in the main river channels in Bangladesh) in north-western Bangladesh showed an increase in the households’ expenditure on food and increased food consumption in the intervention households (Mascie-Taylor et al., 2010). They further demonstrated that improved food availability led to significant improvements in the current nutritional status (mainly decrease in wasting) among children less than five years in the intervention households compared with the control households within a time-period of 10 weeks (range 8-12 weeks) (Mascie-Taylor et al., 2010). The mean differences in the z-scores for weight-for-age, height-for-age, weight-for-height and mid-upper arm circumference-for-age were calculated taking account of the age and sex of the children. While the intervention and the control households were reported to be similar in some characteristics (such as baseline age of the mother and children, number of male children) (Mascie-Taylor et al., 2010), the socioeconomic status of the households (income, assets, consumption expenditure etc) in the two groups was not reported. In order to attribute the improvements in children’s nutritional status to the cash-

for-work programme, it is important to account for the baseline difference in socioeconomic status between the intervention and control groups.

Although more likely to be positive, the impact of employment provision programmes on child malnutrition may also have negative effects. The anthropometric measurements taken on children between six and 60 months in the Food Consumption Survey of Niger's public works programme conducted in 1990-91 showed that children in the participant households were 1.5 to 2 times more likely to be malnourished than those in the non-participant households (Webb, 1995). The author suggested that this could be either due to high pre-existing malnutrition in children in participant households or due to compromises in child care by working mothers in these households compared to the non-participant households (Webb, 1995).

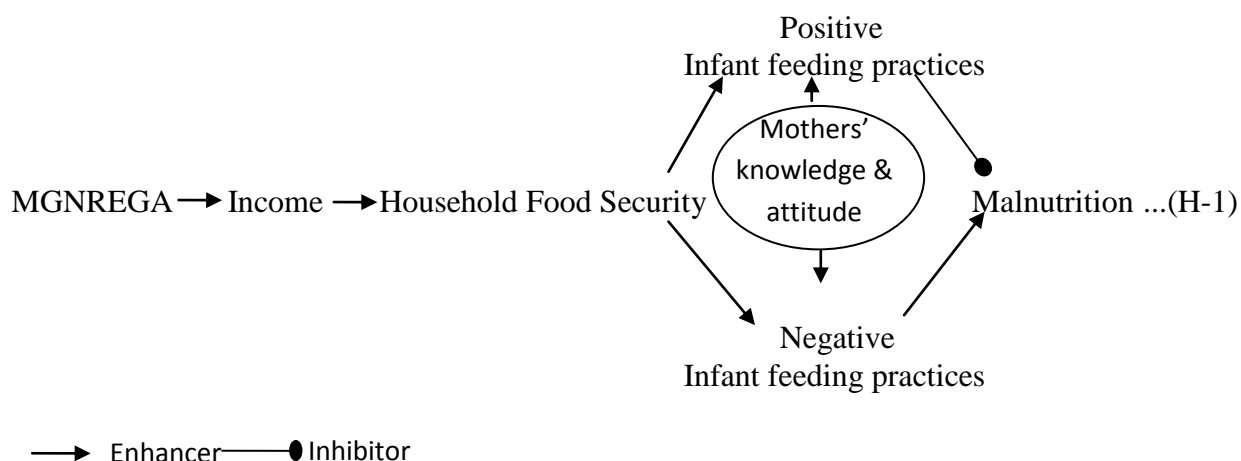
Two other studies that followed 1,343 children from birth to 24 months of age within the Maternal and Infant Nutrition Intervention in Matlab (MINIMat) in rural Bangladesh, showed that household food security<sup>20</sup> was associated with improved anthropometric indicators of nutrition (weight-for-age, length-for-age and weight-for-length) in children 0-24 months of age (Saha et al., 2009) even after adjusting for important confounding factors such as maternal age and education, sex of the infants and socioeconomic status of households (measured using household asset index) (Saha et al., 2008). Household food security was also shown to be associated with infant feeding practices and the type of complementary food given to infants (Saha et al., 2008). While household food security was

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<sup>20</sup> Household food security was measured using an eleven item questionnaire based on another MINIMat study – frequency of food purchased, frequency of food cooked, borrowed or lended, access to adequate meals and snacks. SAHA, K. K., FRONGILLO, E. A., ALAM, D. S., ARIFEEN, S. E., PERSSON, L. A. & RASMUSSEN, K. M. 2009. Household food security is associated with growth of infants and young children in rural Bangladesh. *Public Health Nutr*, 12, 1556-62.

found to improve feeding among infants 6 to 12 months of age (higher proportion of infants received fruit juices, cow’s milk, solid and semi-solid food in the food-secure households compared with food-insecure households), it increased the risk of inappropriate feeding in the age group of 3-6 months (Saha et al., 2008). The authors explain this as an adverse effect of household food security. Mothers in the food-secure households could afford to feed cow’s milk, fruits and fruit juices (which are otherwise foods of the elite) to infants and thus introduced these early compared to the food-insecure households (Saha et al., 2008).

Therefore, the first hypothesized pathway (H-1) of effect of MGNREGA on infant malnutrition (shown in figure 2.1) was that MGNREGA will improve household food security due to an increase in household income which will affect infants’ nutrition through the intermediate factor - infant feeding practices. However, the effect of household food security on infant feeding could be positive or negative depending on the mother’s knowledge about infant feeding and her attitude towards infant care.



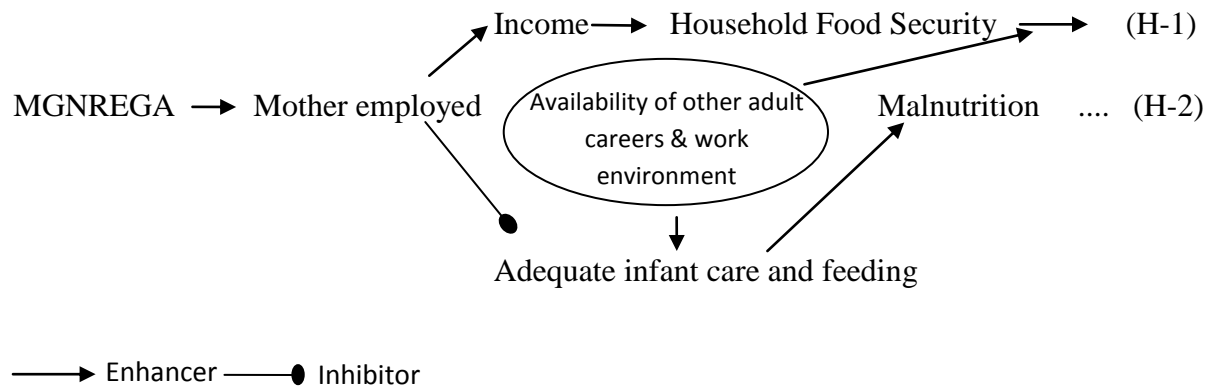
**Figure 2.1: Hypothetical pathway of effect of MGNREGA on infant malnutrition**

Since the MGNREGA makes special provision for women's employment, a separate pathway was hypothesized to understand the effects of mothers' employment on infant malnutrition. Studies showed that mothers' employment could have a protective effect against infant malnutrition due to improvements in household income and their social status (Tucker and Sanjur, 1988, Engle, 1993), but could also lead to compromises in child care and feeding which could increase the risk of malnutrition (Abbi et al., 1991, Choudhary et al., 1986, Sethuraman et al., 2006, Lamontagne et al., 1998). Evaluation surveys in the states of Bihar, Jharkhand, Rajasthan, Himachal Pradesh and Tamil Nadu in India showed that employment provision to women through MGNREGA had led to economic benefits to the family, provided independence and security to women, and benefits to children (Pankaj and Tankha, 2010, Narayanan, 2008). Women were shown to be more judicious in spending their earnings on food and healthcare for their children (Narayanan, 2008).

While MGNREGA is considered successful in providing employment and equal wage opportunity to women, it has somewhat overlooked the child care factors related to mothers' employment. In policy, the Act includes provision for crèche facilities at all worksites where a woman worker is required to be deputed to look after young children when there are at least five children below the age of six years at the worksite (India. *The National Rural Employment Guarantee Act 2005*). However, surveys of crèche facilities and child care practices among mothers employed at MGNREGA worksites in Tamil Nadu (Narayanan, 2008) and Andhra Pradesh (Uppal, 2009) showed that the facilities are not only inadequate, but also in some cases deliberately unfavourable for child care. In the Tamil Nadu survey, half of the 104 women interviewed left their infants at home either without a carer or with their siblings and only 19% brought their children to the workplace (Narayanan, 2008). A

few women complained that their supervisors did not approve of them breastfeeding their child and even threatened to send them home if they spend more time breastfeeding (Narayanan, 2008). Consequently, reports suggest that the frequency of breastfeeding decreased to less than half of usual practice for several women in the study sites (Narayanan, 2008). Further, foods for non-breastfed children who accompany their mothers often include a share from their mother's lunch (such as rice, leftover foods in the house etc.) which is usually grossly deficient in nutritive value (Narayanan, 2008). The problem was not so much for children older than one year who could either be left at Anganwadi centres or sent to schools and thus had better chances of being adequately cared for (Narayanan, 2008).

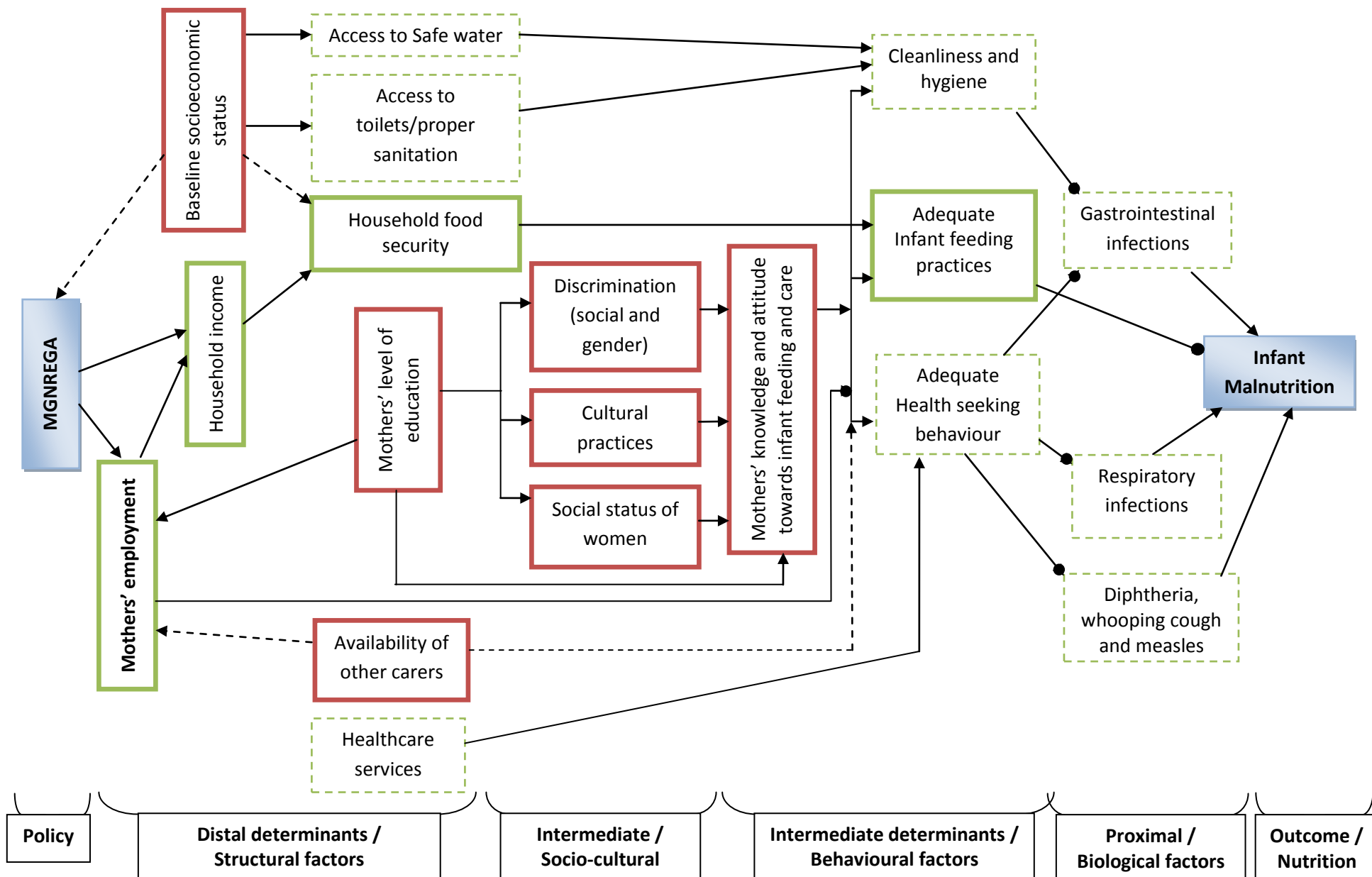
Further, a review of studies on employment through public works programme in Botswana and Tanzania showed that participation of mothers in these programmes depended on the availability of other adult carers in the household (Teklu, 1995). Similarly, in Zimbabwe, women of the reproductive age group (17-41 years) were less likely to participate in the employment programmes (Webb, 1995). Thus, based on these studies it can be inferred that although mothers' employment through MGNREGA could lead to improvements in income and household food security, it is more likely to increase the risk of infant malnutrition due to compromises in infant feeding and care. However, the effect will also be determined by the availability (and quality) of other adult carers in the household. Figure 2.2 provides a pictorial description of the hypothesized pathway of mothers' employment through MGNREGA on infant malnutrition (H-2).



**Figure 2.2: Hypothetical pathway of effect of mother’s employment through MGNREGA on infant malnutrition**

Apart from the factors included in the pathways described in H-1 and H-2, there are other determinants that could play important roles either as confounders or as effect modifiers and influence the effect of MGNREGA on infant malnutrition. As was discussed in section 2.5, income influences the household environment, the living standards, and access to clean water and proper sanitation, thereby causing an indirect effect on the biological risk factors of infant malnutrition. Moreover, access, utilisation and quality of healthcare services though not embedded in the impact pathway of MGNREGA, have an important role in preventing the biological risk factors through disease prevention and health promotion programmes, such as vaccination programmes, nutritional interventions etc. The hypothetical pathways and the identified determinants of infant malnutrition were combined to construct the conceptual framework for the study (figure 2.3).

Figure 2.3: Conceptual framework of the pathways of effect of MGNREGA on infant malnutrition



Index of figure 2.3

**Green solid boxes** - include the factors that constitute the pathway of effect of MGNREGA on infant malnutrition.

**Red solid boxes** - include factors that are external to the pathway, but could modify the effect of MGNREGA on infant malnutrition.

**Green dotted boxes** - include other determinants of infant malnutrition which although may not affect the pathway as such, are important on their own.

————→ Enhancer      ————● Inhibitor

## 2.7: Study hypothesis

The theoretical conceptual framework suggests that employment through MGNREGA, although an important determinant, would not act in isolation, but through a pathway of other determinants which will determine the direction and strength of the effect of MGNREGA on infant malnutrition. Therefore, the **hypothesis adopted for this study was that policies set to address unemployment, which is a determinant of infant malnutrition, will have a protective effect through a composite synergistic pathway of socioeconomic, behavioural and biological determinants rather than in isolation, and this pathway will determine the direction and strength of the effect.** The hypothesis was based on the ‘ecosocial theory’ of social epidemiology (Krieger, 2001). This theory involves *‘understanding societal patterns of health and disease acknowledging the inextricable and ongoing intermingling at all levels of the social and the biologic’* (Krieger, 1994). The theory conceptualizes individuals as ‘embodiment’ of the biological and the social world and thus their health and disease conditions are determined by the interplay of structural, social, behavioural and biological determinants (Krieger, 2001). The hypothesis was also informed by the concepts developed by the Commission on Social Determinants of

Health. The conceptual framework for the determinants of health and well-being provided in its 2010 report comprises of the biological and behavioural risk factors at the proximal end, followed distally by the socio-cultural and economic factors and finally policies (health and social), governance and the socio-political contexts (World Health Organisation, 2010b). It is recommended that these determinants are viewed as causal pathways in a composite social, economic and biological environment (Bonney et al., 2007).

Therefore, in addition to analysing the overall effect of MGNREGA on infant malnutrition, it was important to delineate the pathways through which the effects of MGNREGA may be transmitted. The two specific mechanisms through which MGNREGA could affect infant malnutrition were postulated as:

- i. MGNREGA would reduce infant malnutrition through a positive effect on household food security and infant feeding.
- ii. Mothers' employment through MGNREGA could increase the risk of infant malnutrition due to compromises in infant care and feeding.

## 2.8: Methods used to test the study hypothesis

This research was not merely about testing hypothesis in terms of MGNREGA having a positive or a negative effect on infant malnutrition, but involved the understanding of human behaviour, household conditions, culture and context which could modify the effect of MGNREGA on infant malnutrition. Further, the postulated positive and negative mechanisms of effect of the upstream determinants such as mothers' employment and household food security (described in H1 and H2) make this process even more complex. Thus a mixed methods approach (i.e. quantitative and qualitative methods) was used to test

the hypothesis and to build an empirical model delineating the pathways of effect of MGNREGA on infant malnutrition. The theoretical conceptual framework and the research questions guided the mixing of qualitative and quantitative components, and the methods of inquiry (data collection, analysis and interpretation) (Creswell and Plano Clark, 2007). While the quantitative study was used to analyse the effect of MGNREGA on infant malnutrition, the qualitative study helped to understand the postulated mechanisms through which the wage-for-employment policy could have an effect on infant malnutrition. A classic quantitative or a qualitative study would not be able to emphasize the interplay of subjective and objective knowledge required for this purpose (Doyle et al., 2009, Salkind, 2010). Methodological triangulation also helped to overcome the innate weakness of any one of these approaches alone (Bowling, 2009) and to substantiate the findings of both methods (Creswell, 2009, Doyle et al., 2009, Onwuegbuzie and Teddlie, 2003). Such an approach to evaluating complex interventions which include evaluating the effects of non-health interventions on health, has been recommended by the framework of the Medical Research Council of the United Kingdom (UK) (Craig et al., 2008).

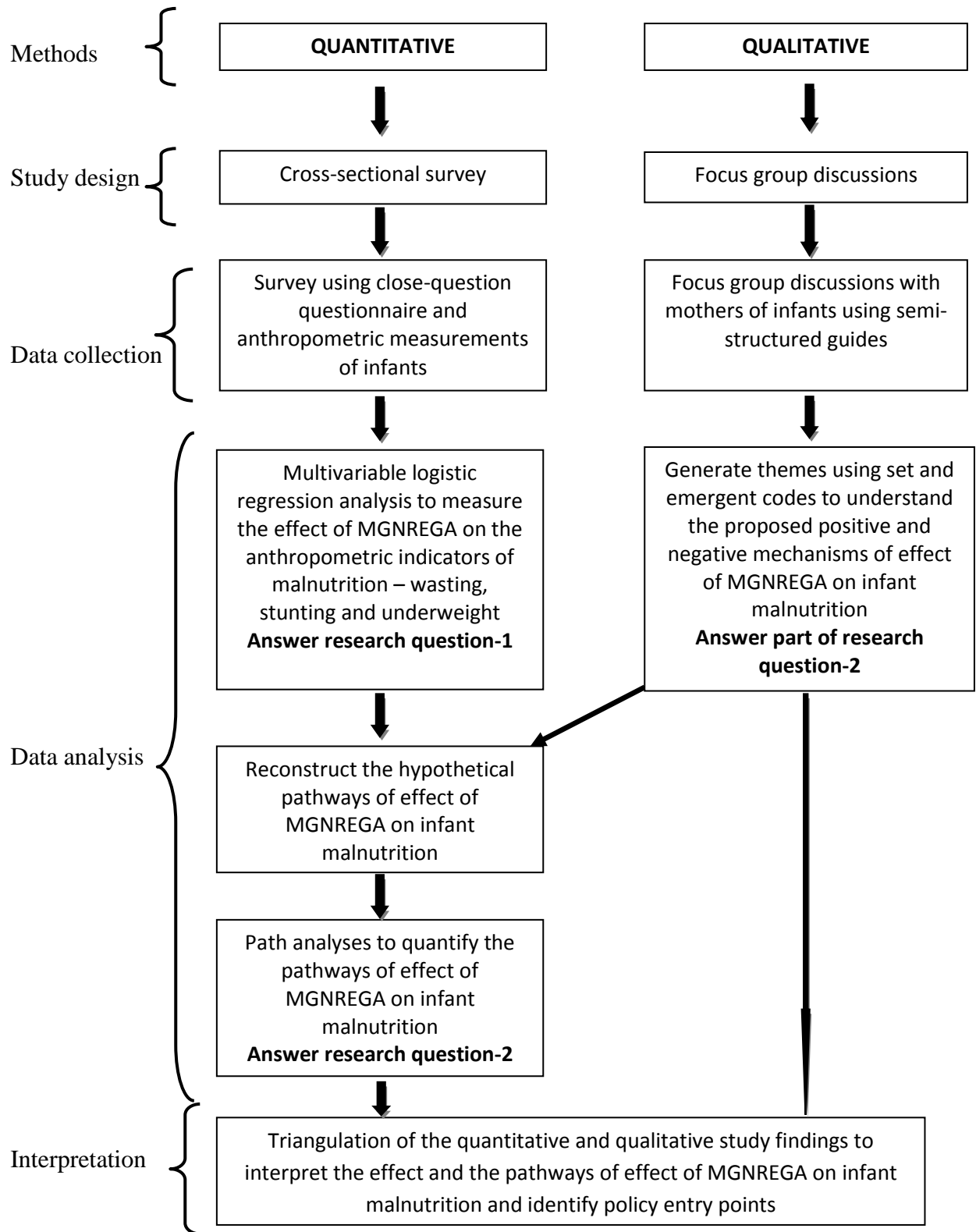
A convergent parallel mixed methods approach (Creswell and Plano Clark, 2007, Creswell and PlanoClark, 2011, Doyle et al., 2009) was employed which comprised of equal weighted quantitative and qualitative strands (Creswell and PlanoClark, 2011) implemented concurrently, with parallel data collection and analysis. The quantitative strand for this study was through a cross-sectional survey and the qualitative component was through focus group discussions. The analysed data from each strand was triangulated through integration and correlation (Onwuegbuzie and Teddlie, 2003, Greene and McClintock, 1985, Greene et al., 1989, Bryman, 2006, O' Cathain et al., 2010) to interpret the findings and to re-construct

the hypothesized pathways (H-1 and H-2) to finally develop empirical models linking MGNREGA and infant malnutrition. Details of the quantitative and qualitative methods used are included in chapters 3, 4 and 5, but a summary of the process is presented diagrammatically in figure 2.4. This process enhanced both representation<sup>21</sup> and legitimation<sup>22</sup> (Onwuegbuzie and Teddlie, 2003), which are key principles of validation in mixed methods research (Dellinger and Leech, 2007). The method employed was also similar to that used in a study by the World Bank in Guatemala that assessed the determinants of social capital and its utilization through concurrent cross-sectional survey, focus group discussions, one-to-one interviews, direct observation and social mapping exercises (Ibáñez et al., 2002).

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<sup>21</sup> 'Representation refers to the ability to extract adequate information from the underlying data' (Pg.353) ONWUEGBUZIE, A. J. & TEDDLIE, C. 2003. A framework for analysing data in mixed methods research. In: TASHAKKORI, A. & TEDDLIE, C. (eds.) *Handbook of mixed methods in social and behavioural research*. Thousand Oaks, CA: Sage.

<sup>22</sup> 'Legitimation refers to the validity of data interpretation' (Pg 353) *ibid.*



**Figure 2.4: Diagrammatic summary of the mixed methods approach used in the study**

## 2.9: Summary

There are various determinants of infant malnutrition which are inter-connected in a complex and dynamic fashion. Depending on their proximity, the determinants of infant malnutrition could be divided into the proximal biological risk factors, the intermediate behavioural and socio-cultural factors and the distal structural factors. The wage-for-employment policy, MGNREGA, was hypothesized to have an effect on infant malnutrition through a pathway of determinants. Two mechanisms of effect of MGNREGA on infant malnutrition were proposed:

- i. Positive effect on household food security and infant feeding leading to decreased risk of infant malnutrition in the participating households.
- ii. Negative effect of mothers' employment through MGNREGA on infant feeding and care leading to increase in the risk of malnutrition.

A mixed methods study using quantitative and qualitative methods was used to measure the effect of MGNREGA on infant malnutrition, understand the mechanisms of effect and delineate the pathways of effect of MGNREGA on infant malnutrition. The next three chapters present the methods, results and discussion of the cross-sectional study, focus group discussions and the path analysis examining the effect of MGNREGA on infant malnutrition.

## Chapter 3

### Effect of MGNREGA on infant malnutrition

#### 3.1: Overview of the chapter

This chapter presents the methods, results and discussion of the cross-sectional study used to address the first research question concerning the effect of MGNREGA on infant malnutrition. Further, considering that MGNREGA has special provision for providing employment to women, a sub-sample analysis estimating the possible effects of mothers' employment through MGNREGA on infant malnutrition is also presented (secondary objective of the study). The chapter is divided into the following sections – aims and objectives, methods (includes the study design, study population and setting, sample size required to power the study for internal validity, sampling design, tools for data collection, study variables, ethics approvals, final study sample and the statistical analyses techniques), description of the study clusters and study population, and results of the univariable and multivariable logistic regression models assessing the effect of MGNREGA (both household and mothers employment) on infant malnutrition. The chapter then presents a discussion of the results and concludes with a summary.

#### 3.2: Aim

This chapter aims to answer the first research question with regards to whether employment through MGNREGA reduces malnutrition among infants in the participating households.

### 3.3: Objectives

Two objectives are covered in this chapter:

1. Analysing the effect of MGNREGA on wasting (low weight-for-length), underweight (low weight-for-age) and stunting (low length-for-age) among infants in the participating households.
2. Estimating the effect of mothers' employment through MGNREGA on wasting, underweight and stunting among infants.

### 3.4: Methods

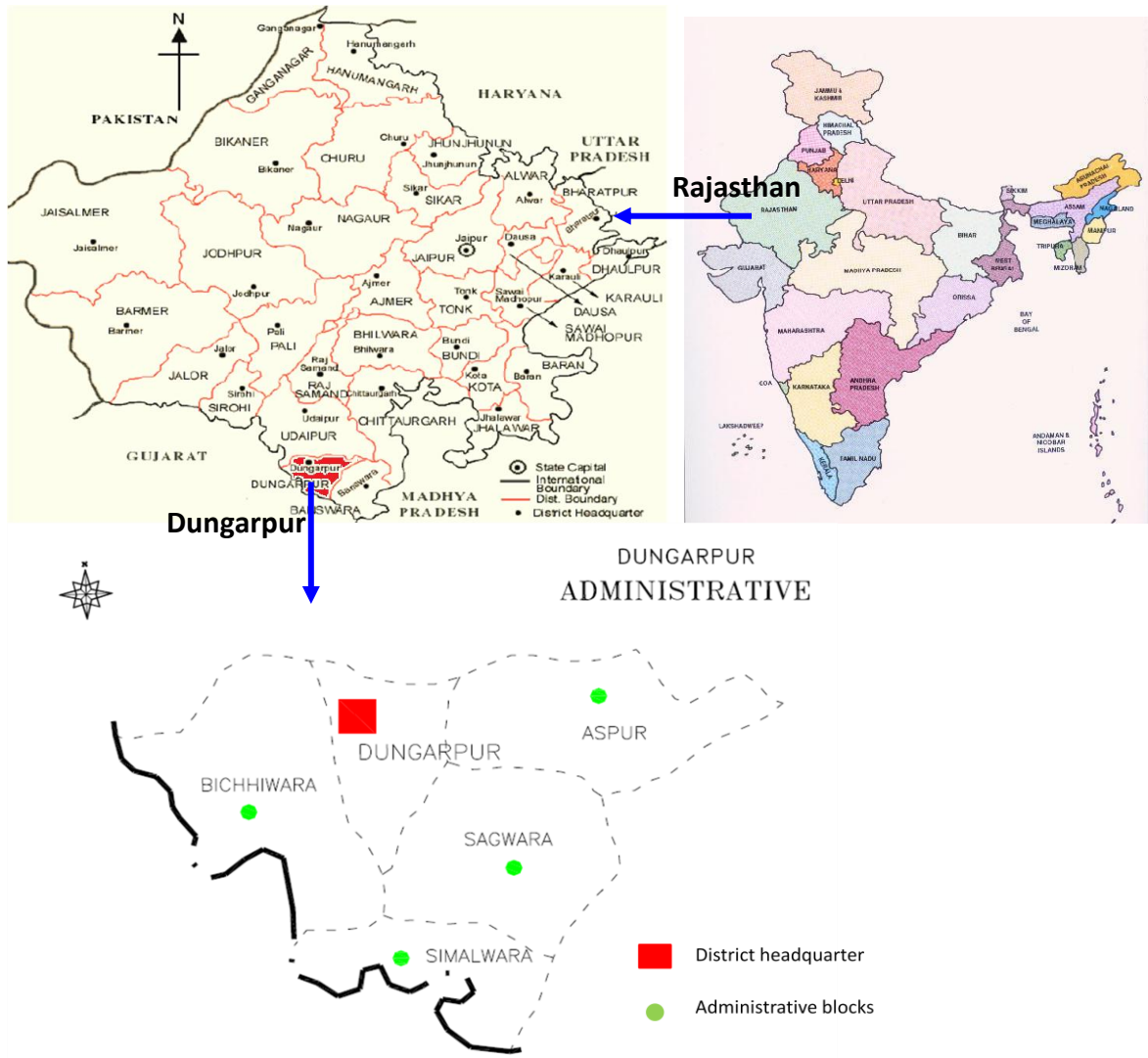
#### 3.4.1: Study design

The quantitative strand of this mixed methods study was through a cross-sectional survey that analysed the effect of households' participation in MGNREGA on infant malnutrition. MGNREGA has been implemented in all districts in India since 2007, thus using a randomised controlled trial or a prospective cohort study to analyse its impact on infant malnutrition was ruled out due to non-availability of a control group. An ideal control group to match the participants who received employment through MGNREGA would be participants who demanded employment, but did not receive. However, according to the Government of Rajasthan's database on MGNREGA, the proportions provided employment against demand was between 90% and 100% at both the household and individual level (Ministry of Rural Development; Government of India). As discussed in chapter 2, Jha et. al. (2010) successfully employed a cross-sectional survey to model the macro and micro-nutritional attainments among MGNREGA participants. Therefore, a cross-sectional study was used to analyse the effect of MGNREGA on infant malnutrition by comparing

households that participated in the programme between - August 2010 and September 2011 with those that did not. The pre-defined period of MGNREGA employment was taken to be 14 months prior to the date of the survey. This was done to coincide with the upper limit of the age of the infants included in the study (12 months) plus two additional months. Survey comparisons may not carry the convictions of experimental designs, but considering the real world situation of MGNREGA implementation, a cross-sectional survey was considered the best alternative.

### 3.4.2: Study site

For the purposes of this investigation, the study site selected was Dungarpur district of Rajasthan, in which MGNREGA has been implemented successively since 2005-06 using recommended standards. This was done to avoid differences in the anthropometric outcomes in the MGNREGA participating and non-participating households being attributed to the shorter duration and less than standard implementation, rather than the nature of the programme. Dungarpur is a Phase-I district, where MGNREGA has been implemented since September 2006 and according to reports of the Ministry of Rural Development, Government of India, the district was awarded for excellence in MGNREGA implementation (Ministry of Rural Development; Government of India, 2010). Further, the occupational, employment, and child health and nutritional challenges in the district are such that the district is likely to benefit from this wage-for-employment policy.



**Figure 3.1: Study site - Dungarpur district in Rajasthan, India**

A summary of the characteristics of Dungarpur district is presented in table 3.1. Briefly, Dungarpur is the smallest district of Rajasthan located in the southern plains of the state (Government of Rajasthan and Planning Commission of India, 2009, UN World Food Programme (WFP), 2009, Government of Rajasthan, 2008) (figure 3.1). The district is mainly inhabited by people belonging to the Schedule Tribe and Schedule Caste social

classes (Government of Rajasthan and Planning Commission of India, 2009, UN World Food Programme (WFP), 2009) who are socially and geographically isolated (Government of Rajasthan, 2008). Dungarpur is a sub-montane region and has recurrent droughts (Government of Rajasthan, 2008). Agriculture, which is seasonal, is the major source of livelihood (Planning Commission; Government of India, 2006, Government of Rajasthan, 2008). More than two-thirds of the households in Dungarpur are employed in casual labour (UN World Food Programme (WFP), 2009). Thus, one of the major challenges in this district is seasonal unemployment which is a form of under-employment (Planning Commission; Government of India, 2006). The average income per capita (at current prices) in Dungarpur is among the lowest in the state of Rajasthan (Government of Rajasthan, 2008) and more than half of the total households live below the poverty line (Government of Rajasthan).

Several nutritional and child health problems have been identified in the district. The United Nations World Food Programme ranks Dungarpur as an extremely food insecure district (UN World Food Programme (WFP), 2009) which corresponds with the prevailing high proportion (57%) of underweight children under five years of age (UN World Food Programme (WFP), 2009). As per Census report 2001, the infant mortality rate in Dungarpur was 112 per 1,000 live births, much higher than the state average of 80 per 1,000 live births (Government of Rajasthan, 2008). Health and nutrition of infants remain poor despite the district being considered one of the better-off districts of Rajasthan with regards to access to healthcare facilities. About 34% of the villages in Dungarpur have access to the Primary Health Centres (defined as within 5 Kms of the village) (UN World Food Programme (WFP), 2009).

**Table 3.1: Summary of the characteristics of Dungarpur district**

<b>Indicators</b>	<b>Dungarpur</b>
Area <sup>a</sup>	3,856 Sq. Kms
Revenue villages as per Census 2001 <sup>a</sup>	872
Sub-centre villages as per Census 2001 <sup>b</sup>	318
Population as per Census 2001 <sup>a</sup>	1,107,037
Rural population as per Census 2001 <sup>a</sup>	1,026,787
Population density (per square Km) as per Census 2001 <sup>a</sup>	294
Birth rate (per 1000/year) as per Census 2001 <sup>a</sup>	32.0
Decadal growth rate as per Census 2001 <sup>a</sup>	26.58
Female to male ratio as per Census 2001 <sup>a</sup>	1,027: 1,000
Population composition as per Census 2001 <sup>a</sup>	72.4 % of total population belong to Schedule Tribe/ Schedule Caste
Primary occupation <sup>a</sup>	Agriculture
Secondary occupation <sup>a</sup>	Livestock rearing
Ratio of rural working age population as per Census 2001 <sup>a</sup>	1.09
Women workforce participation rate as per Census 2001 <sup>a</sup>	70.1%
Main characteristic of employment <sup>c</sup>	Seasonal employment
Agricultural labourers as per Census 2001 <sup>a</sup>	16.6% of the entire workforce
Casual labourers in areas other than agriculture as per Census 2001 <sup>a</sup>	68% of the working population
Percentage of households below poverty line <sup>d</sup>	55.6%
Percentage of total literates as per Census 2001 <sup>e</sup>	48.6%
Male literacy as per Census 2001 <sup>e</sup>	66%
Female literacy as per Census 2001 <sup>e</sup>	31.8%
Rural female literacy as per Census 2001 <sup>f</sup>	28.9%
Percentage of households living in Kutcha houses (roof/floor/walls not made of concrete materials) <sup>g</sup>	78.6%
Percentage of households without proper roofing <sup>g</sup>	7%
Percentage of households without a house <sup>g</sup>	6.5%
Food Security Outcome Index (FSOI) <sup>f</sup>	0.374 (lowest among 33 districts)
Food Security Index (FSI) <sup>f</sup>	0.3829 (ranks 30 among 33 districts in Rajasthan)
Households having access to proper toilet facilities <sup>gh</sup>	15%
Households with access to safe drinking water <sup>h</sup>	71.6%
Villages with piped water scheme <sup>h</sup>	82 (9.6% of villages)
Villages with hand-pump scheme <sup>h</sup>	693 (81.1%)
Villages with regional water scheme <sup>h</sup>	60 (7.1%)
Villages with other local sources of water <sup>h</sup>	19 (2.2%)
Infant Mortality Rate (per 1,000 live births) as per Census 2001 <sup>a</sup>	112
Proportion of underweight (Weight-for-age) children <5 years (DLHS-2002-04) <sup>f</sup>	57%

<b>Indicators</b>	<b>Dungarpur</b>
Proportion of severely underweight (Weight-for-age) children <5 years (DLHS-2002-04) <sup>f</sup>	28.6%
Proportion of children < 5yrs who suffered from diarrhoea (DLHS III (2007-08)) <sup>i</sup>	46.5%
Proportion of children < 5yrs who suffered from acute respiratory tract infection <sup>i</sup> (DLHS III (2007-08))	4.6%
Proportion of villages with access to Primary Health Centres (Census 2001) <sup>f</sup>	34%

Sources of data: a - Government of Rajasthan. *Dungarpur*; b -Government of Rajasthan. *National Rural Health Mission*; c - Planning Commission; Government of India, 2006; d - Government of Rajasthan. *BPL Census*; e - Directorate of Literacy and Continuing Education and State Literacy Mission Authority; Government of Rajasthan; f - UN World Food Programme (WFP), 2009; g - Sen et al., 2009; h - Directorate of Economics and Statistics; Rajasthan; Jaipur, 2008); i - International Institute for Population Sciences

### 3.4.3: Study population

Households that had an infant in the age group of 1 to <12 months (based on the records of the village nurse) were eligible for inclusion in the study. Infants < 1 month of age were not included in the study because access to them was difficult. Cultural practices and beliefs restrict people (other than the mother) from coming in contact with infants until 40-45 days after birth. Thus, infants (1 to <12 months) and their mothers/ caregivers constituted the study population. The selected households were divided into MGNREGA-households and non-MGNREGA-households based on participation in the MGNREGA between August-2010 and September-2011 (based on the data collected from the selected households during the study).

### 3.4.4: Sample size

The null hypothesis (H0) for the study was that there is no difference in the prevalence of the anthropometric indicators of malnutrition – wasting, stunting and underweight among infants (between 1 and 12 months of age) in the MGNREGA participating and non-participating households. Thus, sample size calculation for the cross-sectional survey was

done using the method of two-sided, two-sample comparison of percentages (Lemeshow et al., 1990). The assumed baseline prevalence of being malnourished was based on the reported prevalence of the anthropometric indicators – underweight 41.7%, wasting 19.2% and stunting 53.4% in children under five years of age in Durgapur district (Naandi Foundation, 2011). The desired effect size was 13% based on the ‘Young Lives’ study in Andhra Pradesh, India (Uppal, 2009). In this study two different econometric models found 13% and 15% increase in the z-scores of height-for-age for children (5-6 years of age) whose parents were employed through MGNREGA against their baseline measurements taken before the implementation of MGNREGA in the study sites (Uppal, 2009). The sample size calculations for each of the three outcomes – underweight, wasting and stunting were done using the online sample size calculator developed by Glaziou<sup>23</sup> taking 41.7%, 19.2% and 53.4% as the baseline prevalence for the outcomes underweight, wasting and stunting respectively, effect size 13%, significance level of 5% ( $\alpha=0.05$ ), power (1- $\beta$ ) as 80%, and assuming equal sample size in each group (employed through MGNREGA or not).

The sample size calculation for the three outcome variables are shown in table 3.2. The largest of three estimated samples, 460, was taken for this study. This was then inflated to adjust for the clustering effect of the single-stage cluster sampling design (described below) by multiplying with a design effect or a variance inflation factor based on intraclass correlation coefficient. Intraclass correlation coefficient ‘*represents the proportion of the total variance that is accounted for by between-cluster rather than within-cluster variation*’ (page.246, Gulliford et al., 2005) and ranges from 0 to 1 (Lemeshow et al., 1990). It depends on the prevalence of the outcome variables and the degree of clustering in a community

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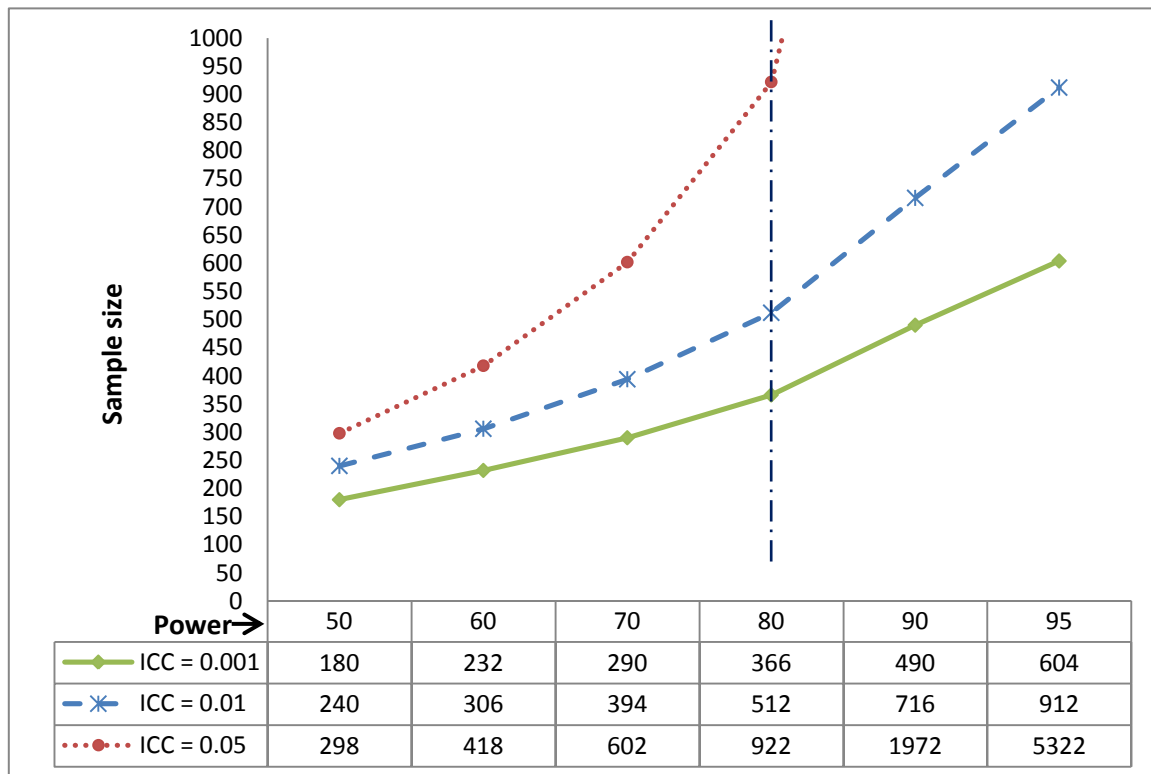
<sup>23</sup> [https://practice.sph.umich.edu/micphp/dynamic/site.php?module=courses\\_one\\_instructor&id=142](https://practice.sph.umich.edu/micphp/dynamic/site.php?module=courses_one_instructor&id=142)

which in turn varies with the study context and characteristics of the study population (Gulliford et al., 2005). Due to difficulty in obtaining a precise intraclass correlation coefficient, a range of possible values was taken to calculate the design effect (Gulliford et al., 2005). For the purpose of this study three possible design effects with three different values for intraclass correlation coefficient, 0.001, 0.01 and 0.05 were used (Gulliford et al., 2005). The samples sizes for each of these intraclass correlation coefficients were plotted against a gradient of power (1- $\beta$ ) from 50% to 95% and are shown in figure 3.2.

**Table 3. 2: Sample size calculations for the three outcome variables**

Outcome	Baseline prevalence	Desired effect size	Total sample calculated	Estimated sample per group
Underweight	0.42	13%	424	212
Wasting	0.19	13%	202	101
Stunting	0.53	13%	<b>460</b>	230

Significance =5% ( $\alpha=0.05$ ) and power (1- $\beta$ ) = 80%



**Figure 3.2: Sample size calculations for different values of ICC and power (1- $\beta$ )**

The sample size of 512 (256 in each group,  $n_1:n_2=1$ ; ICC = 0.01) which was statistically and operationally most feasible was taken as the sample size for this study. Finally this sample of 512 was further inflated by an attrition rate of 5% to account for probable missing data leading to the final sample size of 540. Considering a likelihood of recruiting 12 households per village, 44 clusters were required to draw the sample.

#### 3.4.5: Sampling design

A single-stage cluster random sampling design was used to select the required number of 540 households. The primary sampling units were the five administrative blocks of the district – Aaspur, Bichiwada, Sagwada, Simalwara and Dungarpur. All sub-centre villages in each of the five administrative blocks were listed, which were the clusters. Sub-centre villages are those that have a village health centre or sub-centre<sup>24</sup> and an Auxiliary Nurse and Midwife (ANM) to provide health services, and depending on the size of the population it could have a minimum of one to a maximum of four to five Integrated Child Development Services (ICDS) centres. Restricting the sample to sub-centre villages would match the baseline characteristics of the two study groups (MGNREGA and non-MGNREGA households) in terms of access to healthcare services and nutrition programmes, although the quality of services may vary. The number of clusters/ villages to be randomly selected per administrative block was based on probability proportional to size, that is based on the total number of sub-centre villages in each block and is shown in table 3.3. However, many villages in the Simalwara block were flooded during the period of fieldwork and were difficult to access, so fewer villages were selected from this block than originally planned

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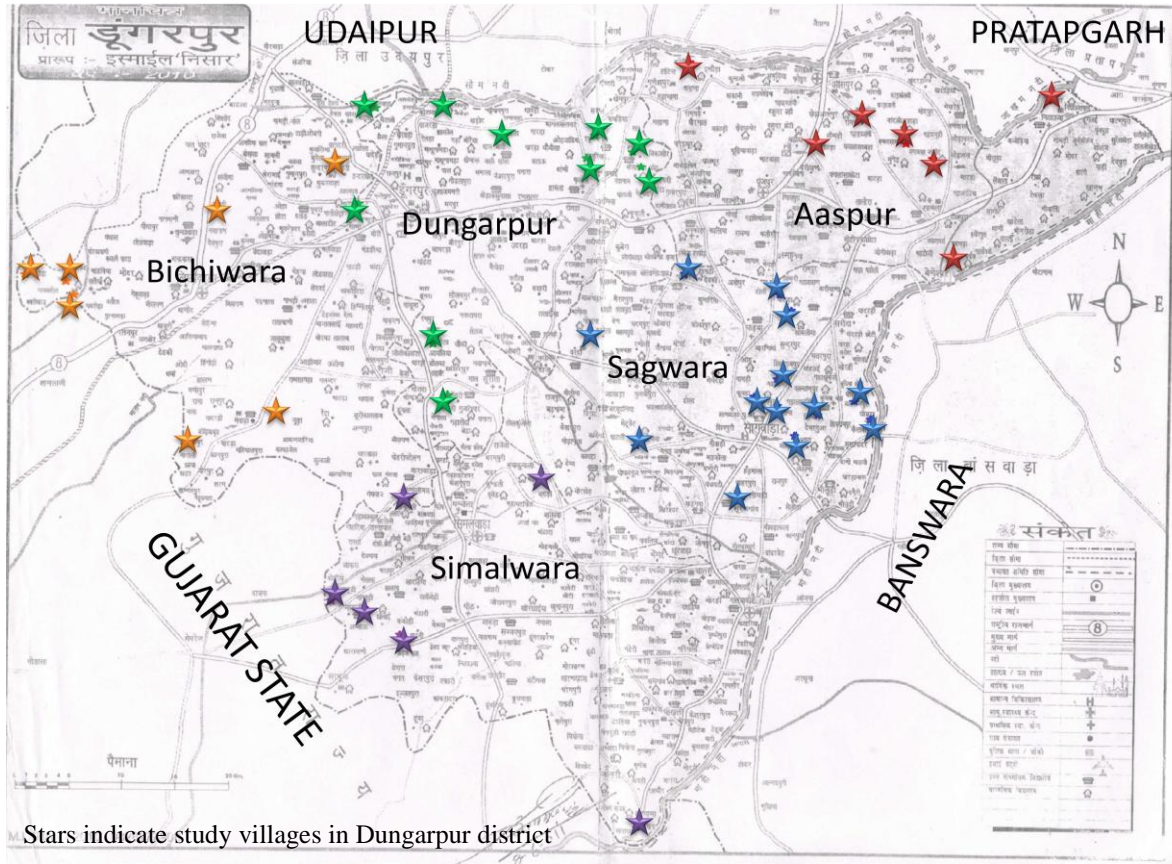
<sup>24</sup> ‘A sub-centre is the rural peripheral and first contact point in a primary healthcare system and is established for every 5,000 population in plain areas and for every 3,000 population in the hilly/tribal/desert areas’. DIRECTORATE GENERAL OF HEALTH SERVICES MINISTRY OF HEALTH & FAMILY WELFARE; GOVERNMENT OF INDIA 2006. Indian Public Health Standards (IPHS) for sub-centres.

(table 3.3). Consequently to meet the required number (44 clusters), more villages had to be selected from the adjacent blocks (a list of the selected villages is provided in appendix 3.1). These 44 clusters/ villages from which the sample was obtained constituted 13.8% of the 318 sub-centre villages and 5% of the total 872 revenue villages in the district. The surveyed villages were spread throughout the district (as shown in figure 3.3) and their distances from the district headquarter ranged from 15 to 65 Kms. The villages were selected by generating a random list for each block using Stata; version 11 (StataCorp. Tx, 2009).

**Table 3.3: Total sub-centre villages per block and number of randomly selected sample villages**

Name of administrative blocks	Total number of sub-centre villages (Census 2001)	Villages planned to be sampled per block	Actual number of villages sampled per block
Aaspur	57	8	8
Bacchiwada	68	9	8
Sagwada	71	9	13
Simalwara	70	11	6
Dungarpur	52	7	9

All households having an infant in the age group of 1 to <12 months were identified from the records of the local village nurses in each of these randomly selected 44 villages and were invited to participate in the study. A total of 615 households were approached and the response rate was 89.6%. The main reason for non-response was non availability of the infant and the mother in the village. There were three refusals. A total of 1,102 participants in 551 households (551 pairs of mother and infant) were finally included in the cross-sectional survey.



**Figure 3.3: Distribution of the randomly selected villages in the study district**

### 3.4.6: Study variables and tools

The study variables and tools for the cross-sectional study were guided by the theoretical conceptual framework (chapter 2, figure 2.3). The aim of the cross-sectional study was to measure the effect of households' participation in MGNREGA on infant malnutrition.

#### 3.4.6.1: Outcome variables

There are several anthropometric indicators used to measure infant growth and nutrition. Anthropometry is considered to be *'a simple tool for assessing nutritional status in individuals and communities and offers the advantages of objectivity and relatively low*

*technology*' (page 1-2, Duggan, 2010). The WHO's Child Growth Standards recommend about 13 anthropometric indicators to measure the nutritional status of children (World Health Organisation, 2011). Despite the disadvantage of lack of specificity of the anthropometric tools in general, wasting, stunting and underweight are traditionally accepted as the most reliable, valid and sensitive measures of infant and child nutrition (De Onis, 2000). These comprehensive indicators of nutrition were used as outcome variables in this study. A joint statement by WHO and UNICEF recommends mid upper-arm circumference (MUAC)-for-age along with weight-for-height and oedema as a measure of severe acute malnutrition for children between 6 and 60 months (World Health Organisation and Unicef, 2009). The WHO Child Growth Standards tool for MUAC-for-age provides reference standards of z-scores and percentile charts for children between 3 and 60 months (World Health Organisation, 2007). The age range of infants for this cross-sectional study was 1 month to <12 months so the MUAC-for-age measure was not suitable.

#### *3.4.6.2: Anthropometric measurements*

Weight and recumbent length of infants were measured by the author with the help of three trained female nurses (field assistants). Weight was measured using an electronic digital infant weighing scale (Seca 384, seca deutschland, Hamburg, Deutschland) and recumbent length was measured using a portable infantometer (Seca 417, seca deutschland, Hamburg, Deutschland). The methods for measuring weight and recumbent length of infants were based on the standard guidelines provided in the manual of WHO Multi-centre Growth Reference Study (de Onis et al., 2004). Details of the procedures of the anthropometric measurement are provided in appendix 3.2.

### *3.4.6.3: Independent variables*

#### Tools and methods of data collection

A paper-based questionnaire was developed to collect information from the mothers/caregivers about the various factors that could influence infant nutrition based on the conceptual framework (chapter 2, fig 2.3). A summary of the variables, indicators and tools used to measure the variables, and instruments used to develop the questionnaire for the study is provided in appendix 3.3. In addition to the participant questionnaire, a community questionnaire was used to elicit information about the villages (clusters) selected for the study. The objective was to ascertain whether the randomly selected villages were comparable in terms of their geography and demography, access to basic services and amenities (example: police station, educational institutions, bank, post office, health and nutrition centres, healthcare providers, market, electricity, irrigation system etc.), implementation of the different health, social and nutrition programmes and the status of MGNREGA's implementation. These are important community level characteristics that could influence the measured effect of households' participation in MGNREGA on infant malnutrition. Both questionnaires were translated to Hindi (local spoken language) and back-translated to check the construct of the questionnaires. The English and Hindi versions of the questionnaires are provided in appendix 3.4.

The participant questionnaire was administered verbally to the mothers of infants one-to-one by the author and the three trained field assistants (graduate female nurses). The village nurse (ANM) was requested to complete the community questionnaire. The interviews and the anthropometric measurements were carried out in the village health centres and the nutrition centres (Anganwadi centres under the Integrated Child Development Services

Scheme). Before commencing the study, the field assistants were trained to administer the questionnaire to the mother and to record the anthropometric measurements of the infants. A pilot study was conducted in 20 households (20 mothers and 20 infants) in a village in the Dungarpur block of the district.

During the pilot phase it was found that two out of the three instruments used to measure household food security were not useful for the study population. The participants were unable to respond to several questions of the Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007) and the Months of Adequate Household Food Provisioning (MAHFP) (Bilinsky and Swindale, 2010) (Questions 629: A-I, 632 and 633 of the participant questionnaire provided in appendix 3.4). They found it difficult to recall the details about access to food in the past one month and availability of food in the household in the past 12 months. In addition, the ‘General Health Questionnaire-12’ incorporated in the participant questionnaire to assess the mental health status of the mothers was not found to be useful. During the pilot study it was observed that a majority of the women were not able to understand the questions. Despite the fact that the ‘General Health Questionnaire-12’ has been translated into a number of Indian languages and validated, the tool was not found to be useful for this study population. These sections were thus removed from the participant questionnaire before the start of the survey. Moreover, the collection of data on hand-washing (as a variable to measure cleanliness and hygiene) was discontinued after about 200 interviews. Almost all participants reported hand-washing with soap before feeding their child, but neither water nor soap was available in the washing area in the 20% of the randomly checked participant-households. Thus, the self-reported data could not be relied

upon. The time required per participant for administering the questionnaire was between 20 and 30 minutes.

#### Data entry

Information from the 551 completed questionnaires were entered in an excel data-sheet. Double data entry was done for 113 forms (20.5 % of the questionnaires). Number of fields re-entered were 38,194 (338 Columns X 113 Rows) and number of keying errors found were 24 (24 error fields), which gave an error rate of 6.3 per 10,000 fields. Although, there is no consensus on an acceptable cut-off for error rates (Day et al., 1998), a rate of 10 or less per 10,000 is considered acceptable by some (Neaton et al., 1990).

#### Definition and construct of the independent variable

The data collected were used to construct the independent variables using standard definitions and guidelines as described below. The variables were grouped as demographic variables and proximal/ biological, intermediate/ socio-cultural, intermediate/ behavioural and distal/ structural determinants according to the conceptual framework of the study (chapter 2, figure 2.3).

#### **Demographic factors**

***Low birth-weight:*** Reported birth weight (verified using records from village nurses and community health and nutrition workers where available) was categorised as <2,500 grams and  $\geq$  2,500 grams according to the definition of low birth-weight given by WHO, which is ‘weight at birth of less than 2500 grams (5.5 pounds)’ (World Health Organization).

***Birth-order:*** The ordinal variable birth order was calculated based on the number of children born alive prior to the index child<sup>25</sup> and was categorised as first born, second born, third born and 4+ live births. This did not include still birth and abortions.

***Pregnancy desired:*** Mothers were asked whether they desired to have the index child and the binary variable was constructed based on their answer (yes or no).

***Presently pregnant:*** Mothers were asked whether they were pregnant at the time of the survey and the data was used to construct this variable.

In addition child's and mother's age were noted from the records of the village auxiliary nurse and mid-wife, the gender of the infant was noted and all participants were asked about the religion that the members of the household primarily followed.

### **Proximal determinants/ biological factors**

***Diarrhoea:*** Diarrhoea was defined as '*three or more loose stools or any number of loose stools with blood in a twenty-four hour period*' (page 1061, Baqui et al., 1991). It is suggested that this definition while being clinically and operationally suitable, fits well with the perspective of mothers (Baqui et al., 1991). Further, each new episode of diarrhoea was defined as three intervening diarrhoea free days from the previous episode (Baqui et al., 1991). Survey instrument based on the Demographic and Health Surveys (DHS) (Bose et al., 2007), District Level Household & Facility Survey-III (DLHS-III) (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences) were used to elicit history of diarrhoeal episodes of infants from their mothers.

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<sup>25</sup> The infant participating in the study

***Upper respiratory tract infection:*** This was defined on the basis of elicited history from mothers on the presence of the following symptoms – cough and fever with or without rapid breathing (more than usual). This is in accordance with the definitions used in the national demographic and health surveys (DLHS and NFHS). Survey instrument was based on the DHS (Bose et al., 2007), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences) instruments.

***Adequate vaccination (age specific):*** Considering the difficulty in interpreting and communicating the signs and symptoms about measles, diphtheria, whooping cough etc. to mothers, self-reported history on these vaccine preventable diseases were not collected. Instead the variable ‘adequate vaccination’ was used as a proxy. Vaccination history of the infants was matched with their age. Using the age specific guidelines of the Universal Immunisation Programme schedule of India, the infants were then classified as having received adequate or inadequate (age specific) vaccination.

### **Intermediate determinants/ behavioural factors**

***Early initiation of breast feeding:*** This was defined as ‘*proportion of children born in the last 24 months who were put to the breast within one hour of birth*’ (World Health Organisation, 2010a). The questions and construct of the variable was based on the WHO’s indicators for assessing infant and young child feeding practices (World Health Organisation, 2010a).

***Adequate infant feeding practices:*** This was a composite variable of two indicators from the WHO guidelines for assessing infant and young child feeding practices (World Health Organisation, 2010a):

- Infants under 6 months - Exclusive breastfeeding defined as *'proportion of infants 0–5 months of age who are fed exclusively with breast milk.'*
- Infants  $\geq$  6 months - Minimum acceptable diet defined as *'proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk).'*

It includes information on minimum meal frequency and minimum dietary diversity.

***Cleanliness of water and food:*** This was measured using two indicators – 'boiled water given to infants' and 'proper disposal of infant faeces'. Mothers were asked about the type of water given to infants and about the methods used to dispose infant stool. Based on the criteria for adequate method of faeces disposal provided by the WHO's core questions on drinking-water and sanitation for household surveys (World Health Organisation and Unicef, 2006), the data was classified as adequate and inadequate.

***Infant care:*** This determinant was assessed using three indicators – 'duration of care by other carers', 'adequate feeding during diarrhoea' and 'Oral Rehydration Salt given to infants during diarrhoea'. Information was sought about the total hours that the infant was cared for by someone other than the mother in the week prior to the survey and this continuous variable was categorised into 'none', ' $\leq$  20 hours per week' and '> 20 hours per week'. The cut-off was based on the mean duration of care provided by the other carers which was calculated to be 19.5 (Standard Error (SE) 0.63) hours per week in the sampled households. Infant feeding during episodes of diarrhoea was classified as adequate and

inadequate based on a score generated using the DLHS tool (International Institute for Population Sciences). Mothers were also asked if Oral Rehydration Salt was given to the infants during diarrhoea and the data was used to construct the binary variable.

***Health seeking behaviour:*** As discussed in chapter 2, this factor was assessed using four variables – first two are related to health seeking for infants and the others to maternal health seeking behaviour.

- Treatment for diarrhoea/ respiratory tract infection: The infants were considered to have received adequate healthcare if they were taken to a doctor/ public or private hospital/ village nurse. This was from the self-reported history of mothers regarding seeking treatment and the type of facilities from which treatment was sought.
- Households where at least one sibling died: The mothers were asked about the total number of children that were born alive and if any child had died. A binary variable was constructed using this data.
- Mother had antenatal checkups: Mothers were asked whether they received any antenatal checkups during their pregnancy with the index child and the data was used to construct the binary variable.
- Institutional delivery: Place of delivery was enquired and classified as institutional (if delivered in a public or private healthcare facility) or home delivery.

***Social status of mothers:*** This factor was assessed using the DHS tool (Bose et al., 2007) for measuring women's empowerment. Three categorical variables, each assessing the role of women in different types of household decision making were created – 'mothers participating in household decision making', 'decision on spending mother's earning' and

‘decision on spending husband's earning’. In addition, mothers were asked if they owned any property to generate a binary variable - ‘mothers owning any property’.

### **Intermediate determinants/ socio-cultural factors**

**Caste:** Based on the social class system in India the households were divided into two groups – Schedule Caste and/ or Schedule Tribe and other social class. The historically marginalised (Chitnis, 1997) and geographically isolated social groups (Galanter, 1984) as described in chapter 1 were grouped as Schedule Caste and/ or Schedule Tribe. The other social groups (Non-Schedule Caste/ Schedule Tribe) were those that did not belong to either of these groups and were presumably better off in their social status.

### **Distal determinants/ structural factors**

This group comprised a total of 11 variables:

***Access to safe drinking water and proper sanitation:*** Sources of drinking water and sanitation/ toilet facilities were categorised as adequate/ proper and inadequate/ improper based on the WHO’s Core questions on drinking-water and sanitation for household surveys (World Health Organisation and Unicef, 2006).

***Crowding / household density:*** Information was collected on the number of members physically living in the household and the total number of rooms in the house. A continuous variable was generated by dividing the total number of household members with the total number of rooms in each household.

***Socioeconomic status:*** The DHS tool (Bose et al., 2007) was used to elicit information about the household amenities and assets including landownership and domestic animals.

These were then weighted using the factor loadings from a principal component analysis of the asset variables. The calculated scores of each asset variable were added to generate an asset index. The continuous variable (asset index) was then divided into quintiles. The lowest two quintiles were combined to construct four categories of the socioeconomic status variable. This method was based on the suggestions by the World Bank for calculating asset and wealth indices (Vyas and Kumaranayake, 2006).

***Mothers' and fathers' level of education:*** Based on the reported history from the mother/caregiver, the education levels of mothers and fathers of infants were divided into – illiterate corresponding to no formal education, primary education if they completed primary school and secondary or higher education. Some participants were taught to sign their names, but did not know how to read or write, such participants were categorised as illiterate.

***Mother employed / worked to earn money after delivery:*** Information was elicited with regards to whether the mothers (study participants) worked to earn money after delivery and were classified as ‘not worked’, ‘worked in MGNREGA’ and ‘employed in other jobs’. If a mother worked in the family’s farm without pay, she was not considered as employed.

***Primary occupation of household:*** This was elicited by enquiring about the profession of each adult member of the household. If any member had a regular job<sup>26</sup>, the household was included under ‘regular employment’ and if all members were engaged in seasonal employment (agriculture/ agricultural labour), the household was included under ‘seasonal employment’.

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<sup>26</sup> Regular job here refers to salaried job and not an ad-hoc or seasonal employment

***Received food through the Public Distribution System:*** This variable was constructed based on the answer from the participants with regards to whether the household received food from the Public Distribution System. Public Distribution System is a means to supply food grains to the poor households at a subsidised price in India (Planning Commission; Government of India, 2002).

***Below poverty line households:*** The households were classified as below the poverty line based on the availability of the below poverty line status card for the household. The Planning Commission of India defines 'Below Poverty Line' households as households (average 5 family members) with per capita consumption expenditure of INR 672.8 on a monthly basis in rural areas and INR 859.6 in urban areas at prices prevailing in 2009-10 (Planning Commission; Government of India, 2012).

***Household food security:*** The three FANTA.2 (Food And Nutrition Technical Assistance.2) scales - Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007), Household Dietary Diversity Score (HDDS) (Swindale and Bilinsky, 2006) and Months of Adequate Household Food Provisioning (MAHFP) (Bilinsky and Swindale, 2010) were incorporated in the original study questionnaire. However, only the Household Dietary Diversity Score was retained after the pilot study due to the problems described earlier. Although, no published studies were found on the reliability and validity of the Household Dietary Diversity Score in the context of India, the tool has been validated in other low and middle income countries such as Costa Rica (González et al., 2008) and Nepal (UCL Centre for International Health and Development (CIHD)). Further, a study which validated the proxy indicators of food insecurity (such as the World Food Programme's Food Consumption Scores) and the Household Dietary Diversity Score (of the Food And Nutrition Technical

Assistance) against the gold standard of individual and household calorie intake in three countries (Sri Lanka, Burundi and Haiti) found the latter to be a better indicator of food security (Wiesmann et al.). Thus, the variable household food security in this study was a continuous variable generated from the Household Dietary Diversity Score.

### 3.5: Ethics approval

Ethics approvals for the study were obtained from the Directorate of Medical, Health and Family Welfare Services, Government of Rajasthan, Jaipur and the University of Oxford Tropical Research Ethics Committee (OXTREC); OXTREC Reference: 43-11. Participant information sheet and consent form in local languages were used to elicit written informed consent from all participants before implementing the survey questionnaire (English and Hindi versions are included in appendix 3.5). For participants who were unable to read, the interviewer read out the participant information sheet and consent form printed in the local language. It was ascertained by the interviewer that the participant has understood all risks and benefits associated with the study, that the participation is purely voluntary and that she can refrain from answering any question or withdraw from the study at any point. Thumb impression on the consent form was taken for such participants who after being thoroughly explained by the interviewer agreed to participate in the study. To measure the weight and recumbent length of the infants, written informed consent was taken from the mothers on a separate form. These processes for obtaining informed consent were followed for the pilot study as well. Moreover, strict confidentiality of all information was maintained and data were stored in password protected files. A unique identification code was assigned to each participant and all participant identification data were de-linked from the file before conducting analysis.

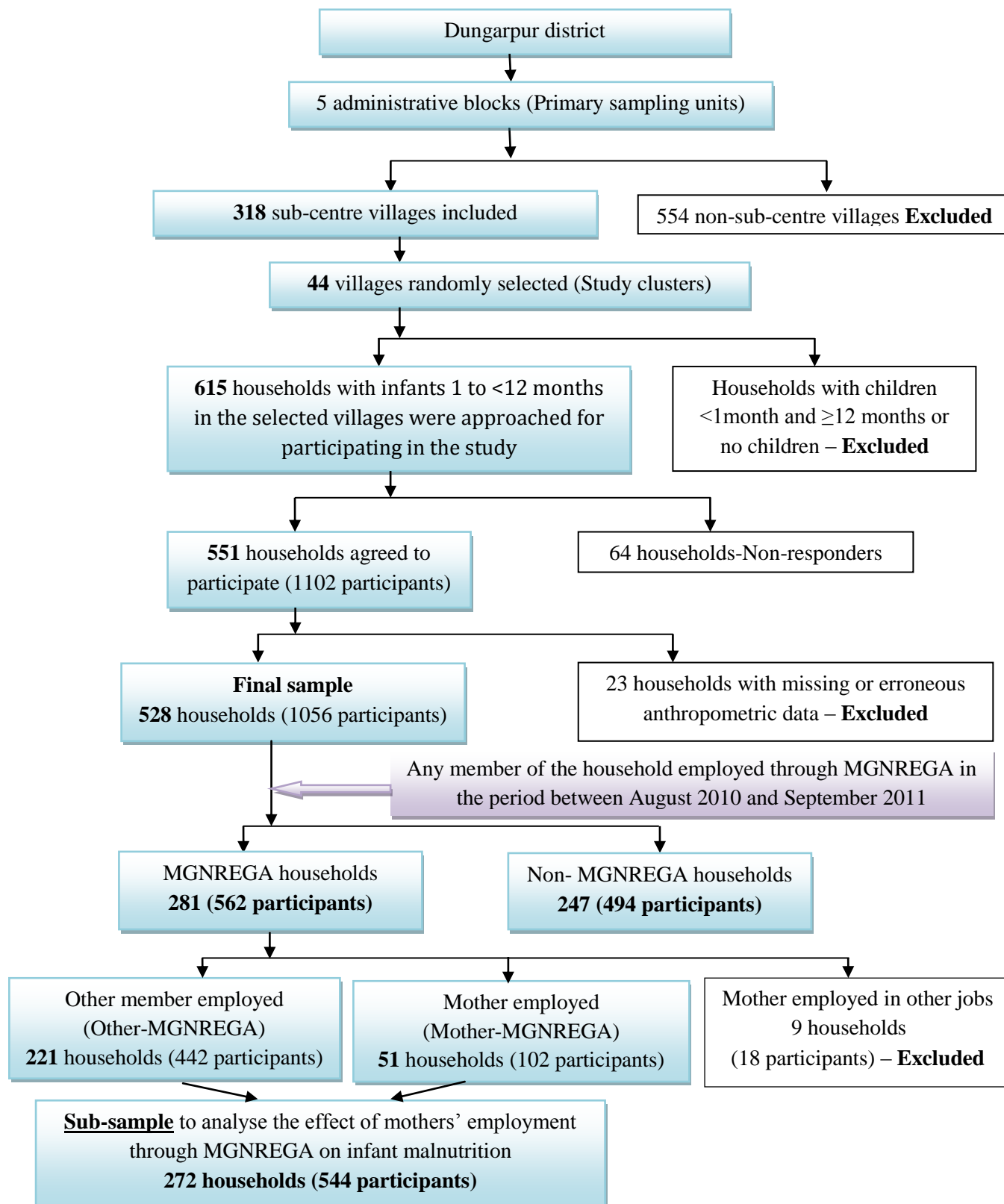
### 3.6: Final sample for the study

Data were collected from 1,102 participants in 551 households (551 pairs of mother and infant). Data of nine households were removed because either one of the anthropometric measurements of the infant was missing or the measurements were erroneous. Another 14 households where the z-scores of anthropometric measurements of infants were flagged as outliers during statistical analysis ( $<-5$  or  $>5$  Standard Deviation for weight-for-length;  $<-6$  or  $>6$  Standard Deviation for length-for-age and weight-for-age) (de Onis et al., 2004) were removed, thus arriving at the final sample of 528 households and 1056 participants. The proportion of MGNREGA participation in the 23 households removed from the dataset was similar to that in the final sample. In the 23 households removed, 12 (52.2%) were employed through MGNREGA which was similar to the proportion of households participating in MGNREGA in the final study sample, 53.2% (281 MGNREGA participating households).

The 281 MGNREGA households were further sub-divided into mother employed<sup>27</sup> (mother-MGNREGA) and other family member employed (other-MGNREGA) households to estimate the effects of mothers' employment through MGNREGA on infant malnutrition. From the 281 MGNREGA households, nine households where the mothers were employed in other regular jobs were removed, thus arriving at the sub-sample of 272 households. The exposure of interest was households where the mothers of infants were employed through MGNREGA (n=51) compared with households where any other member was employed (n=221). A schematic diagram of the study sample is provided in figure 3.4.

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<sup>27</sup> The households, where mother of the infant was employed, were included in the mother-MGNREGA group if the number of days of mother's employment was  $>50\%$  of the total MGNREGA employment days for the household, otherwise grouped as other-MGNREGA household.



**Figure 3.4: Schematic presentation of the study sample**

### 3.7: Statistical analyses

Using the anthropometric data of infants (weight and recumbent length), z-scores of weight-for-age, length-for-age and weight-for-length were calculated using the WHO 2007 STATA macro package. Using a cut-off of less than minus two standard deviation ( $<-2SD$ ) compared with the standard WHO's Multi-centre Growth Reference Study population (World Health Organization, 2006), the infants were categorised as underweight (low weight-for-age), wasted (low weight-for-length) and stunted (low length-for-age).

Descriptive analyses of all variables were conducted followed by comparison of the prevalence of the determinants of infant malnutrition in the MGNREGA and non-MGNREGA households. Tests of statistical significance were conducted using student's t-test and ANOVA for continuous variables and chi-square tests for categorical variables. Univariable logistic regression analyses were done for each of the three binary anthropometric outcomes – underweight, wasting and stunting to estimate the crude odds ratios of association between these outcome variables and the independent variables. Since participation in MGNREGA was not randomised, an exploratory multivariable logistic regression analysis was done to identify the factors that influenced households' participation in MGNREGA. These identified factors along with other known confounders were then controlled for using multivariable logistic regression analyses to estimate the effects of households' and mothers' participation in MGNREGA on the anthropometric indicators of malnutrition. Tests for interaction were done to identify the factors that could modify the effect of MGNREGA on the anthropometric indicators of infant malnutrition. To account for data dependency and within-cluster correlations, robust standard errors (Huber-White sandwich estimator) were reported. A detailed account of the steps involved in building the

multivariable logistic regression models is provided later in the chapter. All statistical associations were considered to be significant at a two-tailed p-value of less than 0.05. All statistical analyses were performed using Stata; version 11 (StataCorp. Tx, 2009).

### 3.8: Description of the study clusters

The sampled households belonged to 44 clusters or villages selected randomly in the five administrative blocks of Dungarpur district. The predominant social class group in the 44 villages was the Schedule Tribe (70.4%) followed by the other backward classes<sup>28</sup> (14.8%), the proportions of Schedule Caste and other social classes were 7.4% each. Agriculture was the primary occupation of the people in the 44 villages. The sampled villages were comparable in terms of their access to health facilities. In 40 out of 44 villages the sub-centre was located in the village and in the remaining four it was situated at a distance of less than one kilometre, and was accessible in less than one hour. The sub-centres had either one or two Auxiliary Nurse and Midwife (ANM) and in most of them (39 of 44 villages) at least one ANM was available in the village for more than five days a week. All villages had an Anganwadi centre of the Integrated Child Development Services Scheme (ICDS) and at least one community nutrition worker (Anganwadi worker) was available in the centre for more than five days a week. All villages also had a community health worker (Accredited Social Health Activist or ASHA). The access to other amenities such as market, post office, bank, police station etc. was variable and is described in table A.3.6 included in appendix 3.6. Although only half of the sampled villages had a government secondary school, almost

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<sup>28</sup> 'Other Backward Classes' is a group within the Indian social class system. Those communities which are not classified as Schedule Caste or Schedule Tribe, but are comparatively less well-off economically, socially and educationally than the most advanced groups in the society are included in this social group, but there have been fundamental disagreements with regards to who these communities are GALANTER, M. 1978. Who Are the Other Backward Classes?: An Introduction to a Constitutional Puzzle. *Economic and Political Weekly*, 13, 1812-1828.

all villages had a government primary school. MGNREGA was implemented in 36 villages since 2006 and in the remaining eight since 2007. The implementation status of other programmes such as housing, water and sanitation and social assistance programmes were also comparable (table A.3.6). The centres of the Public Distribution System (programme for providing subsidised food grains) were located in 34 of the 44 villages and the remaining 10 villages were linked to centres in nearby villages.

### 3.9: Description of the study population

#### 3.9.1: Prevalence of the anthropometric indicators of malnutrition

The mean (robust standard error) z-scores for weight-for-age, length-for-age and weight-for-length were -1.93 (0.08), -1.17 (0.08) and -1.58 (0.08) respectively. Shapiro-Wilk W test for normality suggested that weight-for-age and length-for-age were normally distributed, but not weight-for-length (shown in figures 3.5, 3.6 and 3.7). Based on a cut-off of less than minus 2 standard deviation ( $<-2SD$ ) for z-scores of weight-for-age, length-for-age and weight-for-length compared against the standard WHO's Multi-centre Growth Reference Study population, the prevalence of underweight (low weight-for-age), stunting (low length-for-age) and wasting (low weight-for-length) among infants in the study population was found to be 50.4%, 24.4% and 39%, respectively. About 17.6% of the infants were in the category of severe underweight (weight-for-age  $<-3SD$ ), 7.4% severely stunted (length-for-age  $<-3SD$ ) and 14.6% severely wasted (weight-for-length  $<-3SD$ ).

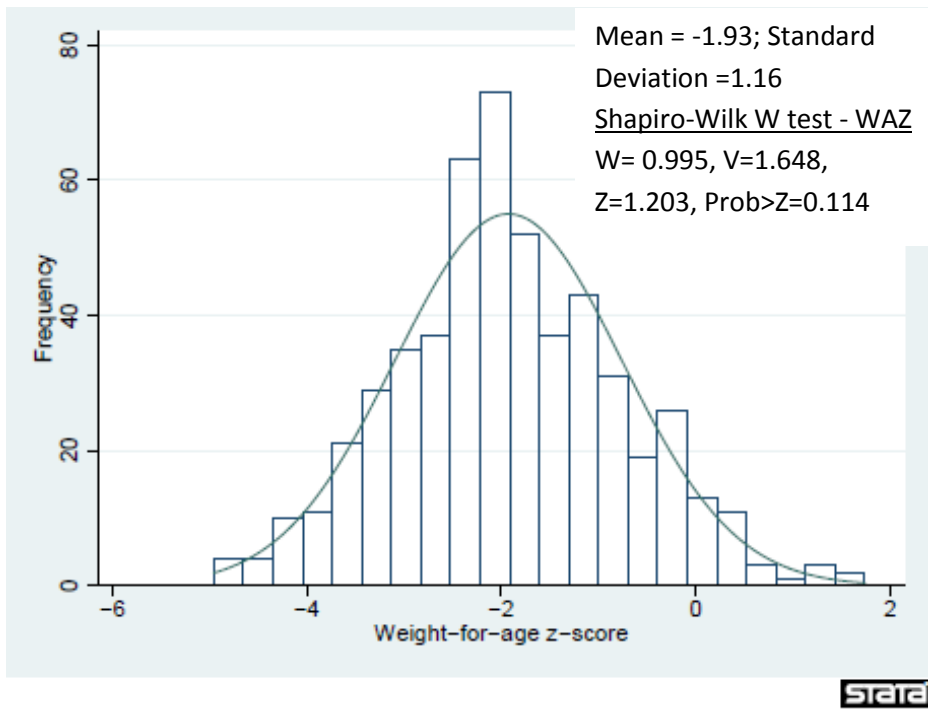


Figure 3.5: Distribution of z-scores for weight-for-age in the study population

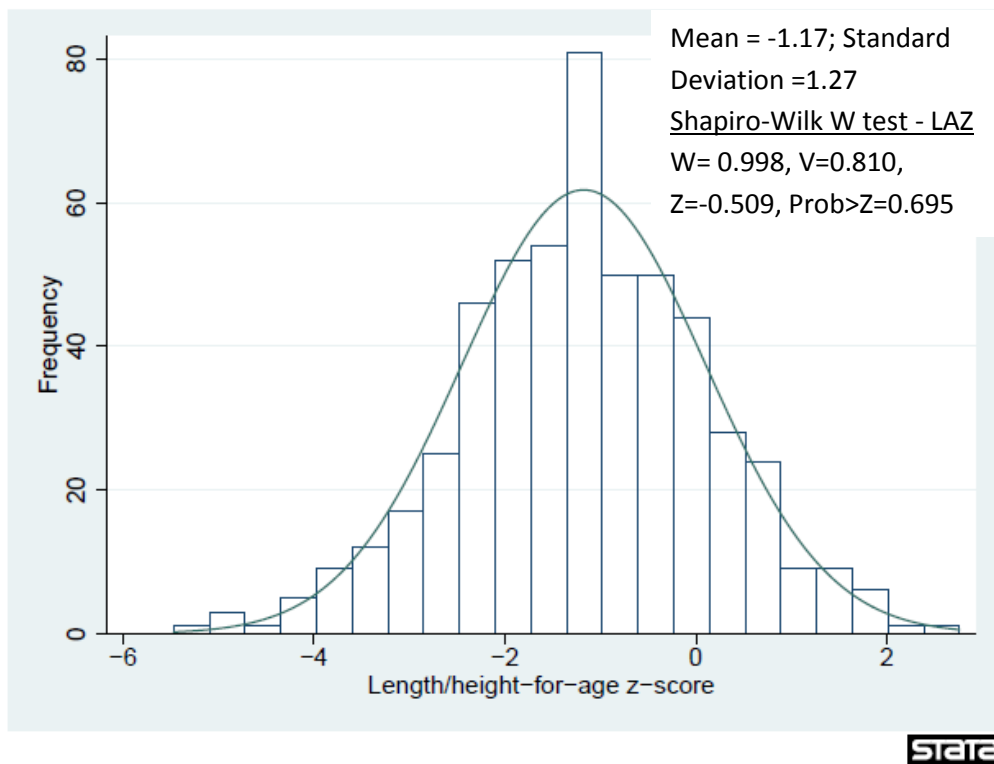
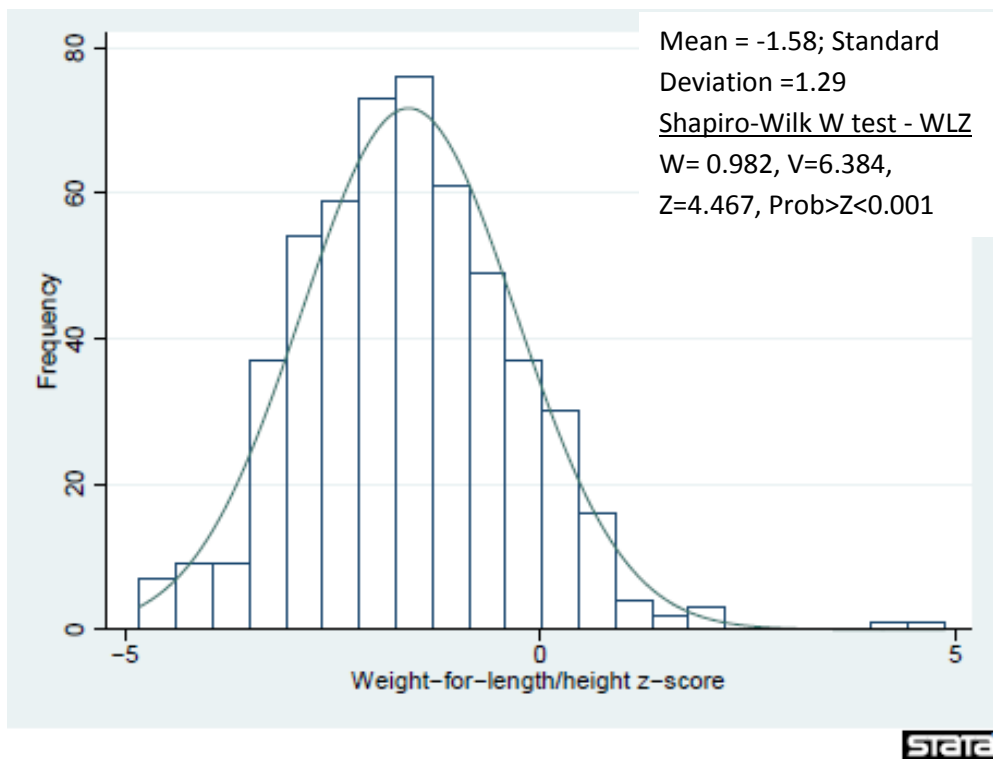


Figure 3.6: Distribution of z-scores for length-for-age in the study population



**Figure 3.7: Distribution of z-scores for weight-for-length in the study population**

### 3.9.2: Prevalence of the determinants of infant malnutrition

Prevalence of the proximal (biological), intermediate (behavioural & socio-cultural) and distal (structural) determinants of infant malnutrition in the study population and their demographic characteristics are presented in table 3.4 and are described below.

**Table 3.4: Description of the study population**

Characteristics (N= 528 households*)	Number of households	% (95% Confidence Interval)
<b>Wage-for-employment policy: MGNREGA<sup>f</sup></b>		
Employed through MGNREGA <sup>f</sup>	281	53.2 (48.9 - 57.5)
<b>Outcome – Infant malnutrition</b>		
Households with underweight infants	266	50.4 (46 - 54.7)
Households with infants categorised as wasted	206	39 (34.8 - 43.3)
Households with infants categorised as stunted	129	24.4 (20.8 - 28.3)
<b>Proximal determinants/ biological factors</b>		
Infant having diarrhoea	79	15 (12 - 18.3)

<b>Characteristics (N= 528 households*)</b>	<b>Number of households</b>	<b>% (95% Confidence Interval)</b>
Infant having Upper Respiratory Tract Infection	49	9.3 (6.9 - 12.1)
Infant with adequate vaccination (age specific vaccination)	207	39.2 (35 - 43.5)
<b>Intermediate determinants/ behavioural factors</b>		
Adequate infant feeding	122	23.1 (19.6 - 26.9)
<b>Infant feeding practices</b>		
Continued breast feeding	523	99.1 (97.8 - 99.7)
Early initiation of breast feeding	414	78.4 (74.7 - 81.8)
Exclusive breastfeeding under 6 months [n=230]	118	51.3 (44.6 - 57.9)
Timely Introduction of solid, semi-solid foods ( $\geq 6$ months) [n=298]	19	6.4 (3.9 - 9.8)
<b>Adequacy of nutrient intake (<math>\geq 6</math>months) [n=298]</b>		
Minimum dietary diversity	9	3 (1.4 - 5.7)
Minimum meal frequency	22	7.4 (4.7 - 10.9)
Minimum acceptable diet	4	1.3 (0.4 - 3.4)
Total infants given water	380	72 (67.9 - 75.8)
<b>Cleanliness of water and food</b>		
Boiled water given to infants [Households infants given water, n=380]	7	1.8 (0.7 - 3.8)
Proper disposal of infant faeces	23	4.4 (2.8 - 6.5)
<b>Health seeking for infants</b>		
Treatment for diarrhoea/ respiratory infections [n=119]	84	70.6 (61.5 - 78.6)
At least one sibling died	38	7.2 (5.1 - 9.7)
Institutional delivery	427	80.9 (77.3 - 84.1)
<b>Infant care</b>		
Cared by someone other than the mother	286	54.2 (49.8 - 58.5)
<b>Other caregiver</b>		
Grandparents	199	69.6 (63.9 - 74.9)
Father	31	10.8 (7.5 - 15.0)
Elder daughter	31	10.8 (7.5 - 15.0)
Elder son	6	2.1 (0.8 - 4.5)
Other family member	7	2.5 (1.1 - 5.0)
Someone from outside the family	4	1.4 (0.4 - 3.5)
Left alone	8	2.8 (1.2 - 5.4)
<b>Duration of care per week by other carers</b>		
None	242	45.8 (41.5 - 50.2)
$\leq 20$ hours	169	32.0 (28.0 - 36.2)
$>20$ hours	117	22.2 (18.7 - 25.9)

<b>Characteristics (N= 528 households*)</b>	<b>Number of households</b>	<b>% (95% Confidence Interval)</b>
Adequate feeding of infants during diarrhoea (households in which children had diarrhoea; n=79)	4	5.1 (1.4 - 12.5)
ORS <sup>†</sup> given ((households in which children had diarrhoea; n=79)	29	36.7 (26.1 - 48.3)
<b>Intermediate determinants/ socio-cultural factors</b>		
<b>Caste</b>		
Non Schedule Caste/ Schedule Tribe	120	22.7 (19.2 - 26.5)
Schedule Caste/ Schedule Tribe	408	77.3 (73.5 - 80.8)
<b>Child's gender</b>		
Male	283	53.6 (49.2 - 57.9)
Female	245	46.4 (42.1 - 50.8)
<b>Social status of mothers</b>		
Mothers participating in household decision making	14	2.7 (1.5 - 4.4)
Mothers who own household property	1	0.2 (0 - 1.1)
<b>Decision on spending mother's earning (households where mother of infant earns; n=76)</b>		
In-laws	36	47.4 (35.8 - 59.2)
Mother of infant	4	5.3 (1.5 - 12.9)
Husband	22	28.9 (19.1 - 40.5)
Jointly by mother of infant and her husband	14	18.4 (10.5 - 29.0)
<b>Decision on spending husband's earning (households where husband earns; n=525)</b>		
In-laws	247	47 (42.7 - 51.4)
Mother of infant	15	2.9 (1.6 - 4.7)
Husband	178	33.9 (29.9 - 38.1)
Jointly by mother of infant and her husband	85	16.2 (13.1 - 19.6)
<b>Distal determinants/ structural factors</b>		
<b>Safe drinking water</b>		
Safe source of drinking water	459	86.9 (83.8 - 89.7)
Drinking water purified	466	88.3 (85.2 - 90.9)
Adequate methods used to purify drinking water [n=466]	0	0
Proper sanitation	29	5.5 (3.7 - 7.8)
<b>Type of housing</b>		
Not concrete	434	82.2 (78.7 - 85.4)
Semi concrete	42	8 (5.8 - 10.6)
Concrete	52	9.8 (7.4 - 12.7)
<b>Primary occupation</b>		
Seasonal	424	80.3 (76.7 - 83.6)

<b>Characteristics (N= 528 households*)</b>	<b>Number of households</b>	<b>% (95% Confidence Interval)</b>
Regular	104	19.7 (16.4 - 23.3)
Below poverty line (BPL)	415	78.6 (74.9 - 82.0)
Received food from Public distribution system (PDS)	424	80.3 (76.7 - 83.6)
<b>Socioeconomic status (Asset index)</b>		
Lowest 2 quintiles	212	40.1 (35.9 - 44.5)
Third quintile	105	19.9 (16.6 - 23.6)
Fourth quintile	106	20.1 (16.7 - 23.8)
Fifth quintile	105	19.9 (16.6 - 23.6)
<b>Mothers' level of education</b>		
Illiterate	349	66.1 (61.9 - 70.1)
Primary education	141	26.7 (22.9 - 30.7)
Secondary and higher	38	7.2 (5.1 - 9.7)
<b>Fathers' level of education</b>		
Illiterate	182	34.5 (30.4 - 38.7)
Primary education	236	44.7 (40.4 - 49.1)
Secondary and higher	110	20.8 (17.4 - 24.6)
<b>Employment of mothers</b>		
Mother employed through MGNREGA in the past 12 months [MGNREGA households; n=281]	51	18.1 (13.8 - 23.2)
<b>Mother employed/ worked to earn money after delivery</b>		
Not worked	454	86.0 (82.7 - 88.8)
In MGNREGA	51	9.7 (7.3 - 12.5)
Other jobs	23	4.3 (2.8 - 6.5)
<b>Who motivated the mother to work? [n=74]</b>		
Self	72	97.3 (90.6 - 99.7)
Husband	1	1.4 (0.0 - 7.3)
In-laws	1	1.4 (0.0 - 7.3)
<b>Demographic characteristics</b>		
<b>Child's age</b>		
1 to < 6 months	230	43.6 (39.3 - 47.9)
≥ 6 to <12 months	298	56.4 (52.1 - 60.7)
<b>Mothers' age</b>		
≤ 20 years	38	7.2 (5.1 - 9.7)
21 - 25 years	266	50.4 (46.3 - 54.7)
26 - 30 years	172	32.6 (28.6 - 36.8)
>30 years	52	9.8 (7.4 - 12.7)
Low birth weight infants [birth-weight <2,500 grams; missing data = 121]	233	44.1 (39.8 - 48.5)
Pregnancy was desired	509	96.4 (94.4 - 97.8)

Characteristics (N= 528 households*)	Number of households	% (95% Confidence Interval)
Mother is presently pregnant	20	3.8 (2.3 - 5.8)
Birth order		
First	142	26.9 (23.2 - 30.9)
Second	166	31.4 (27.5 - 35.6)
Third	124	23.5 (19.9 - 27.3)
≥ four	96	18.2 (14.9 - 21.7)
Language		
Wagri	504	95.5 (93.3 - 97.1)
Hindi	9	1.7 (0.8 - 3.2)
Gujarati	11	2.1 (1.0 - 3.7)
Banjari	4	0.7 (0.2 - 1.9)
Religion (Hindu)	528	100 (99.3 - 1.0)**

\*Total number of households = 528 (unless specified along with the variable); †MGNREGA - Mahatma Gandhi National Rural Employment Guarantee Act; ‡ORS - Oral rehydration salt; \*\*one-sided 97.5% confidence interval

### *3.9.2.1: Proximal biological determinants*

The prevalence of diarrhoea among the infants in the sampled households was 15% and in only 9.3% of households the infants had a history of upper respiratory tract infection characterised by fever with cough in the two weeks preceding the survey. A very small proportion (1.9%) had severe respiratory tract infection (breathing difficulty along with fever and cough). In 39.2% of the sampled households, the infants received adequate vaccination for age.

### *3.9.2.2: Intermediate behavioural determinants*

In almost all households the infants were being breastfed. However early initiation of breastfeeding (i.e. infants put to breast within one hour of birth) was found in 78.4% of the households and in about half of the total households infants less than 6 months were found to be exclusively breastfed. In just 6.4% of the total households with infants ≥6 months, there was timely introduction of supplementary feeding. Adequate infant feeding was found

to be prevalent in 122 households which constituted 23.1% of the total study sample. Irrespective of their age, in 72% of the households infants were given water which was un-boiled. In relation to cleanliness and hygiene, proper disposal of infant faeces was found in only 4.4% of the households.

In more than half of the sampled households, the infants were cared for by someone else other than the mother on a regular basis in the four weeks preceding the survey. While the mean duration of care provided by the other carers was 19.5 (SE = 0.63) hours per week, in 22.2% of the sampled households the infant was taken care of by other caregivers for more than 20 hours per week. With regards to care provided to infants during illness, in only 36.7% of the households where the infants had diarrhoea, Oral Rehydration Salt was given and in still fewer (5.1%) households the infants were adequately fed during diarrhoea. The three surrogate indicators used to assess the health seeking behaviour of the population in the surveyed households showed that in 80.9% of the households the mothers had undergone institutional delivery, in 70.6% of the households treatment was sought for infants suffering from diarrhoea and/ or upper respiratory tract infection and in 7.2% of the households at least one sibling of the infant had died.

### *3.9.2.3: Intermediate socio-cultural determinants*

A majority of the households belonged to the Schedule Tribe social class. The Schedule Tribe and Schedule Caste groups together constituted 77.3% of the surveyed households. Slightly more than half of the infants were male. With regards to the role of mothers in household decision making, in only 2.7% of the sampled households, the mother reported participating in day to day household decision making. Even among the households where the mothers earned money, the decision to spend their earnings were mainly taken by their

in-laws (in 47.4% of the households) or by their husbands (in 28.9% of the households). Further, it was found that in just one of the 528 households surveyed, the mother owned any property.

#### *3.9.2.4: Distal structural determinants*

A majority of the surveyed households were engaged in seasonal employment, 40.1% belonged to the lowest two quintiles of the asset index and 19.9% belonged to the highest quintile. The mean dietary diversity score (indicator of household food security) for the households was 5.7 (SE = 0.10). While in a majority of the surveyed households, the mothers of infants were illiterate, the proportion of households with illiterate fathers was comparatively low. The proportion of households where parents had undergone secondary or higher education was low. A majority of the households (86.9%) had access to a safe source of drinking water and 88.3% used some method to purify the drinking water. However, the method used in all these households was sieving water through a cloth which is not considered to be appropriate (World Health Organisation and Unicef, 2006). Only 5.5% of the households had access to toilet facilities.

In 14% of the households, the mother worked to earn money, in 51 households (about 10% of total) mother was employed through MGNREGA and in the rest 23 (4%) she either worked as agricultural labourer or had other jobs (e.g. teacher, community health or nutrition worker).

#### *3.9.2.5: Demographic characteristics*

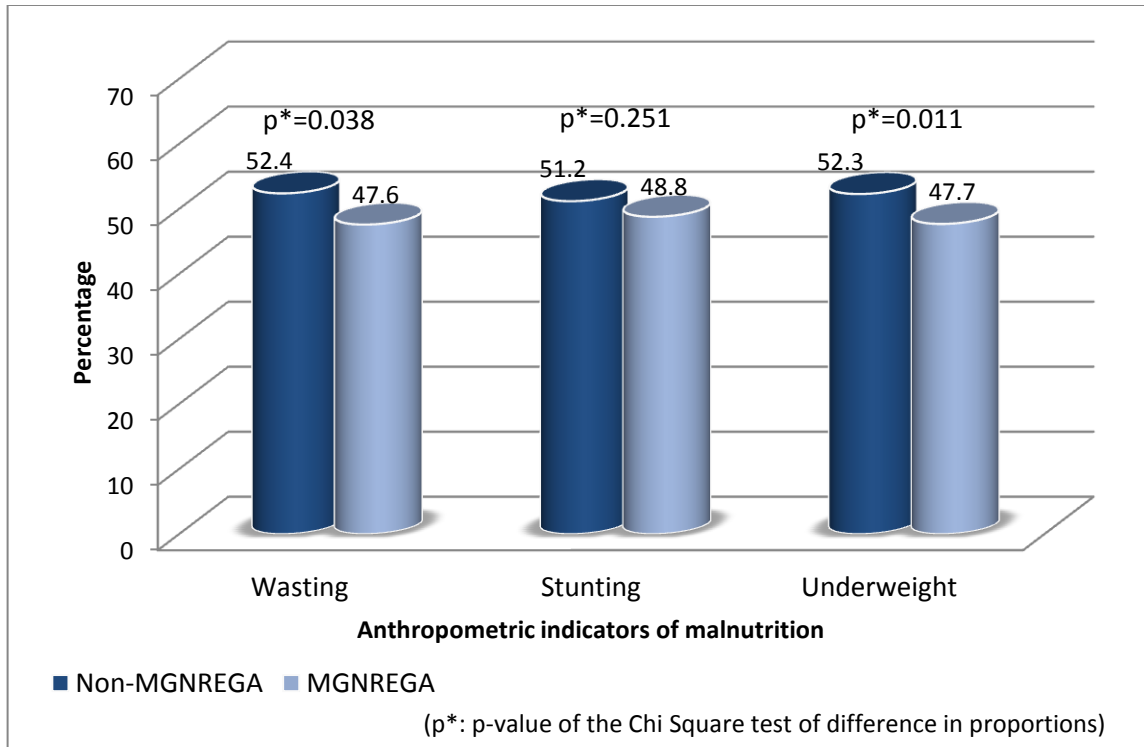
All households included in this study belonged to the Hindu religion and Wagri was the common language spoken. In 43.6% of the surveyed households the infant was less than 6

months of age. The mean birth weight of the infants was 2,644.5 (SE = 32) grams and in 44.1% of the households the infant was categorised as low birth-weight (<2,500 grams). The mean age of the mothers was 25.7 (SE = 0.23) years, such that half of the mothers belonged to the age group of 21-25 years. In 96.4% of the households, the mother desired to have the child and in about 3.5% of the households the mother was pregnant during the survey. The median live births in the surveyed households was two, but ranged from one to ten.

### 3.10: MGNREGA and its association with the determinants of infant malnutrition

The proportion of households that participated in MGNREGA was 53.2% (281 households) and in about 18% of the MGNREGA households the mothers of the infants were employed through the programme. For the entire sample of 528 households, the median years of participation in MGNREGA, implemented in 2006, was 4 years, and ranged from 0 to 6 years. Among the MGNREGA households, 73.7% participated in the programme continuously for more than 3 years with the remainder working intermittently. Among the non-MGNREGA households, 39.3% never participated in the programme, 35.6% worked intermittently and 25.1% worked continuously for more than 3 years prior to the period considered for this study (August 2010 to September 2011).

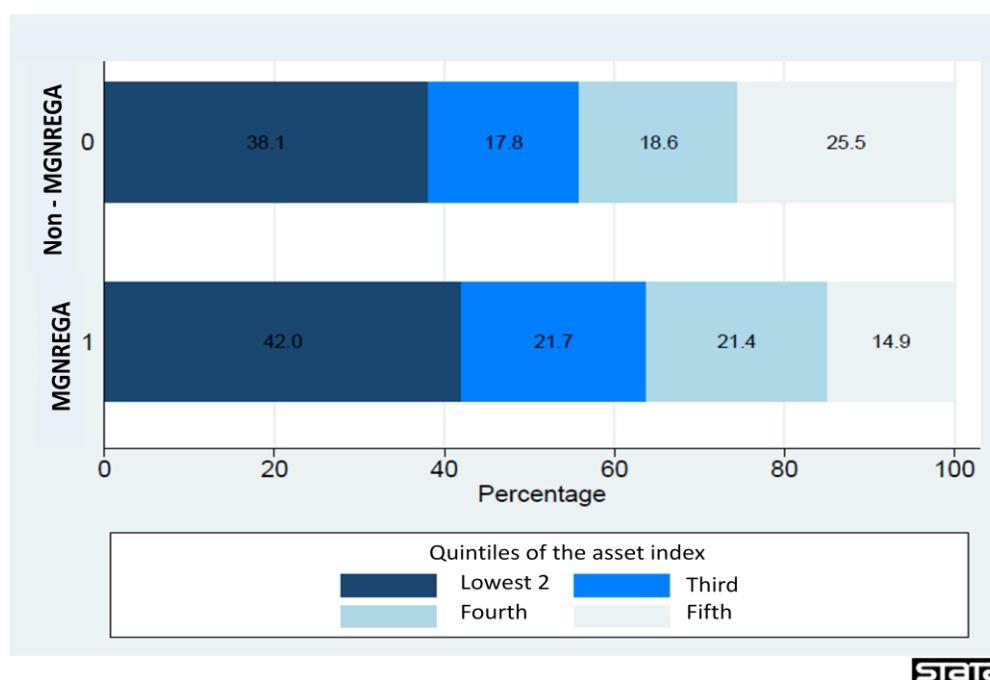
The prevalence of underweight and wasting among infants was found to be significantly lower in the MGNREGA participating households compared with the non-MGNREGA households, although the magnitude of difference was small (figure 3.8). There was no statistically significant difference found for stunting.



**Figure 3.8: Comparison of prevalence of wasting, stunting and underweight among infants in MGNREGA and non-MGNREGA households**

The prevalence of the proximal determinants (i.e. diarrhoea and upper respiratory infections) did not differ between the MGNREGA and non-MGNREGA households and except for the variable ‘duration of care by other carers’ the factors constituting the intermediate determinants of the conceptual framework did not statistically significantly differ between the two groups (table 3.5). Among the structural factors, more households employed through MGNREGA belonged to the lowest three quintiles of the asset index compared with the households not employed through MGNREGA (figure 3.9). Among those below the poverty line, 57.6% were MGNREGA households and among the households that received food through the Public Distribution System, 55.4% were MGNREGA households. More MGNREGA households were engaged in seasonal employment compared to non-MGNREGA households. Mean household density was higher in the MGNREGA

households (table–3.5). Among the total households that had access to proper sanitation, 34.5% were MGNREGA-households. None of the factors used to indicate the social status of mothers differed significantly between the MGNREGA and the non-MGNREGA households and among the demographic characteristics of the study population, only the mean age of the mothers was marginally higher in the non-MGNREGA households compared with the MGNREGA households (table 3.5).



**Figure 3.9: Comparison of socioeconomic status-MGNREGA & non-MGNREGA households**

Since participation in MGNREGA is through self-selection, a multivariable exploratory logistic regression model was used to determine the factors that influenced participation of the sampled households in MGNREGA. The results suggested that only households categorised as being below the poverty line were more likely to participate in the programme (OR= 1.98; 95% CI=1.22-3.19; p=0.006) and apart from this no other known

factor was found to be significantly associated with participation in MGNREGA (details are provided in appendix 3.7).

**Table 3.5: Prevalence of the determinants of malnutrition in MGNREGA and non-MGNREGA households**

Determinants of malnutrition	Frequency (%)		P-value (Chi square test)
	Non-MGNREGA <sup>f</sup>	MGNREGA <sup>f</sup>	
<b>Proximal Determinants/ biological factors</b>			
Diarrhoea	42 (53.2)	37 (46.8)	0.217
Upper respiratory tract infection (URTI)	24 (49)	25 (51)	0.746
Adequate vaccination (age specific)	101 (48.6)	107 (51.4)	0.509
<b>Intermediate determinants/ behavioural factors</b>			
Early initiation of breast feeding	193 (46.6)	221 (53.4)	0.887
Adequate infant feeding	56 (45.9)	66 (54.1)	0.824
<i>Cleanliness of water and food</i>			
Boiled water given to infants [Households infants given water, n=381]	4 (57.1)	3 (42.9)	0.580
Proper disposal of infant faeces	15 (65.2)	8 (34.8)	0.070
<i>Health seeking behaviour</i>			
Treatment for diarrhoea/ URTI [n=119]	43 (51.2)	41 (48.8)	0.981
Institutional delivery	196 (45.9)	231 (54.1)	0.405
Household at least one sibling died	16 (42.1)	22 (57.9)	0.549
<i>Infant care</i>			
Cared by someone other than the mother	124 (43.4)	162 (56.6)	0.087
Duration of care by other carers			
None	123 (50.8)	119 (49.2)	<0.001
≤20 hours per week	88 (52.1)	81 (47.9)	
>20 hours per week	36 (30.8)	81 (69.2)	
Adequate feeding during diarrhoea (children with diarrhoea; n=79)	3 (75.0)	1 (25.0)	0.369
ORS <sup>†</sup> given (children who had diarrhoea; n=79)	13 (44.8)	16 (55.2)	0.258
<b>Intermediate determinants/ socio-cultural factors</b>			
Caste			
Non ST/ SC <sup>†</sup>	64 (53.3)	56 (46.7)	0.102
ST/ SC <sup>†</sup>	183 (44.9)	225 (55.1)	
Gender of the child			
Male	133 (47.0)	150 (53)	0.915
Female	114 (46.5)	131 (53.5)	

<b>Determinants of malnutrition</b>	<b>Frequency (%)</b>		<b>P-value (Chi square test)</b>
	<b>Non- MGNREGA<sup>f</sup></b>	<b>MGNREGA<sup>f</sup></b>	
<b>Social status of mothers of infants</b>			
Mothers participating in household decision making	8 (57.1)	6 (42.9)	0.431
Decision on spending mother's earning (households where mother of infant earned; n=74)			
In-laws	6 (16.7)	30 (83.3)	0.292
Mother of infant	2 (50.0)	2 (50.0)	
Husband	3 (13.6)	19 (86.4)	
Jointly by mother of infant and her husband	4 (28.6)	10 (71.4)	
Decision on spending husband's earning (households where husband earned; n=525)			
In-laws	120 (48.6)	127 (51.4)	0.339
Mother of infant	8 (53.3)	7 (46.7)	
Husband	74 (41.6)	104 (58.4)	
Jointly by mother of infant and her husband	44 (51.8)	41 (48.2)	
<b>Distal determinants/ structural factors</b>			
Access to safe source of drinking water	213 (46.4)	246 (53.6)	0.656
Proper sanitation	19 (65.5)	10 (34.5)	0.038
Crowding [mean household density (SE), t-statistic]	3.7 (0.11)	4.1 (0.12)	0.054*
<b>Socioeconomic status (Asset index)</b>			
Lowest 2 quintiles	94 (44.3)	118 (55.7)	0.025
Third quintile	44 (41.9)	61 (58.1)	
Fourth quintile	46 (43.4)	60 (56.6)	
Fifth quintile	63 (60)	42 (40)	
<b>Mothers' level of education</b>			
Illiterate	156 (44.7)	193 (55.3)	0.252
Primary education	69 (48.9)	72 (51.1)	
Secondary and higher	22 (57.9)	16 (42.1)	
<b>Fathers' level of education</b>			
Illiterate	86 (47.2)	96 (52.8)	0.904
Primary education	108 (45.9)	128 (54.1)	
Secondary and higher	53 (48.2)	57 (51.8)	
<b>Primary occupation</b>			
Seasonal	190 (44.8)	234 (55.2)	0.067
Regular	57 (54.8)	47 (45.2)	
Received food through Public distribution system	189 (44.6)	235 (55.4)	0.040

<b>Determinants of malnutrition</b>	<b>Frequency (%)</b>		<b>P-value (Chi square test)</b>
	<b>Non- MGNREGA<sup>f</sup></b>	<b>MGNREGA<sup>f</sup></b>	
Below poverty line (BPL) households	176 (42.4)	239 (57.6)	<0.001
Household dietary diversity score [mean (SE), t-statistics]	5.8 (0.10)	5.7 (0.10)	0.251
<b>Demographic variables</b>			
Live births [mean (SE), t-statistics]	2.4 (0.08)	2.4 (0.08)	0.884*
Low birth weight			
No	72 (41.4)	102 (58.6)	0.194
Yes	113 (48.5)	120 (51.5)	
Missing	62 (51.2)	59 (48.8)	
Mother's age [mean (SE), t-statistics]	26.1 (0.27)	25.3 (0.23)	0.0271*
Child's age [mean (SE), t-statistics]	6.8 (0.20)	6.4 (0.19)	0.195*

Total sample = 528 (unless specified along with the variable); <sup>f</sup>MGNREGA - Mahatma Gandhi National Rural Employment Guarantee Act; †ORS - Oral rehydration salt; †SC - Schedule Caste, ST - Schedule Tribe; \*P-value for t-statistics.

### 3.11: Results of the univariable unadjusted logistic regression analyses

The results of the univariable logistic regression analyses for each of the three anthropometric indicators are presented in table 3.6 and described below. The analyses were adjusted for the cluster sampling design using the method of robust estimation of standard errors and all associations were considered to be significant at a two-tailed p-value of <0.05. The results are presented in the following order: the composite indicator underweight, indicator of acute malnutrition (wasting) and indicator of chronic malnutrition (stunting).

#### 3.11.1: Underweight

The likelihood of the infant being underweight was 36% lower in the MGNREGA households compared to the non-MGNREGA households (Crude odds ratio (OR) = 0.64; 95%CI=0.41-1.00; p=0.051). However, the duration of participation of the household in MGNREGA (OR=1.03; 95%CI=0.94-1.12; p=0.513) and the employment status of the

mother (whether employed through MGNREGA or working in any other job) were not found to be significantly associated with underweight.

No statistically significant associations were observed between the biological risk factors and underweight (table 3.6). Among the intermediate behavioural factors, 'proper disposal of infant faeces' and 'institutional delivery' were each associated with lower odds of underweight (table 3.6). With respect to the socio-cultural determinants, the likelihood of infants being underweight was more than four and a half times higher in households belonging to the Schedule Tribe/ Schedule Caste social group compared with those belonging to the non-Schedule Tribe/ Schedule Caste group ( $p < 0.001$ ). Girls were 38% more likely to be underweight, but the p-value was 0.096. The variables indicating the social status of mothers were not found to have a significant association with underweight.

Among the structural determinants, socioeconomic status, below poverty line status, household density, access to proper sanitation and employment type of the household were found to have a significant effect on infant underweight. The odds of infants being underweight decreased with increase in the socio-economic status of the households ( $p < 0.001$ ) such that the odds of being underweight was 34%, 50% and 84% lower for the third, fourth and the fifth quintiles of the asset index in the sampled households compared with the lowest two quintiles. The odds of being categorised as underweight was 98% higher among infants belonging to households that were below the poverty line compared with those in the above poverty line households (OR=1.98; 95%CI=1.18-3.34;  $p = 0.011$ ). The odds of infants being underweight increased by 15% with every unit increase in household density ( $p = 0.016$ ). Having access to proper sanitation reduced the odds of infant underweight by 86% (OR=0.14, 95%CI=0.05-0.45;  $p = 0.001$ ) and infants in households

where any member had a regular employment were 51% less likely to be underweight than households where all members were seasonally employed ( $p=0.007$ ).

The likelihood of infants being underweight was 52% and 65% lower in households where the mother had primary and secondary/ higher education, respectively, compared with households where the mother was illiterate. A similar unadjusted OR was observed for father's level of education (table 3.6). Underweight and household food security had a significant inverse association ( $p=0.028$ ), the odds of infants being underweight decreased linearly by 17% per unit increase in the household dietary diversity score. Infants in households that received food through the Public Distribution System were 92% more likely to be underweight than households that did not receive this ( $p=0.025$ ), but the variable was found to be highly correlated with the 'below poverty line status' variable ( $r=0.83$ ,  $p\text{-value}<0.001$ ).

Low birth-weight infants were about four and a half times more likely to be underweight compared to infants with normal birth-weight. A significant increase in underweight was found with increase in age of the mother ( $p=0.003$ ), but only the age category of  $>30$  years ( $OR=2.60$ ,  $95\%CI=1.02-6.64$ ;  $p=0.046$ ) was significantly different from the baseline category of  $\leq 20$  years. Similarly, increase in order of birth of the infant increased the likelihood of being underweight ( $p=0.001$ ), but the crude ORs of only the third and four or more order of birth were significantly different from the first.

### 3.11.2: Wasting

The odds of infants being wasted in households that participated in MGNREGA was 31% lower than the non participating households, but the  $p\text{-value}$  was 0.092. Similar to

underweight, the duration of participation in MGNREGA was not found to have a statistically significant effect on wasting. However, in contrast to underweight, the univariable analysis showed that the infants in households where the mother was employed in other jobs were two and a half times more likely to be wasted than households where the mother was not working (OR=2.55; 95% CI=1.01-6.42; p=0.047), but the crude OR of the MGNREGA employed mothers group was not significantly different from the not working group.

Like underweight, the crude ORs of association between the biological factors (diarrhoea and upper respiratory tract infection) and wasting were not significant (table 3.6). While adequate infant feeding was not found to be significantly associated with underweight, the odds of being categorised as wasted was as much as 50% less in households with adequate infant feeding practices and this association was statistically significant (p=0.006). Similar to underweight, 'proper disposal of infant faeces' was found to be significantly associated with lower odds of infant wasting. The likelihood of infants being wasted was 44% lower in households where the mother underwent institutional delivery compared to households where the mother did not (OR=0.56; 95%CI=0.37-0.85; p=0.008). As was seen with underweight, the odds of infants being wasted was significantly higher in households which belonged to the Schedule Tribe/ Schedule Caste groups compared with households which belonged to the non- Schedule Tribe/ Schedule Caste groups (OR=3.66; 95%CI=1.79-7.50; p=0.001).

Similar to underweight, an inverse association between socioeconomic status of households and infant wasting was found (p=0.001). Infants in households belonging to the fifth quintile (OR=0.28; 95% CI=0.14-0.56; p=0.001) of the asset index were significantly less likely to

be wasted than those in households belonging to the lowest quintiles. The odds of wasting was higher in infants belonging to the below poverty line households compared with those in the above poverty line households (OR=1.93; 95%CI=1.11-3.37; p=0.022). Similar reduced odds of wasting were found with increase in the level of education of mothers and fathers. Again, like underweight, the odds of infants being wasted was lower in households with access to proper sanitation facilities (OR=0.31, 95%CI=0.11-0.90; p=0.032) and the odds of wasting among infants increased by 11% with every unit increase in household density.

Similar to underweight, infants in households where any member had regular employment were less likely to be wasted compared with households where all members had seasonal employment (OR=0.54; 95%CI=0.33-0.89; p=0.016). The odds of wasting decreased linearly with increase in the household dietary diversity score (p=0.016) and infants in households that received food through the Public Distribution System were 75% more likely to be wasted than households that did not receive food through this scheme (p=0.083).

Like underweight, low birth-weight infants were about three and a half times more likely to be wasted than the normal birth weight infants (p<0.001). The infants in the age group of 6 to <12 months were 47% more likely to be categorised as wasted compared to infants in the age group of 1 to <6 months. Similar to underweight, increase in mother's age and order of birth of the infant were associated with increase in the likelihood of infants being categorised as wasted (table 3.6).

### 3.11.3: Stunting

Unlike underweight and wasting, the association between stunting and MGNREGA was not found to be statistically significant even at the 10% level, although the direction and magnitude of the crude OR was similar to that of the other two anthropometric indicators (OR=0.79; 95%CI=0.54-1.16; p=0.222). Similar to the other two anthropometric indicators, the duration of participation in MGNREGA and the biological risk factors were not significantly associated with stunting. Stunting was not found to be significantly associated with mothers' employment.

Unlike underweight and wasting which were significantly associated with a number of variables in the intermediate determinants group, stunting was found to be significantly associated with only 'institutional delivery'. The likelihood of stunting was 55% lower in households where the mother underwent institutional delivery compared with households where the mother had a home delivery (p=0.003). Similar to the other two anthropometric indicators, the odds of stunting was statistically significantly higher in infants born in Schedule Tribe/ Schedule Caste households compared with those born in non-Schedule Tribe/ Schedule Caste households (OR=2.29, 95%CI=1.13-4.64; p=0.022).

Like underweight and wasting, a similar inverse relationship was observed between the socioeconomic status of households and stunting, the crude OR being significantly lower for only the fifth quintile compared with the baseline. Household density and belonging to below poverty line status were not significantly associated with stunting, but households' access to proper sanitation facilities reduced the likelihood of stunting among infants (OR=0.22, 95%CI=0.05-1.00; p=0.050). The likelihood of stunting decreased with increase

in the level of education of fathers, but mothers' level of education was not found to be associated with this outcome (table 3.6).

Like the other two anthropometric indicators, infants in households where any member had regular employment were 58% less likely to be stunted than households where all members had seasonal employment (table 3.6). The odds of stunting decreased linearly with increase in the household dietary diversity score ( $p=0.011$ ) as was observed for the other two outcomes, but unlike the other two anthropometric indicators, access to the Public Distribution System was not found to be significantly associated with stunting at a p-value of  $<0.10$ .

Similar to the other two anthropometric indicators, low birth-weight and increase in birth order were associated with increased likelihood of infant stunting. However, there was no significant association of stunting with infant's and mother's age.

**Table 3.6: Crude odds ratios of association of anthropometric indicators and the determinants of malnutrition**

Determinants of malnutrition	Underweight			Wasting			Stunting		
	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend
<b>Non-health Policy</b>									
MGNREGA <sup>f</sup> (in the past 14 months)	0.64 (0.41-1.00)	0.051	NA	0.69 (0.45-1.06)	0.092	NA	0.79 (0.54-1.16)	0.222	NA
Duration of employment in MGNREGA <sup>f</sup> (in the past 6 years)	1.03 (0.94-1.12)	0.513	NA	0.97 (0.87-1.07)	0.489	NA	1.06 (0.95-1.17)	0.297	NA
Mother worked in MGNREGA <sup>f</sup> after delivery									
Not worked	1			1			1		
MGNREGA <sup>f</sup>	0.96 (0.51-1.82)	0.902	NA	1.06 (0.59-1.89)	0.853	NA	1.37 (0.71-2.65)	0.345	NA
Worked in other jobs	1.56 (0.58-4.16)	0.370		2.55 (1.01-6.42)	0.047		1.75 (0.57-5.33)	0.316	
<b>Proximal determinants/ biological factors</b>									
Diarrhoea	1.14 (0.68-1.89)	0.605	NA	1.29 (0.86-1.94)	0.208	NA	0.83 (0.46-1.47)	0.505	NA
Upper respiratory tract infection (URTI)	1.63 (0.87-3.04)	0.114	NA	1.09 (0.63-1.86)	0.758	NA	1.27 (0.62-2.58)	0.508	NA
Adequate vaccination (age specific)	0.83 (0.55-1.17)	0.385	NA	0.93 (0.62-1.39)	0.719	NA	0.81 (0.51-1.28)	0.362	NA
<b>Intermediate determinants/ behavioural factors</b>									
Early initiation of breast feeding	0.85 (0.53-1.38)	0.508	NA	0.98 (0.67-1.43)	0.897	NA	0.93 (0.57-1.52)	0.777	NA
Adequate infant feeding practices	0.73 (0.46-1.15)	0.168	NA	0.50 (0.31-0.81)	0.006	NA	0.85 (0.57-1.24)	0.390	NA
<i>Cleanliness of water and food</i>									
Boiled water given to infants [Infants given water, n=381]	0.39 (0.09-1.60)	0.185	NA	1.17 (0.31-4.43)	0.808	NA	0.51 (0.06-4.70)	0.545	NA
Proper disposal of infant faeces	0.14 (0.03-0.55)	0.006	NA	0.07 (0.01-0.65)	0.021	NA	0.28 (0.06-1.29)	0.092	NA
<i>Infant care</i>									
Duration of care by other carers									
None	1			1			1		
≤ 20 hours per week	0.97 (0.66-1.44)	0.896	0.294	1.37 (0.90-2.08)	0.134	0.155	0.92 (0.60-1.41)	0.697	0.479

Determinants of malnutrition	Underweight			Wasting			Stunting		
	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend
>20 hours per week	1.29 (0.82-2.03)	0.257		1.33 (0.85-2.09)	0.210		1.25 (0.75-2.06)	0.381	
Adequate feeding during diarrhoea (children with diarrhoea; n=79)	0.88 (0.19-4.07)	0.861	NA	0.40 (0.07-2.38)	0.305	NA	1.23 (0.09-16.8)	0.874	NA
ORS <sup>†</sup> to infants with diarrhoea [n=79]	1.14 (0.42-3.09)	0.797	NA	1.29 (0.46-3.58)	0.617	NA	1.74 (0.55-5.48)	0.337	NA
<i>Health seeking behaviour</i>									
Treatment for diarrhoea/ URTI [n=119]	0.97 (0.39-2.42)	0.950	NA	0.86 (0.42-1.76)	0.677	NA	0.63 (0.20-2.00)	0.261	NA
Institutional delivery	0.44 (0.26-0.75)	0.003	NA	0.56 (0.37-0.85)	0.008	NA	0.45 (0.27-0.74)	0.003	NA
Households where at least one sibling died	1.39 (0.63-3.07)	0.413	NA	1.02 (0.49-2.11)	0.954	NA	1.47 (0.69-3.14)	0.311	NA
<b>Intermediate determinants/ socio-cultural factors</b>									
<i>Caste</i>									
Non ST/ SC <sup>†</sup>	1		NA	1		NA	1		NA
ST/ SC <sup>†</sup>	4.60 (2.20-9.62)	<0.001		3.66 (1.79-7.50)	0.001		2.29 (1.13-4.64)	0.022	
<i>Gender of the child</i>									
Male	1		NA	1		NA	1		NA
Female	1.38 (0.94-2.02)	0.096		1.15 (0.76-1.74)	0.497		1.19 (0.82-1.71)	0.355	
<i>Social status of mothers</i>									
Mothers participating in household decision-making	0.98 (0.32-3.00)	0.978	NA	1.58 (0.59-4.23)	0.352	NA	0.23 (0.04-1.52)	0.125	NA
<i>Decision on spending mother's earning (n=74)</i>									
In-laws	1	-		1	-		1	-	
Mother of infant	1 (0.20-5.00)	1.000	NA	1.77 (0.29-11.0)	0.525	NA	0.66 (0.04-12.1)	0.776	NA
Husband	1.44 (0.38-5.45)	0.574		2.56 (0.71-9.21)	0.145		1.14 (0.37-3.54)	0.810	

Determinants of malnutrition	Underweight			Wasting			Stunting		
	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend
Jointly by mother and her husband	1.33 (0.32-5.43)	0.677		1.77 (0.39-8.05)	0.445		0.55 (0.09-3.48)	0.507	
Decision on spending husband's earning (n=525)									
In-laws	1	-		1	-		1	-	
Mother of infant	1.49 (0.41-5.46)	0.541	NA	0.92 (0.30-2.82)	0.881	NA	1.16 (0.20-6.78)	0.867	NA
Husband	0.93 (0.61-1.40)	0.713		1.28 (0.80-2.04)	0.294		0.98 (0.62-1.56)	0.944	
Jointly by husband & wife	1.12 (0.64-1.93)	0.689		1.56 (0.82-2.95)	0.168		1.18 (0.62-2.25)	0.603	
<b>Distal determinants/ structural factors</b>									
Access to safe drinking water	1.38 (0.74-2.55)	0.301	NA	1.54 (0.89-2.66)	0.119	NA	0.70 (0.35-1.41)	0.315	NA
Proper sanitation	0.14 (0.05-0.45)	0.001	NA	0.31 (0.11-0.90)	0.032	NA	0.22 (0.05-1.00)	0.050	NA
Crowding / household density	1.15 (1.03-1.29)	0.016	NA	1.11 (1.01-1.23)	0.035	NA	1.07 (0.96-1.19)	0.238	NA
Socioeconomic status									
Lowest 2 quintiles	1			1			1		
Third quintile	0.66 (0.45-0.98)	0.040	<0.001	0.59 (0.33-1.04)	0.068	0.001	0.86 (0.48-1.55)	0.609	0.001
Fourth quintile	0.50 (0.30-0.84)	0.010		0.68 (0.42-1.10)	0.116		0.93 (0.56-1.57)	0.790	
Fifth quintile	0.16 (0.08-0.33)	<0.001		0.28 (0.14-0.56)	0.001		0.20 (0.09-0.44)	<0.001	
Mothers' level of education									
Illiterate	1			1			1		
Primary education	0.48 (0.31-0.76)	0.002	NA	0.59 (0.37-0.96)	0.014	NA	0.60 (0.32-1.11)	0.102	NA
Secondary and higher	0.35 (0.17-0.69)	0.004		0.53 (0.27-1.07)	0.077		0.60 (0.25-1.40)	0.227	
Fathers' level of education									
Illiterate	1			1			1		
Primary education	0.58 (0.37-0.92)	0.021	NA	0.70 (0.47-1.05)	0.079	NA	0.67 (0.46-0.97)	0.034	NA
Secondary and higher	0.36 (0.22-0.57)	<0.001		0.45 (0.27-0.73)	0.002		0.54 (0.30-0.99)	0.045	
Primary occupation of household									
Seasonal	1	-		1	-		1	-	
Regular	0.49 (0.30-0.82)	0.007	NA	0.54 (0.33-0.89)	0.016	NA	0.42 (0.23-0.77)	0.006	NA

Determinants of malnutrition	Underweight			Wasting			Stunting		
	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend	OR (95% CI)	P-value	P-value trend
Received food through PDS	1.92 (1.09-3.39)	0.025	NA	1.75 (0.93-3.31)	0.083	NA	1.35 (0.78-2.35)	0.279	NA
Below poverty line households	1.98 (1.18-3.34)	0.011	NA	1.93 (1.11-3.37)	0.022	NA	1.26 (0.74-2.13)	0.388	NA
Household dietary diversity score	0.83 (0.71-0.98)	0.028	NA	0.86 (0.76-0.97)	0.016	NA	0.83 (0.73-0.96)	0.011	NA
<b>Demographic factors</b>									
Child's age									
< 6 months	1	-	NA	1	-	NA	1	-	NA
≥ 6 months	1.40 (0.94-2.07)	0.092		1.47 (1.01-2.14)	0.045		1.61 (0.97-2.70)	0.067	
Low birth weight [n=407]	4.45 (2.82-7.03)	<0.001	NA	3.38 (2.04-5.59)	<0.001	NA	1.69 (1.07-2.66)	0.025	NA
Mothers' age									
≤ 20 years	1		0.003	1		0.024	1		0.277
21 - 25 years	1.16 (0.56-2.40)	0.673		1.53 (0.78-2.98)	0.265		1.69 (0.77-3.69)	0.182	
26 - 30 years	1.66 (0.81-3.39)	0.161		1.42 (0.74-2.72)	0.371		1.95 (0.77-4.93)	0.155	
>30 years	2.60 (1.02-6.64)	0.046		3.35 (1.61-6.95)	0.002		1.78 (0.64-4.96)	0.265	
Pregnancy desired	0.35 (0.11-1.11)	0.074	NA	0.70 (0.25-1.98)	0.494	NA	0.69 (0.24-1.95)	0.475	NA
Presently pregnant	0.52 (0.20-1.34)	0.168	NA	0.84 (0.34-2.07)	0.692	NA	0.77 (0.22-2.69)	0.670	NA
Birth order of the infant									
First	1		0.001	1		0.007	1		0.039
Second	1.13 (0.69-1.83)	0.624		1.13 (0.66-1.93)	0.656		1.92 (1.00-3.69)	0.049	
Third	1.83 (1.08-3.12)	0.027		1.72 (0.93-3.17)	0.081		1.72 (0.83-3.60)	0.143	
≥ Four	2.28 (1.34-3.87)	0.003		2.25 (1.22-4.13)	0.010		2.35 (1.09-5.07)	0.030	

Total sample = 528 (unless specified along with the variable); fMGNREGA - Mahatma Gandhi National Rural Employment Guarantee Act; fORS - Oral rehydration salt; †SC - Schedule Caste, ST - Schedule Tribe; PDS – Public Distribution System; OR –odds ratio; CI – Confidence interval; NA – Not applicable

### 3.12: Multivariable logistic regression models

#### 3.12.1: Effect of households' participation in MGNREGA on the anthropometric indicators of infant malnutrition

Multivariable logistic regression modelling was done to adjust for the known confounders and estimate the effect of MGNREGA on anthropometric indicators of infant malnutrition - underweight, wasting and stunting. The following method was used to fit the variables of each of the determinants group (distal, intermediate and proximal) and the demographic variables in building the logistic regression models for each of the three outcome variables:

- i. Selection of independent variables: Only those independent variables that were statistically significantly associated with the outcomes – underweight, wasting and stunting in the univariable analyses at  $p < 0.10$  were entered in the models. A higher cut-off value of 10% was used for variable selection to be more inclusive. The variable 'duration of care by other carers', although not associated with the outcome variables at  $p < 0.10$  was entered into the models considering that time devoted to care by mothers is an important determinant and could confound the effect of MGNREGA on the anthropometric outcomes. This is consistent with the recommendations provided by Victora et al. (1997) for constructing regression models using conceptual frameworks. To make the models comparable and consistent, the same set of variables were entered in the three models:
  - a. The variable 'mother worked' which was significantly associated with wasting but not with underweight and stunting was included in all three models.
  - b. The variables 'gender' and 'pregnancy desired' associated with underweight at  $p < 0.10$  but not with wasting and stunting were entered in the three models.

- c. The variables ‘household density’, ‘mother’s level of education’, ‘below poverty line’, ‘Public Distribution System’ and ‘mother’s age’ significantly associated with underweight and wasting, but not stunting were entered in the stunting model to make it consistent with the other two.
- ii. The independent variables were examined for collinearity (shown in table 3.7). The variables for which the coefficient of correlation (r) was  $\geq 0.40$  were not entered concurrently in the same equation during model building to avoid over adjusting the models, except ‘socioeconomic status’ and ‘caste’. Although statistically ‘socioeconomic status’ and ‘caste’ were correlated, (r = -0.59; p<0.001), each had a unique role as determinant of infant malnutrition. The variable ‘caste’ in the conceptual framework was used to examine the social factors such as discrimination and cultural practices related to infant feeding.
- iii. Before adjusting for ‘socioeconomic status’, test for interaction was done for MGNREGA and ‘socioeconomic status’ by fitting the interaction term ‘MGNREGA X socioeconomic status’ in each of the three models. The ORs for the three interaction groups (employed in MGNREGA X third/ MGNREGA X fourth/ MGNREGA X fifth quintiles of the asset index) were not significantly different from the non-MGNREGA X baseline group and the collated p-value for the fitted interaction term for each of the three outcomes were not significant (p-value underweight = 0.272, p-value wasting = 0.408 and p-value stunting = 0.305). This suggested that socioeconomic status was not an effect modifier and was thus accounted for in estimating the effects of MGNREGA in the three models.

- iv. Variables that were in the causal pathway of effect of MGNREGA on the anthropometric outcomes, namely; household food security and adequate infant feeding (Chapter 2, figure 2.3) were not included in the models. In addition, the variable low birth-weight would also be in the pathway of effect of MGNREGA on infant malnutrition. Although not a hypothesized mechanism for this study, MGNREGA through influencing nutrition of women during pregnancy could have an effect on the birth-weight of infants which is a known determinant of infant malnutrition (as discussed in Chapter 2).
- v. Order of variable entry: The variables were entered sequentially one at a time according to the conceptual framework of the determinants from distal to intermediate to proximal and finally the demographic factors. This was according to the method suggested by Victora et al. (1997).
- vi. Each variable was examined for confounding by analysing whether the estimated effect of MGNREGA on the outcome changed in size and significance. The odds ratio of association between MGNREGA and the outcomes and its two-tailed p-value for each step of variable entry in the three models and the description of the models are provided in appendix 3.8.
- vii. The variables that neither influenced the estimated effect of MGNREGA, nor were significantly associated with the outcome were eliminated to improve the parsimony of the models.
- viii. To account for the cluster sampling design, robust standard errors (Huber-White sandwich estimator) were reported for each step of the model building.

ix. A log likelihood ratio test was done to compare the fit of the final model with that of the 20-variable model for each outcome variable.

The estimated effects of MGNREGA on each of the three outcome variables after adjusting for the known confounders in the multivariable logistic regression models are provided in table 3.8.

**Table 3.7: Coefficient of correlation between the independent variables**

Variables	MGNREGA	SES	Proper sanitation	Household density	Mother's education	Father's education	Mother worked	Primary occupation	BPL	PDS	Caste	Gender	Proper disposal of infant stool	Institutional Delivery	Cared by other carers	Mother's age	Child's age	Pregnancy desired	Birth order
MGNREGA	1																		
SES	-0.09*	1																	
Proper sanitation	-0.09*	0.35*	1																
Household density	0.08*	-0.37*	0.21*	1															
Mother's education	-0.07	0.38*	0.23*	-0.22*	1														
Father's education	-0.00	0.40*	0.18*	-0.19*	0.49*	1													
Mother worked	0.14*	-0.00	-0.01	-0.00	0.05	-0.05	1												
Primary occupation	-0.08	0.43*	0.25*	-0.17*	0.33*	0.33*	0.01	1											
BPL	0.17*	-0.27*	-0.26*	0.08	-0.16*	-0.12*	-0.02	-0.21*	1										
PDS	0.09*	-0.27*	-0.28*	0.07	-0.13*	-0.09*	-0.07	-0.19*	0.83*	1									
Caste	0.07	-0.59*	-0.35*	0.23*	-0.26*	-0.24*	0.01	-0.32*	0.28*	0.28*	1								
Gender	0.00	-0.07	-0.09*	-0.01	-0.05	-0.05	0.01	-0.04	0.00	0.01	0.15*	1							
Proper disposal of infant stool	-0.08	0.31*	0.68*	-0.18*	0.24*	0.19*	-0.04	0.27*	-0.30*	-0.31*	-0.28*	-0.07	1						
Institutional Delivery	0.04	0.17*	0.05	-0.12*	0.16*	0.10*	0.04	0.17*	-0.09*	-0.12*	-0.24*	0.01	0.06	1					
Cared by other carers	0.14*	0.03	-0.11*	-0.02	-0.07	-0.06	0.49*	-0.08	0.06	0.04	-0.06	0.01	-0.11*	0.07	1				
Mother's age	-0.09*	-0.13*	-0.00	-0.11*	-0.20*	-0.19*	0.12*	-0.09*	0.01	-0.02	0.07	0.04	-0.02	-0.14*	0.06	1			
Child's age	-0.07	0.07	0.04	-0.02	0.00	-0.00	0.18*	0.15*	-0.10*	-0.12*	-0.09*	-0.06	0.09*	0.02	0.20*	0.01	1		
Pregnancy desired	-0.06	0.03	0.00	-0.09*	0.08	0.06	-0.03	-0.03	-0.03	-0.04	-0.01	-0.04	0.04	0.03	-0.07	-0.03	-0.05	1	
Birth order	-0.01	-0.16*	-0.08	0.25*	-0.26*	-0.21*	0.08	-0.13*	0.01	0.01	0.12*	0.06	-0.08	-0.19*	0.09*	0.60*	-0.07	-0.19*	1

Sample size = 528; \*p-value <0.05; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System

### *3.12.1.1: Adjusted odds ratios for underweight*

The final model for underweight comprised of six independent variables (MGNREGA, socioeconomic status, caste, duration of care by other carers, child's age and birth-order) which were either observed to be confounders, or were found to be independent risk factors for underweight among infants in the study population. The final six-variable model also provided the best fit to the data (appendix 3.8).

The odds of infants being underweight in households participating in MGNREGA was 52% lower compared with households that did not participate in MGNREGA after controlling for the explanatory variables (socioeconomic status, below poverty line, caste, duration of care by other carers, birth-order and child's age) and cluster sampling in the final model. The association was statistically significant ( $p=0.002$ ). Both the magnitude of the OR and the strength of statistical association improved in the multivariable model (OR=0.48; 95%CI=0.30-0.76;  $p=0.002$ ) compared with the univariable model (OR=0.64; 95%CI=0.41-1.00;  $p=0.051$ ), suggesting that the adjusted explanatory variables were negatively confounding (Kirkwood and Sterne, 2003) the association between MGNREGA and underweight.

Although the odds of infants being underweight in the households belonging to the third and fourth quintiles of the asset index were not statistically significantly different from the households belonging to the lowest quintiles at the 5% level, the odds of infants being underweight was 75% lower in households belonging to the highest (fifth) quintile compared with those belonging to the lowest quintiles of the asset index ( $p=0.001$ ). There was a significant inverse linear trend even after controlling for other explanatory variables, such that the likelihood of underweight decreased with increase in the socioeconomic status

of the households (p-value of Chi square test for trend=0.002). The likelihood of infants being categorised as underweight was more than two and a half times higher in the households belonging to the Schedule Tribe/ Schedule Caste social groups than those belonging to the non- Schedule Tribe/ Schedule Caste groups. Duration of care by other carers was observed to be an important confounder because including this variable altered the magnitude and the strength of association between MGNREGA and the outcome, but the odds of underweight in the '≤ 20 hours per week' and '>20 hours per week' categories were not significantly different from the baseline.

While a significant linear trend of increase in the likelihood of being underweight with increase in birth-order of the infant was observed (p-value of Chi square test for trend=0.004), only ≥ four order of birth significantly increased the risk of infant underweight compared with the first (OR=1.85; 95%CI=1.14-2.99; p=0.014). Child's age was significantly associated with underweight. On controlling for the explanatory variables including MGNREGA, the odds of underweight was 62% higher among infants ≥ 6 months of age than infants <6 months (p=0.030).

#### *3.12.1.2: Adjusted odds ratios for wasting*

The final model for wasting included seven independent variables (MGNREGA, socioeconomic status, below poverty line, caste, duration of care by other carers, child's age and birth-order) which were either observed to be confounders or independent risk factors for wasting. The final seven-variable model provided the best fit to the data (appendix 3.8).

On adjusting for the independent variables in the final model and for cluster sampling, the likelihood of infants being categorised as wasted in households participating in MGNREGA

was 43% lower compared to the non-MGNREGA households. Similar to underweight, the magnitude of the OR and the level of statistical significance increased in the multivariable logistic regression model (OR=0.57; 95%CI=0.37-0.89; P-value=0.014) compared with the univariable analysis (OR=0.69; 95%CI=0.45-1.06; P-value=0.092) suggesting negative confounding (Kirkwood and Sterne, 2003) by the other explanatory variables.

Unlike underweight, socioeconomic status was not found to have an inverse linear association with wasting, and the odds ratios in the three categories of socioeconomic status were not significantly different from the baseline. Although below poverty line status and duration of care by other carers were found to be negative confounders (appendix 3.8), these were not significantly associated with infant wasting. However, infants born in Schedule Tribe/ Schedule Caste households were nearly three times more likely to be wasted compared with those born in non-Schedule Tribe/ Schedule Caste households (OR=2.83, 95%CI=1.39-5.76) and the association was significant (p=0.005).

Similar to underweight, increase in birth-order of the infant was associated with a linear increase in the likelihood of wasting (p-value of Chi square test for trend=0.019). The odds of wasting in the second and third birth-order group was not significantly different from the first in the final model, but the infants of four or higher birth order were two times more likely to be wasted compared with the first born. Further, infants  $\geq 6$  months of age were 64% more likely to be wasted than those  $<6$  months of age (p=0.017).

### *3.12.1.3: Adjusted odds ratios for stunting*

The final model for stunting included five independent variables (MGNREGA, socioeconomic status, duration of care by other carers, child's age and birth-order). This five-variable model was observed to provide the best fit to the data (appendix 3.8).

On adjusting for the other independent variables in the final model and for cluster sampling, the likelihood of infants being categorised as stunted in households participating in MGNREGA was 30% lower compared with the non-MGNREGA households, but the association was not significant ( $p=0.086$ ). Similar to underweight and wasting, the magnitude of the OR and the level of statistical significance improved in the multivariable logistic regression model (OR=0.70; 95% CI = 0.46-1.05;  $p=0.086$ ) compared with the univariable model (OR=0.79; 95% CI = 0.54-1.16;  $p=0.222$ ), but the association did not reach the desired 5% level of statistical significance.

The association of socioeconomic status with stunting was found to be similar to that observed for the underweight model. Apart from being a negative confounder, socioeconomic status had an inverse linear association with stunting and the odds of stunting among infants was significantly lower in households belonging to the fifth quintile of the asset index compared with those belonging to the lowest two quintiles (OR=0.17; 95% CI = 0.08-0.39;  $p<0.001$ ). Duration of care by other carers and birth-order were negative confounders, but did not independently have an effect on stunting after controlling for the other explanatory variables in the final model. As was observed in the other two models, the odds of stunting was 76% higher among infants aged  $\geq 6$  months than infants  $<6$  months of age (OR = 1.76; 95% CI = 1.04-2.99;  $p=0.037$ ).

**Table 3.8: Effect of MGNREGA on underweight, wasting and stunting - adjusted odds ratios after controlling for known confounders**

Determinants of malnutrition	Underweight			Wasting			Stunting		
	aOR (95% CI)	P-value (Wald test)	P-value (Trend)	aOR (95% CI)	P-value (Wald test)	P-value (Trend)	aOR (95% CI)	P-value (Wald test)	P-value (Trend)
<b>Employed through MGNREGA (Non-health Policy)</b>									
No	1	-	NA	1	-	NA	1	-	NA
Yes	0.48 (0.30-0.76)	0.002		0.57 (0.37-0.89)	0.014		0.70 (0.46-1.05)	0.086	
<b>Distal determinants/ structural factors</b>									
Socioeconomic status									
Lowest 2 quintiles	1	-		1	-		1	-	
Third quintile	0.72 (0.48-1.06)	0.096	0.002	0.62 (0.35-1.11)	0.108	0.148	0.86 (0.47-1.58)	0.627	0.001
Fourth quintile	0.62 (0.34-1.11)	0.107		0.86 (0.52-1.45)	0.573		0.91 (0.52-1.58)	0.733	
Fifth quintile	0.25 (0.11-0.54)	0.001		0.58 (0.31-1.11)	0.098		0.17 (0.08-0.39)	<0.001	
Below poverty line									
No	Not significant for the model			1	-	NA	Not significant for the model		
Yes				1.65 (0.93-2.91)	0.083				
<b>Intermediate determinants/ socio-cultural factors</b>									
Caste									
Non-ST/ SC <sup>†</sup>	1	-	NA	1	-	NA	Not significant for the model		
ST/ SC <sup>†</sup>	2.72 (1.27-5.80)	0.011		2.83 (1.39-5.76)	0.005				
<b>Intermediate determinants/ behavioural factors</b>									
Duration of care by other carers									
None	1	-		1	-		1	-	
≤ 20 hours per week	0.84 (0.55-1.28)	0.407	0.173	1.20 (0.75-1.93)	0.245	0.208	0.80 (0.51-1.25)	0.323	0.743
>20 hours per week	1.52 (0.94-2.46)	0.088		1.36 (0.83-2.22)	0.222		1.17 (0.74-1.86)	0.499	
<b>Demographic factors</b>									
Birth order of the infant									
First	1	-		1	-		1	-	
Second	1.14 (0.70-1.86)	0.602	0.004	1.20 (0.67-2.14)	0.533	0.019	1.93 (0.97-3.84)	0.062	0.058
Third	1.55 (0.89-2.71)	0.116		1.60 (0.84-3.04)	0.084		1.51 (0.75-3.06)	0.241	
≥ Four	1.85 (1.14-2.99)	0.014		2.11 (1.15-3.86)	0.011		2.04 (0.97-4.28)	0.060	
Child's age									
< 6 months	1	-	NA	1	-	NA	1	-	NA
≥ 6 months	1.62 (1.05-2.51)	0.030		1.64 (1.10-2.45)	0.017		1.76 (1.04-2.99)	0.037	

Sample size=528 households; <sup>†</sup>ST/ SC – Schedule Tribe/ Schedule Caste; aOR – adjusted odds ratio; CI – Confidence interval; NA – Not applicable

### 3.12.2: Effect of mothers' employment through MGNREGA on the anthropometric indicators of infant malnutrition

The univariable analysis showed that the odds of infants being categorised as underweight, wasted and stunted in the households where the mother was employed through MGNREGA was not significantly different from the households where the mother was not engaged in paid employment (table 3.6). However, there could be negative confounding by other independent variables which could alter the magnitude and level of statistical significance of the estimated effect of mothers' employment, as was observed to be the case for the effect of households' participation in MGNREGA (in section 3.12.1). Therefore, a sub-group analysis was done to estimate the effect of mothers' employment through MGNREGA (n=272) on the anthropometric outcomes using multivariable logistic regression models.

The steps involved in building the mother-MGNREGA multivariable logistic regression model was similar to the steps described for the household MGNREGA model in the above section. Here the exposure of interest was mothers' employed compared with other family members employed in the MGNREGA-households. Similar to the method described above for the MGNREGA models, before adjusting for 'socioeconomic status', test for interaction was done for mother-MGNREGA and 'socioeconomic status' by fitting the interaction term 'mother-MGNREGA X socioeconomic status' in each of the three models. The ORs for the three interaction groups – mother employed in MGNREGA X third/ fourth/ fifth quintiles of the asset index were not significantly different from the other-MGNREGA X lowest two quintiles group and the collated p-value for the fitted interaction term for each of the three outcomes were not significant (p-value underweight = 0.153, p-value wasting = 0.247 and p-value stunting = 0.803). Thus, socioeconomic status was not considered to be an effect

modifier and was adjusted for in the three models. Further, the variable ‘duration of care by other carers’ was not entered in the model because it was in the pathway between mothers’ employment through MGNREGA and infant malnutrition (mother’s employment status would influence her time devoted to infant care and feeding which in turn could affect infant’s nutritional status), and was also moderately correlated with mother-MGNREGA,  $r = 0.49$  ( $p < 0.001$ ). The models are described in appendix 3.9 and the results are presented in table 3.9.

The results suggest that the likelihood of infants being underweight, wasted and stunted was respectively, 9%, 30% and 51% higher in households where the mother was employed compared with the households where other members were employed through MGNREGA, but the associations were not significant at the 5% level (table 3.9).

**Table 3.9: Effect of mothers' employment through MGNREGA on underweight, wasting and stunting**

Determinants of malnutrition	Underweight			Wasting			Stunting		
	aOR (95% CI)	P-value (Wald test)	P-value (Trend)	aOR (95% CI)	P-value (Wald test)	P-value (Trend)	aOR (95% CI)	P-value (Wald test)	P-value (Trend)
<b>Mother employed through MGNREGA (Non-health Policy)</b>									
No	1	-	NA	1	-	NA	1	-	NA
Yes	1.09 (0.54-2.02)	0.801		1.30 (0.58-2.89)	0.517		1.51 (0.63-3.59)	0.346	
<b>Distal determinants/ structural factors</b>									
Socioeconomic status									
Lowest 2 quintiles	1	-		1	-		1	-	
Third quintile	0.69 (0.41-1.17)	0.166	0.114	0.56 (0.25-1.25)	0.149	0.855	0.96 (0.36-2.54)	0.927	0.518
Fourth quintile	0.90 (0.49-1.66)	0.737		1.16 (0.63-2.12)	0.628		0.98 (0.42-2.29)	0.961	
Fifth quintile	0.31 (0.09-1.03)	0.056		0.82 (0.34-1.96)	0.644		0.49 (0.14-1.81)	0.278	
Below poverty line									
No	Not significant for the model			1	-	NA	Not significant for the model		
Yes				2.52 (1.02-6.19)	0.044				
<b>Intermediate determinants/ socio-cultural factors</b>									
Caste									
Non-ST/ SC <sup>†</sup>	1	-	NA	1	-	NA	1	-	NA
ST/ SC <sup>†</sup>	3.28 (1.23-8.69)	0.018		3.18 (1.26-8.02)	0.016		1.46 (0.47-4.55)	0.500	
<b>Intermediate determinants/ behavioural factors</b>									
Institutional delivery									
No	Not significant for the model			Not significant for the model			1	-	NA
Yes							0.53 (0.25-1.16)	0.111	
<b>Demographic factors</b>									
Birth order of the infant									
First	Not significant for the model			1	-		1	-	
Second				1.92 (0.84-4.39)	0.119	0.004	1.93 (0.97-3.84)	0.062	0.058
Third				2.76 (1.39-5.49)	0.005		1.51 (0.75-3.06)	0.241	
≥ Four				2.56 (1.24-5.27)	0.012		2.04 (0.97-4.28)	0.060	
Child's age									
< 6 months	1	-	NA	1	-	NA	1	-	NA
≥ 6 months	1.77 (1.00-3.13)	0.048		1.32 (0.75-2.33)	0.327		1.76 (1.04-2.99)	0.037	
Pregnancy desired									
No	1	-	NA	Not significant for the model			Not significant for the model		
Yes	0.25 (0.07-0.91)	0.036							

Sample size=272 households; <sup>†</sup>ST/ SC – Schedule Tribe / Schedule Caste; aOR – adjusted odds ratio; CI – Confidence interval; NA – Not applicable

### 3.13: Discussion

#### 3.13.1: Effect of MGNREGA on infant malnutrition

Participation in MGNREGA significantly reduced wasting (acute malnutrition) and underweight, but not chronic malnutrition (stunting) among the infants in households where any member was employed through this programme. The only other study that assessed the impact of MGNREGA on child malnutrition showed a negative effect on chronic malnutrition (stunting) in children 5-6 years of age, but no effect on underweight, and no estimates were provided for wasting (Uppal, 2009). The findings of this study are comparable to that of ‘The Chars Livelihood Programme’ in Bangladesh, a cash-for-work programme, which was associated with reductions in all the three anthropometric indicators of malnutrition in children less than five years in the participating households (Mascie-Taylor et al., 2010). However, they are in contrast with the findings of the Food Consumption Survey of Niger’s public works programme which showed that children 6 to 60 months were two-times more likely to be malnourished in the participating households (Webb, 1995).

Although comparable to the Bangladesh programme, MGNREGA was not found to be protective against chronic malnutrition. It is suggested that decrease in the prevalence of stunting in a population is indicative of improvements in the overall socioeconomic conditions (De Onis et al., 1993). The findings of this study may therefore suggest that the economic benefits of participating in MGNREGA are short term which helps to prevent acute malnutrition (i.e. wasting), but not cumulative enough to have an effect on chronic malnutrition (i.e. stunting). This argument is further supported by the finding that the effect on the anthropometric indicators of malnutrition in the study population did not vary with

the number of years of participation of the households in MGNREGA (table 3.6). There was a high prevalence of wasting which is associated with starvation and/ or severe disease and in most cases reflects the level of food insecurity in the population (De Onis et al., 1993). The observed results suggest that MGNREGA was probably able to prevent starvation in the participating households and thus have a protective effect against acute malnutrition.

### 3.13.2: Effect of mothers' employment through MGNREGA on infant malnutrition

Although mothers' employment in MGNREGA did not have a statistically significant effect on infant malnutrition, the direction of the relationship suggests that mothers' employment could increase the risk of infant malnutrition (table 3.9). The sample for this sub-group analysis was not adequately powered to obtain the desired level of significance, thus the results need to be interpreted with caution. Nevertheless, it generates an important hypothesis that needs to be tested in subsequent studies. It is possible that, as found elsewhere in the literature, mothers' employment leads to compromises in child care and feeding, thus increasing the risk of malnutrition among infants in the study population.

While the literature suggests that earnings of women are more likely to be used for the benefit of children than that of men (Charmarbagwala et al., 2004), the effect of mothers' employment on the nutritional status of children is influenced by several intervening factors such as availability of other caregivers (Lamontagne et al., 1998, Tucker and Sanjur, 1988), socioeconomic status of the households (Popkin and Solon, 1976), and the ability of women to utilise their own earnings (Abbi et al., 1991, Bennett, 1988). The outcomes are also suggested to differ by place of residence and age of children. A study in Philippines showed that mothers' employment increased the risk of child malnutrition in rural areas, but was

protective in urban areas (Ricci and Becker, 1996). Another study in Nigeria showed that mothers' employment was more detrimental to the current nutritional state of younger children compared with that of older children (Ukwuani and Suchindran, 2003). In India, the studies on maternal employment have shown mixed effects on child nutrition. While a study in southern India showed that mothers' employment results in improved nutrition of children (Sethuraman et al., 2006), others have found the effect to be detrimental to both child care and nutrition (Abbi et al., 1991, Choudhary et al., 1986). The main reason identified for the negative effects of mothers' employment was the inability of women to access and utilise their own earnings (Abbi et al., 1991). The descriptive statistics of this cross-sectional study (table 3.4) showed that the decision to utilise the earnings of the mothers in the study population were taken by their in-laws in 47.4 % of the households and by their husbands in 28.9% of the households. In only four of the 76 households (5%) where the mother worked to earn money, did she have the autonomy to spend her own earnings.

### 3.13.3: Infant malnutrition

The high prevalence of malnutrition in the study population is in and of itself an important finding that warrants attention. Although the Indian subcontinent is known to have higher prevalence of wasting (De Onis et al., 1993, Fernandez et al., 2002), a prevalence of 39% moderate wasting and 15% severe wasting among infants is critical for the district. While wasting and stunting are measures of acute and long-term malnutrition, respectively, underweight is a composite indicator, but does not indicate the nature of malnutrition and is thus difficult to interpret. However, it is suggested that underweight reflects the problem of the type of malnutrition that is more prevalent in the population (De Onis et al., 1993). Thus,

in this study underweight mostly reflects acute malnutrition since there was a high prevalence of wasting in the surveyed households.

A similar high prevalence of malnutrition among children under five years of age in the district of Dungarpur was observed in a survey conducted by a not-for-profit organisation in 2011 (Naandi Foundation, 2011). According to their report, 41.7% of the children under five years of age were underweight (21% severely underweight), 19.2% wasted (7.4% severely wasted) and 53.4% stunted (31.5% severely stunted) (Naandi Foundation, 2011). Similarly another study conducted in 2005 in three districts of Rajasthan (including Dungarpur) showed that 32% of the children in the age group of 0-59 months were underweight and 21.1% severely underweight (Kumar, 2006). The same study found stunting to be more prevalent in the age group of 36-59 months compared with 0-35 months (Kumar, 2006). Compared with the population of this cross-sectional study which included only infants in the age group of 1 to <12 months, the above mentioned surveys included children from zero to 59 months of age, which could be the reason for the higher reported prevalence of stunting. It is suggested that while wasting can manifest at any age from infancy to childhood, stunting which is an 'accumulated consequence of retarded growth', may take a few years to manifest (WHO Working Group, 1986). Further, data from 19 countries (2 from South Asia, 10 from Africa and 7 from Latin America) showed a declining pattern for the prevalence of wasting (particularly severe wasting) among children from 0 to 24 months of age, but a progressive increase in the prevalence of stunting until 24 months of age followed by a plateau (Black et al., 2008).

#### 3.13.4: Effect of other determinants on infant malnutrition

In addition to answering the research question with regards to the effect of MGNREGA on infant malnutrition, the study provides an understanding of the effects of the other determinants of infant malnutrition. The role of socioeconomic status in improving nutritional outcomes over and above employment through MGNREGA suggests that while MGNREGA is probably acting through improving socioeconomic status of the households, there are still residual effects of socioeconomic status on the anthropometric indicators. Irrespective of whether the households were employed through MGNREGA, their level of socioeconomic status was observed to be an important determinant of infants' nutritional status. The positive effect of higher socioeconomic status on infant and child malnutrition has been shown by various studies in India and globally (Mishra et al., 1999, Charmarbagwala et al., 2004, Assis et al., 2008, Bomela, 2009, Das and Rahman, 2011).

The study also conforms to the findings of many other studies in India which show a higher risk of malnutrition among children born in the Schedule Tribe and Schedule Caste social groups (Das, 2008, Bawdekar and Ladusingh, 2008). This higher risk is mostly attributed to poverty and specific infant feeding and care practices in these social classes or to the marginalisation of these groups (Bawdekar and Ladusingh, 2008). However, social class did not have an effect on chronic malnutrition among the infants in this study population.

Institutional delivery as an indicator of health seeking behaviour had a protective effect against chronic malnutrition, but not acute malnutrition. However, other studies have suggested delivery in health institutions to be protective against stunting (Rahman and Chowdhury, 2007) as well as underweight and wasting (Kamiya, 2011). Although other behavioural risk factors were not found to be associated with infant malnutrition, increased

underweight among infants  $\geq 6$  months compared with  $<6$  months observed in this study could be attributed to inadequate supplementary feeding practices. Breastfeeding alone is not sufficient to provide the required energy and protein to infants after 6 months and inadequate nutrient supplementation increases the vulnerability of infants  $>6$  months of age to malnutrition (Victora et al., 1984, Bawdekar and Ladusingh, 2008). A comparative analysis of the nation-wide data of five countries in South Asia showed that India had the lowest proportion of children 6-23 months receiving minimum acceptable diet (about 9%, compared to 40% in Nepal and Bangladesh, and 68% in Sri Lanka) and minimum dietary diversity (about 15% compared to 42% each in Nepal and Bangladesh and 71% in Sri Lanka). The reasons found were poverty and low maternal education, but the role of factors such as cultural practices related to timely and adequate supplementary feeding should be understood. Wasting and underweight among infants of higher birth-order could also be attributed to compromises in care and feeding as was shown in other studies (MacCorquodale and de Nova, 1977, Madzingira, 1995).

Two important determinants, gender and mother's level of education were not found to have a significant effect on infant malnutrition in the study population. Studies in India have shown mixed results with regards to discrimination against the female gender as a risk factor of malnutrition. Three regional level studies showed a higher risk of malnutrition among girls, (Singh et al., 2006, Pande, 2003, Bose et al., 2007), but the nationally representative demographic and health surveys and other large scale surveys in India have not reported the existence of gender discrimination in child malnutrition (Mishra and Retherford, 2000, Bharati et al., 2008, Gaiha and Kulkarni, 2005, Mishra et al., 1999). While several studies show a protective effect of mother's education, particularly higher level of education, on

infant and child nutrition (Bomela, 2009, Bouvier et al., 1995, Casapia et al., 2007, Das and Rahman, 2011), this was not found to be the case in this study. However, this is not implausible because studies suggest that mother's knowledge and her attitude towards infant care and feeding are more important than her level of education, which in many cases were found to function through the former (Glewwe, 1999, Gaiha and Kulkarni, 2005).

Moreover, in contrast to the common belief that diarrhoea, respiratory infections, water and sanitation have a direct effect on the nutritional status of infants (Mwadime and Baldwin, 1994, Martorell and Ho, 1984, Adair et al., 1993, Bardosono et al., 2007, Bloss et al., 2004, Das and Rahman, 2011, Gaiha and Kulkarni, 2005), this study showed that the nutritional status of infants were not affected by these determinants. This is similar to the findings of a few studies in different states in India (Bawdekar and Ladusingh, 2008) and in other countries (Vella et al., 1992, Casapia et al., 2007, Charmarbagwala et al., 2004, de Menezes et al., 2011, Engebretsen et al., 2008). A longitudinal study in Bangladesh showed that while malnourished children were at a higher risk of having diarrhoea, the effect was transient (Briend et al., 1989). Another study in Zimbabwe showed that weight loss in children 9-24 months with each episode of diarrhoea was about 2% and more than 90% of the children returned to their normal weight in a month's time (Moy et al., 1994). Thus, factors other than the proximal risk factors are perhaps more important in preventing malnutrition, but the effects of these factors are also shown to be context specific (Som et al., 2006) and vary with the age of the child (Magnani et al., 1993). Som et al. (2006) used the NFHS-II data to demonstrate that different factors had varying degrees of affect on child malnutrition in two neighbouring states of India, Assam and West Bengal, with comparable social, demographic and geographical conditions. Whereas mother's level of education and birth order were

important determinants of wasting, underweight and stunting in West Bengal (not significant for Assam); father's education, place of residence, availability of toilet facilities and social class were important factors influencing children's nutritional status in Assam (not significant for West Bengal) (Som et al., 2006). A cross-sectional study in Philippines by Magnani et al. (1993) found breastfeeding and sanitation to be important determinants of underweight in children less than one year, but for children more than one year of age low socioeconomic status and being female increased the risk of malnutrition.

### 3.14: Limitations

This study provides empirical evidence about the effects of MGNREGA on infant malnutrition, but has a number of limitations. Cross-sectional study is not considered to be a good study design to measure the prevalence of malnutrition. It provides a snap-shot of a point in time and anthropometric indicators fluctuate across infancy and childhood. A prospective cohort study would provide better insights into the effect of MGNREGA on the nutritional status of the infants during the entire period of infancy. However, considering the limitations of cost and feasibility, most studies on infant and child malnutrition are cross-sectional as was the case for this study. Besides, even though cross-sectional studies provide estimates at a point in time, these cannot be ignored with regards to the evidence generated.

Participation in the MGNREGA is through self-selection and the exploratory regression analysis showed that belonging to below poverty line status was the only criterion that was associated with households' participation in MGNREGA. The final multivariable regression model accounts for this factor and thus controls selection bias to a certain extent. Moreover, all villages were sub-centre villages thus the MGNREGA and non-MGNREGA groups were matched in terms of their access to healthcare and nutrition services. However, this restricts

generalisation as the sampled sub-centre villages could be different from other villages in the district.

Considering that this is not a randomised controlled trial there could be other unaccounted factors that influenced participation in MGNREGA in the study population, and thus selection bias cannot be completely ruled out. For the same reason, although all known confounders identified from literature have been controlled for, there could still be residual confounding. For example, mothers' nutritional and mental health status could have an effect on infant malnutrition (Bhargava, 2000, Anoop et al., 2004, Adair et al., 1993, Rahman et al., 2004, Gewa et al., 2012, Bharati et al., 2008). Considering the limitations of resource and time for primary data collection, anthropometric measurement of mothers were not feasible, thus mothers' nutritional status was not known. However, this variable may have been accounted for, at least in part, by the variables household food security and socioeconomic status. With regards to mental health status, an attempt was made to capture data using the 'General Health Questionnaire – 12', but as discussed in section 3.4.6.3, the tool was removed from the questionnaire after the pilot study because the participants were unable to understand the questions.

### 3.15: Summary

The cross-sectional study in 528 households involving 1,056 participants (528 pairs of mothers and infants) in Dungarpur district of Rajasthan, India, showed that MGNREGA had a protective effect against infant malnutrition in households participating in MGNREGA compared with non-participating households. Although it appeared that mothers' employment in MGNREGA could increase the risk of infant malnutrition, due to the small sample of the sub-group this needs to be interpreted with caution. This chapter answered the

first research question with regards to whether MGNREGA has an effect on infant malnutrition. However, MGNREGA affects infant malnutrition through a pathway of other socio-economic, behavioural and biological determinants. Thus, apart from measuring the effect, it is important to understand the mechanisms through which MGNREGA affects infant malnutrition. Focus group discussions were used to explore the mechanisms of effect of households' and mothers' participation in MGNREGA on infant malnutrition. The findings are presented and discussed in the next chapter.

## Chapter 4

### Understanding the mechanisms of effect of MGNREGA on infant malnutrition

#### 4.1: Overview of the chapter

The logistic regression analysis of the cross-sectional study data showed that MGNREGA had a protective effect against wasting and underweight among infants in the households participating in MGNREGA compared with households that did not participate. This answers the first research question about whether there is any effect of MGNREGA on infant malnutrition. However, it is important to understand the mechanisms through which MGNREGA affects infant nutrition. The methods, findings and discussion of the qualitative study used to explore these mechanisms of effect of MGNREGA on infant malnutrition are presented in this chapter. The chapter is divided into eight sections - methods and participants (includes the study design, study population and setting, sample size, sampling design, tools used and techniques for analysis), ethical considerations, challenges in implementing the focus group discussions, findings and discussions of the two proposed mechanisms of effect of MGNREGA, understanding the role of social class inequalities as a risk factor of infant malnutrition (identified in the cross-sectional study), limitations of the study and finally a summary of the important points.

#### 4.2: Aim

This chapter aims to explore the mechanisms through which MGNREGA affects infant malnutrition in order to delineate the pathways of effect of MGNREGA.

### 4.3: Objectives

The objective of this chapter is to understand whether the following proposed positive and negative mechanisms of effect of MGNREGA on infant nutrition hold true in the study population:

1. Positive mechanism: households' participation in MGNREGA leads to improvement in household food security and infant feeding.
2. Negative mechanism: mothers' participation in MGNREGA is detrimental to infant care and feeding.

### 4.4: Methods and participants

The qualitative component of this mixed methods study was through focus group discussions. Focus groups were used to generate **themes** and **interactions** (Kitzinger, 1995b, Kitzinger, 1994) through group discussion with mothers of infants aged 1 to <12 months to explore the proposed mechanisms of effect of participation in MGNREGA on infant malnutrition. The advantage of focus group discussion is that it is an interactive process of generating data (Kitzinger, 1994). Focus group discussions are routinely used to understand people's perceptions of '*illness, health and health seeking behaviours*' (Kitzinger, 1995b). It is suggested that focus group discussion are more effective than the in-depth interviews when the topic is not sensitive, but is more socially relevant (Morgan, 1997, Wutich et al., 2010).

The study site was the same as that of the cross-sectional study (described in section 3.4.2, chapter 3). Focus group discussions were conducted in all the five administrative blocks of Dungarpur district. Unlike the cross-sectional study in which sample sizes were

mathematically calculated to power the study for internal validity, the sample size for the focus group discussion was based on expert opinions, published literature and the research question (Teddlie and Tashakkori, 2009, Creswell and PlanoClark, 2011). With regards to focus groups the rule of thumb as discussed by Morgan (Morgan, 1997) and Kitzinger (Kitzinger, 1995a), is three to five groups. However, they also suggest that the number depends on within and across group diversity, structure of the interview guide and the point of saturation<sup>29</sup> of information (Morgan, 1997, Kitzinger, 1995a). Although, 'saturation' was reached after six focus group discussions, to achieve a fairly high degree of within and across group diversity, 10 focus groups were conducted in 10 villages, two in each of the five administrative blocks of the study district. The groups were composed of a minimum of five and maximum of eight participants.

A purposive sampling method was used to recruit participants for the focus group discussions. Participants were a sub-set of the randomly selected participants for the cross-sectional study, known as a nested sampling approach (Onwuegbuzie and Collins, 2007). Eleven focus group discussions (including the pilot study) were conducted with 65 participants, 62 mothers of infants, two local village nurses and a nutrition worker. Through homogenous and segmentation sampling (Morgan, 1997, Teddlie and Tashakkori, 2009, Teddlie and Yu, 2007) participants were categorised into two groups according to their social class (Schedule Tribe/ Schedule Caste and non-Schedule Tribe/ Schedule Caste). Among the total participants, 44 belonged to the Schedule Tribe/ Schedule Caste and 21 were from the non-Schedule Tribe/ Schedule Caste groups. Segregation by social class was

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<sup>29</sup> 'Saturation in purposive sampling occurs when the addition of more units does not result in new information that can be used in theme development' (Page-183) TEDDLIE, C. & TASHAKKORI, A. 2009. Foundations of mixed methods research. Integrating quantitative and qualitative approaches in the social and behavioural sciences, Thousand Oaks, CA, Sage.

done to discuss the common cultural practices and beliefs with regards to infant care and feeding. Although it was planned to segregate the participants (mothers of infants) based on their employment through MGNREGA to understand the perception of the MGNREGA employed and non-employed mothers, it was not possible to do so. The reason was that not many mothers were employed through MGNREGA during the study period within the selected villages. Only one third (n=19) of the total 62 mothers worked in MGNREGA at some point, and just over one quarter (n=16) worked after their delivery and were still employed during the time of the focus group discussions.

While the groups were homogenous with regards to all participants being mothers of infants, the participants were significantly different in terms of their level of education (illiterate = 39; primary education = 17; secondary and higher education = 9), and socioeconomic status (lowest two quintiles of asset index = 21; third quintile = 10; fourth quintile = 14; and fifth quintile = 19). The median age of the participants was 25 years (inter quartile range = 22 to 28 years). This sampling method facilitated the understanding of the role of various factors in shaping the attitudes and perceptions of the participants with regards to the two proposed mechanisms of effect of MGNREGA on infant malnutrition. A table of the descriptive statistics of the participants is included in appendix 4.1. Two characteristics of the participants are noted along with the participant IDs for each quote presented in the chapter, namely; social class group (Schedule Tribe/ Schedule Caste (ST/ SC) or non- Schedule Tribe/ Schedule Caste (non-ST/ SC)) and ever employed through MGNREGA (MGNREGA) or never employed through MGNREGA (non-MGNREGA). Some women who were never employed through MGNREGA had specific perceptions and opinion about

the programme because either their households participated in the programme or they had observed and/ or heard about the experiences of other women.

A semi-structured guide with probes was used to conduct the focus group discussions (provided in appendix 4.2). The probes used were adapted to capture the emergent themes as the focus group discussions progressed. The semi-structured guide was tested in a pilot study conducted with six mothers of infants belonging to the Schedule Tribe social class. The focus group discussions were conducted by the author with the help of a field assistant (trained female nurse). The field assistant acted as the translator and also took notes during the discussion. Memo and code books were maintained, and all focus group discussions were recorded using a voice recorder for maximum transparency.

The recorded tapes were transcribed non-verbatim, translated to English and cross-checked with the field notes. These along with the memos (taken during focus group discussions) were coded using set themes (based on the conceptual framework) and emergent themes (Morgan, 1997). The transcripts and codes were managed using NVivo9 (NVivo, 2010). Considering that the groups were segregated by social class, the 'grid' method of analysis was used to first analyze the themes generated within each group and then compared across the two social class groups to understand the common and unique individual and group themes (Kitzinger, 1994, Morgan, 1997). Further, thick descriptions on group dynamics and interactions were used to clearly state the context of the focus group discussions (Kitzinger, 1994). While inter-coder agreement is considered to be a useful means to address the reliability issues of qualitative data, it was not possible to have a second researcher code the transcripts considering that this was for doctoral research. However, the codes and the themes were checked by two supervisors. It was also not possible to do a 'member-

checking' to ensure validity of the reported themes (Creswell and Miller, 2000), but a short summary of the discussions was presented at the end of each focus group discussion to check if the views of the participants were captured accurately.

#### 4.5: Ethical considerations

As was done for the cross-sectional study, participant information sheet and consent form (provided in appendix 4.3) in local languages were used to elicit written informed consent from the participants. For participants who were unable to read and write, the interviewer read out the participant information sheet and consent form. It was ascertained that the participant had understood all risks and benefits associated with the study and that the participation is purely voluntary and that she could refrain from answering any question or withdraw from the study at any point. Thumb impression on the consent form was taken for such participants who after being thoroughly explained by the interviewer agreed to participate in the study. Further, before conducting the focus group discussions, participants who consented to participate were required to sign a confidentiality form (provided in appendix 4.4) agreeing that the discussions held and the information shared during the discussion would not be shared with anyone or made public. The participants were assured that confidentiality will also be maintained by the facilitator and the field assistants. Written informed consent and confidentiality agreement were also obtained from the local village nurses (ANM) and the nutrition workers (Anganwadi workers) who were present during the focus group discussions. In addition, the interview tapes were stored in locked cabinets and the transcribed data were stored in pass-word protected files. To maintain strict confidentiality of all information, a unique identification code was used for each participant and all participant identification data were de-linked from the files before analysis.

#### 4.6: Challenges in implementing the focus group discussions

The major challenge faced was initiating discussions among the participants. The women were reluctant to speak and had their faces covered. To overcome this problem and to make the participants comfortable, the focus groups discussions were conducted in the *Anganwadi centres* (the village Integrated Child Development Services centres). The local village nurse was also allowed to be present during the discussions. This resulted in some prompting by the local nurse or Anganwadi worker present in the centre. However, these prompts were noted in the memos and were taken into consideration while analysing the themes. Even after using these measures it was observed that one or two participants (usually the educated ones) dominated the focus group discussions and a few of them (mainly young and illiterate women) did not speak at all but simply nodded their heads.

#### 4.7: Positive effect of MGNREGA through improved household food security and adequate infant feeding

The literature review suggested that MGNREGA by contributing to income in the participating households could lead to food security, which would have a positive effect on infant feeding and thus, reduce infant malnutrition in participating households (Mascie-Taylor et al., 2010, Jha et al., 2011, Khera, 2011). However, studies suggest that mothers' knowledge, cultural practices and poverty are important factors that influence infant feeding and care (Burchi, 2010, Jesmin et al., 2011, Paul et al., 2011, Senarath and Dibley, 2012, Ramachandran, 2007, Ruel et al., 1999) regardless of improved food security, and would thus play an important role in mediating these positive effects of MGNREGA. The first proposed mechanism was therefore explored using three themes:

1. MGNREGA's effect on household food security
2. Mothers' knowledge about infant feeding
3. Cultural practices influencing infant feeding

#### 4.7.1: MGNREGA's effect on household food security

Agriculture is the main source of livelihood in the district of Dungarpur. The participants (both employed through MGNREGA and not) suggested that earnings from MGNREGA contributed towards preventing hunger and starvation when there is crop failure particularly among the poor. There was heavy rainfall and floods in the district during the agricultural season (July to September) in 2011 which destroyed the major crop and staple food, maize. The focus group discussions were conducted in September 2011 and several participants mentioned being dependant on MGNREGA to obtain food. A participant employed through MGNREGA at the time of interview commented that if the programme was to be abolished, the poor people would be the losers because they do not have recourse to any other means of income.

*“If they stop the programme, the poor people will be at a loss” (M-43; MGNREGA, non-ST/ SC)*

Another participant, who although had not benefited from the programme directly, explained that MGNREGA was essential because the people could not survive on their agricultural produce alone. The earnings from MGNREGA helped the poor people buy food grains who would have otherwise starved during crop failure.

*“If there is no Rozgar Guarantee [MGNREGA] then what do we eat? If we get some money [we] can buy food grains for the house and [we] can go on. What ripens in cultivation? What do we eat? There are no crops, so we have benefited from Rozgar [MGNREGA].” (M-13; non-MGNREGA, ST/ SC)*

Apart from being able to ward off hunger, the participants consistently mentioned that the earnings from MGNREGA helped them to meet minor household expenses such as buying tea leaves, sugar etc. for the household, but there were no comments about savings or MGNREGA lending financial or food security to the participating households.

*“[We buy] small things like, tea leaves, sugar, milk..... minor expenses can be met.” (M-32; MGNREGA, non-ST/ SC)*

Although it was agreed that MGNREGA conferred some benefits (preventing hunger during crop failure and meeting minor household expenses otherwise), the participants complained of low wages and delays in receiving payments. They did not trust the supervisors, responsible for paying the wages to the workers, complaining that they siphoned off money and paid only a small portion of the daily wages to the workers. The participants perceived these as barriers to receiving the complete financial benefits from the programme that intends to address income poverty in rural areas.

*“Who gets 100 [INR]? The person responsible for paying us the wages takes away most of it. Last time I got 200 rupees for 11 days, so there is no benefit.” (M-19; MGNREGA, ST/ SC)*

Poverty itself was a factor that negatively affected infant feeding. “Inability to afford” compromised the type of complementary foods given to the infants. These were mostly biscuits or a piece of dry roti (bread) made of either wheat or maize which were grossly deficient in nutritional value. Although the mothers were aware that these foods could harm the child, they could not afford to buy anything else and had no other option. For example, a mother mentioned that her young daughter was unable to swallow biscuits and often vomits it out, so she had no option other than breastfeeding.

*“Where do we get vegetables to give to our children?” (M-38; non-MGNREGA, ST/ SC)*

*“Yes only biscuits. Sometimes I soak the biscuit in milk and give, but she vomits. She can’t eat so I am giving her my milk” (M-43; MGNREGA, non-ST/ SC)*

None of the participants claimed MGNREGA to improve infant feeding or food and nutrient intake of pregnant women and breast feeding mothers. Thus, it seems unlikely that MGNREGA led to food security in the participating households in the study population. Even if it did, food security may not have resulted in adequate infant feeding due to lack of mothers’ knowledge and cultural practices that negatively influenced feeding practices.

#### 4.7.2: Mothers’ knowledge of infant feeding

The focus group discussions revealed that mothers’ knowledge with regards to initiation of breastfeeding, exclusive breastfeeding and weaning practices were inadequate. There were several misconceptions revealed among the mothers of infants who participated in the focus group discussions. There was a general belief that breast milk is produced only after two hours of delivery, so the mothers delayed feeding of the infant by at least two hours and in some cases for six hours or two days.

*“I started breastfeeding after two hours because I did not have enough milk. Milk comes only after two hours.” (M-40; non-MGNREGA, ST/ SC)*

*“We don’t have enough milk, so we don’t feed for two days.” (M-03; non-MGNREGA, non-ST/ SC)*

A local village nurse (ANM) present during the focus group discussions informed that the women believed they have to collect the milk in the breast for the first few hours after delivery to increase the production and quantity of breast milk. It was also found that some

mothers expressed and discarded the colostrum because they believed the colostrum was stale and could harm the child.

*“First breast milk is not good because it was stored in the breast for a long time and may have germs.” (M-03; non-MGNREGA; non-ST/ SC)*

Apart from late initiation of breastfeeding, it was found that infants less than six months were not exclusively breastfed. It was a common practice to give water and animal milk (cow’s, goat’s, buffalo’s) with or without *ghee* (clarified butter). The reasons for this varied. Some mothers said that breast milk alone was not sufficient for the infants after three to four months; others believed that *ghee* will make the infants strong and help them to reach their developmental milestones rapidly. Animal milk mixed with *ghee* was also suggested to have soporific properties and was given to put the infant to sleep while the mother completed her household chores.

*“[We give ghee] so that the child is not weak, [ghee] gives strength. If we give ghee the child learns to walk early.” (M-55; MGNREGA, non-ST/ SC)*

*“[We] give ghee in two months [or] four months when mother goes to the farm to work. [She] puts ghee in the milk and gives to the child. The child will sleep.” (M-50; MGNREGA, ST/ SC)*

It appeared from the discussions with the mothers that the infant feeding practices were strongly influenced by the cultural practices in the society. The community health and nutrition workers also attributed the inappropriate infant feeding practices to traditions and customs rather than to the lack of awareness or knowledge among the mothers. However, it was suggested that institutional delivery aided in promoting early initiation of breastfeeding because the mothers were instructed by the doctors and other skilled birth attendants in the health centres, but certain beliefs were still prevalent.

*“Madam, there is a tradition among the schedule tribes; they believe that milk comes only after two hours. They have to collect the milk in the breast. But now many women who deliver in the health centres are made to breastfeed within half to one hour by the doctor or the nurse. Still some women do it [do not feed the infant until two days]” (ANM)*

The focus group discussions suggest a general lack of knowledge among mothers about adequate infant feeding, but the practices were also informed by the cultural practices.

#### 4.7.3: Cultural practices influencing infant feeding

Cultural practices appeared to inform mothers’ knowledge and influenced their infant feeding practices. A custom known as ‘*Annsprashan*’ was found to be commonly prevalent in which the infant is weaned after a ceremony where the maternal uncle (*mama*) first introduces semi-solid and solid foods. The initiation of complementary feeding can vary from seven to eleven months depending on the auspicious time determined for the ceremony. In addition, certain communities did not give any semi-solid or solid food to infants until they were 12 months of age. These practices considerably delayed the initiation of complementary feeding and increased the vulnerability of the infants to malnutrition.

*“We have this custom, Mama [maternal uncle] will give food to the child, rice in 8th month or 9th month or 11th month. There is a puja [ceremony of worshipping God] and then rice is given to the child.” (M-51; MGNREGA, ST/SC)*

*“We Patidaars [a community] give nothing except milk [to the child] until 12 months. We don’t give roti [bread].” (M-53, non-MGNREGA, non-ST/SC)*

Several practices that interfered with adequate infant feeding were being passed on for generations in the community in the name of customs and norms. A participant commented that these practices were necessary and it was important to follow them because the customs were made by their forefathers. Another participant said that they have to follow the traditions and the norms if they wanted to be a part of the society.

*“Yes, people have been doing this [Annaprashan-the custom for initiating supplementary feeding] for a long time, it is necessary.” (M-57; non-MGNREGA, non-ST/ SC)*

*“These [customs] are necessary, if we want to stay in a society, it is important to follow the customs and traditions.” (M-55; MGNREGA, non-ST/ SC)*

For some women the customs were irrefutable and thus could not be changed, others felt that they were not capable of changing the set norms. It was mentioned that their incapability to bring about change was enforced by the society who did not educate women for the fear of liberating their thoughts and actions.

*“Things are not going to change based on what we say or think, these will remain as it is. The customs will remain.” (M-49; MGNREGA, ST/ SC)*

*“We want, but they [referred to the society] don’t let us bring changes.” (M-45; non-MGNREGA, non-ST/ SC)*

Thus, cultural practices played a significant role in determining infant feeding. Most women participating in the focus group discussions have accepted the norms of the society, but education could bring about the desired changes as was commented by a village nurse -

*“They are learning gradually, but their mother-in-laws and other elderly women in the house force them to follow the customs. Even my mother-in-law forced me to follow this custom (giving ghee to the child), but I did not listen to her.” (ANM)*

Nevertheless, it can be inferred that societal norms and culture related to infant feeding has important implications for the pathway of MGNREGA under investigation and could limit the benefits of MGNREGA on infant feeding.

#### 4.7.4: Discussion

Although the desired goal of MGNREGA is to address food insecurity in rural households, the findings of this qualitative study suggested that earnings from the MGNREGA were good enough to prevent hunger, but they were insufficient to lend food security to the

households. This is in contrast to the findings of a survey among MGNREGA workers in north India which suggested that MGNREGA was able to provide food and financial security to the participating households (Khera and Nayak, 2011). The difference could be due to lower than intended wages and delays in payment mentioned by the study participants. Several studies and programme audit reports compiled in the book by Reetika Khera (Khera, 2011) have identified such problems related to wages and timely payments, a majority of which were attributed to corruption. Nevertheless, the study participants considered MGNREGA essential to support the livelihood of the poor in the rural areas who had limited access to other social and economic support.

The findings support the results of the logistic regression models which showed that MGNREGA reduced recent malnutrition (wasting) among the infants which is considered to be associated with hunger, starvation, acute illness and financial shocks (De Onis, 2000, Victora, 1992), but no significant impact was observed on long standing malnutrition (stunting) which mostly depends on the household's socio-economic status (De Onis, 2000, Victora, 1992). Therefore, for the population surveyed, it may be concluded that MGNREGA was able to prevent hunger, but did not lead to long term and sustained food security. It is possible that the drawbacks in programme implementation such as low wages, delayed payments and corruption are preventing MGNREGA from providing the participant households with sustainable long term food security.

Even if MGNREGA was able to confer food security to the participating households, food security was not likely to translate into adequate infant feeding because of lack of appropriate knowledge about infant feeding among the mothers in the study population. Cultural practices, societal norms and poverty also played an important role in influencing

mothers' feeding practices. Other studies in different parts of India have also highlighted the problem of inadequate knowledge among mothers and the misconceptions prevalent with regards to infant feeding and care (Abbi et al., 1988, Bawdekar and Ladusingh, 2008) . Delayed initiation of breastfeeding (Vatsayan et al., 1996) and complementary feeding (at 9-12 months) attributable to cultural beliefs and norms are reported by studies from different parts of India (David, 1989). In addition, the types of complementary food given to infants are also determined by the prevailing societal and cultural beliefs (David, 1989). Other studies showed that newborn infants were not given the colostrum, which is vital for building up the immune system of the child and the prevalence of exclusive breast-feeding was low (Bawdekar and Ladusingh, 2008, Rao et al., 2005). Apart from cultural practices, it is also noted that child care and nutrition education of the mothers are inadequate in the country (Das, 2008). However, not just education per se, but the societal norms and inability of mothers to go against them could pose serious hindrances to the acceptance and uptake of the behaviour change and health promotion programmes directed towards improving infant feeding practices in the community.

Poverty was another barrier to adequate feeding and MGNREGA was not able to overcome it. This is supported by the fact that the participants of the focus group discussions did not mention anything about MGNREGA's role in improving infant feeding despite there being a general consensus about the necessity to earn money (from any source) to feed the children. Therefore, it can be inferred that the mechanism of observed protective effect of MGNREGA against infant malnutrition is not likely to be through its positive effect on household food security and adequate infant feeding in the study population.

#### 4.8: Negative effects of mother's employment through MGNREGA on infant feeding and care

Studies suggest that providing employment to women could directly benefit infant nutrition and indirectly through mother's financial independence and empowerment (Charmarbagwala et al., 2004). However, it could also have a negative effect due to mother's time away from infant feeding and care (Abbi et al., 1991, Popkin and Solon, 1976), but the role of other caregivers could mitigate this negative effect (Bennett, 1988, Lamontagne et al., 1998). Four themes were generated from the focus group discussions regarding the impact of mothers' employment through MGNREGA on infant feeding and care:

1. Mothers' employment compromises infant feeding and care
2. Caregivers inability to substitute mothers' care
3. Benefits from MGNREGA not worth the cost of child care
4. Employment as disempowering

##### 4.8.1: Mothers' employment compromises infant feeding and care

The participants commented that mothers' employment in MGNREGA led to compromises in infant feeding and care. The women had problems in breastfeeding their infants during work hours which compromised both timely feeding and exclusive breastfeeding. The work sites were sometimes far from the village and long hours of work made it difficult for them to come home to feed the child even during their lunch breaks. This left the child hungry and in distress.

*“Even if [we] get a little time, [we] come home and feed the child. Tell them [the supervisors], then run and come and feed the child.” (M-60; MGNREGA, ST/SC)*

*“[We can come home] if the work place is near, if far cannot [come], then [we] breastfeed only when the day is over.” (M-48; MGNREGA, ST/ SC)*

The mothers employed in MGNREGA faced physical problems such as pain and swelling in their breasts due to not being able to feed their child for long hours. They were also anxious and worried about their child. These adverse effects on mothers' health could in turn have negative effects on child care.

*“Milk accumulates in the breast, it swells and is painful when I don't feed the child from time to time. It happens when I am away for a long time.” (M-47; MGNREGA, ST/ SC)*

*“Yes, we have problems in leaving the child at home, Even if we go we have problems, we are worried about the child. Our mind and heart are with the child.” (M-55; MGNREGA, non-ST/ SC)*

Although the policy guidelines of MGNREGA makes it mandatory for all work sites with five or more children below six years of age to provide crèche facilities (India. *The National Rural Employment Guarantee Act 2005*), such provisions were not available in the communities surveyed. While some women felt that provision of crèche facilities at work site would address the problems related to infant feeding, others were concerned about the safety of their children at the work sites and therefore, did not feel that crèche facilities would make any difference.

*“[If crèche facilities are available] our breast will not swell, we can feed the child from time to time.” (M-15; MGNREGA, ST/ SC)*

*“No we will not take the child, he is safe at home in the shade. Don't know how another woman will keep him, he is safe at home.” (M-25; non-MGNREGA, ST/ SC)*

*“It is hot, where do we keep the child? We do just this kind of work [manual labour] which is not safe, where will we keep the child?” (M-27; MGNREGA, ST/ SC)*

Thus, it appears from the focus group discussions that mothers' employment in MGNREGA was detrimental to both infant feeding and to their own health. The mandatory provisions for crèche facilities at worksites existed only on paper and mothers had to spend a considerable time away from infant feeding and care.

#### 4.8.2: Caregivers' inability to substitute mothers' care

During the MGNREGA work hours, the infant was taken care of by another family member, usually the paternal grandmother of the child (mother-in-law of the woman). There were different perceptions among the mothers with regards to care by other carers. While some study participants believed that their mother-in-laws took good care of the infant in their absence, others did not trust them and yet others did not know.

*"We have faith in her [mother-in-law] that is why we leave the child with her."* (M-27; MGNREGA, ST/ SC)

*"Who will take care of a child like a mother does? My mother-in-law works in the house, cooks roti (food), washes clothes, does other work. She just lays down the child somewhere on the floor."* (M-21; non-MGNREGA, non-ST/ SC)

A mother who was employed through MGNREGA complained that her mother-in-law only pretended to take care of the child in order to compel her to work. Another participant mentioned that the mothers employed through MGNREGA had no choice but to leave their children with other caregivers irrespective of whether the children were taken care of or not.

*"She [mother-in-law] does not take care of the child, but when she sees me coming home, she will pretend to take care of the baby otherwise she thinks that I will not go for work the next day and not bring home money."* (M-08; MGNREGA, ST/ SC)

*"How do we know? Whether [she] takes care or not, we leave the child and go."* (M-44; MGNREGA, non-ST/ SC)

Although some women knew that their children were neglected by the other caregivers and were not provided timely and adequate feeding, they found themselves helpless due to the necessity to earn money and lack of child care facilities at the work sites.

*“Child is in distress, but so what, we have to go.” (M-26; MGNREGA, ST/ SC)*

Although, women were doubtful about the benefits of the crèche facilities at worksite, it seems that the options of care available at home were not a substitute for their time. Lack of adequate care by other caregivers could be mainly attributed to their attitudes, but it could also be due to lack of appropriate knowledge. Whatever the reason, the focus group discussions suggested that other caregivers could not compensate for the working mothers’ time away from infant care and feeding.

#### 4.8.3: Benefits from MGNREGA not worth the cost of child care

Providing employment to women was generally considered beneficial for economic and social well-being of the family. However, due to compromises in time devoted by mother to child care and feeding, and lack of adequate compensatory care by other caregivers, the study participants were of the opinion that the benefits received from participating in MGNREGA were not worth at the cost of child care and feeding. Besides, they had to face the general problems of delayed payment and low wages. Under the prevailing conditions, women with young children mostly opted out of MGNREGA.

*“Don’t get any benefit. I leave the child crying at home and go and don’t get anything. Don’t get money, if I work now I will get money one year later. What is the use of going?” (M-19; MGNREGA, ST/ SC)*

*“We think, what do we earn after leaving the child at home, but what can we do, we have to go to work.” (M-44; MGNREGA, non-ST/ SC)*

*“I used to go before, not now. What is the use when we get the money so late? I don’t go, if the child is sick, from where will I get money for his treatment?” (M-58; MGNREGA, non-ST/ SC)*

From the above themes, it can be inferred that providing employment to mothers through MGNREGA led to compromises in infant care and feeding among the study participants. There was a general agreement that the negative effects on child care outweighed the benefits from MGNREGA. Thus many women preferred not to seek employment after their delivery, but some did not have a choice.

#### 4.8.4: Employment as disempowering

While it is generally believed that providing employment would provide women with financial independence and lead to empowerment, this was not found to be the case among the study participants. None of the participants mentioned employment through MGNREGA as being essential for women’s financial independence and empowerment. This can perhaps be explained by the reasons given by the participants for working in MGNREGA and how their earnings were used. There were three reasons found for women’s participation in MGNREGA: self-motivation, forced to work and no other option.

The need to earn money for the household and for her own survival was the motivation described by some women for working in MGNREGA.

*“I go on my own [to work in MGNREGA], I understand.” (M-27; MGNREGA, ST/ SC)*

*“Who will give me food if I keep sitting [at home]?” (M-51; MGNREGA, ST/ SC)*

In the second focus group discussion one woman mentioned that they were forced to work and were being battered by their husbands and mother-in-laws to go to work in MGNREGA.

Thereafter, the other groups were probed to understand these issues of domestic violence and how they were associated with women's employment in MGNREGA. Domestic violence, women being beaten up and forced to work in MGNREGA came out as a major reason behind women's participation in MGNREGA.

*“If I go they beat me less, if I don't go they beat me a lot.” (M-15; MGNREGA, ST/SC)*

*“Mother-in-law sends us, she says go and work, everyone else is working. We will keep the young child, you go, they say. We have to go. [We] have swelling of the breast and pain, but what can we do? We have to go. Come back home only when they [supervisors] give us leave for the day” (M-44; MGNREGA, non-ST/SC)*

This reflects the social status of the women in the study district and alludes to their helplessness. Women were not free to decide whether they wanted to work or not, it was the family members (in-laws and husband) who decided and in several cases used force and violence to make them work. Some women mentioned that they had to go to work in MGNREGA because there was no other option. Because of the reservation of a third of the jobs for women in MGNREGA, it is easier for the women in the house to get the job. Women with young children often did not work if their mother-in-laws were able to replace them, but if there was no other female member capable of working in MGNREGA they were compelled to go considering their economic circumstances and pressure from the family members (in-laws and/ or husband).

*“[I] have to go to work, my mother-in-law is sick, if I don't go my boy will die of hunger. If we earn we can feed, so we have to go, [we] have to understand and go.” (M-52; MGNREGA, ST/SC)*

Further, the women were not allowed to use their earnings according to their own free will. They had to surrender their earnings to the household head (either father-in-law or mother-

in-law) and were at their mercy to get even a small amount to spend from their own earnings.

*“We give it to our mother-in-law, she buys the daily household goods, we get a little from her to spend.” (M-55; MGNREGA, non-ST/ SC)*

*“No we cannot keep any, if we keep money they [mother-in-law and father-in-law] say you have money so run the house. How can we run the whole [house]?” (M-44; MGNREGA, non-ST/ SC)*

The small amount of money that they received was mostly spent on small personal things such as bangles and to buy biscuits for their infants. There was no mention about using the mothers' earnings for healthcare or for savings. Thus, it can be suggested that employment of mothers through MGNREGA in addition to leading to compromises in infant care and feeding was also a means of oppressing women further. Low social status and oppression did not allow women to take independent decisions about spending their own earnings. Under such circumstances, it is unlikely that employment through MGNREGA could lead to women empowerment in the study population.

#### 4.8.5: Discussion

One of the salient features of MGNREGA is that at least one-third of the beneficiaries should be women (Ministry of Rural Development; Government of India, 2010). Studies suggest that this has improved women's participation in the programme which has conferred financial security (Khera and Nayak, 2011) and independence (Pankaj and Tankha, 2010). However, this was not found to be the case among the study participants. MGNREGA led to domestic violence and compromised infant feeding and care. The mothers felt that the compromises to infant care and feeding due to long hours of work, lack of alternative adequate care arrangements for the infant, low wage and delayed payments outweighed the benefits

from the programme. A study among women in a state in southern India highlighted similar problems related to infant and child care associated with women employment through MGNREGA (Narayanan, 2008).

While studies suggest that availability of other carers at home could minimize the negative effects of mother's employment on child care and nutrition (Bennett, 1988), the findings of this study suggest that some mothers did not trust the other caregivers, who were mainly their mother-in-laws, and perceived the care provided to be inadequate. A qualitative study in western Kenya suggested that the relationship between mothers' employment and child nutrition is influenced by household factors that necessitate mothers' employment (such as low income and deprivation), and knowledge and attitude of other caregivers who compensate for the mothers' time away from child care (Whyte and Kariuki, 1991). It was suggested that in addition to mothers, the other caregivers (mainly the grandmother and the child's father) should be educated about adequate child feeding and care practices (Whyte and Kariuki, 1991). Nevertheless, mother's care is suggested to be the best, especially for infants and young children (Choudhary et al., 1986, Ukwuani and Suchindran, 2003). While some studies suggested that providing crèche facilities at MGNREGA work sites could ensure that the mothers are able to spend more time caring for and feeding their young children (Narayanan, 2008), the participants in this study had mixed opinion about the utility of crèche facilities even if made available.

While mothers' employment could be associated with compromises in child care and feeding, it is generally suggested that employment can lead to empowerment of women through financial independence and security which could have a positive impact on child health and well-being (Charmarbagwala et al., 2004). The propaganda of the MGNREGA is

'Employment for Empowerment'. A qualitative study in four states in India including Dungarpur district in Rajasthan suggested the reasons for women's participation in MGNREGA to be: employment opportunities at 'doorstep', non-requirement of specific skills, female supervisors and equal wage rates for males and females (Pankaj and Tankha, 2010). In contrast, the focus group discussions in this study showed that the reasons for women's participation, especially mothers of infants and young children, may not always be positive. The financial need of the households and the policy favouring women compel mothers with infants and young children to participate in MGNREGA despite the hardships that they face and the compromises to infant feeding and care. The compulsion is either self-selected or imposed by their family members, in some cases through domestic violence which could have negative effects on child care and feeding. In addition to the evident physical harms of domestic violence, studies show that women who experience domestic violence have higher levels of psychological stress (Briere and Jordan, 2004) and are unable to make day-to-day decisions about feeding and care of their children and themselves (Sethuraman et al., 2006). Moreover, research suggests that there are adverse effects of domestic violence against women on both short and long term child nutritional outcomes (Ackerson and Subramanian, 2008, Sethuraman et al., 2006, Rahman et al., 2012).

The women in this study were neither allowed to keep their earnings nor had the autonomy to spend their own earnings, an issue that was noted in the qualitative study by Pankaj and Tankha (2010), but not discussed in-depth. However, other studies in India have highlighted this as a major hindrance to realising the benefits of women employment (Abbi et al., 1991). The findings of this qualitative study are supported by the results of the cross-sectional study which showed that only four out of 76 working mothers (5.3%) independently decided on

how to spend their own earnings. However, in the cross-sectional survey 97% of the mothers who were employed in MGNREGA stated their reason for working in MGNREGA as ‘self motivation’. In the absence of the qualitative study, the findings of the quantitative study would have been misleading suggesting that women were free to choose and perhaps empowered to make their own decisions with regards to participating in MGNREGA.

Although employment in MGNREGA has provided women in the study population with some earnings to meet their small personal needs, it has not led to empowerment. It is rather a source of further oppression that could negatively affect the health, nutrition and well-being of women and their children. Perhaps this is due to the underlying discrimination and low social status of women in the study population. The descriptive statistics in the cross-sectional study showed that only 2.7% (95%CI = 1.5 - 4.4) of mothers participated in household decision making and only one out of the 528 mothers owned any property.

In sum, the findings suggest that the benefits for mothers working in MGNREGA are a few but disadvantages are many. This leads to compromises in infant care and feeding which in turn may increase the risk of infant malnutrition. The results of the multivariable logistic regression model (chapter 3, table 3.9) although not statistically significant, suggest that there could be a negative effect of mothers’ employment through MGNREGA on infant nutrition. The qualitative study indicates that the proposed mechanism of this negative effect is perhaps through compromises in care and feeding. Moreover, merely providing employment would not lead to women’s empowerment unless the position of women in the society is improved.

#### 4.9: Social class inequality and its influence on the effects of MGNREGA

Social class was found to be a major determinant of infant malnutrition in the logistic regression analysis of the cross-sectional study. While there was no social class difference with regards to enrolment in MGNREGA, infants whose parents belonged to Schedule Tribe/ Schedule Caste were more likely to be malnourished compared with those belonging to the non-Schedule Tribe/ Schedule Caste groups. Low social class is a known risk factor of infant and child malnutrition in India (Das, 2008, Bawdekar and Ladusingh, 2008, Pande, 2003) and independently affected the nutritional outcomes in the study infants irrespective of the effects of MGNREGA. The qualitative data was used to further explore social class inequalities in the study population and understand their possible role in influencing the effects and the mechanisms of effect of MGNREGA on infant malnutrition.

Of the eleven focus group discussions, six were conducted in villages inhabited by the Schedule Tribe/ Schedule Caste social classes. These were small villages located at the outskirts of the main village known as the branches (*plalas*) of the main village. The main villages were primarily inhabited by the upper social class groups (non- Schedule Tribe/ Schedule Caste). The data included in this section is from the last question in the topic guide which was meant to enquire if the participants wanted to add anything more apart from what was already discussed. The analysis was performed separately for the two social class groups.

The findings suggest that although the perceptions of the day-to-day problems faced by the two groups were similar such as drinking water source being located far from the village and lack of toilet facilities, there were some problems unique to participants belonging to the Schedule Tribe/ Schedule Caste social classes. The participants of these social groups

perceived themselves to be neglected by the government and their villages to be under-developed compared to the non-Schedule Tribe/ Schedule Caste villages.

*“Yes we do [appeal to the Panchayat (local self-government)], but nobody cares about what we say. We can have roads, bridges, but nothing is done.” (M-16; non-MGNREGA, ST/ SC)*

The Schedule Tribe/ Schedule Caste participants recognised that lack of education was a major hindrance to their economic and social development. They felt themselves to be less capable of demanding facilities from the government and voice their concerns against the perceived neglect.

*“Ours is an illiterate village so we don’t get anything. Patels [a non- Schedule Tribe/ Schedule Caste group] can tell the government, we are not literate, cannot tell the government, the little money that we get from manual labour is all that we have.” (M-48; MGNREGA, ST/ SC)*

During the focus group discussions it was observed that the non-Schedule Tribe/ Schedule Caste groups did not discriminate against the Schedule Tribe/ Schedule Caste people as being inferior. The women from all social groups sat together, had friendly conversation and shared their problems, but it can certainly be suggested that some of the healthcare providers considered them to be uncivilized and did not treat them with respect. The health workers complained that the people from these classes did not want to vaccinate their children or utilise the family planning services. They attributed this to lack of education and/ or awareness among this group.

*“Madam, they are all jungly [living in a jungle or uncivilised], don’t understand anything even if we tell them again and again. Aey!! Did you hear what madam said? Do you all understand? Jungly people don’t understand. Madam they don’t come for vaccination, I have to send the ASHA-Sahyogini [community health worker] several times to their houses to call. I am fed up, they trouble a lot.” (ANM)*

#### 4.9.1: Discussion

Despite India's post-independence policy of affirmative action (positive discrimination of Schedule Tribe and Schedule Caste through reservations and benefits) (Chitnis, 1997, Galanter, 1984), these social groups continue to be at a disadvantage with regards to the nutritional outcomes of their infants and children (Das, 2008, Bawdekar and Ladusingh, 2008). Studies attribute the increased risk of adverse child health and nutritional outcomes among these social groups to their food habits, child care practices and health seeking behaviour (Rao et al., 2005, de Poel and Speybroeck, 2009), apart from low education levels and socioeconomic status. It was not evident from the focus group discussions that the Schedule Tribe/ Schedule Caste social groups were discriminated by other social classes, neither was it mentioned that the healthcare and health facilities were inaccessible to these groups, but clearly they were illiterate and were neglected in terms of infrastructure.

However, these are not the sole attributes that explain the higher risk of malnutrition among the infants born in the Schedule Tribe and Schedule Caste groups. A study tried to decompose the childhood malnutrition inequalities between the different social classes in India and found that the issues of lower healthcare seeking behaviour and education among the Schedule Tribes and Schedule Castes compared with other social classes were not related to access but to utilization (de Poel and Speybroeck, 2009). The indifferent attitude and lack of respect by the healthcare providers towards the people of these social groups as seen in this study perhaps discourage them from utilizing the health and nutrition services.

The logistic regression results of the cross-sectional study showed higher odds of infant wasting and underweight in households belonging to Schedule Tribe/ Schedule Caste group compared with the non-Schedule Tribe/ Schedule Caste group. Many studies stop at this by

simply attributing the higher risk to the social class without understanding the underlying factors (the causes of the cause). The higher risk of infant malnutrition in these social groups could be due to structural problems such as difficulty in reaching these groups that mostly reside in the outskirts and far flung areas, but could also be due to purposive neglect by the healthcare providers. It is also possible that efforts are being made to create awareness among these groups about adequate infant feeding and care, but they do not trust the healthcare providers, the community and nutrition workers due to their indifferent attitude and lack of respect towards the people of the Schedule Tribe/ Schedule Caste groups. Poverty and high illiteracy further contribute to increased risk of malnutrition. Unless these underlying social barriers are addressed, the benefits of social and macroeconomic policies such as MGNREGA and even nutritional interventions will not translate into improved nutritional outcomes for infants and children in the Schedule Tribe and Schedule Caste social groups.

#### 4.10: Limitations

The findings of the qualitative study cannot be generalised due to the purposive sampling method and small sample size. Thus, we have to pay due consideration to those whose voices we are hearing in the focus group discussions and those we are not. However, the participants were a heterogeneous group with varying levels of education, socioeconomic status and social classes, and included mothers who had never worked in MGNREGA, mothers who worked in MGNREGA but stopped after delivery and mothers who were employed through MGNREGA at the time of the study. Still it is possible that the perspectives of women who participated in the focus group discussions could be different from those who did not participate. This could bias the inferences with regards to the

proposed mechanisms of effect of MGNREGA on infant malnutrition in one way or the other. Nevertheless, the qualitative study helped to explore and understand the proposed mechanisms of effect by explaining the possible role of several key determinants of infant malnutrition which otherwise could not have been found through the quantitative study alone.

#### 4.11: Summary

The findings of the focus group discussions suggested that the hypothesized positive mechanism of effect of MGNREGA through improving household food security and infant feeding may not be true for the study population. The findings also suggest negative effects of mothers' employment through compromises in child care and feeding. The discussions further elucidated the role of various socio-cultural determinants of infant malnutrition such as mother's knowledge of infant care and feeding, societal norms and culture, domestic violence against women and social class discrimination in influencing the proposed mechanisms of MGNREGA's effect.

The qualitative study helped explain the findings of the logistic regression results of the cross-sectional study. However, some questions remained unanswered. While the results of the logistic regression model showed that participation in MGNREGA reduced wasting and underweight among infants in the participating households, the qualitative study did not indicate that this effect is through the hypothesized pathway of positive impact on household food security leading to adequate infant feeding and reduced malnutrition. Therefore, the question that emerged was; what could be the possible pathway/s of effect of MGNREGA on infant malnutrition? To answer this question, the hypothesized pathways (Chapter-2, section 2.6, H-1, H-2) were reconstructed using the findings of both the logistic regression

analysis and qualitative study. These models were then quantified using the same data of the cross-sectional study employing path-analysis. The following chapter presents the method, results and the discussions of the path-analysis.

## Chapter 5

### Pathways of effect of MGNREGA on infant malnutrition

#### 5.1: Overview of the chapter

MGNREGA had a protective effect against wasting and underweight among infants in the study population, but the mechanisms could not be attributed to the positive effects of MGNREGA on household food security and infant feeding practices. The results of the logistic regression model did not show a significant effect of mothers' employment through MGNREGA on the anthropometric indicators of malnutrition, but the qualitative study suggested that providing employment to mothers could lead to compromises in child care and feeding. In light of these findings, this chapter further explores the hypothesized pathways of effect of MGNREGA on infant malnutrition through path-analysis of the cross-sectional data to answer the second research question.

#### 5.2: Aim

This chapter aims to delineate the empirical pathways of effect of MGNREGA on infant malnutrition.

#### 5.3: Objectives

The objectives covered in this chapter are:

1. Re-construct the hypothesized theoretical pathways (chapter 2, section 2.6, H-1 and H-2) of effect of MGNREGA on infant malnutrition using the findings of the logistic regression analyses and the focus group discussions.
2. Quantify the re-constructed model of the pathways of effect of households' participation in MGNREGA on the anthropometric outcomes.
3. Quantify the re-constructed model of the pathways of effect of mothers' employment through MGNREGA on the anthropometric outcomes.
4. Triangulate the findings from the focus group discussions with the results of the path-analysis from this chapter to answer the second research question (What are the pathways of effect of MGNREGA on infant malnutrition?)

#### 5.4: Methods

The findings from the multivariable logistic regression models and the focus group discussions were used to re-construct the hypothetical pathways of effect of households' and mothers' participation in MGNREGA on the anthropometric indicators of infant malnutrition. The data from the cross-sectional study was used to test these models using path-analysis. The methods of the cross-sectional study (design, sample size, sampling method, study tools, data collection, variables and their construction and ethical approval processes) are described in chapter 3, so this chapter includes only the details of the path-analysis, a statistical technique used to quantify the models of MGNREGA's effect on infant malnutrition.

Path-analysis was originally developed by Sewall Green Wright and used in genetics and social science research (Blunch, 2008). In recent years, after the development of the software programmes such as the Linear Structural Relations (LISREL), Mplus etc. path-

analysis as a statistical technique is gradually gaining ground in health research (Blunch, 2008, Vasconcelos et al., 1998). Although path-models are not causal models, they could demonstrate the most probable interrelationships that exist among the independent variables and between the independent and dependent variables, especially when guided by clear and explicit theoretical justification and conceptual frameworks (Spencer, 2003). The benefits of path-analysis over multiple regression modelling in delineating the relationships between the various determinants and their effects on infant mortality and child health have been shown by other studies (Brooks, 1975a, Brooks, 1975b, Brush et al., 1993, Jayachandran and Jarvis, 1986). Brooks (1975a) used path-analysis to understand the influence of the population's social and demographic factors (such as level of education, type of occupation and race) on infant mortality over time. Jayachandran and Jarvis (1986), using data from 60 low and middle income countries extended the model of infant mortality to include other determinants such as healthcare service provision, employment status of mothers, nutritional status of infants and the general social and economic development of the countries. Brush et.al (1993) attempted to delineate path-models of infant growth (length and weight) by fitting data on the socioeconomic and behavioural determinants of infant growth. In addition, Chenoweth et al. (1983) used path-analysis to understand the pathways through which the known risk factors act to culminate in spontaneous pre-term birth.

It was hypothesized *a priori* that MGNREGA will affect infant malnutrition by improving household food security and via this improve infant feeding (figure 2.1, chapter-2). Moreover, MGNREGA's effect on the anthropometric outcomes could be mediated via birth-weight. A positive effect of MGNREGA on household food security could improve birth-weight (probably through a maternal nutrition pathway). Although multivariable

regression models allowed the measurement of the total effect of MGNREGA on infant malnutrition by accounting for the independent variables, all these variables cannot be treated as having the same properties and as independent variables acting at a single point in time (Vasconcelos et al., 1998). Path-analysis allowed quantitative estimation of the relationship between the variables constituting the pathway of effect of MGNREGA on infant malnutrition, such as the relationship between MGNREGA, food security, infant feeding, birth-weight and the anthropometric indicators while controlling for known confounders. It was used to delineate the relationship between the determinants of infant malnutrition by fitting a set of regression equations under the assumption that the model is not affected by unmeasured confounding (Vasconcelos et al., 1998). A weighted least square adjusted for mean and variance was used to calculate the probability coefficients (Beauducel and Herzberg, 2006). This estimator is considered particularly useful in fitting categorical variables model (Beauducel and Herzberg, 2006) and is also an efficient and unbiased estimator for models with missing data and sample sizes between 200-500 (Asparouhov and Muthén, 2010).

Three model fit indices, chi square ( $\chi^2$ ) test for model fit, Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA), each related to a specific aspect of the model were used to quantify the degree of correspondence between the hypothesized models and the data (Hooper et al., 2008, Kenny and McCoach, 2003).

1. Chi square ( $\chi^2$ ) test of model fit: This is the traditional test that evaluates the overall fit of the model (Hooper et al., 2008) or the predictive accuracy of the model (Barrett, 2007). The null hypothesis is that, *“there is no difference between the model-implied population covariances and the actual observed sample covariances”*

(Barrett, 2007). Therefore, a low value of  $\chi^2$  test statistics with  $p > 0.05$  indicates good fit (Hooper et al., 2008, Barrett, 2007).

2. Root Mean Square Error of approximation (RMSEA): This is an absolute fit index which indicates how well the chosen parameter estimates fit the population covariance matrix (Hooper et al., 2008). A value of  $\leq 0.06$  is considered a good fit (Hooper et al., 2008, Hu and Bentler, 1999).
3. Comparative Fit Index (CFI) of Bentler: This is an incremental fit index that compares the sample covariance model with a null model (all variables are uncorrelated) (Bentler, 1990). The statistic ranges from 0 to 1 and a value close to 1 indicates good fit, presently the cut off is set at  $\geq 0.95$  (Hu and Bentler, 1999).

The  $\chi^2$  test is sensitive to sample size such that the chance of rejecting the null hypothesis increases with increase in the sample size. Considering that the sample size in this study is not very large and that the test being the most explicit and direct test available, the model fit was assessed based on the p-value of the  $\chi^2$  test for model fit (Barrett, 2007). However, to ensure that the model fit is not biased by sample size, in addition to the  $\chi^2$  test, Comparative Fit Index considered to be least affected by sample size (Hooper et al., 2008) was also used to assess the models. Nevertheless, it is acknowledged that there are limitations associated with fit indices mainly because of the criticisms regarding what they actually indicate and what the threshold value or cut-point value for 'model-fit' should be (Barrett, 2007). In addition to calculating the coefficients of association between the variables included in the models, indirect effects were computed by multiplying the relevant path coefficients, and each model was controlled for cluster sampling using robust estimation of standard error.

Statistical significance was considered at the 5% level and the analyses were performed using Mplus version 7. The following section describes the construction of the path-models.

#### 5.4.1: Construction of the path-models

The hypothesized pathways of effect of MGNREGA on infant malnutrition (figure 2.1, chapter-2) were reconstructed based on hypothesized relationships between the variables, results from the cross-sectional study and the themes generated in the focus group discussions using the method of Directed Acrylic Graphs (presented in figure 5.1). Directed Acrylic Graphs represent a set of formal rules for diagrammatically demonstrating the statistical associations implied by a given set of assumptions (in this case the hypothesized pathways) about the relationships between the study variables (Glymour, 2006, Greenland et al., 1999). Although, not a mechanism through the child related pathway, the effect of MGNREGA on infant malnutrition through improving household food security and via low birth-weight was also estimated.

The hypothesized relationship among the variables for the pathway of effect of mothers' employment through MGNREGA (mother-MGNREGA) was similar to that of the general household MGNREGA participation pathway. However, an additional pathway of increased risk of malnutrition via negative effects on infant care (duration of care by other carers) and 'adequate infant feeding' was hypothesized (shown by the black dotted line in figure 5.2).

Figure 5.1: Hypothesized pathway of effect of MGNREGA on infant malnutrition

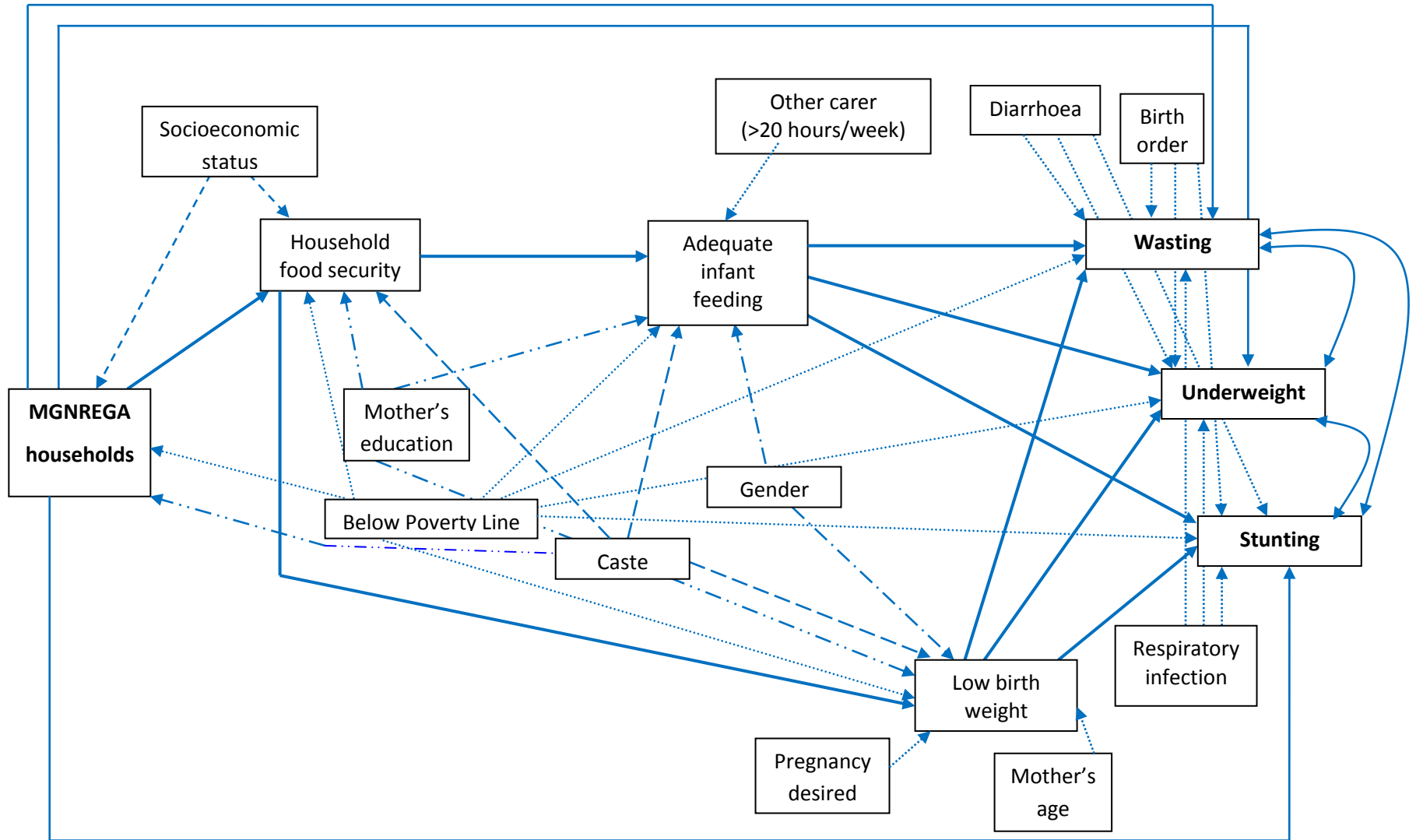
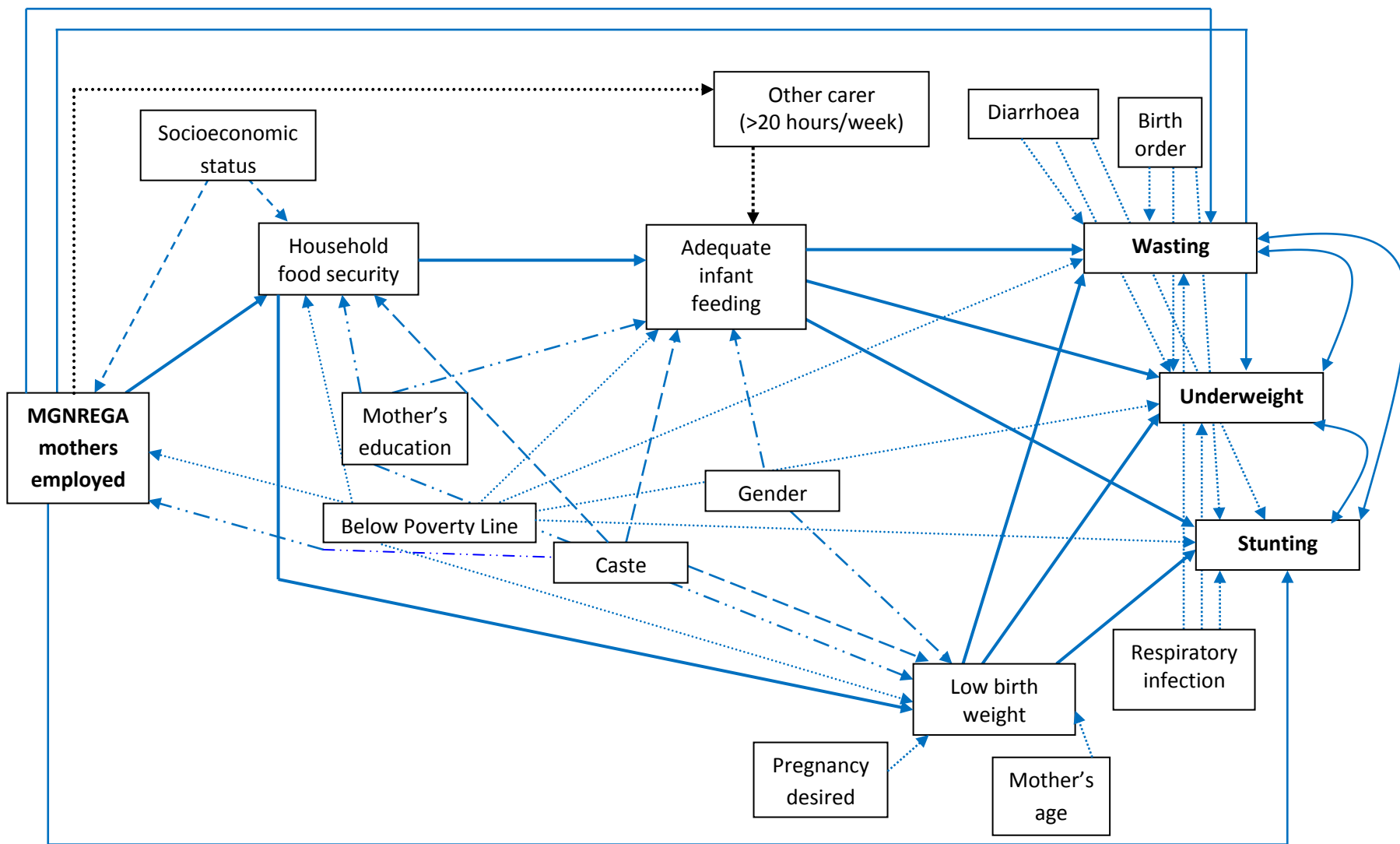
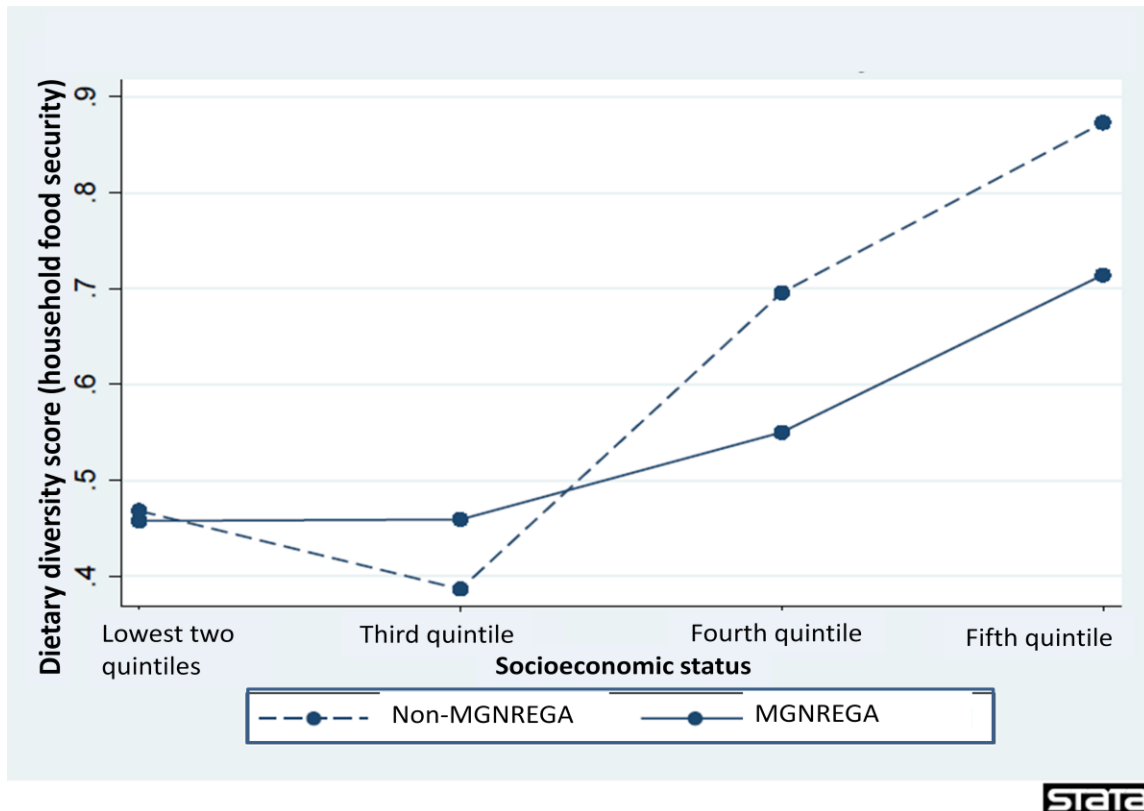


Figure 5.2: Hypothesized pathway of effect of mothers' employment through MGNREGA on infant malnutrition



Only those variables that were directly related to the pathway of effect of MGNREGA on infant malnutrition were included in the path-models. Household food security, adequate infant feeding and low birth-weight were endogenous variables between the outcome variables (wasting, stunting and underweight) and participation in MGNREGA. It was observed that the variable socioeconomic status might modify the effect of MGNREGA on household food security (collated p-value for the fitted interaction term – MGNREGA X socioeconomic status for household food security was 0.037). To account for this, separate path-models were fitted to subgroups of the participants defined by their wealth index. Those in the lowest three quintiles of the asset index, the poor households (n = 317), separately from those in the top two quintiles, non-poor households (n = 217), based on the interaction effects shown in figure 5.3. However, for mothers' employment effects (mother-MGNREGA) where the denominator was only MGNREGA-households (n = 272), no such interaction between MGNREGA and socioeconomic status was observed (collated p-value for the fitted interaction term = 0.280). Adequate infant feeding and child's age was moderately correlated ( $r = -0.64$ ;  $p < 0.001$ ) in all the three sample groups (poor, non-poor and mother-MGNREGA) due to the fact that the construction of the variable 'adequate infant feeding' is based on the age of the child (adequate feeding for a given age). In addition, the variables birth-order and mother's age ( $r = 0.62$ ;  $p < 0.001$ ) were also found to be moderately correlated in all the three sample groups, and socioeconomic status and caste were correlated in the mother-MGNREGA ( $r = -0.52$ ;  $p < 0.001$ ) and non-poor-MGNREGA ( $r = -0.45$ ;  $p < 0.001$ ) samples. To avoid multi-collinearity and improve parsimony, the variables 'child's age' and 'mother's age' were excluded from the models (mother's age was used as a predictor of low birth-weight only in the low birth-weight regression equation),

and caste and socioeconomic status were not incorporated together in the same equations in the mother-MGNREGA and non-poor-MGNREGA models.



**Figure 5.3: Regression of dietary diversity score (indicator of household food security) on MGNREGA stratified by socioeconomic status of the households**

Five models (A-E) for each of the three sample groups, poor-MGNREGA, non-poor-MGNREGA and mother-MGNREGA were fitted and their above mentioned fit indices were compared.

- Model A: Single outcome variable - wasting
- Model B: Single outcome variable - underweight
- Model C: Single outcome variable - stunting

- Model D: Including all anthropometric outcomes in a single model & using observations with missing data (pair-wise deletion)
- Model E: Including all anthropometric outcomes in a single model & deleting observations with missing data (list-wise deletion)

In each model robust estimates of standard error were used to take cluster sampling into account. Identical sets of equations were used to fit all the path-models. While the probability coefficients did not vary much across the five models for each of the sample groups (poor-MGNREGA, non-poor-MGNREGA and mother-MGNREGA), the variations were observed for the model-fit indices as shown in table 5.1.

**Table 5.1: Comparison of the model fit indices of the fitted models**

Poor – MGNREGA households					
N=317			N=230		
Model fit indices	A1	B1	C1	D1	E1
p-value of $\chi^2$ test for model fit	0.268	0.194	0.288	0.191	0.193
RMSEA (95%CI)	0.02 (0.00, 0.05)	0.03 (0.00, 0.05)	0.02 (0.00, 0.05)	0.03 (0.00, 0.05)	0.03 (0.00, 0.06)
CFI	0.85	0.81	0.69	0.96	0.94
Non-poor – MGNREGA households					
N=211			N=177		
Model fit indices	A2	B2	C2	D2	E2
p-value of $\chi^2$ test for model fit	0.084	0.187	0.239	0.065	0.052
RMSEA (95%CI)	0.04 (0.00, 0.07)	0.03 (0.00, 0.06)	0.03 (0.00, 0.06)	0.04 (0.00, 0.07)	0.05 (0.00, 0.08)
CFI	0.61	0.82	0.78	0.88	0.87
Mother – MGNREGA households					
N=272			N=213		
Model fit indices	A3	B3	C3	D3	E3
p-value of $\chi^2$ test for model fit	0.051	0.081	0.136	0.070	0.038
RMSEA (95%CI)	0.04 (0.00, 0.07)	0.04 (0.00, 0.07)	0.03 (0.00, 0.06)	0.04 (0.00, 0.06)	0.05 (0.01, 0.07)
CFI	0.30	0.68	0.49	0.89	0.86

$\chi^2$  – Chi square; RMSEA – Root Mean Square Error of Approximation; CI – Confidence Interval; CFI – Comparative Fit Index; A–Wasting model; B–Underweight model; C–Stunting model; D–All anthropometric indicators model; E-All anthropometric indicators deleting variables with missing data model.

For each sample group, model D (D1, D2 and D3) was selected as the final model due to the following reasons:

1. The model fit indices (p-value for  $\chi^2$  test for model fit, RMSEA and CFI) were better compared to the separate models (table 5.1). While all fit indices were found to be good for the poor-MGNREGA model (D1), the CFI of models D2 (non-poor households) and D3 (mother-MGNREGA) were <95. Since two out of the three indicators, the commonly used  $\chi^2$  test for model fit and RMSEA suggested good fit, the D2 and D3 models were considered to be good fit for the data.
2. Model D includes all the three anthropometric outcomes compared to models A, B and C which include only one outcome variable (wasting or underweight or stunting). Underweight is suggested to be a composite indicator of wasting and stunting and thus highly correlated with the other two anthropometric outcomes. Therefore, it was important to take this correlation into account in the path-analyses.
3. Although correlated with underweight, wasting and stunting are suggested to involve two different physiological processes and are not in the causal pathway of each other (Victora, 1992, De Onis, 2000). Thus, all the three anthropometric indicators could be fitted as outcome variables in the same model.
4. Inclusion of observations with missing data in model D – data on the ‘low birth-weight’ variable was missing for 121 participant households (n = 528). A two-by-two analysis showed that missing values for low birth-weight were evenly distributed between the MGNREGA and the non-MGNREGA groups [MGNREGA group = 59 households (21% of the total MGNREGA households) and non-MGNREGA group = 62 households (25% of the total non-MGNREGA households)]; p-value for  $\chi^2$  test =

0.263], and the mother-MGNREGA and other-MGNREGA groups [mother-MGNREGA = 10 households (19.6% of total mother-MGNREGA households) and other-MGNREGA = 49 (22.2% of the total other-MGNREGA households); p-value for  $\chi^2$  test = 0.689]. Further, the reason for this missing data was non-availability of recorded birth-weights which cannot be attributed to any specific characteristics of the sample population. Therefore, the missing values could be considered to be ‘missing at random’, although may not be ‘completely missing at random’ as it is difficult to assume with certainty that the missing values are completely unrelated to the outcome variables and MGNREGA (Kirkwood and Sterne, 2003). The estimator weighted least square controlled for mean and variance (used in this study) with pair-wise deletion does not delete all observations with missing value as is done by ‘list-wise deletion’, instead uses some of the observations with missing data (Muthén and Muthén, 1998-2011). Although both list-wise and pair-wise deletion are unbiased estimators of missing data at random, ‘pair-wise deletion’ is considered to be more efficient (Muthén and Muthén, 1998-2011), thus justifying the selection of model D (D1, D2, D3) for each of the three sample groups.

## 5.5: Results of the path-analyses

The three path-models are shown in figures 5.4, 5.5 and 5.6. The parameter estimates are the probability coefficients, and their magnitude and direction demonstrate the inter-relationships between the variables included in the pathway. Although, the relationship of the factors identified from focus group discussions – ‘wage rate and regularity of payment’, ‘mothers’ and caregivers’ knowledge’, ‘cultural practices’, ‘domestic violence against women’, and the unknown ‘maternal factors’ could not be tested numerically in the path-

analyses, they are diagrammatically shown in the path-models to understand and interpret the final outputs of the path-analyses. Wasting and stunting were each significantly positively correlated with underweight in all the three models. Wasting was observed to be negatively correlated with stunting, but this correlation was significant (at  $p < 0.05$ ) only for the poor-MGNREGA model.

Figure 5.4: Path model showing the effect of MGNREGA on infant malnutrition in POOR households

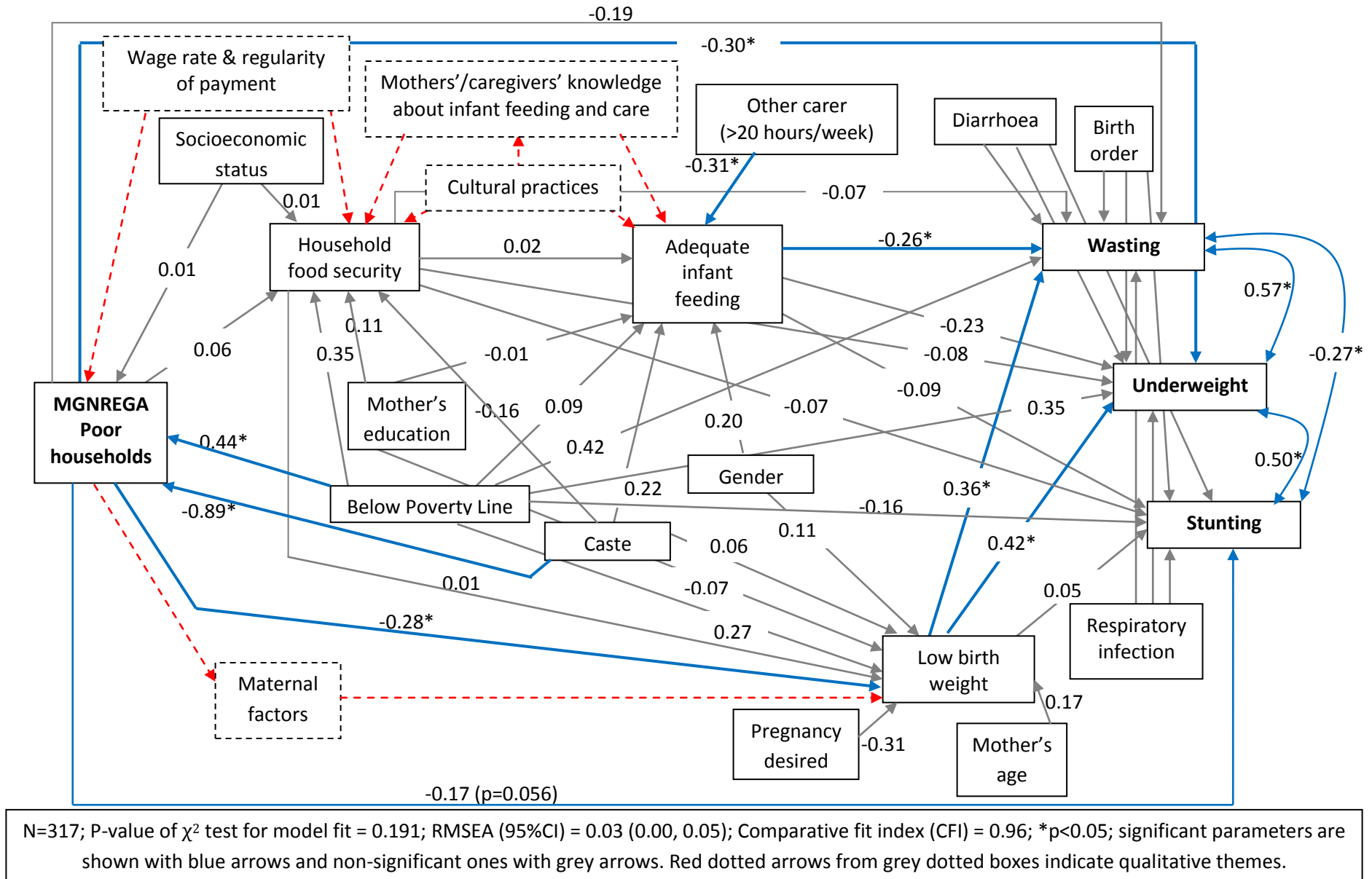
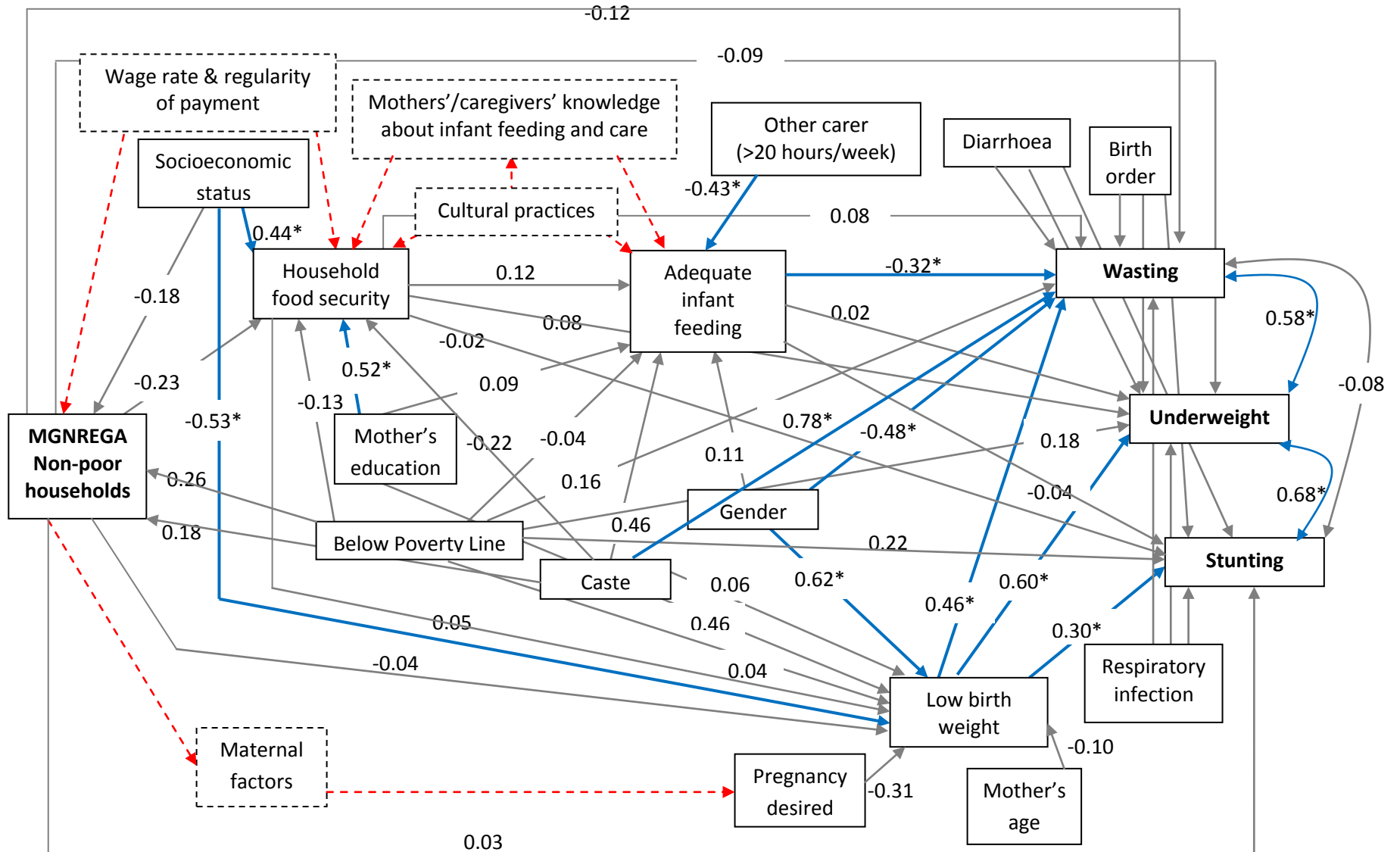
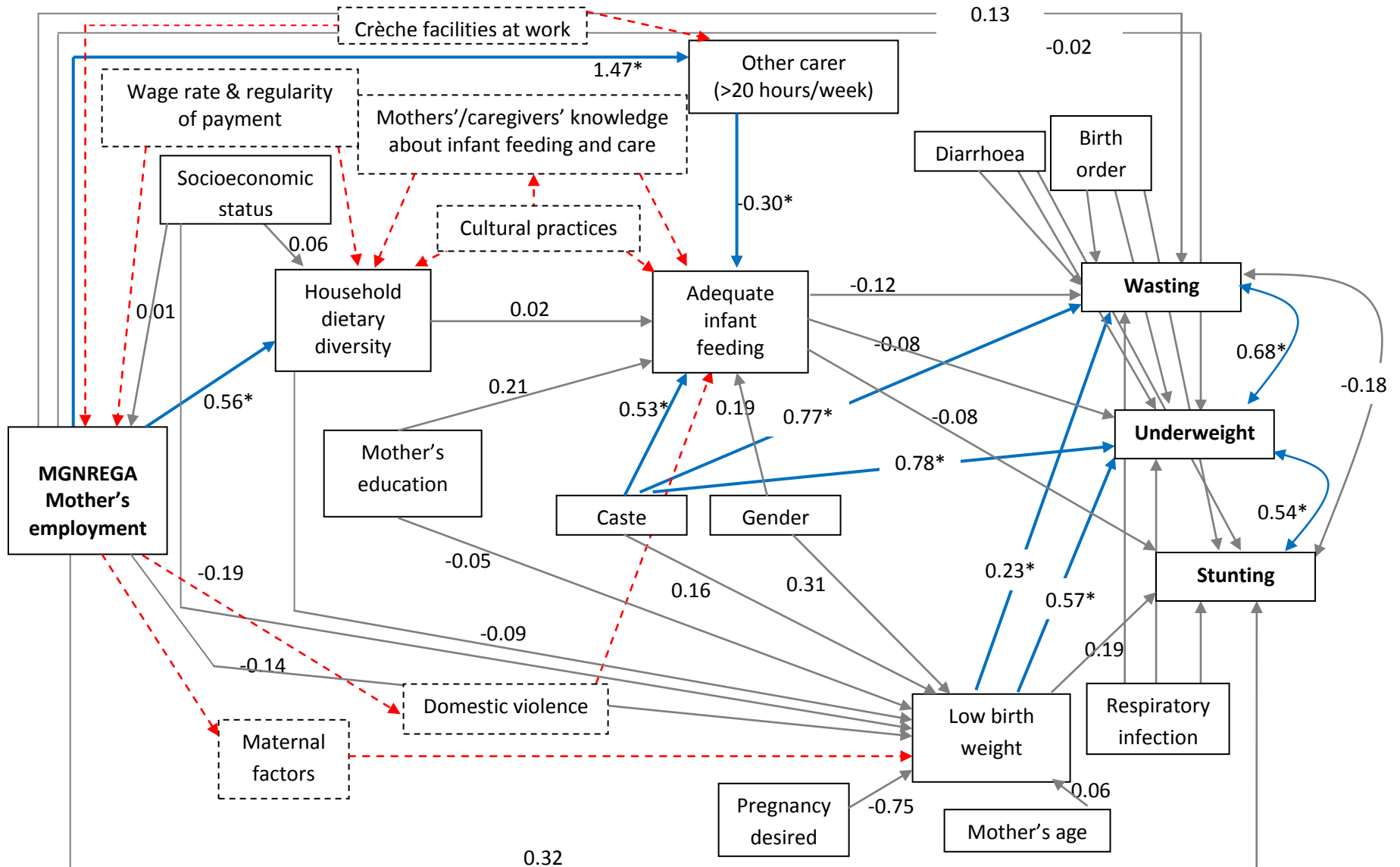


Figure 5.5: Path-model showing the effect of MGNREGA on infant malnutrition in NON-POOR households



N=211; P-value of  $\chi^2$  test for model fit = 0.065; RMSEA (95%CI) = 0.04 (0.00, 0.07); Comparative fit index (CFI) = 0.88; \*p<0.05; significant parameters are shown with blue arrows and non-significant ones with grey arrows. Red dotted arrows from grey dotted boxes indicate qualitative themes.

Figure 5.6: Path-model showing the effect of mother's employment in MGNREGA on infant malnutrition



N=272; P-value of  $\chi^2$  test for model fit = 0.070; RMSEA (95%CI) = 0.04 (0.00, 0.06); Comparative fit index (CFI) = 0.89; \*p<0.05; significant parameters are shown with blue arrows and non-significant ones with grey arrows. Red dotted arrows from grey dotted boxes indicate qualitative themes.

In the poor-MGNREGA model, the estimated effects of MGNREGA via household food security and adequate infant feeding on wasting, underweight and stunting were each 0.00 (p-value=0.73) (table 5.2), indicating that the *a priori* hypothesized pathway was not significant. However, there was evidence of a significant pathway of effect of MGNREGA on wasting and underweight through ‘low birth-weight’ (estimated effect for wasting was -0.10 (SE) = 0.05); p=0.047 and underweight was -0.12 (SE = 0.05); p=0.033. No such effect was observed for stunting (table 5.2). In addition to the effect via low birth-weight, MGNREGA was found to have a direct negative effect on underweight, but not on wasting (table 5.2) suggesting that there could be other unidentified variables (not included in the models in this study) in the pathway between MGNREGA and underweight. Although there was no effect on stunting via the low birth-weight pathway (table 5.2), a direct negative effect was estimated (-0.17; SE = 0.09; p=0.056), also suggesting a possible role of other unidentified factors (figure 5.4 and table 5.2).

To control for selection bias (since households’ participation in MGNREGA was not randomized), the factors socioeconomic status, below poverty line status and caste, which according to the literature, could influence participation in MGNREGA were accounted for in the models. The parameter estimates for the model showed that ‘below poverty line status’ and ‘caste’ were significant predictors of participation in MGNREGA among the poor households. While below poverty line status was positively associated with MGNREGA participation, belonging to Schedule Tribe/ Schedule Caste social groups had a negative association with MGNREGA participation (figure 5.4). The variables included in the poor-MGNREGA model explained 31% of the variance in wasting, 38% in underweight and 10% in stunting.

Unlike the poor-MGNREGA model, neither the direct nor the indirect estimated effects of MGNREGA were found to be statistically significant in the non-poor-MGNREGA model (figure 5.5 and table 5.2). However, after adjusting for other variables a similar effect on wasting and underweight was observed through negative effects on low birth-weight, but the variable at the distal end was socioeconomic status instead of MGNREGA (fig 5.5). The estimated specific indirect effect of higher socioeconomic status via low birth-weight on wasting was -0.27 (SE=0.12);  $p=0.023$  and on underweight was -0.35 (SE=0.16);  $p=0.028$ .

In contrast to the poor-MGNREGA model, the variables ‘below poverty line’ and ‘caste’ were not found to be significantly associated with participation in MGNREGA in the better-off households. The variables included in the model explained 38% of the variance in wasting, 37% in underweight and 14% in stunting. The estimated coefficients for the direct, total indirect, total-total (direct + indirect) and specific indirect effects of MGNREGA on wasting, underweight and stunting for the poor and non-poor models are provided in table 5.2.

The findings of the mother-MGNREGA model (fig 5.6) were comparable to that of the non-poor model in that no significant direct or indirect pathways of effect of MGNREGA on the anthropometric indicators of infant malnutrition were estimated (table 5.3). However, a negative effect of mothers’ employment on adequate infant feeding via ‘duration of care by other carers’ was observed (coefficient = -0.44 (SE = 0.14),  $p=0.002$ ). Further, in contrast to the other two models, mothers’ participation in MGNREGA had a significant positive effect on household food security (coefficient = 0.56; SE = 0.27;  $p=0.036$ ). The variables included in the model explained 21% of the variance in wasting, 41% in underweight and 13% in stunting. The estimated coefficients for the total direct, total indirect, total-total and specific

indirect effects of mother-MGNREGA on wasting, underweight and stunting are provided in table 5.3.

**Table 5.2: Estimates of MGNREGA’s pathways of effect on wasting, underweight and stunting in poor and non-poor households**

Effects	Poor Households					
	Effects from MGNREGA to Wasting		Effects from MGNREGA to Underweight		Effects from MGNREGA to Stunting	
	Estimate (SE)	P-value	Estimate (SE)	P-value	Estimate (SE)	P-value
<b>Total-total</b>	-0.31 (0.12)	0.008	-0.43 (0.16)	0.007	-0.19 (0.09)	0.043
<b>Total Direct</b>	-0.19 (0.11)	0.079	-0.30 (0.14)	0.032	-0.17 (0.09)	0.056
<b>Total indirect</b>	-0.11 (0.06)	0.060	-0.13 (0.06)	0.036	-0.02 (0.03)	0.467
<b>Specific indirect</b>						
Via adequate feeding	-0.01 (0.03)	0.806	-0.01 (0.03)	0.805	-0.00 (0.01)	0.821
Via low birth weight	-0.10 (0.05)	0.047	-0.12 (0.05)	0.033	-0.01 (0.02)	0.597
Via household food security	-0.00 (0.01)	0.577	-0.01 (0.01)	0.560	-0.00 (0.01)	0.609
Via household food security and adequate feeding	0.00 (0.00)	0.735	0.00 (0.00)	0.738	0.00 (0.00)	0.744
Via household food security and Low birth weight	0.00 (0.00)	0.905	0.00 (0.00)	0.903	0.00 (0.00)	0.905
Non-poor Households						
<b>Total-total</b>	-0.13 (0.14)	0.304	-0.14 (0.17)	0.404	0.02 (0.14)	0.904
<b>Total Direct</b>	-0.12 (0.13)	0.368	-0.09 (0.16)	0.550	0.03 (0.14)	0.853
<b>Total indirect</b>	-0.02 (0.07)	0.730	-0.05 (0.08)	0.548	-0.01 (0.04)	0.822
<b>Specific indirect</b>						
Via adequate feeding	0.01 (0.04)	0.756	-0.00 (0.01)	0.906	0.00 (0.01)	0.783
Via low birth weight	-0.02 (0.06)	0.744	-0.03 (0.08)	0.744	-0.01 (0.04)	0.752
Via household food security	-0.02 (0.02)	0.388	-0.02 (0.02)	0.341	0.01 (0.02)	0.816
Via household food security and adequate feeding	0.01 (0.01)	0.213	-0.00 (0.00)	0.892	0.00 (0.00)	0.738
Via household food security and low birth weight	-0.01 (0.01)	0.543	-0.01 (0.01)	0.543	-0.00 (0.01)	0.523

SE – Standard error

**Table 5.3: Estimates of MGNREGA mothers employment pathways of effect on wasting, underweight and stunting**

Effects	Effects from mother-MGNREGA to Wasting		Effects from mother-MGNREGA to Underweight		Effects from mother-MGNREGA to Stunting	
	Estimate ( $\pm$ SE)	P-value	Estimate ( $\pm$ SE)	P-value	Estimate ( $\pm$ SE)	P-value
<b>Total-total</b>	0.18 (0.22)	0.412	0.04 (0.25)	0.874	0.30 (0.22)	0.160
<b>Total Direct</b>	0.13 (0.27)	0.615	-0.02 (0.27)	0.955	0.32 (0.29)	0.272
<b>Total indirect</b>	0.05 (0.16)	0.776	0.05 (0.21)	0.793	-0.02 (0.19)	0.933
<b>Specific indirect</b>						
Via household food security	0.01 (0.03)	0.750	0.04 (0.04)	0.307	-0.06 (0.04)	0.086
Via adequate feeding	0.03 (0.06)	0.577	0.02 (0.05)	0.683	0.02 (0.04)	0.565
Via other carer (>20hrs/week)	-0.003 (0.12)	0.977	0.06 (0.17)	0.707	0.03 (0.18)	0.877
Via low birth weight	-0.03 (0.05)	0.499	-0.08 (0.12)	0.494	-0.03 (0.05)	0.554
Via household food security and adequate feeding	-0.001 (0.003)	0.752	-0.001 (0.002)	0.766	-0.001 (0.002)	0.763
Via other carer (>20hrs/week) and adequate feeding	0.05 (0.05)	0.325	0.04 (0.06)	0.565	0.03 (0.04)	0.385
Via household food security and low birth weight	-0.01 (0.01)	0.469	-0.03 (0.04)	0.420	-0.01 (0.01)	0.492

SE – Standard error

## 5.6: Discussion

### 5.6.1: Pathways of effect of MGNREGA on infant malnutrition

Results from the path-analyses did not show that MGNREGA had an effect on infant malnutrition through improving household food security and infant feeding, but did suggest a pathway of effect through improving birth-weight in the poor households. The probability of being born with low birth-weight (<2,500 grams) was lower in participating households than in non-participating households, which reduced the risk of infant malnutrition in the participating households. In the comparatively better-off households, participating in MGNREGA did not have any effect on infant malnutrition. However, higher socioeconomic status had a negative effect on all the three anthropometric indicators of malnutrition, the effect being mediated through the same low birth-weight pathway. MGNREGA is probably able to fulfil the basic nutritional requirements of pregnant women leading to improved birth-weight among infants in participating households compared with non-participating households in the poor communities. However in the better-off group, in which pregnant women may already have access to basic nutrition, it is the higher socioeconomic status that makes a difference rather than participation in MGNREGA. Therefore, the pathway of effect appears to be through a maternal pathway by improving birth-weight of infants, rather than the hypothesized pathway and is evident for only the relatively poorer households. Low birth-weight is a well recognized risk factor of both acute and long-term malnutrition affecting children for a few years after birth (Marins and Almeida, 2002, Binkin et al., 1988, Fernandez et al., 2002).

As suggested by the qualitative study, perhaps the wages earned from MGNREGA were sufficient to prevent hunger in the poor households, but did not improve household food

security due to irregular payments and lower than intended wages (shown in figures 5.4, 5.5 and 5.6 by the dotted-line box). It could also be that the dietary diversity score used to measure household food security was not sensitive in detecting small improvements. However, a validity test of this household food security tool in Burkina Faso showed that it was a valid tool for determining household food security over time and across seasons among different households, but was not found to be associated with child anthropometry (Frongillo and Nanama, 2006). Based on this, the authors suggested that household food security do not directly translate into improved nutrition for children, and is determined by other factors such as quality of care, diseases and physiological utilization of food (Frongillo and Nanama, 2006). The focus group discussions in this study suggested that infant feeding practices were determined by factors such as mothers' knowledge and cultural practices prevalent in the community which could therefore be important mediators between household food security and adequate infant feeding. Perhaps collecting data on these factors in subsequent studies and quantitatively analysing their mediation effects in the path-models would help in better delineation of the pathways.

The path-models consolidated the findings of the logistic regression results which showed that participation in MGNREGA reduced wasting and underweight among infants in the participating households and the focus group discussions which suggested that this protective effect of MGNREGA was not likely to be mediated via improved household food security and infant feeding. Although birth-weight is an important factor influencing the growth trajectory of infants and children, a study showed that its effect on the nutritional status of children gradually wanes with increasing age (Ricci and Becker, 1996). Thus, without attention to the intermediate factors - knowledge and attitude towards feeding and

care, and cultural practices, the protective effect of MGNREGA against malnutrition through decreasing low birth-weight is most likely to become insignificant in older children.

In addition, the poor and non-poor models suggested that the effects of MGNREGA vary according to the level of socioeconomic status of the households. Participation in MGNREGA had a positive effect on birth-weight and via this on infant nutrition in the poor households, but no such effect was observed in the relatively better-off households. Compared to wasting and underweight, only a small proportion of variance in stunting was explained by the variables included in the path-models. This suggests the role of other unknown determinants not included in the studied models. An understanding of these determinants is important to analyse the effect of MGNREGA on long term infant malnutrition.

#### 5.6.2: Pathways of effect of mothers' employment through MGNREGA on infant malnutrition

The mother-MGNREGA path-model (fig 5.6) confirms the results of the logistic regression analysis which showed that there is no significant effect of mothers' employment through MGNREGA on infant malnutrition. However, it helped reveal significant inter-relationships between variables within the pathway. In particular, compared to any other member of the family, providing employment through MGNREGA to mothers could lead to improvements in household food security, but mothers' participation in MGNREGA had a negative effect on adequate infant feeding due to compromises in her time devoted to infant care.

Studies both in India and abroad show that compared to men, working women contribute more to the household's maintenance (Mencher, 1988, Tucker and Sanjur, 1988). Studies also show that mothers who are employed spend less time in child care compared to

unemployed mothers, but the effect on child health and nutrition in mother employed households depends on the compensation of her time by other caregivers in the family (Tucker and Sanjur, 1988, Bennett, 1988, Lamontagne et al., 1998). The negative effect of mothers' employment on adequate infant feeding mediated via decreased maternal caregiving time to the infants may suggest that knowledge of the other caregivers were inadequate and/ or their attitudes towards child care inappropriate. Thus, the other caregivers were unable to compensate for mothers' time away from infant care. This supports the findings of the qualitative study which suggested that mothers' participation in MGNREGA could increase the risk of infant malnutrition due to compromises in infant care and feeding, and lack of alternative adequate care arrangements. The mothers who participated in the focus group discussions expressed distrust about other caregivers, particularly the paternal grandmother who was the most frequent carer in the absence of the mother. Other than knowledge, the attitude of the grandmothers towards child care was questionable. It appeared from the discussions that the main reason for them to take the responsibility of child care was to persuade the mothers to work in MGNREGA. Such an issue did not come across in the other studies on women employment through MGNREGA.

While the results of the logistic regression analysis showed that there was no significant effect of mothers' employment through MGNREGA on infant malnutrition, the qualitative study and the path-analysis explained the reasons behind this observation. Providing employment to women on the one hand had positive implications for household food security, justifying the benefits of reserving a third of the jobs under MGNREGA for women, but on the other hand had negative effects on infant feeding and care. To translate the economic and food security benefits of women employment through MGNREGA into

improved nutrition of infants and children, it is important to address the intervening risk factors - compromises in time devoted by mother to child feeding and care, and lack of adequate child care support at home. As was recommended in the qualitative study (chapter 4), crèche facilities at worksites and employing women in worksites closer to their homes could have some benefits. However, there are greater challenges in terms of lack of appropriate knowledge and attitude towards infant feeding and care, cultural practices leading to inadequate feeding, and the general low status of women in the society.

### 5.7: Limitations

Despite showing the most probable relationship between the variables in the pathway, the findings do not suggest a cause and effect relationship. Although underpinned by literature, the constructed path-models may not be the only way of ordering the variables (Mason-Hawkes and Holm, 1989). While all major variables that could influence the effect of MGNREGA on infant malnutrition were identified through literature review and included in the models, there could be other unknown variables affecting the pathway. In addition, information about some known determinants of was unavailable. For example, an important determinant of stunting (low length-for-age) in addition to birth-weight is birth-length (Brush et al., 1993). Since this is not routinely measured at birth in health centres in India, the data was not available. Including the birth crown-rump length of infants in the models could alter the findings. While the path-analyses controlled for a few determinants of low birth-weight (such as maternal age, pregnancy desired, birth-order, caste, maternal education and gender) data on other important factors such as pre-pregnancy maternal nutrition and height, obstetric history etc. were not available. Since the study was concerned with child related factors, data on the maternal factors were not collected. Including these factors in the

model could alter the magnitude, strength and the direction of impact of MGNREGA on low birth-weight and thereby on infant malnutrition. In addition, lack of information on birth-weight of infants in about 23% of the households could bias the results since the missing data cannot be completely attributed to random. Nevertheless, the study generates an important hypothesis about the positive effect of MGNREGA on infant nutrition through a maternal pathway which could be further explored in subsequent studies.

### 5.8: Summary

The mechanism of MGNREGA's effect on infant malnutrition as determined by path analysis was not through the hypothesized child pathway, but rather through a maternal pathway by improving birth-weight of the infants. Further, it was observed that providing employment to women through MGNREGA could improve household food security, but its benefits on infant nutrition is nullified due to compromises in mother's time devoted to infant care and feeding. The path-models also provide an understanding of the role of the socioeconomic context in determining the effects of MGNREGA. MGNREGA was not found to be effective in reducing malnutrition among infants in comparatively better-off households. This suggests that the effect of MGNREGA will vary according to the level of socioeconomic status of the households. However, factors such as compromises in time devoted to infant care by the mother, lack of knowledge and inappropriate attitudes towards infant feeding and care, and cultural practices interfering with adequate infant feeding practices increase the risk of infant malnutrition irrespective of socioeconomic status. The findings of the logistic regression models, focus group discussions and the path-models underline the importance of addressing these factors over and above providing income through the social and economic policies to reduce malnutrition among infants in India.

## Chapter 6

### Discussions and recommendations

Among our study population in the Dungarpur district of Rajasthan, India, MGNREGA reduced the risk of wasting and underweight, but not stunting among infants in the participating households. This effect was mainly via improving birth-weight of infants, but was evident only in the relatively poorer households. The *a priori* hypothesis that MGNREGA would lead to improved infant nutrition through its positive effect on household food security and infant feeding was shown to be incorrect by both the findings of the focus group discussions and path-analysis of the cross-sectional data. From the focus group discussions, it appeared that although MGNREGA was able to prevent hunger, the programme did not confer food security to the participating households due to various programme implementation issues (such as delayed payments, lower than standard wages etc.). Lack of knowledge among mothers and caregivers, and cultural practices interfering with appropriate infant feeding were other important barriers to improving the infants' nutritional status which would not be mitigated by merely providing employment or food security to the households. Similarly, it was observed that unless working conditions are made conducive (providing crèche facilities at work sites etc.) and the status of women in the society is improved, providing employment to mothers through MGNREGA would not result in positive effects, but rather could increase the risk of infant malnutrition due to compromises in child care and feeding.

## 6.1: Effect of MGNREGA on infant malnutrition and the pathways of effect

MGNREGA had a significant effect in reducing underweight and wasting (acute malnutrition) among infants in households where any member was employed through MGNREGA compared with households that did not participate in this programme. A lower risk of malnutrition was observed despite the higher prevalence of some of the important risk factors of infant malnutrition in the MGNREGA participating households compared with the non-participating households. The MGNREGA participating households were poorer, a higher proportion was seasonally employed, most of the households lacked access to proper sanitation, and had a higher mean household density compared with the non-participating households. However, the mechanism of this protective effect of MGNREGA against acute malnutrition was not through the hypothesized pathway of improved household food security and infant feeding. Although MGNREGA was able to prevent hunger, the earnings were not enough to lend food security to the households. Even if food security was obtained, this was unlikely to translate into adequate infant feeding because of lack of appropriate knowledge about infant feeding and care among the mothers in the study population. In addition, cultural practices and societal norms played an important role in influencing mothers' knowledge and practices.

Another important finding was that households' participation in MGNREGA did not protect the infants against chronic malnutrition. MGNREGA may help avoid starvation, but lower than standard wages and delayed payments meant that the participants did not receive all the benefits of the programme. The earnings from MGNREGA did not lead to long term and sustained food security and thus probably did not have an effect on chronic malnutrition.

While providing employment to households through MGNREGA was likely to reduce the risk of infant malnutrition, mothers' employment through MGNREGA was not found to have a significant effect on the anthropometric indicators – wasting, stunting or underweight. However, from the focus group discussions it appeared that providing employment to mothers could lead to compromises in feeding and care of the infants. It was found that other caregivers in the family were unable to compensate for the mother's time away from infant care and feeding. The mothers were also forced to work in MGNREGA to earn money against their will and even faced domestic violence suggesting that MGNREGA could be a tool for further oppression of women. Under these circumstances, mothers' employment could be detrimental to the health of both the mothers and infants.

Furthermore, domestic violence against women and their lack of autonomy to choose to be employed or not highlights the low status of women in the society. Low social status of women in India is recognised as an important risk factor of child malnutrition and a significant barrier to the success of the interventions directed towards improving the health and nutrition of women and children (Von Braun et al., 2008, Svedberg, 2008).

Thinking retrospectively, it can be suggested that oppression, lack of freedom to decide, and domestic violence could be the factors behind difficulty in conducting the focus group discussions and using the 'General Health Questionnaire -12' (to assess the mental health status of the mothers). The major challenge in implementing the focus group discussions was to overcome the reluctance of the mothers to speak. Perhaps the set norms of the society do not allow women to think or voice out their opinion and concerns. Further, during the pilot study it was observed that the participants (mothers of infants) were unable to respond to many questions of the 'General Health Questionnaire -12' (discussed earlier in chapter 3).

Half of the questions in this tool were related to ‘the capability of decision making’, ‘playing a useful part in things’, ‘being able to face up to problems and overcome difficulties’, ‘self-confidence’ and ‘self-worthiness’ which are subjects that the women of this study population could not perhaps identify with.

The qualitative study also unpacked the determinant ‘caste’ into a number of underlying social risk factors which need to be addressed in order to reduce child malnutrition among the Schedule Tribe and Schedule Caste social groups. Simply considering these groups as vulnerable and focusing on improving coverage of MGNREGA and nutrition interventions will not resolve the high burden of malnutrition among these social classes. The causes of the cause – poverty, low education and discrimination will have to be mitigated in order to comprehend the true benefits of health, nutrition, social and economic interventions targeting these marginalised social classes.

Nevertheless, it is important to reiterate that MGNREGA did have a protective effect against wasting and underweight among infants in the study population and the pathway of effect was through reducing the probability of low birth-weight among infants in the MGNREGA-participating households. Low birth-weight is a major risk factor of infant and child malnutrition in India. According to the 2011 World Health Statistics, an estimated 28% of infants born in India in 2000-09 were of low birth-weight. Low birth-weight increases the risks of infant mortality (Black et al., 2008), impaired childhood growth and cognitive development, and possibly adult chronic diseases (Victora et al., 2008). Low birth-weight mothers are more likely to give birth to low birth-weight babies (Black et al., 2008), thus creating a trans-generational effect.

In addition to the possibility that the benefits of MGNREGA function through a pathway affecting women during pregnancy, the path-models suggest a context specific effect of MGNREGA. MGNREGA is probably able to fulfil the basic nutritional requirements of pregnant women in the poor households thereby reducing low birth-weight among infants in MGNREGA participating households in the poor socioeconomic group. MGNREGA was not found to be effective in reducing malnutrition among infants in the comparatively better-off households. This also suggests that the pathways of effect of MGNREGA are dynamic and could thus evolve or change based on the interplay of the prevalent contextual, structural, social, cultural, behavioural and biological risk factors of infant malnutrition. For example, in poor communities where mothers and caregivers are well informed and there are no cultural barriers to appropriate infant feeding practices, MGNREGA could have a positive impact on infant feeding and nutrition over and above its positive effect on birth-weight. This is the principle that underlies the ‘ecosocial’ theory (Krieger, 2001) which guided the research hypothesis in the first place.

## 6.2: Policy implications

The study results have implications for MGNREGA, policies and programmes for addressing infant and child malnutrition, and economic and social policies in general targeting the broader determinants of health.

### 6.2.1: Implications for MGNREGA

The study brought out a number of issues related to the implementation of MGNREGA:

- i. lower than standard wages;
- ii. delays in receiving payments and

iii. non-availability of child care facilities at work site.

Although this study is not the first to highlight these problems, it suggests that the repercussion of these could extend throughout the pathway of the determinants of infant nutrition. Addressing these issues could lead to a better likelihood of long term and sustainable positive effects on household food security, and mitigate the disadvantages associated with mothers' employment which would enhance the protective effect of MGNREGA against infant malnutrition.

Another key finding was that the protective effect of MGNREGA against infant malnutrition was observed only in the poorer households (households belonging to the lower three quintiles of the asset index). In the well-to-do households (households in the upper two quintiles of the asset index), it was the basic socioeconomic status of the household instead of participation in MGNREGA that led to reduced wasting, underweight and stunting among the infants (figure 5.4, chapter 5). In the absence of the path-models segregating the effects of MGNREGA on infant malnutrition in poor and non-poor households, the results of the multivariable logistic regression analysis would have been misleading. The logistic regression models showed lower odds of wasting and underweight among infants in MGNREGA participating households compared with non-participating households after accounting for the socioeconomic status of the households. This has important implications for population targeting in MGNREGA. At present, the beneficiaries are not determined by the level of their socioeconomic status, instead the concept of this wage-for-employment policy itself ensures that only the needy apply for employment through MGNREGA. Hard physical labour and standard daily wage rates deter the well-to-do from utilising the benefits of MGNREGA. However, 57% of the study participants belonging to the fourth quintile and

40% of those belonging to the fifth quintile of the asset index were found to be employed through MGNREGA, whereas about 44% of the households belonging to the lowest three quintiles did not receive employment through MGNREGA. Targeting the poor households could increase effectiveness and efficiency of MGNREGA, facilitating better utilisation of the limited resources.

### 6.2.2: Implications for policies addressing infant and child malnutrition

Although theoretically it was postulated that MGNREGA could reduce infant malnutrition through its positive effect on household food security and infant feeding, empirically the mechanism was not straightforward. Several factors were found to influence the determinants pathway and modify the effect of MGNREGA on infant malnutrition. Addressing the issues related to MGNREGA implementation could improve household food security, but to translate household food security into adequate feeding, mothers' and caregivers' knowledge about infant feeding and care will have to be improved. Similarly, to have a positive effect of mothers' employment through MGNREGA on infant nutrition, not only the working conditions will have to be made conducive, but the underlying social status of women will also have to be made better. Therefore, an integrated approach will be required.

In India, the requirement for an integrated approach to address malnutrition among infants and children has long been recognized, but has not been implemented effectively (Von Braun et al., 2008). The stated objectives of the Integrated Child Development Services scheme launched in 1975 include *'effective coordination of policy and implementation amongst the various departments to promote child development, and enhance capability of*

*the mothers to look after the normal health and nutrition needs of the child through proper nutrition and health education'* (page1602, Kapil et al., 1992).

Although difficult, integrated approaches have been successfully adopted and implemented to address child malnutrition by other countries and lessons can be learnt from them. The decline in malnutrition among Brazilian children in the past 30 years (from 1975 to 2007) has been attributed to reductions in poverty and increases in family income coupled with national programmes for health, education and sanitation (Monteiro et al., 1992, Monteiro et al., 2009). Social and economic policies together with promotion of female education, accounted for half of the decline in stunting among under-five children (Monteiro et al., 2009). Improving access to proper sanitation and healthcare resulted in an additional 15% decline in stunting between 1996 and 2007 (Monteiro et al., 2009). Thus, the known risk factors of infant and child malnutrition need to be addressed simultaneously. This is possible only when health and nutrition programmes are supported by economic and social policies that address deprivation and hunger, and promote female education and access to proper sanitation. Another study analysed the benefits of a multi-country, multi-sector rural-development initiative on reducing stunting among children in nine countries in Sub-Saharan Africa (Remans et al., 2011). The project implemented a package of interventions in agriculture, health, education, and infrastructure over a 10-year period (Remans et al., 2011). The results showed that the integrated rural-development initiative was effective in reducing stunting among children within three years of its implementation compared to the baseline (Remans et al., 2011). It produced a synergistic effect on nutritional outcomes by improving food security in households, practices of exclusive breastfeeding and early initiation of breastfeeding, use of health services, measles vaccination and Vitamin A

supplementation (Remans et al., 2011). The authors recommend that health promotion programmes alone are insufficient to address the problems of malnutrition among children, but have to be implemented as part of a comprehensive package that targets the cascade of the determinants of malnutrition (structural, behavioural and biological) (Remans et al., 2011). In addition, the rapid reductions in child malnutrition in China, Thailand and Vietnam has been attributed to the concomitant actions in the areas of economic development, social security, nutrition and education driven by strong inter-sectoral commitment and leadership (Von Braun et al., 2008).

#### *6.2.2.1: Policy entry points*

Policy entry points identified by this study spans the spectrum of the determinants pathway and is shown in figure 6.1. In addition to mitigating the problems of MGNREGA implementation related to delayed payments and lower than standard wages (policy entry point A) as discussed in section 6.2.2, factors such as lack of mothers' knowledge about adequate infant feeding and care influenced by the socio-cultural norms (policy entry point B) will have to be addressed. While health promotion and educational interventions can improve mothers' knowledge of infant care and feeding, it is difficult to plan direct interventions targeting the social norms and beliefs because of cultural sensitivity. Improving the education levels of mothers and sensitising the caregivers in the family (grandparents in particular) about the adverse consequences of the socio-cultural misconceptions could be a way forward, although easier said than done.

MGNREGA itself could provide a platform to promote knowledge about health and nutrition, and increase awareness about the adverse effects of some of the cultural practices

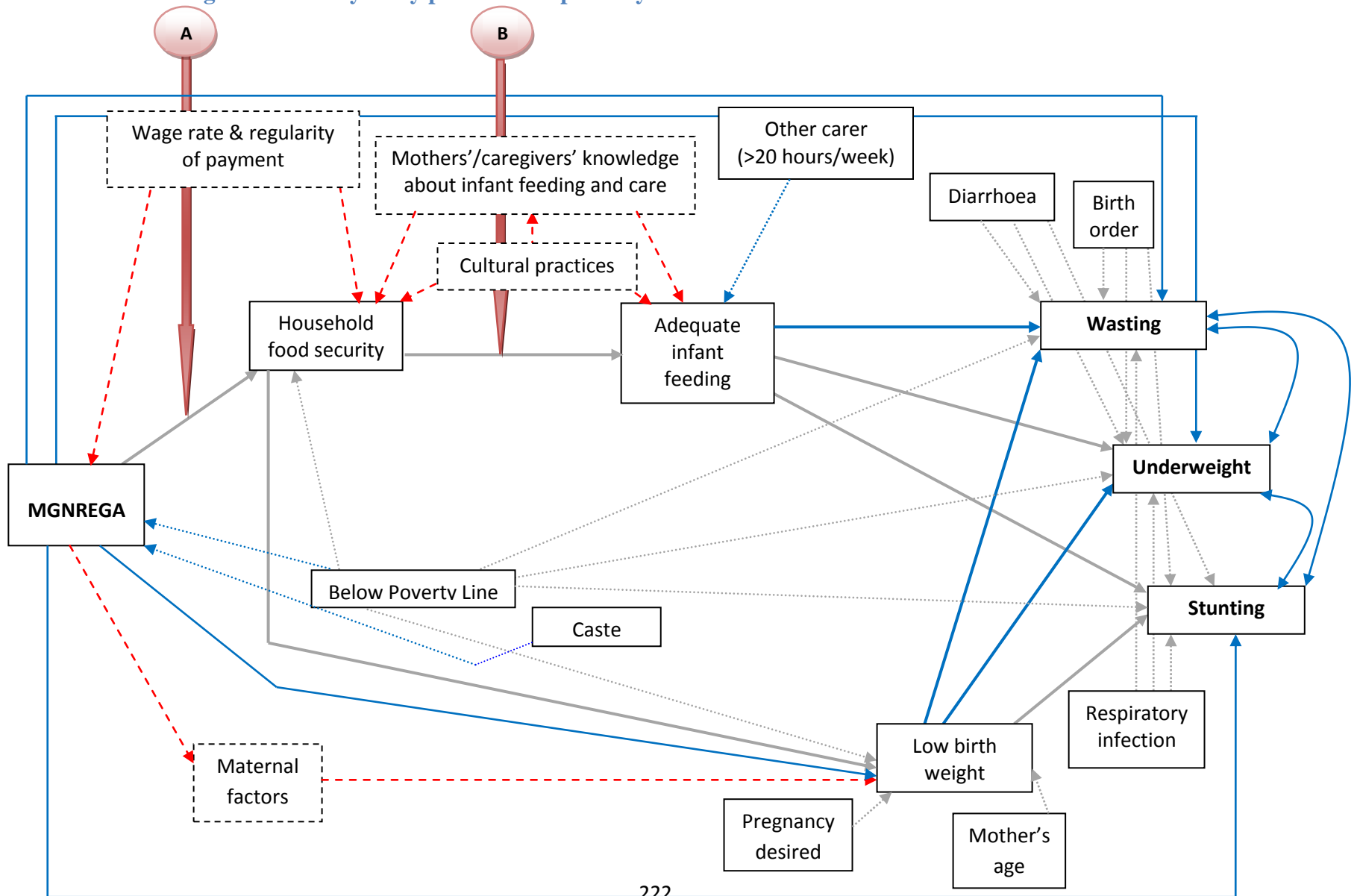
related to infant feeding. Bangladesh has successfully used the Micro-Credit programme<sup>30</sup> to communicate health knowledge and promote healthy behaviour among the participants. Studies showed that interventions to promote health knowledge and facilitate discussions among women to create awareness were more effective in improving women's knowledge when integrated with the Micro-Credit programmes compared to implementing them in isolation (Strobach and Zaumseil, 2007, Hadi, 2001). Micro-Credit programmes integrated with a package of services which included discussion meetings, skills training, and promoting basic literacy and utilisation of primary healthcare services were found to be effective in improving mothers' knowledge about adequate child care practices such as breastfeeding, nutrition intake, immunisation and use of safe drinking water (Hadi, 2001). Knowledge about health and nutrition was not only better among the participants of the Micro-Credit programme than the non-participants, but was also found to improve with the duration of participation in the programme (Hadi, 2001, Strobach and Zaumseil, 2007). However, the studies do not provide information about whether knowledge was translated in practice to ultimately improve the health and nutrition of children. Another approach suggested to be effective is the participatory learning and action through women's groups in which local women (who are not health workers, but have received basic training in maternal and newborn health) convene and facilitate women group meetings (Prost et al., 2013). A systematic review of seven trials from Bangladesh, India, Nepal and Malawi demonstrated that such women's group interventions have a remarkable effect in reducing maternal and neonatal mortality, particularly in rural and low-resource settings (Prost et al., 2013). MGNREGA could provide a platform for mothers' group participatory learning and

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<sup>30</sup> Micro-Credit programme is a rural grass-root level organization that loans small amounts of money to the poor for income generating activities RAHMAN, A. 1999. Micro-credit initiatives for equitable and sustainable development: Who pays? *World Development*, 27, 67-82.

action to address the issues of inadequate knowledge and practices of infant feeding and care. Although health is not the primary objective of MGNREGA, such models can be applied to address the behavioural and socio-cultural risk factors of infant malnutrition.

Figure 6.1: Policy entry points in the pathway of effect of MGNREGA on infant malnutrition



Significant relations are shown with blue arrows and non-significant with grey arrows. Red dotted arrows from grey dotted boxes indicate qualitative themes

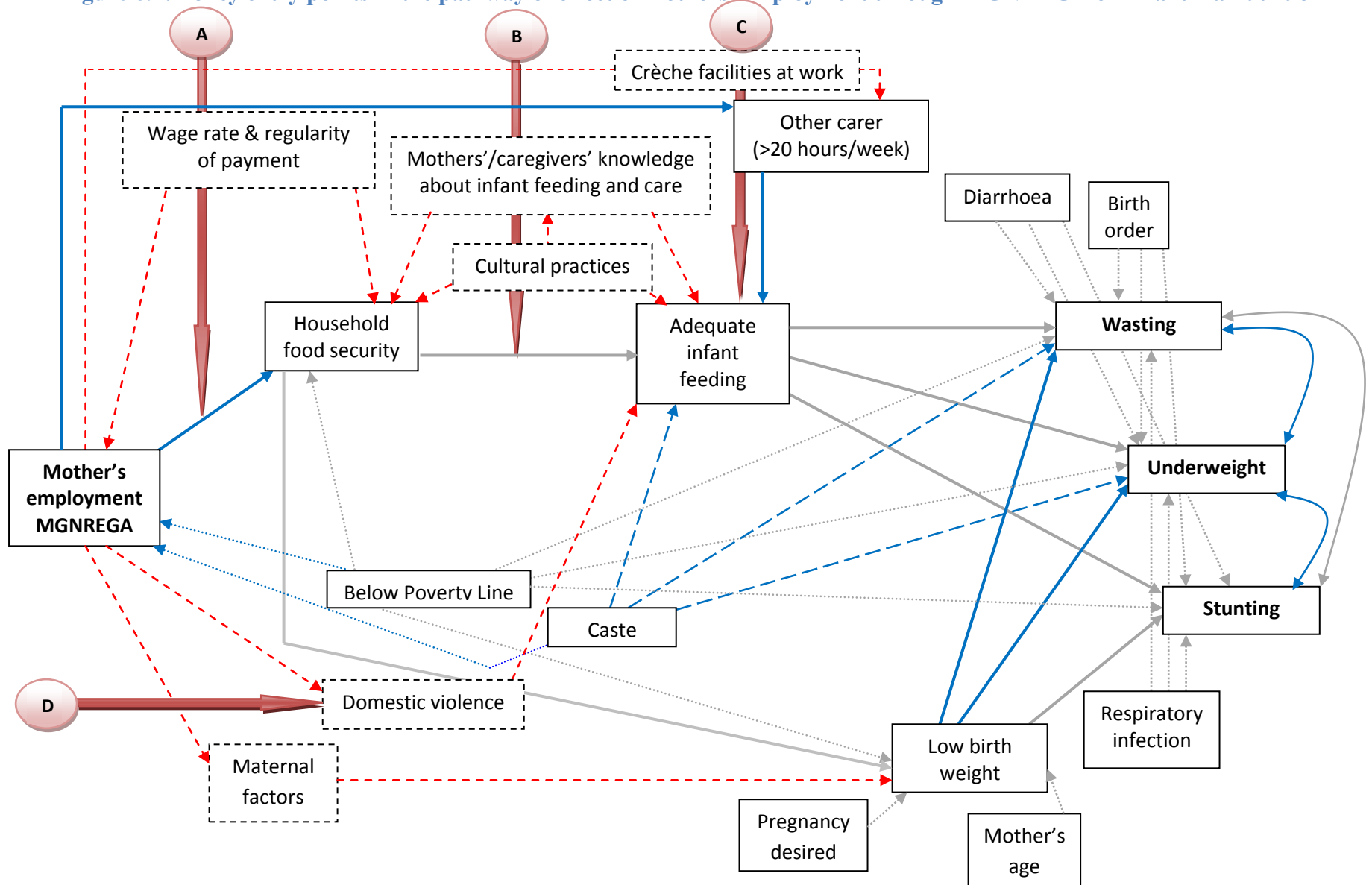
The study also identified a number of policy entry points in the pathway of effect of mothers' employment. Figure 6.2 shows that apart from addressing the MGNREGA implementation gaps (Policy entry point A) and lack of mothers' knowledge about infant feeding and care (Policy entry point B), it is important to mitigate the negative effects of mothers' employment due to compromises in time devoted to child care and feeding (Policy entry point C), and improve the social status of women in general (Policy entry point D).

In addition to providing child care facilities at work-sites, which is already recommended in the MGNREGA policy, it would be useful for women with infants and young children to have two to three feeding breaks. The work sites should be closer to the villages such that the mothers do not have to travel long distances to breastfeed their children. Furthermore, merely providing employment to women may not lead to their financial independence or empowerment, unless their status within the households and the society at large is improved. Unless mothers have the power to decide on the utilisation of their earnings from any source, it is not likely that their earnings will be used to benefit child health and nutrition.

While addressing the child care issues related to mothers' employment is straight forward, the issues related to domestic violence against women and their oppression cannot be mitigated in a short span of time. It will require efforts from various sectors to bring about a social change. Women in India are an important part of the economic sector and the reproductive age of women (15-44 years) overlap with their economically productive age (15-59 years) (Planning Commission; Government of India, 2002). It is estimated that there are at least 233.7 million women in the age group of 15-44 years which constitutes approximately 47% of the total population (Planning Commission; Government of India, 2002). While in policy, MGNREGA reserves 33% of the person-days of work for women,

in the financial year 2012-13, 52% (983 million) of the total person-days generated were provided to women (Ministry of Rural Development; Government of India, 2005). It is most likely that a majority of them are in their reproductive age group. Therefore, it is recommended that in addition to analysing the trade-offs between mothers' employment and child care, the evaluation studies of MGNREGA should focus on in-depth understanding of the sensitive household and societal factors (such as domestic violence, societal oppression and lack of freedom to decide on the utilisation of their own earnings) that mediate the effects of mothers' employment on infant nutrition. Only then can we weigh the actual merits of providing employment to women and understand the outcomes in a transparent and credible manner. Such an approach to evaluating complex interventions by studying their whole range of effects through interlinked factors on intended and unintended outcomes have been recommended by the UK Medical Research Council's framework (Craig et al., 2008). In addition, the investigations will enable policy makers to package the provision of women employment in MGNREGA in a more effective manner taking account of the social factors and their responsibilities of child care.

Figure 6.2: Policy entry points in the pathway of effect of mothers' employment through MGNREGA on infant malnutrition



Significant relations are shown with blue arrows and non-significant with grey arrows. Red dotted arrows from grey dotted boxes indicate qualitative themes

### 6.2.3: Implications for policies targeting the broader determinants of health

While MGNREGA is suggested to be an initiative for addressing the social determinants of health (Marmot et al., 2011), this study provides empirical evidence with regards to how the policy could have an effect on the social determinants of infant malnutrition. From this study it can be suggested that to improve health and wellbeing of infants, actions in the arenas of economic and social policies are as important as in health. Thus, the study has implications for policies globally.

Presently, policies and programmes intended to provide economic and social security in the low and middle income countries are likely to transcend their intended goals to impact on health through a social determinants pathway. This study paves the way for analysing the social determinants of health and nutrition. Such an approach towards understanding the impacts of non-health policies on health will contribute towards developing a practical proposition for the concepts of the WHO's Commission on the Social Determinants of Health (Kelly et al., 2007) and the Adelaide Statement on Health in All Policies (World Health Organization and the Government of South Australia, 2010).

The WHO's Commission on Social Determinants of Health suggests that the social position of individuals is a key determinant of health, and interventions that enable individuals to change their social position can have an impact on health (Kelly et al., 2007). The argument behind this proposition is that health is not merely determined by the biological risk factors, but it is an outcome of interaction between socioeconomic, cultural, behavioural and biological factors (Kelly et al., 2007). Thus, one of the key recommendations of the 2011 World Conference on Social Determinants of Health was inter-sectoral coordination to take action against these broader determinants of health (World Health Organization, 2012a).

However, this proposition is not new. The Ottawa CHARTER for health promotion developed in 1986 for action to achieve 'Health for All' by the year 2000 stated that:

*“Health promotion is not just the responsibility of the health sector, but goes beyond healthy life-styles to well-being.”* (Ottawa CHARTER (World Health Organization))

The fundamental prerequisites for health were identified as peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice and equity (World Health Organization). More recently, the Adelaide Statement on Health in All Policies reiterated the need for multi-sectoral convergence for improving health and well-being, considering the growing interwoven challenges of health, food security, poverty, energy, the global economic crisis and climate change (World Health Organization and the Government of South Australia, 2010, Krech et al., 2010). The statement recommended new responsibilities for the health departments of countries, which among others include building the knowledge and evidence-base for inter-sectoral policy actions (World Health Organization and the Government of South Australia, 2010)

This study makes a case for such actions by demonstrating that non-health policies can have significant effect on addressing current health and nutrition problems, but act through a synergistic pathway of social and behavioural determinants. Thus, a concerted effort is required. However, such policy recommendations should be based on evidence. The methods used in this study could be adopted to analyse and delineate the pathways of effect of health and non-health policies globally (example: analyse the effect and pathways of effect of Micro-Credit programmes on health and nutrition of children). This would not only provide evidence for policy entry points, but could also help to answer questions with

regards to efficacy and targeting by identifying factors that enable and/ or hinder the policies from achieving their desired effects. However, there is scope to develop and refine the methods used in this study to improve the robustness of evidence.

### 6.3: Further studies

In addition to replicating the study in the context of other social and economic policies, it is important to conduct further studies to test the hypotheses generated by this study:

- i. The mechanism of MGNREGA's effect on infant malnutrition was not through the hypothesized infant pathway, but through a maternal pathway by improving birth-weight of the infants. This pathway needs to be further delineated to understand the effects of MGNREGA on maternal nutritional status during pregnancy.
- ii. The effect of MGNREGA on infant malnutrition was found to be influenced by the socioeconomic context of the study population. While MGNREGA protected the infants against acute malnutrition by improving their birth-weight in the poor households, it was not found to be effective in reducing malnutrition among infants in the comparatively better-off households. This warrants the need for studies to analyse and delineate the pathways of effect of MGNREGA in different socioeconomic, geographical and political contexts. This will lead to better understanding of the inter-play of contextual effects and the various determinants of infant malnutrition in order to effectively tailor the policy interventions. Further, it will also provide an opportunity to replicate the study in other settings.
- iii. The path-models and findings of the focus group discussions suggested that mothers' employment through MGNREGA could increase the risk of infant malnutrition and the pathway of effect could be through compromises in infant care and feeding. This

needs to be further explored in subsequent studies that are adequately powered. The qualitative themes identified as the drivers of the negative effects of mothers' employment such as problems faced by the mother and the child due to inability of the mothers to breastfeed, domestic violence against the mothers, compulsion to participate in MGNREGA to earn money and lack of autonomy, could be used to generate a quantitative tool. The quantitative variables measured using such tools should then be tested for their effects as confounders and/ or effect modifiers to further delineate the pathways of effect of mothers' employment through MGNREGA on infant nutritional status.

#### 6.4: Conclusion

In conclusion, this study is the first, which is known of, to analyse the effect and the pathways of effect of MGNREGA on infant malnutrition and empirically demonstrates the inter-play of the various determinants of malnutrition. Although the pathways of effect of MGNREGA developed in this study cannot be termed as causal, the evidence generated is useful for policies pertaining to MGNREGA as well as to health and nutrition. The UK Medical Research Council's guidance for evaluating complex interventions states:

*“Evaluating the health outcomes of non-health interventions is complex and may at times not be optimal in terms of the desired level of internal validity, however, considering the cost of such interventions and the useful results that it may yield, evaluations should still be considered”* (page 980, Craig et al., 2008).

MGNREGA is considered a landmark program in the history of India, due to its rights-based and statutory framework. It is the largest wage-for-employment program in the world in terms of costs and beneficiaries. The total budget outlay for the financial year 2011-12 was INR 400 billion (about 7.5 billion US\$) and since 2006 until December 2011 MGNREGA

generated more than 11 billion person-days of employment in the rural areas of the country (Ministry of Rural Development; Government of India, 2012). Although its immediate goals are to address deprivation, hunger and food insecurity among the rural population in India (Ministry of Rural Development; Government of India, 2012), the results of this study suggest that MGNREGA could protect infants against malnutrition and thus support the various existing health and nutrition interventions targeting infant malnutrition.

However, to achieve a sustainable impact on acute malnutrition and to protect infants and children against chronic malnutrition, a multi-faceted approach will be required. Ensuring timely and adequate payment could improve household food security, and augment the protective effect of MGNREGA against infant malnutrition. Factors such as mothers' knowledge and practices of infant feeding and care, cultural beliefs and norms, and social status of women appear as important as provision of employment. The findings suggest that irrespective of the source of income and food security, unless the identified socio-cultural risk factors are addressed, the gains to infant and child nutrition will be minimal. If a larger improvement on infant nutritional outcome is desired, it may be worthwhile to invest the resources in educating women and addressing the intermediate socio-cultural and behavioural risk factors (such as lack of mothers' knowledge about adequate infant feeding and care, misconceptions related to cultural practices and norms, and domestic violence against women), over and above improving the economic conditions of the rural population. Therefore, policies need to target the persistent problem of infant and child malnutrition prevalent in India through a convergence of economic, development, social, and nutrition policies and programmes.

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- WORLD HEALTH ORGANISATION 2010a. *Indicators for assessing infant and young child feeding practices. Part 2 Measurement*, Geneva, Switzerland, WHO Press.
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- WORLD HEALTH ORGANISATION AND UNICEF 2006. *Core questions on drinking-water and sanitation for household surveys*, Geneva, WHO Press.
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- WORLD HEALTH ORGANIZATION 2012a. *All for equity: World Conference on Social Determinants of Health (Rio De Janeiro, Brazil, 19 - 21 October 2011)*. Geneva, Switzerland: World Health Organization.
- WORLD HEALTH ORGANIZATION 2012b. *World health statistics 2012*, Geneva, Switzerland, World Health Organization.
- WORLD HEALTH ORGANIZATION & THE GOVERNMENT OF SOUTH AUSTRALIA 2010. *The Adelaide Statement on Health in All Policies: moving towards a shared governance for health and well-being. Health promotion international*, 25, 258-260.
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**EFFECT OF THE MAHATMA GANDHI NATIONAL RURAL  
EMPLOYMENT GUARANTEE ACT ON INFANT MALNUTRITION:  
A MIXED METHODS STUDY IN RAJASTHAN, INDIA**

**PART 2  
Appendices**

**Trinity term 2013**

**Submitted in partial fulfilment of the requirements for the degree  
of Doctor of Philosophy**

**University of Oxford**

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## Appendix 2.1: List of published articles and reports used in the literature review

Sl. No.	Country/countries - study conducted	Year published	Complete Reference
1	28 low and middle income countries <sup>31</sup>	2012	Arabi M, Frongillo EA, Avula R, Mangasaryan N. Infant and Young Child Feeding in Developing Countries. <i>Child Development</i> . 2012;83(1):32-45.
2	Asia, Africa and Latin America	2004	Charmarbagwala R, Ranger M, Waddington H, White H. The determinants of child health and nutrition: a meta-analysis: World Bank; 2004.
3	Bangladesh	1993	Ahmed NU, Zeitlin MF, Beiser AS, Super CM, Gershoff SN. A longitudinal study of the impact of behavioural change intervention on cleanliness, diarrhoeal morbidity and growth of children in rural Bangladesh. <i>Social science &amp; medicine</i> (1982). 1993;37(2):159-71.
4	Bangladesh	1990	Aziz KM, Hoque BA, Hasan KZ, Patwary MY, Huttly SR, Rahaman MM, et al. Reduction in diarrhoeal diseases in children in rural Bangladesh by environmental and behavioural modifications. <i>Transactions of the Royal Society of Tropical Medicine and Hygiene</i> . 1990;84(3):433-8.
5	Bangladesh	1980	Bairagi R. Is income the only constraint on child nutrition in rural Bangladesh? <i>Bull World Health Organ</i> . 1980;58(5):767-72.
6	Bangladesh	2011	Das S, Rahman RM. Application of ordinal logistic regression analysis in determining risk factors of child malnutrition in Bangladesh. <i>Nutrition journal</i> . 2011;10(1):124.
7	Bangladesh	2012	Kabir I, Khanam M, Agho KE, Mirshahi S, Dibley MJ, Roy SK. Determinants of inappropriate complementary feeding practices in infant and young children in Bangladesh: secondary data analysis of Demographic Health Survey 2007. <i>Maternal &amp; Child Nutrition</i> . 2012;8(Suppl. 1):11-27.
8	Bangladesh	2011	Mostafa KS. Socio-economic determinants of severe and moderate stunting among under-five children of rural Bangladesh. <i>Malaysian journal of nutrition</i> . 2011;17(1):105-18.
9	Bangladesh	2007	Rahman A, Chowdhury S. Determinants of chronic malnutrition among preschool children in Bangladesh. <i>J Biosoc Sci</i> . 2007;39(2):161-73.
10	Brazil	2008	Assis AMO, Barreto ML, de Oliveira LPM, de Oliveira VA, da Silva Prado M, da Silva Gomes GS, et al. Determinants of mild-to-moderate malnutrition in preschoolers in an urban area of Northeastern Brazil: a hierarchical approach. <i>Public Health Nutrition</i> . 2008;11(4):387-94.

<sup>31</sup> Montenegro, Serbia, Belarus, Macedonia, Albania, Kazakhstan, Bosnia and Herzegovina, Thailand, Ukraine, Belize, Jamaica, Syrian Arab Republic, Mongolia, Viet Nam, Uzbekistan, Kyrgyzstan, Yemen, Tajikistan, Ghana, Bangladesh, Togo, Gambia, Co<sup>^</sup>te d'Ivoire, Guinea-Bissau, Central African Republic, Sierra Leone, Iraq and Somalia

Sl. No.	Country/countries - study conducted	Year published	Complete Reference
11	Brazil	2011	de Menezes RC, de Lira PI, Leal VS, Oliveira JS, Santana SC, Sequeira LA, et al. Determinants of stunting in children under five in Pernambuco, northeastern Brazil. <i>Revista de saude publica.</i> 2011;45(6):1079-87.
12	Brazil	2002	Marins VM, Almeida RM. Undernutrition prevalence and social determinants in children aged 0-59 months, Niterói, Brazil. <i>Annals of human biology.</i> 2002;29(6):609-18.
13	Brazil	2006	Menegolla IA, Drachler Mde L, Rodrigues IH, Schwingel LR, Scapinello E, Pedroso MB, et al. [Nutritional status and social determinants of child height in the Guarita Indigenous Territory, Southern Brazil]. <i>Cad Saude Publica.</i> 2006;22(2):395-406.
14	Brazil	2008	Oliveira Assis AM, Barreto ML, Magalhaes de Oliveira LP, de Oliveira VA, da Silva Prado M, da Silva Gomes GS, et al. Determinants of mild-to-moderate malnutrition in preschoolers in an urban area of Northeastern Brazil: a hierarchical approach. <i>Public Health Nutr.</i> 2008;11(4):387-94.
15	Brazil	1984	Victora CG, Vaughan JP, Martines JC, Barcelos LB. Is prolonged breast-feeding associated with malnutrition? <i>The American Journal of Clinical Nutrition.</i> 1984;39(2):307-14.
16	Uzbekistan, Kyrgyzstan and Kazakhstan	2009	Bomela NJ. Social, economic, health and environmental determinants of child nutritional status in three Central Asian Republics. <i>Public Health Nutr.</i> 2009;12(10):1871-7.
17	Colombia	1991	Lomperis AMT. Teaching Mothers to Read: Evidence from Colombia on the Key Role of Maternal Education in Preschool Child Nutritional Health. <i>The Journal of Developing Areas.</i> 1991;26(1):25-52.
18	Countries in three regions – Asia (110 countries), Africa (157) and Latin America (99)	2002	Fernandez ID, Himes JH, de Onis M. Prevalence of nutritional wasting in populations: building explanatory models using secondary data. <i>Bull World Health Organ.</i> 2002;80(4):282-91.
19	Countries in three regions – Asia (17 countries), Africa (32) and Latin America (20)	1997	Frongillo EA, de Onis M, Hanson KMP. Socioeconomic and demographic factors are associated with worldwide patterns of stunting and wasting of children. <i>The Journal of Nutrition.</i> 1997;127(12):2302-9.

<b>Sl. No.</b>	<b>Country/countries - study conducted</b>	<b>Year published</b>	<b>Complete Reference</b>
20	Countries in three regions – Asia (17 countries), Africa (32) and Latin America (20)	1995	Frongillo EA, Hanson KMP. Determinants of variability among nations in child growth. <i>Annals of human biology</i> . 1995;22(5):395-411.
21	Democratic Republic of Congo	2000	Delpuech F, Traissac P, Martin-Prevel Y, Massamba JP, Maire B. Economic crisis and malnutrition: socioeconomic determinants of anthropometric status of preschool children and their mothers in an African urban area. <i>Public Health Nutr</i> . 2000;3(1):39-47.
22	Democratic Republic of Congo	1994	Haggerty PA, Muladi K, Kirkwood BR, Ashworth A, Manunebo M. Community-based Hygiene Education to Reduce Diarrhoeal Disease in Rural Zaire: Impact of the Intervention on Diarrhoeal Morbidity. <i>International Journal of Epidemiology</i> . 1994;23(5):1050-9.
23	Democratic Republic of Congo	2011	Kandala NB, Madungu TP, Emina JB, Nzita KP, Cappuccio FP. Malnutrition among children under the age of five in the Democratic Republic of Congo (DRC): does geographic location matter? <i>BMC public health</i> . 2011;11:261-75.
24	Ecuador	2005	Larrea C, Kawachi I. Does economic inequality affect child malnutrition? The case of Ecuador. <i>Social Science &amp; Medicine</i> . 2005;60(1):165-78.
25	Ethiopia	1998	Getaneh T, Assefa A, Tadesse Z. Protein-energy malnutrition in urban children: Prevalence and determinants. <i>Ethiopian Med J</i> . 1998;36(3):153-66.
26	Gabon	2009	Blaney S, Beaudry M, Latham M. Determinants of undernutrition in rural communities of a protected area in Gabon. <i>Public Health Nutr</i> . 2009;12(10):1711-25.
27	Gambia	2010	Mwangome M, Prentice A, Plugge E, Nweneka C. Determinants of appropriate child health and nutrition practices among women in rural Gambia. <i>Journal of health, population, and nutrition</i> . 2010;28(2):167-72.
28	Ghana	1999	Ruel MT, Levin CE, Armar-Klemesu M, Maxwell D, Morris SS. Good care practices can mitigate the negative effects of poverty and low maternal schooling on children's nutritional status: evidence from Accra. <i>World Development</i> . 1999;27(11):1993-2009.
29	Guatemala	1993	Engle PL. Influences of mothers' and fathers' income on children's nutritional status in Guatemala. <i>Social Science &amp; Medicine</i> . 1993;37(11):1303-12.

<b>Sl. No.</b>	<b>Country/countries - study conducted</b>	<b>Year published</b>	<b>Complete Reference</b>
30	India	1988	Abbi R, Christian P, Gujral S, Gopaldas T. Mothers' nutrition knowledge and child nutritional status in India. Food and nutrition bulletin. 1988;10(3):51-4.
31	India	1991	Abbi R, Christian P, Gujral S, Gopaldas T. The impact of maternal work status on the nutrition and health status of children. Food and nutrition bulletin. 1991;13(1):20-5.
32	India	2004	Anoop S, Saravanan B, Joseph A, Cherian A, Jacob KS. Maternal depression and low maternal intelligence as risk factors for malnutrition in children: a community based case-control study from South India. Archives of Disease in Childhood. 2004;89(4):325-9.
33	India	2008	Bawdekar M, Ladusingh L. Contextual correlates of child malnutrition in rural Maharashtra. Journal of Biosocial Science. 2008;40(05):771-86.
34	India	2008	Bharati S, Pal M, Bharati P. Determinants of nutritional status of pre-school children in India. J Biosoc Sci. 2008;40(6):801-14.
35	India	2007	Bose K, Biswas S, Bisai S, Ganguli S, Khatun A, Mukhopadhyay A, et al. Stunting, underweight and wasting among Integrated Child Development Services (ICDS) scheme children aged 3–5 years of Chapra, Nadia District, West Bengal, India. Maternal & Child Nutrition. 2007;3(3):216-21.
36	India	1986	Choudhary M, Jain S, Saini V. Nutritional status of children of working mothers. Indian pediatrics. 1986;23(4):267-70.
37	India	2008	Das S. Childhood undernutrition: A comparative analysis of Scheduled Tribes and others in the mid-Indian Tribal Region. Social change. 2008;38(1):64-83.
38	India	2005	Gaiha R, Kulkarni V. Anthropometric failure and persistence of poverty in rural India. International Review of Applied Economics. 2005;19(2):179-97.
39	India	1987	Gupta MD. Selective discrimination against female children in rural Punjab, India. Population and Development Review. 1987; 13(1):77-100.
40	India	1968	Jain V. Some social components of infant mortality in India. Indian Journal of Pediatrics. 1968;35(2):109-12.
41	India	2006	Jones G, Schultink W, Babilie M. Child survival in India. Indian J Pediatr. 2006;73(6):479-87.

Sl. No.	Country/countries - study conducted	Year published	Complete Reference
42	India	1988	Khan ME. Infant mortality in Uttar Pradesh: A micro-level study. In: Jain AK, Visaria P, editors. Infant mortality in India: Differentials and determinants. New Delhi: Sage Publication; 1988.
43	India	1999	Mishra VK, Lahiri S, Norman YL. Child Nutrition in India, Report, 14. IIPS, Mumbai and East West Centre, Population and Health Studies, Honolulu, Hawaii. USA, 1999.
44	India	2000	Mishra VK, Retherford RD. Women's education can improve child nutrition in India. National Family Health Survey bulletin. 2000(15):1-4.
45	India	2010	Patel A, Badhoniya N, Khadse S, Senarath U, Agho KE, Dibley MJ, et al. Infant and young child feeding indicators and determinants of poor feeding practices in India: secondary data analysis of National Family Health Survey 2005-06. Food and nutrition bulletin. 2010;31(2):314-33.
46	India	2012	Patel A, Pusdekar Y, Badhoniya N, Borkar J, Agho KE, Dibley MJ. Determinants of inappropriate complementary feeding practices in young children in India: secondary analysis of National Family Health Survey 2005–2006. Maternal & Child Nutrition. 2012;8(Suppl. 1):28-44.
47	India	2007	Rajaram S, Zottarelli LK, Sunil TS. Individual, household, programme and community effects on childhood malnutrition in rural India. Maternal & Child Nutrition. 2007;3(2):129-40.
48	India	2007	Ramachandran P. Poverty nutrition linkages. The Indian journal of medical research. 2007;126(4):249-61.
49	India	2006	Sethuraman K, Lansdown R, Sullivan K. Women's empowerment and domestic violence: the role of sociocultural determinants in maternal and child undernutrition in tribal and rural communities in South India. Food and nutrition bulletin. 2006;27(2):128-43.
50	India	2009	Shroff M, Griffiths P, Adair L, Suchindran C, Bentley M. Maternal autonomy is inversely related to child stunting in Andhra Pradesh, India. Maternal & Child Nutrition. 2009;5(1):64-74.
51	India	2011	Shroff MR, Griffiths PL, Suchindran C, Nagalla B, Vazir S, Bentley ME. Does maternal autonomy influence feeding practices and infant growth in rural India? Social Science & Medicine. 2011;73(3):447-55.
52	India	2006	Singh MB, Lakshminarayana J, Fotedar R, Anand PK. Childhood illnesses and malnutrition in under five children in drought affected desert area of western Rajasthan, India. Journal of Communicable Diseases. 2006;38(1):88-96.

<b>Sl. No.</b>	<b>Country/countries - study conducted</b>	<b>Year published</b>	<b>Complete Reference</b>
53	India	1988	Visaria L. Level, trends and determinants of infant mortality in India. In: Jain AK, Visaria P, editors. Infant mortality in India: Differentials and determinants. New Delhi: Sage Publication; 1988.
54	Indonesia	2007	Bardosono S, Sastroamidjojo S, Lukito W. Determinants of child malnutrition during the 1999 economic crisis in selected poor areas of Indonesia. <i>Asia Pacific Journal of Clinical Nutrition</i> . 2007;16(3):512-26.
55	Indonesia and Bangladesh	2008	Semba RD, de Pee S, Sun K, Sari M, Akhter N, Bloem MW. Effect of parental formal education on risk of child stunting in Indonesia and Bangladesh: a cross-sectional study. <i>The Lancet</i> . 2008;371(9609):322-8.
56	Kenya	2004	Bloss E, Wainaina F, Bailey RC. Prevalence and Predictors of Underweight, Stunting, and Wasting among Children Aged 5 and Under in Western Kenya. <i>Journal of Tropical Pediatrics</i> . 2004;50(5):260-70.
57	Kenya	2012	Masibo PK, Makoka D. Trends and determinants of undernutrition among young Kenyan children: Kenya Demographic and Health Survey; 1993, 1998, 2003 and 2008-2009. <i>Public Health Nutrition</i> . 2012;15(9):1715-27.
58	Kenya	1991	Whyte SR, Kariuki PW. Malnutrition and gender relations in Western Kenya. <i>Health transition review : the cultural, social, and behavioural determinants of health</i> . 1991;1(2):171-87.
59	Lao	2011	Kamiya Y. Socioeconomic determinants of nutritional status of children in Lao PDR: effects of household and community factors. <i>Journal of health, population, and nutrition</i> . 2011;29(4):339-48.
60	Mali	1995	Bouvier P, Papart JP, Wanner P, Picquet M, Rougemont A. Malnutrition of children in Sikasso (Mali): prevalence and socio-economic determinants. <i>Sozial- und Praventivmedizin</i> . 1995;40(1):27-34.
61	Mexico	2004	Reyes H, Perez-Cuevas R, Sandoval A, Castillo R, Santos JI, Doubova SV, et al. The family as a determinant of stunting in children living in conditions of extreme poverty: a case-control study. <i>BMC public health</i> . 2004;4(1):57.
62	Morocco	1999	Glewwe P. Why Does Mother's Schooling Raise Child Health in Developing Countries? Evidence from Morocco. <i>The Journal of Human Resources</i> . 1999;34(1):124-59.
63	Mozambique	2010	Burchi F. Child nutrition in Mozambique in 2003: The role of mother's schooling and nutrition knowledge. <i>Economics &amp; Human Biology</i> . 2010;8(3):331-45.
64	Nicaragua	1998	Lamontagne JF, Engle PL, Zeitlin MF. Maternal employment, child care, and nutritional status of 12–18-month-old children in Managua, Nicaragua. <i>Social Science &amp; Medicine</i> . 1998;46(3):403-14.

<b>Sl. No.</b>	<b>Country/countries - study conducted</b>	<b>Year published</b>	<b>Complete Reference</b>
65	Nigeria	2001	Esimai OA, Ojofeitimi EO, Oyebowale OM. Sociocultural practices influencing under five nutritional status in an urban community in Osun state, Nigeria. <i>Nutrition and Health</i> . 2001;15(1):41-6.
66	Pakistan	1990	Thaver IH, Ebrahim GJ, Richardson R. Infant mortality and undernutrition in the squatter settlements of Karachi. <i>J Trop Pediatr</i> . 1990;36(3):135-40.
67	Panama	1988	Tucker K, Sanjur D. Maternal employment and child nutrition in Panama. <i>Social Science &amp; Medicine</i> . 1988;26(6):605-12.
68	Peru	2007	Casapia M, Joseph SA, Nunez C, Rahme E, Gyorkos TW. Parasite and maternal risk factors for malnutrition in preschool-age children in Belen, Peru using the new WHO Child Growth Standards. <i>The British journal of nutrition</i> . 2007;98(6):1259-66.
69	Philippines	1993	Adair L, Popkin BM, VanDerslice J, Akin J, Guilkey D, Black R, et al. Growth dynamics during the first two years of life: a prospective study in the Philippines. <i>European Journal of Clinical Nutrition</i> . 1993;47(1):42-51.
70	Philippines	1993	Magnani RJ, Mock NB, Bertrand WE, Clay DC. Breast-feeding, water and sanitation, and childhood malnutrition in the Philippines. <i>J Biosoc Sci</i> . 1993;25(2):195-211.
71	Philippines	1976	Popkin BM, Solon FS. Income, time, the working mother and child nutriture. <i>Environment Child Health</i> . 1976;22(4):156-66.
72	Philippines	1996	Ricci JA, Becker S. Risk factors for wasting and stunting among children in Metro Cebu, Philippines. <i>The American Journal of Clinical Nutrition</i> . 1996;63(6):966-75.
73	Republic of Benin	1982	Caputo A, Foraita R, Klasen S, Pigeot I. Undernutrition in Benin-an analysis based on graphical models. <i>Social science &amp; medicine (1982)</i> . 2003;56(8):1677-91.
74	Review of studies based on Eastern and Southern African Region	1994	Mwadime RK, Baldwin SL. Relationship between household access to food and malnutrition in eastern and southern Africa. <i>East African medical journal</i> . 1994;71(9):571-9.
75	Santo Domingo	1977	MacCorquodale DW, de Nova HR. Family size and malnutrition in Santo Domingo. <i>Public health reports (Washington, DC : 1974)</i> . 1977;92(5):453-7.

<b>Sl. No.</b>	<b>Country/countries - study conducted</b>	<b>Year published</b>	<b>Complete Reference</b>
76	South Africa	2004	Mamabolo RL, Alberts M, Mbenyane GX, Steyn NP, Nthangeni NG, Delemarre-van De Waal HA, et al. Feeding practices and growth of infants from birth to 12 months in the central region of the Limpopo Province of South Africa. <i>Nutrition</i> . 2004;20(3):327-33.
77	Sudan	1995	Abdel Sayed ZT, Latham MC, Roe DA. Prolonged Breastfeeding Without the Introduction of Supplementary Feeding. <i>Journal of Tropical Pediatrics</i> . 1995;41(1):29-33.
78	Sudan	1993	Brush G, Harrison G, Zumrawi F. A path analysis of some determinants of infant growth in Khartoum. <i>Annals of human biology</i> . 1993;20(4):381-7.
79	Uganda	2008	Engebretsen IM, Tylleskar T, Wamani H, Karamagi C, Tumwine JK. Determinants of infant growth in Eastern Uganda: a community-based cross-sectional study. <i>BMC public health</i> . 2008;8:418.
80	Uganda	1992	Vella V, Tomkins A, Borghesi A, Migliori GB, Adriko BC, Crevatin E. Determinants of child nutrition and mortality in north-west Uganda. <i>Bull World Health Organ</i> . 1992;70(5):637-43.
81	Uganda	1995	Vella V, Tomkins A, Nviku J, Marshall T. Determinants of Nutritional Status in South-west Uganda. <i>Journal of Tropical Pediatrics</i> . 1995;41(2):89-98.
82	Uganda	2006	Wamani H, Astrom AN, Peterson S, Tumwine JK, Tylleskar T. Predictors of poor anthropometric status among children under 2 years of age in rural Uganda. <i>Public Health Nutr</i> . 2006;9(3):320-6.
83	Zimbabwe	1993	Cosminsky S, Mhloyi M, Ewbank D. Child feeding practices in a rural area of Zimbabwe. <i>Social science &amp; medicine (1982)</i> . 1993;36(7):937-47.
84	Zimbabwe	1995	Madzingira N. Malnutrition in children under five in Zimbabwe: Effect of socioeconomic factors and disease. <i>Biodemography and Social Biology</i> . 1995;42(3-4):239-46.
85	Zimbabwe	1994	Moy RJ, de CMTF, Choto RG, McNeish AS, Booth IW. Diarrhoea and growth faltering in rural Zimbabwe. <i>Eur J Clin Nutr</i> . 1994;48(11):810-21.
86	Zimbabwe and Tanzania	2011	Paul KH, Muti M, Khalfan SS, Humphrey JH, Caffarella R, Stoltzfus RJ. Beyond food insecurity: how context can improve complementary feeding interventions. <i>Food and nutrition bulletin</i> . 2011;32(3):244-53.

**Appendix 3.1: List of villages randomly selected in each of the five administrative blocks in the study district**

<b>Aaspur</b>	<b>Bacchiwada</b>	<b>Sagwada</b>	<b>Simalwara</b>	<b>Dungarpur</b>
Harwar	Ged	Mawita	Bedsa	Karhata
Raiki	Ged Jamburi	Gheo Ka Bela	Mandli	Khajuria
Limdi	Palisoda	Varsinghpur	Jaitholi	Raghunathpura
Varwasa Mafi	Barothi	Bahliya	Sakarsi	Ratnawara
Varwasa jagir	Rampur	Kajela	Jharni	Hathai
Karelia	Bharaput	Matajiphala	Bachadia	Nawagada
SomKamla Amba	Ved	Aara		Peeplada
Amritya	Garhmala	Nayagaon		Jonthari
		Panthalai		Padla Gokia
		Chbuda		
		Balrampur		
		Piludaphala		
		Karada		

## **Appendix 3.2: Standard operating procedures used for the anthropometric measurements of infants**

### **Measurements taken**

1. Weight
2. Recumbent length

### **Equipment**

1. Weight - Electronic digital weighing scale; Seca 384 digital infant scale with a beam balance and measures up to a precision of 10gms (as recommended by Fomon, 1974).
2. Recumbent length - Portable infantometer; Seca 417 – measurement range is from 10-100 cms, with a precision of 2mm.

### **Procedures for measuring weight and recumbent length of the infants**

The methods for measuring weight and recumbent length of infants were based on the standard guidelines and the manual of WHO Multicentre Growth Reference Study (de Onis et al., 2004). Measurements of all 55 infants were conducted by the author assisted by the field assistants who were trained female graduate nurses. Written informed consent was taken from the mothers before measuring the infants.

#### **Weight**

Weight was measured using the electronic digital scale (described above) which had a precision of 10gms. Mothers were requested to remove all clothing of the baby including any diapers. Nude baby was placed on the weighing scale and measurement was recorded immediately (in clear and legible writing in the data form given at the end of the appendix) and rounded off to the nearest 100gms. The measurement process took about 5-6 minutes and no major discomfort to the baby was noted.

#### **Recumbent length**

Recumbent length was measured using the portable infantometer. Any hair ornament or braid that could interfere with the positioning of the head was removed. Diapers, if any were removed because this would cause difficulty in holding the infant's legs together and in straightening them. The author stood on the foot-end of the infantometer, and held the baby's legs with one hand and moved the foot board with the other. The field assistant stood on the head-end and positioned the head against the headboard such that the crown touched the headboard and the vertical line from the ear canal to the lower border of the eye socket was perpendicular to the horizontal board (Frankfort plane positioned vertically). The author then positioned the baby's shoulders and hips at right angles to the long axis of the body. Gentle pressure was applied on the knees to straighten them. Utmost care was taken to prevent any injury or bruise to the baby's knee. The foot board was positioned against the baby's feet with the soles flat on the board and toes pointing upwards. Length was recorded promptly to the

nearest 1mm. The procedure was repeated by changing positions (author at the head-end and field assistant at the foot-end) to take a second measurement. If the difference between the two recordings was more than the maximum allowable limit of 7.00 millimetres, a second set of measurements was taken. This was done for maintaining high precision of the measurement of recumbent length of infants during the study. The maximum allowable limit was based on the WHO's Multicentre Growth Reference Study manual (de Onis et al., 2004). Field assistants were trained to efficiently take the measurements such that the process was quick and accurate with minimal discomfort to the baby.

### **ANTHROPOMETRIC MEASUREMENTS RECORD FORM**

<b><i>Instruction to the research staff:</i></b> Before taking measurements ensure that the consent form has been signed by the mother/caregiver. Explain the procedures to the mother/caregiver and make sure that the baby is calm.		
Participant (mother's) ID <input style="width: 80px;" type="text"/>	Date <input style="width: 40px;" type="text"/> <input style="width: 40px;" type="text"/> <input style="width: 40px;" type="text"/> DD/MM/YY Time <input style="width: 30px;" type="text"/> <input style="width: 30px;" type="text"/> Hrs: <input style="width: 30px;" type="text"/> <input style="width: 30px;" type="text"/> Min	
Interviewer ID: <input style="width: 60px;" type="text"/>	Instrument ID: <input style="width: 60px;" type="text"/> Weighing scale <input style="width: 40px;" type="text"/> Infantometer <input style="width: 40px;" type="text"/>	
<b>Checks (Tick <input checked="" type="checkbox"/> the appropriate box)</b>		
1. All clothing of infant including diaper removed before measuring weight?	Yes 1 <input type="checkbox"/>	No 2 <input type="checkbox"/>
2. All clothing of infant including diaper removed before measuring recumbent length?	Yes 1 <input type="checkbox"/>	No 2 <input type="checkbox"/>
<b>Anthropometric recordings</b>		
Weight <input style="width: 100px;" type="text"/> Kgs	Recumbent length reading-I <input style="width: 60px;" type="text"/> cms	Recumbent length reading-II <input style="width: 60px;" type="text"/> cms
	Difference between the readings >7.0mm (Maximum allowable limit) (Tick <input checked="" type="checkbox"/> the appropriate box)	Yes 1 <input type="checkbox"/> [Repeat measurement] No 2 <input type="checkbox"/> [End procedure]
	Recumbent length reading-III <input style="width: 60px;" type="text"/> cms	Recumbent length reading-IV <input style="width: 60px;" type="text"/> cms
	Difference between the readings >7.0mm (Maximum allowable limit) (Tick <input checked="" type="checkbox"/> the appropriate box)	Yes 1 <input type="checkbox"/> [Repeat measurement] No 2 <input type="checkbox"/> [End procedure]
	Recumbent length reading-V <input style="width: 60px;" type="text"/> cms	Recumbent length reading-VI <input style="width: 60px;" type="text"/> cms

### Appendix 3.3: Summary of the measurement tools and standard instruments used to develop the participant questionnaire.

Study variables	Measures	Standard instruments
<b>Outcome variables</b>		
Anthropometric indicators of malnutrition – wasting, stunting and underweight	Anthropometric measurements: Weight and recumbent length	WHO Child Health Standards (World Health Organisation, 2011, World Health Organisation, 2006)
<b>Independent variables</b>		
<b>Proximal determinants</b>		
Diarrhoea	Reported history from mothers (in past 2 weeks)	Demographic and Health Surveys (DHS) (Bose et al., 2007), District Level Household & Facility Survey-III (DLHS-III)(International Institute for Population Sciences) and National Family Health Survey-III (NFHS-III) (International Institute for Population Sciences)
Upper respiratory tract infection	Reported history from mothers (in past 2 weeks)	DHS (Bose et al., 2007), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences)
No/incomplete vaccination (proxy indicator of vaccine preventable diseases)	Vaccination status was recorded from the health card of the infant (if health card was not available - reported history from mother was taken)	DHS (Bose et al., 2007), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences)
<b>Intermediate determinants</b>		
Cleanliness and hygiene  - Water given to infants - Disposal of infant faeces	Self-report and observation	DHS (Bose et al., 2007), WHO – Core questions on drinking-water & sanitation (World Health Organisation and Unicef, 2006), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences)
Breastfeeding practices	Reported history from mothers using indicators for assessing infant and young child feeding practices	Indicators for assessing infant and young child feeding practices-WHO (World Health Organisation), DHS (Bose et al., 2007)
Complementary feeding practices		
Adequate infant feeding practices		
Discrimination (social, gender)	Demographic details – sex of infant, religion, caste, (self-reported)	DHS (Bose et al., 2007), DLHS-III (International Institute for Population Sciences) and NFHS-III,
Cultural practices		

<b>Study variables</b>	<b>Measures</b>	<b>Standard instruments</b>
Mother's knowledge and attitude towards infant feeding and care	These were mainly explored in the focus group discussions	(International Institute for Population Sciences) for demographic details
Infant care practices <ul style="list-style-type: none"> <li>- Oral Rehydration Salt given during diarrhoea</li> <li>- Adequate feeding during diarrhoea</li> <li>- Duration of care by other carers</li> </ul>	Child care questionnaire (self-reported)	Child care questionnaire from the Centres for Disease Control and Prevention (CDC) – Infant feeding practices study II, National Health Service's Infant feeding 2000 survey, Young Lives (National Health Services (NHS) Tees Public Health, 2002, Centres for Disease Control and Prevention (CDC), Young Lives)
Health seeking behaviour <ul style="list-style-type: none"> <li>- Treatment for diarrhoea and respiratory infections</li> <li>- Sibling died</li> <li>- Antenatal checkups</li> <li>- Institutional delivery</li> </ul>	Self-reported using standard questions	DHS (Bose et al., 2007), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences) for demographic details
Social status of mothers	Self-reported using standard questions to assess empowerment and autonomy of women	DHS (Bose et al., 2007), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences) for demographic details
<b>Distal determinants</b>		
Access to Safe water	Source of drinking water, treatment of water (self-reported & observation)	DHS (Bose et al., 2007), WHO – Core questions on drinking-water and sanitation for household surveys (World Health Organisation and Unicef, 2006), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences)
Access to toilets/proper sanitation	Type of toilet facility in the household (self-reported & observation)	
Household food security	Household food insecurity indicators (FANTA.2) - Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007), Household Dietary Diversity Score (HDDS) (Swindale and Bilinsky, 2006) and Months of Adequate Household Food Provisioning (MAHFP) (Bilinsky and Swindale, 2010). (Self-reported)	FANTA (Food and Nutrition Technical Assistance) Household food insecurity questionnaires (HFIAS (Coates et al., 2007), HDDS (Swindale and Bilinsky, 2006), MAHFP) (Bilinsky and Swindale, 2010)
Crowding within households	Household density calculated using information on number of members in the household and number	DHS (Bose et al., 2007), Young Lives (Young Lives), DLHS-III (International Institute for Population

<b>Study variables</b>	<b>Measures</b>	<b>Standard instruments</b>
	of rooms in the house (self-reported & observation)	Sciences) and NFHS-III (International Institute for Population Sciences)
Socioeconomic status	Asset index using information on availability of a list of household amenities	Young Lives (Young Lives), DHS (Bose et al., 2007), NFHS-III (International Institute for Population Sciences)
Below poverty line status of household	Self-reported	Verified by checking for the availability of the below poverty line status card (red card)
Received food from the Public Distribution System	Self-reported	Verified by checking for the availability of a ration-card in the household
Mother's education	Literacy and level of education (self-reported)	DHS (Bose et al., 2007), DLHS-III (International Institute for Population Sciences) and NFHS-III (International Institute for Population Sciences)
Father's education		
Primary occupation of the household	Information collected on the occupation of all adult members of the household	NFHS-III (International Institute for Population Sciences)
Maternal employment	Type of employment, kind of work, hours of work per day/per week (self-reported)	DHS (Women's questionnaire)(Bose et al., 2007), NFHS-III (International Institute for Population Sciences)
<b>MGNREGA</b> (Intervention / exposure variable)	Whether household was employed through MGNREGA, duration of employment, wage rate, regularity of wage, crèche facilities at work sites (self-reported and observation)	Questions adapted from MGNREGA bi-annual evaluation questionnaire
<b>Demographic factors</b>		
Demographic details – age and sex of infants, age of the mother, religion followed by the household members, family size, birth-order of the infant (self-reported) In addition – desire to have the child, whether presently pregnant and birth weight of the infants.		Information reported by mother/caregivers about the birth-weight of infants, age of the infant and mother, and birth-order was verified with the records of the village Auxiliary Nurse and Midwife

### Appendix 3.4: Questionnaires for the cross-sectional study (English and Hindi versions)

#### EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY

##### PARTICIPANT QUESTIONNAIRE

STUDY SITE INFORMATION				
Name of administrative block _____		Cluster number <input type="text"/> <input type="text"/> <input type="text"/>		
Name of village _____		Participant ID <input type="text"/> <input type="text"/> <input type="text"/>		
INTERVIEWER VISITS				
Visits	1	2	3	Final
Date	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY
Interviewer's name				
Result (insert codes*)	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/>
Next visit Date	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY		
Time	<input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> Hrs: Min	<input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> Hrs: Min		
*Result codes 1. Completed 2. No household member at home 3. No adult member at home 4. Mother/primary caregiver of the infant not at home 5. Entire household absent for extended period of time 6. Postponed		7. Refused 8. Dwelling vacant 9. Address not a dwelling 10. Dwelling destroyed 11. Dwelling not found 12. Others _____ (specify)		
ELIGIBILITY SCREENING OF HOUSEHOLD				
Ask the following questions only to an adult member of the household				

We are conducting a study to understanding the impact of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on your household, especially on the nutritional status of your infant. We would like to ask you a few questions to determine the eligibility of your household to participate in this study.

1	Name of the informant			
2	Do you have a baby in this household who is ≥1 month and <12 months old?	Yes .....1 No .....2	<input type="checkbox"/>	2 → end interview
3	Is anyone in your household employed in MGNREGA (in the past 6 months)?	Yes .....1 No .....2	<input type="checkbox"/>	1 → recruit 2 → go to 4
4	What is the present employment status of the adult members of your household?	All unemployed.....1 Seasonally employed.....2 Regular employment.....3	<input type="checkbox"/>	3 → end interview 1/2 → recruit

**Instruction to interviewer:** Even if one adult member of the household has a 'regular employment' – defined as employed in a job regularly for the past 12 months – do not recruit the household.

Thank the informant for answering your questions if the household is not recruited, else proceed to the next section.

Based on the above questions we have found your household to be eligible for this study. May we talk to the mother of this baby? If the mother is not alive, enquire for the primary caregiver of the baby (*A primary caregiver is one who takes care of the baby, feeds the baby and is responsible for the daily needs of the baby.*)

If the mother / primary caregiver is not present in the household – ask for a convenient day and time to meet her and leave a copy of the participant information sheet and consent form. Note the status in the “*interviewer visits*” section.

**SECTION-1: GENERAL AND BACKGROUND INFORMATION**

Now I am going to start the interview. I will explain each section at the beginning, please ask me anything that is not clear

No	Question	Response codes	Response	Skip
<b>Record start time</b>			<input type="text"/> : <input type="text"/> <b>Hours: Minutes</b>	
101	Can you please tell me the name of your baby again?			
102	Is (NAME) a boy or a girl?	Boy.....1 Girl.....2	<input type="checkbox"/>	
102	Can you please tell me your name again?			
103	What is your relation to (NAME)?	Mother.....1 Primary care giver, relation .....2	<input type="checkbox"/>	
103	What is the name of (NAME's) father?			

104	What is the exact age of (NAME)?	Months <input type="text"/> <input type="text"/>	Days <input type="text"/> <input type="text"/>
105	Source of information for (NAME)'s age	Health card.....1 Birth certificate.....2 Verbal information by mother..3 Verbal information by others..4 Others.....5	<input type="text"/> '5', specify _____
106	How old are you?	(Age in completed years) <input type="text"/> <input type="text"/>	
107	What is your native language?		
108	Have you ever attended school?	Yes .....1 No .....2	<input type="text"/> 2 → go to 110
109	What is the highest level of education you attained?	Did not complete primary....1 Completed primary .....2 Completed secondary.....3 Higher education.....4	<input type="text"/> 1/2 → go to 110 3/4 → go to 111
110	Now I would like you to read this sentence to me (Show the sentence from the literacy card) If the respondent cannot read the whole sentence – <b>probe</b> Can you read part of the sentence to me?	Cannot read at all.....1 Able to read only part of the sentence.....2 Able to the read whole sentence.....3 No card with required language.....4 Blind / visually impaired.....5	<input type="text"/> '4' - , specify language _____
111	Did your husband attend school?	Yes .....1 No .....2	<input type="text"/> 2 → go to 113
112	What is the highest level of education he attained?	Did not complete primary....1 Completed primary .....2 Completed secondary.....3 Higher education.....4	<input type="text"/> 1/2 → go to 113 3/4 → go to 114
113	Can your husband read and write his native language?	Cannot read or write.....1 Only read.....2 Both read and write.....3	<input type="text"/>
114	What is your religion?	Hindu.....1 Muslim.....2 Christian.....3 Sikh.....4 Buddhist.....5 Jain.....6 Parsi.....7 Others.....8	<input type="text"/> Others, specify _____ _____

115	What is your caste or tribe?	Caste _____ (specify) Tribe _____ (specify) No caste/tribe (record 3) _____ Don't know (record 88) _____ Refused to answer (record 888) _____		
<b>SECTION-2: PREGNANCY, DELIVERY AND REPRODUCTIVE HISTORY</b>				
Now I will ask you some questions related to your pregnancy, delivery and reproductive history.				
No	Question	Response codes	Response	Skip
201	Did you register your pregnancy with (NAME) with the ANM?	Yes .....1 No .....2 Don't remember.....88	<input type="text"/>	
202	Do you have a health card given by the ANM?	Yes .....1 No .....2	<input type="text"/>	
203	During your pregnancy with (NAME), did you see anyone for ante-natal care?	Yes .....1 No .....2	<input type="text"/>	2 → go to 210
204	Whom did you see?	ANM/LHV.....1 Health centre doctor.....2 Private doctor.....3 Dai/TBA.....4 Others .....5	<input type="text"/> Others, specify _____	
205	How many months pregnant were you when you first went for your ante-natal check up?	<input type="text"/> <input type="text"/> Months (record '88' for don't know)		
206	How many ante-natal visits did you have during your pregnancy?	<input type="text"/> <input type="text"/> Number (record '88' for don't know)		
207	Did you receive two or more injections of Tetanus Toxoid?	Yes .....1 No .....2 Don't remember.....88	<input type="text"/>	
208	During your ante-natal visit were you given any iron-folic acid tablets or syrup?	Yes .....1 No .....2 Don't remember.....88	<input type="text"/>	
209	Did you consume iron folic acid tablets/syrup at least for three months?	Yes .....1 No .....2 Don't remember.....88	<input type="text"/>	
210	At the time you became pregnant with (NAME), did you want to be pregnant?	Yes .....1 No .....2	<input type="text"/>	
211	Where was (NAME) born?	Home.....1 Sub centre/PHC/CHC/ District hospital.....2 Private hospital.....3 Others.....4	<input type="text"/> Others, specify _____	1/4 → also answer 213 2/3 → skip 213

212	Who assisted with your delivery?	ANM/nurse/LHV.....1 Doctor.....2 Trained birth attendant.....3 Local Dai.....4 Relative/neighbour.....5 Others.....6	<input type="text"/> Others, specify <input type="text"/>				
213	Why did you <b>NOT</b> go to a health facility for delivery?	Cost too much.....1 Facility not open.....2 Too far/no transport.....3 Don't trust the facility.....4 Poor quality service.....5 Not clean/not hygienic.....6 Husband did not allow.....7 Other family member.....8 Not customary.....9 Not necessary.....10 Others.....12	<input type="text"/> '9' record the relationship with the respondent <input type="text"/> Others, specify <input type="text"/>				
214	Are you pregnant now?	Yes .....1 No .....2	<input type="text"/>				
215	Including (NAME) how many children did you/biological mother give birth to (Born alive)? <i>Probe to include children who cried or showed some signs of life, but died after a few hours or days</i>	<input type="text"/> <input type="text"/> <input type="text"/> Number		If first born, no other previous live births skip to → 217			
216	Record the birth history of each live born in the table below (starting from the first birth)						
	Order	Name (if applicable)	Gender Boy.....1 Girl.....2	Date of birth dd/mm/yyyy	Is the child alive? Yes....1 No.....2 →	At what age did the child die?	Cause of deaths (record '88' if not known)
	1		<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	Months <input type="text"/> <input type="text"/> Years <input type="text"/> <input type="text"/>	
	2		<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	Months <input type="text"/> <input type="text"/> Years <input type="text"/> <input type="text"/>	
	3		<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	Months <input type="text"/> <input type="text"/> Years <input type="text"/> <input type="text"/>	
	4		<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	Months <input type="text"/> <input type="text"/> Years <input type="text"/> <input type="text"/>	
	5		<input type="text"/>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>	Months <input type="text"/> <input type="text"/> Years <input type="text"/> <input type="text"/>	

	6		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/>	<input type="text"/>
			<input type="text"/>	<input type="text"/>	<input type="text"/>	Years <input type="text"/>	<input type="text"/>
	7		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/>	<input type="text"/>
			<input type="text"/>	<input type="text"/>	<input type="text"/>	Years <input type="text"/>	<input type="text"/>
	8		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/>	<input type="text"/>
			<input type="text"/>	<input type="text"/>	<input type="text"/>	Years <input type="text"/>	<input type="text"/>
If more than this, use a separate sheet and attach the sheet to the end of this form							
217	How much did (NAME) weigh at birth? (Cross check with records if available)'8888'if not known		<input type="text"/>	<input type="text"/>	<input type="text"/>	Grams	'8888' skip to → 219
218	Is the birth weight from documentation?		Yes .....1	No .....2	<input type="text"/>		
219	Was (NAME) born before you expected?		Yes .....1	No .....2	Don't remember.....88	<input type="text"/>	
220	By how many weeks was the birth early?		Weeks (record '88' if not known)		<input type="text"/>		
<b>SECTION-3: BREAST FEEDING, WEANING AND INFANT CARE</b>							
Thank you for answering the questions so far, now I will ask you questions about infant feeding and care							
No	Question	Response codes			Response	Skip	
301	Did you ever breast feed (NAME)?	Yes .....1	No .....2	<input type="text"/>		2 → go to 305	
302	How long after birth did you first put (NAME) to the breast?	Immediately.....1	Within 1 hour of birth.....2	Within 24 hours of birth.....3	More than 24 hours.....4	Hours <input type="text"/>	1/2 - '00' in hrs 3-'01 to 23' in hrs 4-'no. of days'
				OR	Days <input type="text"/>		
303	Are you still breastfeeding (NAME)?	Yes .....1	No .....2	<input type="text"/>		2 → go to 305	
304	Was (NAME) breast fed yesterday during the day or night?	Yes .....1	No .....2	Don't know.....88	<input type="text"/>		
305	What were the reasons for your decision to stop breastfeeding (NAME)? [Let the participant give you the reasons, record '1' against the reasons given, then PROBE for the other reasons for which you have not coded '1'] Yes.....1; No.....2					Skip this question if response to 301 and 303 is '1' (yes)	
A	(NAME) had trouble suckling or latching on				<input type="text"/>		

B	(NAME) became sick and could not breast feed		
C	(NAME) lost interest in nursing		
D	(NAME) was old enough that difference between breast milk and formula no longer mattered		
E	I thought (NAME) was not gaining enough weight		
F	I didn't have enough milk		
G	I was sick and had to take medicine		
I	I had too many household duties		
J	I couldn't breast feed at work		
K	I was not present to breast feed (NAME) for reasons other than work		
L	This is usually the custom/tradition		
M	I didn't want to breastfeed in public		
N	I became pregnant		
O	Any other reason, specify _____		
306	Who among the following supported or aided your decision to stop breast feeding (NAME)?	<b>Skip this question if response to 301 and 303 is '1' (yes)</b>	
A	(NAME)'s father	Yes .....1 No .....2 Don't know.....88	
B	Your mother	Yes .....1 No .....2 Don't know.....88	
C	Your mother-in-law	Yes .....1 No .....2 Don't know.....88	

D	Any other family member, specify _____ _____	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
E	A doctor/ANM/LHV/nurse	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
F	Anganwadi worker/ASHA (community health worker)	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
G	Your supervisor in work/employer	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Now I would like to ask you about some vitamins or medicines that are sometimes given to infants				
307	Was (NAME) given any vitamin or medicine drops yesterday during the day or night?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
308	Was (NAME) given <i>Jeevan Rakshak Ghol</i> (ORS) yesterday during the day or night?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
309	I would like to ask you about some liquids that (NAME) may have had yesterday during the day or night. Did (NAME) have any of these? (Read the list)	Yes .....1 No .....2 Don't know.....88	How many times? (Indicate only where specified)	
A	Plain water? (If yes, boiled or un-boiled) Boiled water Un-boiled water	↓ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	↓ <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
B	Infant formula such as Cerelac, Farex etc.?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Times <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
C	Milk such as tinned, powdered, or fresh animal milk?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Times <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
D	Juice or juice drinks?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
F	Clear soup ( <i>dal ka pani, chawal ka pani</i> )?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
G	Lassi/Chaas (Yogurt)?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Times <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
H	Thin porridge?	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		

I	Tea?					
J	Others, specify _____					
310	At what age have you started giving (NAME) other fluids, semisolid and solid food? Record '88' in all if Not given any so far	Other fluids .....(months)			→ Go to 312	
		Semisolid food.....(months)			→ Go to 311	
		Solid food.....(months)			→ Go to 311	
311	<p>Please describe everything that (NAME) ate yesterday during the day or night, whether at home or outside the home.</p> <p>i. Think about when (NAME) first woke up yesterday. Did (NAME) eat anything at that time? If YES: please tell me everything that (NAME) ate at that time. <i>PROBE</i>: Anyhting else? <i>UNTIL RESPONDENT SAYS NOTHING ELSE. IF NO, CONTINUE TO QUESTION (ii)</i></p> <p>ii. What did (NAME) do after that? Did (NAME) eat anything at that time? If YES: please tell me everything that (NAME) ate at that time. <i>PROBE</i>: Anyhting else? <i>UNTIL RESPONDENT SAYS NOTHING ELSE. IF NO, CONTINUE TO QUESTION (iii) REPEAT QUESTION (ii) ABOVE UNTIL RESPONDENT SAYS THE CHILD WENT TO SLEEP UNTIL NEXT DAY. IF RESPONDENT MENTIONS MIXED DISHES LIKE A PORIDGE (Kichdi) OR STEW, PROBE:</i></p> <p>iii. What ingredients were there in that MIXED DISH? <i>PROBE</i> Anyhting else? <i>UNTIL RESPONDENT SAYS NOTHING ELSE. AS THE RESPONDENT RECALLS FOODS, UNDERLINE THE CORRESPONDING FOOD AND WRITE '1' (YES) IN THE COLUMN NEXT TO THE FOOD GROUP. IF THE FOOD IS NOT LISTED IN ANY OF THE FOOD GROUPS BELOW, WRITE THE FOOD IN THE BOX 'OTHER FOODS' AT THE END OF THE TABLE. IF FOOD ARE USED IN SMALL AMOUNTS FOR SEASONING OR AS A CODIMENT, INCLUDE THEM UNDER THE CODIMENTS FOR FOOD GROUP. ONCE THE RESPONDENT FINISHES RECALLING FOODS EATEN, READ EACH FOOD GROUP WHERE '1' WAS NOT RECORDED. ASK THE FOLLOWING QUESTION AND RECORD '1' IF THE RESPONDENT SAYS 'YES', '2' IF NO AND '88' IF DON'T KNOW.</i></p> <p>Yesterday during the day or night, did (NAME) drink/eat any (<b>FOOD GROUP ITEMS</b>)?  <b>Response codes: Yes.....1; No.....2; Don't know.....88</b></p>					
<b>No.</b>	<b>Question</b>	<b>Response</b>			<b>Skip</b>	
A	Porridge (Kichdi, halwa), bread, rice, roti, sago, parantha, puri, bati					
B	Pumpkin, carrots, squash, sweet potato					
C	Potato, arrbi					
D	Any dark green leafy vegetables					
E	Ripe mangoes, ripe papaya, kharbuja, tarbooj					If all '2' (No) → Go to 312
F	Any other fruits or vegetables					
G	Liver, kidney, heart or other organ meats					If at least one '1' (Yes) or all '88' (don't know) → Go to 313
H	Any meet such as chicken, lamb, pork, beef or duck					

I	Eggs				
J	Any fresh or dried fish				
K	Any foods made from beans, peas, lentils, nuts or seeds (such as dal, Kichdi)				
L	Dahi (Yogurt), lassi, chaas				
M	Any oil, fats, ghee, desi ghee, butter or foods made of these				
N	Any sugary foods such as chocolates, candies, sweets, cakes, or biscuits				
O	Condiments for flavour, such as chillies, spices (haldi, elaichi, long, dalchini, masala, jeera, dhania, others), herbs (dhania, pudina, tulasi, others)				
P	Other foods: (Please write down the names)				
312	Did (NAME) eat any solid, semi-solid, or soft foods yesterday during the day or night? If 'Yes' PROBE: What kind of solid or semi-solid, or soft food did (NAME) eat?	Yes .....1 Go back to 310, record foods eaten, then continue with 312 No .....2 Don't know.....88			2 or 88 → Go to 314
313	How many times did (NAME) eat solid, semi-solid, or soft foods other than liquids yesterday during the day or night?	Number of times <input type="text"/> Don't know.....88			
314	Did (NAME) drink anything from a bottle with a nipple yesterday during the day or night?	Yes .....1 No .....2 Don't know.....88			
315	Do you wash your hands with soap before cooking and feeding (NAME)?	Yes .....1 No .....2			
316	Ask this question only for infants > 6 mnts age: Do you wash (NAME)'s hand before giving food? PROBE: did you wash (NAME)'s hands today?	Yes .....1 No .....2 Don't know.....88			
317	Do you boil the utensils used to give food to (NAME) or wash them with hot water?	Yes .....1 No .....2 Don't use utensils.....88			

318	Please show me where members of your household most often wash their hands.	Observed.....1 Not observed-not in dwelling/yard/plot.....2 Not observed-no permission to see.....3 Not observed-other reason _____ 4	<input type="text"/>	
319	OBSERVE ONLY: Observe presence of water at the place	Water is available.....1 Water is not available.....2	<input type="text"/>	
320	OBSERVE ONLY: Observe presence of soap, detergent, other cleansing agent	Soap/detergent (bar, liquid, power, paste).....1 Ash, mud, sand.....2 None.....3	<input type="text"/>	
Now I will ask you some more questions related to (NAME)'s care				
321	Was (NAME) cared for by someone else other than you on a regular basis during the past 4 weeks? That is; did someone else usually keep (NAME) at least once a week for three or more hours at a time?	Yes .....1 No .....2	<input type="text"/>	2 → go to the next section
322	Who usually kept (NAME) regularly during the past 4 weeks?	(NAME)'s father.....1 (NAME)'s grandparent(s).....2 Elder daughter.....3 Elder son.....4 Other family member.....5 Someone not in family.....6	<input type="text"/> , <input type="text"/> , <input type="text"/> <input type="text"/> , <input type="text"/> , <input type="text"/>	Include more than one response
323	Where did (NAME)'s care usually occur?	At home.....1 Day care (Anganwadi).....2 Other private home.....3 Other, specify _____ 4	<input type="text"/> , <input type="text"/> , <input type="text"/> <input type="text"/>	Include more than one response
324	On an average how many days per week is (NAME) with this care provider?	Days <input type="text"/> <input type="text"/>		
325	On an average how many hours per day is (NAME) with this care provider?	Hours <input type="text"/> <input type="text"/>		
326	On an average day when (NAME) is with this care provider, how many times does the care provider feed (NAME)? (please include milk, solid food, snack, other liquids)	Number of times <input type="text"/> <input type="text"/>		
327	How often did you find out what this care provider fed (NAME)?	Seldom/never.....1 Sometimes.....2 Always/most of the time.....3	<input type="text"/>	

328	Do you pay the care provider in cash or kind?	Yes .....1 No .....2	<input type="checkbox"/>	
<b>SECTION-4: VACCINATION, HEALTH AND HEALTHCARE</b>				
Now I will ask you some questions about (NAME)'s health, about her/his vaccination history and treatment history if any				
401	Do you have a health-card where (NAME)'s vaccination details are written down? <i>(If yes, may I see it please?)</i>	Yes/seen.....1 Yes/not seen.....2 No card.....3	<input type="checkbox"/>	1 → go to 403 2 → go to 405
402	Did you ever have a vaccination card?	Yes .....1 No .....2	<input type="checkbox"/>	→ go to 405
403	COPY VACCINATION DATES FOR EACH VACCINE FROM THE CARD WRITE '99' IN 'DAY' COLUMN IF CARD SHOWS VACCINATION IS GIVEN BUT NO DATE IS RECORDED IF ONLY PART OF DATE IS SHOWN ON CARD, RECORD '88' OR '8888' FOR 'DON'T KNOW' IN THE COLUMN FOR WHICH INFORMATION IS NOT GIVEN			Skip this question if no health card is available or seen
A	BCG	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
B	Polio '0' (Excluding pulse polio)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
C	DPT-1	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
D	DPT-2	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
E	DPT-3	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
F	Polio-1 (Excluding pulse polio)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
G	Polio-2 (Excluding pulse polio)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
H	Polio-3 (Excluding pulse polio)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
I	Measles	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
J	Vitamin A (First dose)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> DD/MM/YYYY		
404	Has (NAME) received any vaccination that is not recorded on this card? RECORD 'YES' ONLY IF RESPONDENT MENTIONS BCG, DPT 1-3, POLIO, 0-3 AND/OR MEASLES VACCINE (S).	Yes.....1 (PROBE FOR VACCINATIONS AND WRITE '66' IN THE CORRESPONDING DAY COLUMN IN 403 No .....2 Don't know.....88	<input type="checkbox"/>	1 → go to 403 2/88 → go to 408
405	Did (NAME) ever receive any vaccinations to prevent him/her from getting disease; including vaccinations received in a Pulse Polio campaign?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/>	2/88 → go to 407

406	<b>Now please tell me if (NAME) has received any of the following vaccines?</b>		
A	A BCG vaccination against tuberculosis, that is, an Injection on the left upper arm that usually causes a scar?	Yes .....1 No .....2 Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/>
B	Any POLIO VACCINE, that is, drops in the mouth, including vaccine received in a Pulse Polio campaign?	Yes .....1 No .....2 Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/> 2/88 → go to 406 E
C	Was the first POLIO VACCINE received in the first two weeks after birth or later?	Yes .....1 No .....2 Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/>
D	How many times Polio vaccine received? (excluding Polio '0' and pulse polio) (IF 5 OR MORE TIMES RECORD 5)	Number Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/>
E	A DPT vaccination against Diphtheria, Whooping Cough and Tetanus given to the child as an injection?	Yes .....1 No .....2 Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/> 2/88 → go to 406 G
F	How many DPT injections were given in thigh or buttocks, sometimes at the same time as polio?	Number <input type="text"/> <input type="text"/> Don't know.....88	
G	Was an injection against MEASLES given on right arm / shoulder?	Yes .....1 No .....2 Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/>
407	Why was (NAME) not given any vaccination? (select as many as appropriate)	Child to young .....1 Unaware of need.....2 Place of vaccination unknown.....3 Place too far.....4 Time of vaccination unknown.....5 Time inconvenient.....6 Fear of side-effects.....7 No faith in vaccines.....8 ANM absent.....9 Vaccine not available.....10 Mother too busy.....11 Cannot spare time from household work.....12 Cannot spare time from MGNREGA/ other work for pay13 Child ill.....14 Not a custom.....15 Financial problem.....16 Child is a girl.....17 Child is a boy.....18	<input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/>  ‘19’, specify _____ _____

		Others.....19		
408	Where did (NAME) receive her/his vaccine?	Sub-centre/PHC/CHC/ district hospital/other public health facility.....1 Private hospital/clinic.....2 Anganwadi centre.....3 At home.....4 Pulse polio.....5 Others.....6	<input type="checkbox"/> Others, specify _____ _____	
409	Has (NAME) taken any drug to get rid of intestinal worms in the past 6 months?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
410	Has (NAME) had Diarrhoea in the last two weeks?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	2/88 → go to 416
411	During the current (last) episode of diarrhoea have you given the following liquids to the child?			
A	Plain water	Yes .....1 No .....2	<input type="checkbox"/>	
B	Salt and sugar solution	Yes .....1 No .....2	<input type="checkbox"/>	
C	Fruit juice	Yes .....1 No .....2	<input type="checkbox"/>	
D	Lime water	Yes .....1 No .....2	<input type="checkbox"/>	
E	Gruel made from rice (other local grain)	Yes .....1 No .....2	<input type="checkbox"/>	
F	Home remedy	Yes .....1 No .....2	<input type="checkbox"/>	
G	Child on breast milk	Yes .....1 No .....2	<input type="checkbox"/>	
412	Did you give ORS solution to child during the diarrhoea?	Yes .....1 No .....2 Child on breast milk.....3	<input type="checkbox"/>	
413	Whether normal feeding was continued during the diarrhoea?	Yes .....1 No .....2	<input type="checkbox"/>	
414	Did you seek advice or treatment for the diarrhoea from any source?	Yes .....1 No .....2	<input type="checkbox"/>	2 → go to 416
415	Where did you seek advice or treatment? (record all sources mentioned)	Sub-centre/PHC/CHC/.....1 District hospital/other public hospital.....2 Private hospital/clinic.....3 Anganwadi centre.....4 ASHA.....5	<input type="checkbox"/> Others, specify _____ _____	

		Pharmacy.....6 Home remedies.....7 Others.....8		
416	Has (NAME) been ill with fever at any time in the last two weeks?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/>	
417	Has (NAME) been ill with cough at any time in the last two weeks?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/>	2/88 → go to 421
418	When (NAME) had this illness with a cough, did he/she breath faster than usual with short, rapid breaths or have difficulty in breathing?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/>	
419	Did you seek advice or treatment for the illness from any source?	Yes .....1 No .....2	<input type="checkbox"/>	2 → go to 421
420	Where did you seek advice or treatment? (record all sources mentioned)	Sub-centre/PHC/CHC/.....1 District hospital/other public hospital.....2 Private hospital/clinic.....3 Anganwadi centre.....4 ASHA.....5 Pharmacy.....6 Home remedies.....7 Others.....8	<input type="checkbox"/> Others, specify _____ _____	
421	The last time (NAME) passed stools, what was done to dispose of the stools?	Child used toilet/latrine.....1 Put/rinsed into toilet.....2 Put/rinsed into drain/ditch....3 Thrown into garbage.....4 Buried.....5 Left in the open.....6 Other.....7	<input type="checkbox"/> Others, specify _____ _____	
<b>SECTION-5: EMPLOYMENT HISTORY</b>				
Now I am going to ask you about what members of your household do to make a living				
<b>No</b>	<b>Question</b>	<b>Response codes</b>	<b>Response</b>	<b>Skip</b>
501	Are you a BPL card holder?	Yes .....1 No .....2 Don't know.....88	<input type="checkbox"/>	
502	Please tell me the names of all the members residing in this household , including children(that is, the people who are related to you and are members of this household, <b>not</b> guest or relatives who are visiting you) <i>Record the details for the respondent in the first row, then list the names of other household members, their relation to (NAME), age, sex and occupation details(Probe: Please tell me about any job that MEMBER was engaged in even if for a few days or weeks)</i>			

Sl. No.	Name	Relation	Age (in years)	Sex Male.....1 Female.2	Record the codes (given below) for primary and secondary occupation of each member, including children if any number of the months the person was engaged in that occupation in the past 12 months			
					Primary	Number of months	Secondary	Number of months
01	Respondent	Mother/caregiver						
02								
03								
04								
05								
06								
07								
08								
Codes for occupation <i>(Use a second sheet if the household members are more than 08 and attach with the form)</i>								
Agriculture-own land.....01			Rearing household live stock....05			Blacksmith.....09		
Agriculture labourer.....02			Rearing live stock for others.....06			Others.....10		
Non-agriculture, daily wage labourer.....03			Teacher.....07			Unemployed.....11		
Studying in school/ higher education.....04			Gold smith.....08			Don't know.....88		
503	Are any of your household members employed through MGNREGA?			Yes .....1 No .....2		<input type="text"/>		2 → go to 511
504	Who among the members listed above are employed through MGNREGA?			Record the serial numbers from the list in 502				
505	What is the highest number of months for which any member of your household was employed through MGNREGA?			Record only the highest figure				
506	What is the highest number of days in a year for which any member of your household was employed through MGNREGA?			Record only the highest figure				
507	Do you know how often these members receive their wages?			Everyday.....1 Every week.....2 Every 15 days.....3 Every month.....4 In 2 to 6 months.....5 More than 6 months.....6 Have not received any.....7 Don't know.....88		<input type="text"/>		
508	When was the first time that any members of this household start working in MGNREGA? (record the earliest engagement)			5 years ago/2006.....1 4 years ago/2007.....2 3 years ago/2008.....3 2 years ago/2009.....4 Last year/2010.....5		<input type="text"/>		

		This year/2011.....6		
509	What has been the longest duration of continuous employment through MGNREGA for any of these members? (Record the highest continuous duration)	Continuous for past 2 years.1 Continuous for past 3 years.2 Continuous for past 4 years.3 Continuous for past 5 years.4 Don't know.....88	<input type="text"/>	
510	Please let me who are these members	Record the serial numbers from the list in 502		→ Go to 514
511	Have you heard of MGNREGA?	Yes .....1 No .....2	<input type="text"/>	
512	Did any of your household members register for a MGNREGA?	Yes .....1 No .....2 Don't know.....88	<input type="text"/>	
513	Do any of your household members have a job card?	Yes .....1 No .....2 Don't know.....88	<input type="text"/>	
514	<b>Ask the following probe questions if the recorded code for both primary and secondary occupation is '10' in 502 - respondent row, else skip to 515</b>			
A Check	As you know, some women take up jobs for which they are paid in cash or kind. Others sell things, have a small business or work on the family farm or in the family business. In the last seven days, have you done any of these things or any other work?	Yes .....1 No .....2	<input type="text"/>	1 → go to 502 and fill the details Go to → 515
B Check	Have you done any work in the last 12 months?	Yes .....1 No .....2	<input type="text"/>	1 → go to 502 and fill the details, then go to 515 2→go to 525
515	What is your occupation, that is, what kind of work do you mainly do?			
516	Do you usually work throughout the year, or do you work seasonally, or only once in a while?	Throughout the year.....1 Seasonally/part of the year...2 Once in a while.....3	<input type="text"/>	
517	What is the duration of your work? (Record for months, days, weeks and hours)	Months per year <input type="text"/> Weeks per month <input type="text"/> Days per week <input type="text"/>		

		Hours per day <input type="text"/>		
518	How old was (NAME) when you started working after delivery?	Months <input type="text"/> OR Weeks <input type="text"/>		
519	Who cares for (NAME) when you go for work?	Take (NAME) to work place..1 (NAME)'s father.....2 (NAME)'s grandparent(s).....3 Elder daughter.....4 Elder son.....5 Other family member.....6 Someone not in family.....7	<input type="text"/>	
520	Which of the following circumstances describe your situation during the past 4 weeks? (If you have stopped breastfeeding, please answer for the time you were breastfeeding)? Select as many as appropriate	I keep (NAME) with me while I work and breastfeed during my work day.....1 I go to (NAME) and breastfeed her/him during work day.....2 (NAME) is brought to me to breastfeed during work day..3 I do not breastfeed (NAME) during workday.....4	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	4 → go to 522
521	Have you had any of the following experiences during the past 4 weeks? Select as many as appropriate. (If you have stopped breastfeeding during the past 4 weeks, please answer for the time you were breastfeeding during this period.)	A co-worker made negative comments or complained to me about breast feeding.....1 My supervisor/employed made negative comments or complained to me about breast feeding.....2 It was hard for me to arrange breaks for breastfeeding.....3 It was hard for me to find a place for breastfeeding.....4 I felt worried about keeping my job because of breastfeeding.....5 I felt worried about continuing to breastfeed because of my job.....6 I am embarrassed among co-workers, supervisors, or my employer because of breastfeeding.....7	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	If '8' specify the family member's relation with (NAME) _____ _____

		Family member did not allow me to breastfeed during working hours.....8	_____	
522	Are you paid in cash or kind for this work or are you not paid at all?	Cash only.....1 Kind only.....2 Both cash and kind.....3 Not paid.....4	<input type="checkbox"/>	2/4 → go to 525
523	Who usually decides how the money you earn will be used?	Respondent.....1 Husband.....2 Respondent and husband jointly.....3 Others.....4	<input type="checkbox"/> Others, specify _____	
524	Would you say that the money that you earn is more than what your husband earns, less than what he earns, or about the same?	More than him.....1 Less than him.....2 Same as his.....3 No earnings.....4 Don't know.....88	<input type="checkbox"/>	
525	Who usually decides how your husband's money will be used?	Respondent.....1 Husband.....2 Respondent and husband jointly.....3 No earnings.....4 Others.....5	<input type="checkbox"/>	
526	Who usually makes decisions about health care for yourself?	Respondent.....1 Husband.....2 Respondent and husband jointly.....3 Others.....4	<input type="checkbox"/>	
527	Who usually makes decisions about health care for (NAME)?	Respondent.....1 Husband.....2 Respondent and husband jointly.....3 Others.....4	<input type="checkbox"/>	
528	Who usually makes decisions about making major household purchases?	Respondent.....1 Husband.....2 Respondent and husband jointly.....3 Others.....4	<input type="checkbox"/>	



604	How long does it take to go there, get water, and come back?	Minutes <input type="text"/> <input type="text"/> <input type="text"/> Don't know.....888		
605	Do you do anything to the water to make it safer to drink?	Yes .....1 No .....2 Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/>	
606	What do you usually do to make the water safer to drink?  Anything else? (Record all mentioned)	Boil.....1 Add bleach/chlorine.....2 Strain through a cloth.....3 Use water filter (ceramic/ sand/composite/etc.....4 Solar disinfection.....5 Let it stand and settle.....6 Others.....7 Don't know.....88	<input type="text"/> <input type="text"/> <input type="text"/> Others, specify _____	
607	What kind of toilet facility do members of your household usually use?	Flush toilet/septic tank.....1 Pit latrine in household.....2 Pit latrine (communal).....3 Field/bush.....4 Others.....5	<input type="text"/> Others, specify _____	
608	What is the <b>main</b> type of fuel you usually use for cooking?	Wood.....1 Kerosene/paraffin.....2 Charcoal.....3 Gas/electricity.....4 Coal.....5 Cow dung.....6 None.....7 Others.....8	<input type="text"/> Others, specify _____	
609	Do you have a separate room which is used as a kitchen?	Yes .....1 No .....2	<input type="text"/>	
610	Does anyone in your household own this house?	Yes .....1 No .....2	<input type="text"/>	
611	Does anyone in your household own any house anywhere?	Yes .....1 No .....2	<input type="text"/>	
612	Does anyone in your household own the land your house is on?	Yes .....1 No .....2	<input type="text"/>	
613	How many rooms are there in the house?	Number of rooms <input type="text"/> <input type="text"/> <input type="text"/>		
614	Do you have electricity?	Yes .....1 No .....2	<input type="text"/>	

615	OBSERVE THE MAIN MATERIALS USED FOR THE HOUSE (WRITE OBSERVATIONS ONLY)				
A	Wall	Brick/concrete.....1 Mud.....2 Wood/branches.....3 Galvanised iron.....4 Matting.....5 Thatch/straw.....6 Others.....7	<input type="checkbox"/>	Others, specify _____ _____	
B	Roof	Straw/thatch.....1 Earth/mud.....2 Wood/planks.....3 Galvanised iron.....4 Concrete/cement.....5 Tiles/slate.....6 Others.....7	<input type="checkbox"/>	Others, specify _____ _____	
C	Floor	Earth/mud.....1 Wood.....2 Stone/brick.....3 Cement/tile.....4 Laminated material.....5 Others.....6	<input type="checkbox"/>	Others, specify _____ _____	
616	Does anyone in this household own the following? [Yes.....1; No.....2]				
A	Working radio	<input type="checkbox"/>	I	Working cell/mobile telephone	<input type="checkbox"/>
B	Working refrigerator	<input type="checkbox"/>	J	Working landline telephone	<input type="checkbox"/>
C	Working bicycle	<input type="checkbox"/>	K	Working sewing machine	<input type="checkbox"/>
D	Working television	<input type="checkbox"/>	L	Working fan	<input type="checkbox"/>
E	Working motorbike/scooter	<input type="checkbox"/>	M	Working almairah	<input type="checkbox"/>
F	Working car/truck	<input type="checkbox"/>	N	Working clock	<input type="checkbox"/>
G	Working tractor	<input type="checkbox"/>	O	Working bullock cart	<input type="checkbox"/>
H	Farm equipment	<input type="checkbox"/>	P	Working thresher	<input type="checkbox"/>
Now I am going to ask you some questions about land owned or rented by household members in the last 12 months					
617	Did anyone in the household own or rent/borrow any land in the last 12 months apart from the land your house is on?	Yes .....1 No .....2	<input type="checkbox"/>	2 → go to 626	

618	Please tell me about each plot of land owned or rented/borrowed by members of the household during the last 12 months? Starting with the largest and finishing with the smallest plot can you tell me :			
	A. What is the total area of the plot?	B. Enter local unit of measurement used (e.g. acres/cents)	C. Is the plot rented, borrowed, sharecropped, or owned? Rented.....1 Borrowed.....2 Sharecropped.....3 Owned.....4	D. What is the plot used for? Farming.....1 Pasture.....2 Forestry.....3 Building (house/shop).....4 Industry.....5 Rented out.....6 Nothing or left fallow.....7 Others, specify below.....8
Plot-1	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-2	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-3	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-4	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-5	_____		<input type="checkbox"/>	<input type="checkbox"/>
<b>IF NONE OF THE PLOTS ARE AGRICULTURAL (FARM, PASTURE, FORESTRY)</b> skip to → 626				
<b>IF ANY OF THE PLOTS ARE AGRICULTURAL ASK THE FOLLOWING QUESTIONS:</b>				
619	In the last 12 months have you irrigated any of the land?	Yes .....1 No .....2	<input type="checkbox"/>	
620	Of the land, how many "Units of measurement" were irrigated in the last 12 months?	_____		
621	In the last 12 months have you used chemical fertiliser? (DO NOT INCLUDE MANURE)	Yes .....1 No .....2	<input type="checkbox"/>	
622	How much chemical fertiliser have you used in the last 12 months?	_____		
623	Unit of measurement used (local categories)			
624	In the last 12 months did you or anyone in your household ever share a tractor or other farming vehicles with other people in the community?	Yes .....1 No .....2	<input type="checkbox"/>	
625	In the last 12 months did you or anyone in your household ever share labour with other people in the community?	Yes .....1 No .....2	<input type="checkbox"/>	

626	Have you owned any livestock in the last 12 months?	Yes .....1 No .....2	<input type="checkbox"/>	2 → go to 628
627	Now I am going to ask you some questions about animals owned by household members in the last 12 months			
A. Type of livestock	B. Has anyone in your household owned "Name of Animal" in last 12 months? Yes.....1 No.....2	C. If YES, how many does the household currently own?	D. How many were purchased by the household in the past 12 months?	E. How many were sold by the household in the past 12 months?
Camel	<input type="checkbox"/>			
Drought animals (donkey, horse, mules, bullocks)	<input type="checkbox"/>			
Cattle (Cow and calf, buffalo)	<input type="checkbox"/>			
Goat/sheep/pigs	<input type="checkbox"/>			
Rabbits/ poultry (duck, chicken, hen)	<input type="checkbox"/>			
628	Does this household receive food grains from the public distribution system?	Yes .....1 No .....2	<input type="checkbox"/>	
Now, I will ask you some questions related to availability of food in your household				
629	Question	Response code Yes.....1 No.....2	630. How often did this happen? Rarely (once or twice in the past four weeks).....1 Sometimes (three to ten times in the past four weeks).....2 Often (more than ten times in the past four weeks).....3	
A	In the past four weeks, did you worry that your household would not have enough food?	<input type="checkbox"/>	1 →	2 ↓
B	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	<input type="checkbox"/>	1 →	2 ↓

C	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	<input type="checkbox"/> 1 → <input type="checkbox"/> 2 ↓	
D	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	<input type="checkbox"/> 1 → <input type="checkbox"/> 2 ↓	
E	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	<input type="checkbox"/> 1 → <input type="checkbox"/> 2 ↓	
F	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	<input type="checkbox"/> 1 → <input type="checkbox"/> 2 ↓	
G	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	<input type="checkbox"/> 1 → <input type="checkbox"/> 2 ↓	
H	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	<input type="checkbox"/> 1 → <input type="checkbox"/> 2 ↓	
I	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	<input type="checkbox"/> 1 → <input type="checkbox"/> 2 ↓	
631	Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night. READ THE LIST OF FOODS. PLACE A ONE IN THE BOX IF ANYONE IN THE HOUSEHOLD ATE THE FOOD IN QUESTION		Response codes Yes.....1 No.....2
A	Any roti, chapatti, bati, parantha, puri, makka (maize), bread, biscuit, rice, any other item made of rice or wheat or maize?	<input type="checkbox"/>	
B	Any potato, arbi or any other food made of roots or tubers?	<input type="checkbox"/>	
C	Any vegetables?	<input type="checkbox"/>	
D	Any fruits?	<input type="checkbox"/>	

E	Any lamb, goat, chicken, duck, pork, beef, or other birds, liver, kidney, heart, or other organ meats?		<input type="checkbox"/>
F	Any egg?		<input type="checkbox"/>
G	Any fresh or dried fish or shellfish?		<input type="checkbox"/>
H	Any foods made from beans, peas, lentils, or nuts (dal, kichdi)?		<input type="checkbox"/>
I	Any yogurt, milk, chaas, kheer, lassi or other milk products?		<input type="checkbox"/>
J	Any foods made with oil, fat, ghee, desi ghee or butter?		<input type="checkbox"/>
K	Any sweets, cakes, sugar or honey?		<input type="checkbox"/>
L	Any other foods, such as condiments (masala, zeera, others), coffee, tea?		<input type="checkbox"/>
Now I would like to ask you about your household's food supply during different months of the year. When responding to these questions, please think back over the last 12 months, from now to the same time last year.			
632	Were there months, in the past 12 months, in which you did not have enough food to meet your family's needs?	Yes .....1 No .....2	<input type="checkbox"/> 2 → go to 701
633	If yes, which were the months in the past 12 months during which you did not have enough food to meet your family's needs? THIS INCLUDES ANY KIND OF FOOD FROM ANY SOURCE, SUCH AS OWN PRODUCTION, PURCHASE OR EXCHANGE, FOOD AID, OR BORROWING. DO NOT READ THE LIST OF MONTHS ALOUD. PLACE A '1' IN THE BOX IF THE RESPONDENT IDENTIFIES THAT MONTH AS ONE IN WHICH THE HOUSHOLD DID NOT HAVE ENOUGH FOOD TO MEET THEIR NEEDS. IF THE RESPONDENT DOES NOT IDENTIFY THAT MONTH, PLACE A '2' IN THE BOX. USE A SEASONAL CALENDAR IF NEEDED TO HELP RESPONDENT REMEMBER THE DIFFERENT MONTHS REFER TO FESTIVALS SUCH AS HOLI, DIPAWAI, DUSHERA, BAISAKHI, OTHER LOCAL FESTIVAL PROBE TO MAKE SURE THE RESPONDENT HAS THOUGHT ABOUT THE ENTIRE PAST 12 MONTHS.		Yes.....1 No.....2
	AUGUST		<input type="checkbox"/>
	JULY		<input type="checkbox"/>
	JUNE		<input type="checkbox"/>

	MAY		
	APRIL		
	MARCH		
	FEBRUARY		
	JANUARY		
	DECEMBER		
	NOVEMBER		
	OCTOBER		
	SEPTEMBER		
<b>SECTION 7: GENERAL HEALTH OF MOTHERS / CARE GIVERS (GHQ-12)</b>			
Finally, I want to know how your health has been in general over the last few weeks			
<b>Have you recently:</b>			
701	been able to concentrate on what you are doing?	Response code for all questions Not at all .....0 No more than usual ...1 More than usual .....2 Much more than usual 3	
702	lost much sleep over worry?		
703	felt that you are playing a useful part in things?		
704	felt capable of making decisions about things?		
705	felt constantly under strain?		
706	felt you couldn't overcome your difficulties?		
707	been able to enjoy your normal day to day activities?		
708	been able to face up to your problems?		
709	been feeling unhappy or depressed?		
710	been losing confidence in yourself?		
711	been thinking of yourself as a worthless person?		
712	been feeling reasonably happy, all things considered?		
Thank the respondent for her valuable time, and request her to now allow you to measure her child. <i>Thank you for your time. May I now measure the length and weight of (NAME)?</i>			
<b>Record end time</b>		_ _ : _ _  <b>Hours: Minutes</b>	

**EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**

**COMMUNITY QUESTIONNAIRE**

STUDY SITE INFORMATION				
Name of administrative block		Cluster number <input type="text"/> <input type="text"/> <input type="text"/>		
Name of village		Interviewer's name		
<p><b>Informant:</b> The informant should be a member of the community or a service provider to the community. She/he should be living in the community and should be in a position to provide information about the demography, social and economic status in the community/village. An informant can be a Panchayat representative / elected representative or the village head/appointed representative or ANM or Anganwadi worker or ASHA. If the informant is another key person of the village, then specify her/his position in question 104</p>				
<p><b>Community:</b> A community is defined by the administrative boundary of the village and does not include hamlets that may be linked to the village</p>				
<p><b>Provide the participant information sheet and take written consent before beginning the interview</b></p>				
Date of Interview: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY		Start time <input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> Hours: Minutes		
No.	Questions	Response codes	Response	Skip
101	Name of informant			
102	Gender of informant (Observe)	Male.....1 Female.....2	<input type="text"/>	
103	How long have you lived in the community?	Months <input type="text"/> <input type="text"/> Years <input type="text"/> <input type="text"/>		
104	What position does the informant have in the community?	Panchayat leader.....1 ANM.....2 Anganwadi worker.....3 ASHA.....4 Village head (appointed).....5 Others.....6	<input type="text"/> <input type="text"/> Others, specify	
105	Current population of the village:	Census figure (Copy from district records)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
		Census figures according to respondent (if district record not available)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	

106	Total number of households in the village:	<p>Figures from district records</p> <p>Figures according to respondent (if district record not available)</p>	<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td> </tr> </table>										
107	What is the major caste group in the village?	<p>Schedule tribe.....1</p> <p>Schedule caste.....2</p> <p>Other backward caste.....3</p> <p>General caste.....4</p>	<input type="text"/>										
108	What is the major religious group in the village?	<p>Hindu.....1</p> <p>Muslim.....2</p> <p>Christian.....3</p> <p>Sikh.....4</p> <p>Buddhist.....5</p> <p>Jain.....6</p> <p>Parsi.....7</p> <p>Others.....8</p>	<input type="text"/> Others, specify _____ _____										
109	What is the main spoken language in this village												
110	Name the three major occupation groups in the village	<p>First _____</p> <p>Second _____</p> <p>Third _____</p>											
111	What is the main source of drinking water for members of your community? (OBSERVE)	<p>Piped water.....1</p> <p>Tube well/borehole.....2</p> <p>Dug well.....3</p> <p>Water from spring.....4</p> <p>Rain water.....5</p> <p>Tanker truck.....6</p> <p>Cart with small tank.....7</p> <p>Surface water (River/dam/pond/lake/ stream /canal/irrigation canal.....8</p> <p>Others.....9</p>	<input type="text"/>        Others, specify _____ _____										
112	Is the drainage facility available in the village?	<p>Yes .....1</p> <p>No .....2</p>	<input type="text"/>	2 → go to 114									
113	The main type of drainage facility in the village: (RECORD ALL MENTIONED)	<p>Underground drainage.....1</p> <p>Open with outlet.....2</p> <p>Open without outlet.....3</p>	<input type="text"/> , <input type="text"/> , <input type="text"/>										

<b>I would like to ask you a few questions about the services available to people in 'NAME OF COMMUNITY'.</b>				
114	Services	A. Are any of these currently functioning and available to the people living in this village? Yes.....1 No.....2	B. Approximately how far is the "Name of service" from the centre of the village? <1 KM.....1 1-5 KM.....2 5-10 KM.....3 >10 KM.....4 Don't know.....8	C. Approximately how much time does it take to reach the nearest "Name of facility" by the most common means of transport? < ½ hour.....1 ½ to 1 hour.....2 1-2 hours.....3 >2 hours.....4 Don't know.....8
114.1	Police station	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.2	Cinema / Video	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.3	Post office	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.4	Shop selling basic provision/Kirana	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.5	Haat/market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.6	Public telephone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.7	Telephone network	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.8	Primary school (Govt.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.9	Primary school (Pvt.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.10	High school (Govt.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.11	High school (Pvt.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.12	Technical college	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.13	University	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.14	Religious school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.15	Adult literacy centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.16	Sub centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

114.17	PHC	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.18	CHC	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.19	District hospital (public)	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.20	Private hospital	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.21	Drug store/seller	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.22	Bus stand	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.23	Anganwadi centre (ICDS)	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.24	Railway station	<input type="text"/>	<input type="text"/>	<input type="text"/>
114.25	Bank	<input type="text"/>	<input type="text"/>	<input type="text"/>
115	Does the village have electricity?	Yes.....1 No.....2 Yes, for <6 hours.....3 Yes, for ≥6 hours.....4		<input type="text"/>
116	Major crops grown in the village (Write "00" in all if no crops are grown in the village)	First _____ Second _____ Third _____		"00" in all → go to 118
117	Main source irrigation in the village	Rain water.....1 Tank/pond.....2 Stream/river.....3 Canal.....4 Well.....5 Tube well.....6 Water harvesting systems...7 Others.....8	<input type="text"/> Others, specify _____ _____	
118	What problems, if any, does this village encounter in marketing agricultural and non-agro products?	No problems.....1 Don't have any production..2 No storage facility.....3 No transport facility.....4 Non remunerative price.....5 Others.....6	<input type="text"/> Others, specify _____ _____	
119	What are the main transport routes that serve the village? (OBSERVE)	Cement/tar.....1 Gravel.....2 Dirt/mud road.....3	<input type="text"/>	

		River/lake.....4 None.....5		
120	How far is the district's headquarter from the village?	_____Kms		
121	Has this village suffered any natural disasters in the past two years?	Yes .....1 No .....2	<input type="text"/>	2 → go to 123
122	What type/s of natural disaster? [select as many as appropriate]	Drought.....1 Cyclone/tornado/hurricane...2 Flooding.....3 Earthquake.....4 Others.....5	<input type="text"/> , <input type="text"/> , <input type="text"/> Others, specify _____	
123	Now I would like to ask you some questions about availability of health provider in the village either staying or visiting	Responses Yes.....1 No.....2	If Yes (1), number of health providers	Days per week available in the village
A	Anganwadi worker (ICDS)	<input type="text"/>	<input type="text"/>	<input type="text"/>
B	Village Health Guide (VHG)	<input type="text"/>	<input type="text"/>	<input type="text"/>
C	Accredited Social Health Activist (ASHA)	<input type="text"/>	<input type="text"/>	<input type="text"/>
D	Trained birth attendant (TBA)	<input type="text"/>	<input type="text"/>	<input type="text"/>
E	Auxiliary nurse midwife (ANM)	<input type="text"/>	<input type="text"/>	<input type="text"/>
F	Lady doctor	<input type="text"/>	<input type="text"/>	<input type="text"/>
G	Private doctor	<input type="text"/>	<input type="text"/>	<input type="text"/>
H	Registered medical practitioner – alternative medicines	<input type="text"/>	<input type="text"/>	<input type="text"/>
I	Untrained Dai	<input type="text"/>	<input type="text"/>	<input type="text"/>
J	Others, specify _____	<input type="text"/>	<input type="text"/>	<input type="text"/>
124	Is there a village, health and sanitation committee?	Yes.....1 No.....2 Don't know.....8	<input type="text"/>	2 / 8 → go to 126
125	During the last six months how many times cleaning, fogging drive was undertaken in the village?	Cleaning <input type="text"/>	Fogging <input type="text"/>	
126	Are the following programmes currently implemented in your village?	Yes.....1 No.....2 Don't know.....8		

A	Janani Suraksha Yojana (JSY)	<input type="text"/>	M	MGNREGA	<input type="text"/>											
B	Kishori Shakti Yojana	<input type="text"/>	N	National Food for work Programme (NFFWP)	<input type="text"/>											
C	Balika Samridhi Yojana	<input type="text"/>	O	Public Distribution system	<input type="text"/>											
D	Mid-day Meal Programme	<input type="text"/>	P	National Social Assistance programme	<input type="text"/>											
E	Integrated Child Development scheme (ICDS)	<input type="text"/>	Q	Swarnjayanti Gram Swarozgar Yojana	<input type="text"/>											
F	Mahila Mandal Protsahan Yojana (MMPY)	<input type="text"/>	R	Minimum Needs Programme (MNP)	<input type="text"/>											
G	Sanitation Programme (SP)	<input type="text"/>	S	Prime Minister Rojgar Yojana (PMRY)	<input type="text"/>											
H	Rajiv Gandhi National Drinking Water Mission	<input type="text"/>	T	Jawahar Rozgar Yojana (JRY)	<input type="text"/>											
I	Indira Awas Yojna (IAY)	<input type="text"/>	U	Sanjay Gandhi Niradhar Yojana (SGNY)	<input type="text"/>											
J	Samagra Awas Yojana (SAY)	<input type="text"/>	V	Jawahar Gram Samridhi Yojana (JGSY)	<input type="text"/>											
K	Water shed programmes	<input type="text"/>	W	Others, Specify _____	<input type="text"/>											
127	Are there any NGOs working in this village?	Yes.....1 No.....2 2 → go to 129	<input type="text"/>	127 A. If yes (1), how many	<input type="text"/> <input type="text"/>											
128	In what areas are these NGOs working [select as many options required]	Health.....1 Water.....2 Food & nutrition.....3 Agrculture/seeds/fertilizers...4 Self Help Groups.....5 Mahila mandals.....6 Loans/credit.....7 Community association.....8 Mazdoor Kalyan Samiti.....9 Religious groups.....10 Others.....11	<input type="text"/>	<table border="1"> <tbody> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> <tr> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> <td><input type="text"/></td> </tr> </tbody> </table> <p>Others, specify _____</p>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>													
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>													
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>													
129	Answer the following questions only if MGNREGA is implemented in the village, else go to → 130															

A	When was MGNREGA implemented?	Month <input type="text"/> <input type="text"/>	Year <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
B	How many households from this village are employed in the scheme?	Number _____		
C	How many women from your village are employed in the scheme?	Number _____		
D	What is the daily wage rate?	Rupees _____		
E	What is the frequency of wage payment?	Everyday.....1 Every week.....2 Every 15 days.....3 Every month.....4 In 2 to 6 months.....5 More than 6 months.....6 Have not received any.....7 Don't know.....8	<input type="text"/>	
F	Is there an active MGNREGA work site in the village?	Yes.....1 No.....2	<input type="text"/>	2 → go to 130
G	OBSERVE ONLY Is there a shade available in the worksite?	Yes.....1 No.....2	<input type="text"/>	
H	OBSERVE ONLY Is there provision of drinking water in the work site?	Yes.....1 No.....2	<input type="text"/>	
I	OBSERVE ONLY Is there a crèche facility in the worksite?	Yes.....1 No.....2	<input type="text"/>	
J	OBSERVE ONLY Are there female workers in the worksite?	Yes.....1 No.....2	<input type="text"/>	
K	OBSERVE ONLY Is there a muster roll in the worksite?	Yes.....1 No.....2	<input type="text"/>	
130	<b>Record any important observation</b> _____ _____			
<b>Thank the informant for the information and ask permission to re-visit her/him in the future to conduct focus group discussion or for any other purpose if required</b>				
	Record end time	<input type="text"/>	<input type="text"/>	: <input type="text"/>
				Hours: Minutes

**EFFECT OF MGNREGA ON INFANT MALNUTRITION / PARTICIPANT QUESTIONNAIRE (HINDI VERSION)**

**शिशु कुपोषण पर रोजगार (MGNREGA) के प्रभाव/ प्रश्नावली**

STUDY SITE INFORMATION				
Name of administrative block / प्रशासनिक ब्लॉक का नाम		Cluster number <input type="text"/>		
Name of village / गांव का नाम		Participant ID <input type="text"/>		
INTERVIEWER VISITS				
Visits	1	2	3	Final
Date	<input type="text"/> DD/MM/YY	<input type="text"/> DD/MM/YY	<input type="text"/> DD/MM/YY	<input type="text"/> DD/MM/YY
Interviewer's name				
Result (insert codes*)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next visit Date	<input type="text"/> DD/MM/YY	<input type="text"/> DD/MM/YY		
Time	<input type="text"/> : <input type="text"/> Hrs: Min	<input type="text"/> : <input type="text"/> Hrs: Min		
*Result codes				
13. Completed / पूर्ण हो गया 14. No household member at home/ घर के सदस्य घर पर नहीं 15. No adult member at home / घर में कोई वयस्क सदस्य नहीं 16. Mother/primary caregiver of the infant not at home / शिशु की माँ / प्राथमिक caregiver घर पर नहीं 17. Entire household absent for extended period of time / संपूर्ण घर लम्बे समय की अवधि के लिए अनुपस्थित है. 18. Postponed/ स्थगित		19. Refused / माना किया 20. Dwelling vacant / घर खली है 21. Address not a dwelling / घर नहीं है 22. Dwelling destroyed / घर टूटा परा है 23. Dwelling not found / घर मिला नहीं 24. Others / अन्य _____ (specify/, स्पस्ट करे)		

ELIGIBILITY SCREENING OF HOUSEHOLD				
Ask the following questions only to an adult member of the household / केवल घर के एक वयस्क सदस्य को निम्नलिखित प्रश्न पूछें				
हम आपके घर पर आपके शिशु के पोषण की स्थिति पर विशेष रूप से, महात्मा गांधी राष्ट्रीय ग्रामीण रोजगार गारंटी अधिनियम (नरेगा) के प्रभाव को समझने के लिए एक अध्ययन का आयोजन कर रहे हैं. आपके घर का इस अध्ययन में भाग लेने की पात्रता का निर्धारण करने के लिए हम आपसे कुछ सवाल पूछना चाहते हैं.				
1	जानकारी देने वाले ब्यक्ति का नाम			
2	क्या आपके परिवार में १ से १२ महीने की आयु का कोई शिशु / बच्चा है ?	Yes/हाँ .....1 No/ नहीं .....2	<input type="checkbox"/>	2 → end interview
3	क्या आपके परिवार का कोई ब्यक्ति नारिगा (NREGA) में काम करता है ? (पिछले १२ महीने में काम किया है क्या)	Yes/हाँ .....1 No/ नहीं .....2	<input type="checkbox"/>	1 → recruit 2 → go to 4
4	इस समय आपके परिवार के सदस्यों का रोजगार क्या है?	All unemployed/ सभी बेरोजगार.....1 Seasonally unemployed/ मौसम बेरोजगार.....2 Regularly employed / नियमित रोजगार.....3	<input type="checkbox"/>	3 → end interview 1/2→ recruit
<p><b>Instruction to interviewer:</b> यदि परिवार के किसी भी ब्यक्ति को नियमित रोजगार है तो इस घर को अध्ययन में शामिल न करे (नियमित रोजगार - पिछले १२ महीने में नियमित रूप से कोई रोजगार से जुड़े है) </p> <p>Thank the informant for answering your questions if the household is not recruited, else proceed to the next section. अगर घर को शामिल नहीं किया तो आपके सवालों का जवाब देने के लिए मुखबिर को धन्यवाद करे, अन्यथा अगले अनुभाग में बढे  </p> <p>उपरोक्त सवालों के आधार पर आपका घर इस अध्ययन के लिए पात्र हो पाया है   क्या हम इस बच्चे की माँ से कुछ सवाल पूछ सकते है? यदि माँ जीवित नहीं है, बच्चे के प्राथमिक देखभाल प्रदाता से मिलने का अनुरोध करे (प्राथमिक caregiver वह है जो बच्चे की देखभाल करती है, बच्चे को खाना खिलाती है और बच्चे की दैनिक आवश्यकताओं के लिए जिम्मेदार है)</p>				
SECTION-1: GENERAL AND BACKGROUND INFORMATION				
अब मैं साक्षात्कार शुरू करने जा रही हूँ   मैं शुरुआत में प्रत्येक अनुभाग आपको समझाने का प्रयास करूँगी, कृपया कोई चीज स्पष्ट नहीं है तो पूंचे				
No	Question	Response codes	Response	Skip
	Record start time		<input type="text"/> : <input type="text"/>	Hours: Minutes

101	क्या आप मुझे अपने बच्चे का नाम फिरसे बताएँगे?			
102	(नाम) लड़का है या लड़की ?	लड़का.....1 लड़की.....2	┌───┐	
102	आपका नाम फिरसे बताएं			
103	आप (नाम) के कौन लगते हैं ?	माँ.....1 प्राथमिक देखभाल प्रदाता, relation/ सम्बन्ध.....2	┌───┐	
103	(नाम) के पिता का नाम क्या है ?			
104	(नाम) की/ का सही उम्र क्या है ?	Months/ महीने	┌──┐┌──┐	Days / दिन
105	(नाम) के आयु की जानकारी के स्रोत	Health card / स्वास्थ्य कार्ड.....1 Birth certificate/जन्म प्रमाण पत्र.....2 Verbal information by mother / मौखिक जानकारी माँ के द्वारा.....3 Verbal information by others/ मौखिक जानकारी दूसरों के द्वारा.....4 Others / अन्य.....5	┌───┐ '5', specify/ स्पस्ट करे  _____	
106	आपकी उम्र क्या है?	Age/ आयु (in completed years) ┌──┐┌──┐		
107	आपकी मूल भाषा क्या है?			
108	क्या आप कभी स्कूल गयी है ?	Yes/हाँ .....1 No/ नहीं .....2	┌───┐	2 Go to 110
109	शिक्षा का उच्चतम स्तर जो आपने प्राप्त क्या है?	Did not complete primary/ प्रिमारी स्कूल पूरा नहीं किया.....1 Completed primary/ प्रिमारी स्कूल पूरा किया.....2 Completed secondary/ माध्यमिक पूरा	┌───┐	→ 1/ 2 go to 110 → 3/ 4 go to 111

		किया.....3 Higher education/ उच्च शिक्षा.....4		
110	क्या आप इस वाक्य को पढ़ सकती है (साक्षरता कार्ड से वाक्य दिखाएँ) यदि प्रतिवादी पूरी वाक्य नहीं पढ़ सकते हैं - <b>probe</b> क्या आप वाक्य का कोई हिस्सा पढ़ सकती है ?	Cannot read at all/ बिलकुल नहीं पढ़ सकती.....1 Able to read only part of the sentence/ केवल वाक्य का कुछ भाग पढ़ने में सक्षम है.....2 Able to the read whole sentence/ पूरा वाक्य पढ़ने में सक्षम है.....3 No card with required language/ आवश्यक भाषा का कार्ड उपलब्ध नहीं है...4 Blind / visually impaired/नेत्रहीन.....5	<input type="text"/> '4' - , specify language/ भाषा स्पष्ट करे	
111	क्या आपके पति कभी स्कूल गयी है ?	Yes/हाँ .....1 No/ नहीं .....2	<input type="text"/>	2 → go to 113
112	शिक्षा का उच्चतम स्तर जो आपके पति ने प्राप्त क्या है?	Did not complete primary/ प्रिमारी स्कूल पूरा नहीं किया.....1 Completed primary/ प्रिमारी स्कूल पूरा किया.....2 Completed secondary/ माध्यमिक पूरा किया.....3 Higher education/ उच्च शिक्षा.....4	<input type="text"/>	1/ 2 → go to 113 3/ 4 → go to 114
113	क्या आपके पति अपना मूल भाषा पढ़ लिख सकते हैं ?	Cannot read or write/ पढ़ लिख नहीं सकते.....1 Only read/ केवल पढ़ सकते हैं.....2 Both read and write/ पढ़ और लिख दोनों सकते हैं.....3	<input type="text"/>	
114	आपका धर्म क्या है?	Hindu/ हिंदू.....1 Muslim/मुस्लिम.....2		

		Christian/ईसाई.....3 Sikh/ सिख.....4 Buddhist/ बौद्ध.....5 Jain/ जैन.....6 Parsi/पारसी.....7 Others/ अन्य.....8	<input type="checkbox"/> अन्य, स्पस्ट करे     	
115	आपकी जाति या जनजाति क्या है?	Caste/ जाति _____(specify/ स्पस्ट करे) Tribe/ जनजाति _____(specify/ स्पस्ट करे) No caste/tribe/ कोई जाति / जनजाति नहीं (record 3) _____ Don't know/ मालूम नहीं (record 88) _____ Refused to answer/ बताने से मन किया (record 888) _____		
<b>SECTION-2: PREGNANCY, DELIVERY AND REPRODUCTIVE HISTORY</b>				
अब मैं आपसे आपकी गर्भावस्था, प्रसव, और प्रजनन से संबंधित कुछ सवाल पूछना चाहूंगी				
No	Question	Response codes	Response	Skip
201	(नाम) के साथ गर्भावस्था के दौरान, क्या आपने एएनएम के पास गर्भावस्था रजिस्टर किया था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't remember/ याद नहीं.....88	<input type="checkbox"/>	
202	क्या आपको एक स्वास्थ्य कार्ड एएनएम द्वारा दिए गया था ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
203	(नाम) के साथ गर्भावस्था के दौरान, प्रसव पूर्व जांच के लिए क्या आप किसी के पास गए थे ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → go to 210
204	किसके पास दिखाया था ?	ANM/LHV/ एएनएम/ अलएचभी.....1 Health centre doctor/ स्वास्थ्य संस्थान का डॉक्टर.....2 Private doctor/ प्रिवट डॉक्टर.....3 Dai/TBA/ दाई/ टीबीये.....4 Others/ अन्य.....5	<input type="checkbox"/> अन्य, स्पस्ट करे   	

205	आप कितने माह की गर्भवती थी जब पहली बार प्रसव पूर्व जांच के लिए गयी थी ?	<input type="text"/> <input type="text"/> Months/ महीने (record '88' for don't know/ यदि मालूम नहीं)	
206	आप अपनी गर्भावस्था के दौरान कितनी बार प्रसव पूर्व जांच के लिए गयी थी ?	<input type="text"/> <input type="text"/> Number/ संख्या (record '88' for don't know / यदि मालूम नहीं)	
207	क्या आपको टेटनस टोक्सोइड के दो या अधिक इंजेक्शन लगे थे ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't remember/ याद नहीं.....88	<input type="text"/> <input type="text"/>
208	प्रसव पूर्व जांच के दौरान क्या आपको खून की मात्र बढ़ाने के लिए अयेरों- फोलिक एसिड के तबलेत या सिरप मिला था?	Yes/ हाँ.....1 No/ नहीं.....2 Don't remember/ याद नहीं.....88	<input type="text"/> <input type="text"/>
209	क्या अपने कम से कम तीन महीने के लिए अयेरों- फोलिक एसिड के तबलेत / सिरप खाया था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't remember/ याद नहीं.....88	<input type="text"/> <input type="text"/>
210	(नाम) के साथ जब आप गर्भवती हो गयी तब क्या आप गर्भवती होना चाहती थी ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>
211	(नाम) का जन्म कहाँ हुआ था ?	Home/ घर.....1 Sub centre/PHC/CHC/ District hospital/ उप केन्द्र/प्राथमिक स्वास्थ्य केन्द्र/सामुदायिक स्वास्थ्य केन्द्र/जिला अस्पताल.....2 Private hospital/ प्रिवत अस्पताल.....3 Others/ अन्य.....4	<input type="text"/> अन्य, स्पस्ट करे <hr/>
212	किसने आपकी डेलिवरी कराया ?	ANM/nurse/LHV/एएनएम/ अलएचभी/नर्स.....1 Doctor/ डॉक्टर.....2 Trained birth attendant/ प्रशिक्षित दाई.....3 Local Dai/ स्थानीय दाई.....4 Relative/neighbour/ रिश्तेदार /पड़ोसी.....5	<input type="text"/> अन्य, स्पस्ट करे <hr/>

1/4 → also answer 213  
2/3 → skip 213





				No/ नहीं...2		मालूम '88' रिकॉर्ड करे)
1		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
2		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
3		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
4		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
5		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
6		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
7		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
8		<input type="text"/>	<input type="text"/>	<input type="text"/>	Months <input type="text"/> Years <input type="text"/>	
If more than this, use a separate sheet and attach the sheet to the end of this form						
217	जन्म के समय (नाम) का वजन कितना था? (कोई रिकॉर्ड उपलब्ध है तो जाँच करे) '8888' अगर वजन मालूम नहीं है			<input type="text"/>	Grams	'8888' skip to 219
218	क्या कोई दस्तावेज़/रिकॉर्ड से जन्म के समय का वजन लिखा गया है ?		Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>		
219	क्या (नाम) का जन्म समय से पहले हो गया था ?		Yes/ हाँ.....1 No/ नहीं.....2 Don't remember/ याद नहीं.....88	<input type="text"/>		
220	जन्म कितने हफ्ते पहले हो गयी थी ?		Weeks (record '88' if not known/ यदि मालूम नहीं) <input type="text"/>			

SECTION-3: BREAST FEEDING, WEANING AND INFANT CARE				
अबतक सरे सवालो का जवाब देने के लिए धन्यवाद   अब में आपसे बच्चे के खाने पिये और देखभाल के बारे में कुछ सवाल पुचुंगी				
No	Question	Response codes	Response	Skip
301	क्या आपने कभी (नाम) को स्तनपान कराया है ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → go to 305
302	जन्म के कितने समय बाद आपने (नाम) को स्तनपान कराया था ?	Immediately/जन्म के तुरंत.....1 Within 1 hour of birth/जन्म के १ घंटे के भीतर.....2 Within 24 hours of birth/ जन्म के २४ घंटे के भीतर3 More than 24 hours/ २४ से अधिक घंटे बाद.....4	Hours/ घंटे <input type="checkbox"/> <input type="checkbox"/> OR Days/ दिन <input type="checkbox"/> <input type="checkbox"/>	1/2 - '00' in hrs 3-'01 to 23' in hrs 4-'no. of days'
303	क्या आप अभीभी (नाम) को स्तनपान करा रही है ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → go to 305
304	क्या आपने कल दिन या रात के किसी समय (नाम) को स्तनपान कराया था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/>	
305	(नाम) का स्तनपान रोकने का निर्णय आपने किन कारणों के वाजे से लिया ? [participant को पहले कारन बताने दे   निम्न्य लिखी कारणों में से जो कारन participant बताती है वह कारन के साथ "1" रिकॉर्ड करें   जिन कारणों के साथ आपने "1" रिकॉर्ड नहीं किया है उनके बारेमे अब एक एक करके जानकारी लें] <b>Yes/ हाँ.....1; No/ नहीं.....2</b>		<b>Skip this question if response to 301 and 303 is '1' (yes) अगर 301 और 302 में आपने "1" (हाँ) रिकॉर्ड किया है, तो ये सवाल न करें</b>	
A	(नाम) को दूध पीने में मुश्कील हुई थी		<input type="checkbox"/>	
B	(नाम) बीमार हो गयी/ गया था और स्तनपान नहीं कर पाई/पाया		<input type="checkbox"/>	
C	(नाम) ने अपने आप दूध पीना छोड़ दिया		<input type="checkbox"/>	
D	(नाम) बड़ी/ बड़ा हो गयी/ गया थी/था, जिस वाजे से माँ का दूध और डिब्बे के दूध में कोई अंतर नहीं रहा		<input type="checkbox"/>	
E	मुझे लगा की (नाम) का वजन नहीं बढ़ रहा था		<input type="checkbox"/>	

F	मेरा दूध काफी मात्र में नहीं था		
G	मैं बीमार हो गयी थी और दवाई लेना पड़ा था		
I	मुझे घर में बहुत काम करना पड़ता है		
J	घर के बहार काम करने के समय दूध नहीं पिला सकती		
K	काम के इलावा और किसी कारन के वाजे से मैं (नाम) को दूध पिलाने के लिए घर पर नहीं थी		
L	हमारे यहाँ यही रिवाज / परंपरा है		
M	मैं घर के बहार लोगो के सामने दूध नहीं पिलाना चाहती थी		
N	मैं गर्भवती हो गयी थी		
O	अन्य कोई कारन, स्पस्ट करें _____		
306	निम्नलिखित लोगो में से किनहोने (नाम) का स्तनपान रोकने का निर्णय लेने में आपकी सहायता की थी ?	<b>Skip this question if response to 301 and 303 is '1' (yes) अगर 301 और 302 में आपने "1" (हाँ) रिकॉर्ड किया है, तो ये सवाल न करें</b>	
A	(नाम) के पिता	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	
B	आपकी माँ	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	
C	आपकी सास	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	
D	परिवार का कोई अन्य सदाशय, स्पस्ट करें _____	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	

E	किसी डॉक्टर/एएनएम/ अलएचभी/नर्स	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
F	अन्गवादी कार्यकर्ता/ आशा	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
G	आपके काम के पर्यवेक्षक या नियोक्ता (employer)	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
<i>बच्चे को कभी कभी विटामिन या दवाई देने पड़ता है, अब मैं आपसे इसके बड़े में कुछ सवाल करूँगी</i>				
307	काल दिन या रात के किसी समय, क्या आपने (नाम) को विटामिन या दवाई की कोई खुराक दी थी ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
308	काल दिन या रात के किसी समय, क्या आपने (नाम) को <i>जीवन रक्षक घोल (ओआरएस) पिलाया था ?</i>	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
309	काल दिन या रात के किसी समय (नाम) ने जो कुछ भी पिया था, उन सभी चीजों के बारे में जानकारी लेना चाहेंगे क्या (नाम) ने इन में से कोई चीज पिया था ? (लिस्ट पढके सुनाये)	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88 ↓	कितनी बार? (Indicate only where specified) ↓	
A	सदा पानी ? (यदि हाँ, उबला हुआ या बिना उबला पानी) उबला पानी बिना उबला सदा पानी	<input type="text"/>		
B	सेरेलक / फेरेक्स जैसा बच्चो के खाने का मिश्रण	<input type="text"/>	Times <input type="text"/>	
C	डिब्बे का दूध, गाय/भैंस/बकरी इयादी का ताज़ा दूध	<input type="text"/>	Times <input type="text"/>	

D	फल का रस या शरबत					
F	दाल का पानी, चावल का पानी					
G	लस्सी या चांस (दही से बना कोई पदार्थ)				Times	
H	पतला दलीय, किचड़ी, खीर					
I	चाय					
J	अन्य, स्पस्ट करें _____					
310	आपने (नाम) को कितने साल से तरल पदार्थ, अर्ध ठोस और ठोस आहार देना शुरू किया था ? अगर अभी तक शुरू नहीं किया है तो "88" रिकॉर्ड करें	Other fluids/ तरल पदार्थ....(months)			→	Go to 312
		Semisolid food/ अर्ध ठोस आहार.(months)			→	Go to 311
		Solid food/ ठोस आहार.....(months)			→	Go to 311
311	<p>(नाम) ने कल घर पर या घर के बाहर, दिन या रात के दौरान जो कुछभी खाया, उन सभी चीजों का वर्णन करें  </p> <p>iv. कल सुभे (नाम) जब पहली बार उठी/ उठा, उस समय के बारे में सोचे   क्या (नाम) ने तब कुछ खाया था ? यदि हाँ: कृपया (नाम) ने जोभी खाया वोह सभी खाने के बारे में बताएं   जाँच/ Probe : और कुछ ? जब तक माँ "और कुछ नहीं" बोलती है तब तक जांचे   यदि नहीं: सवाल (ii) पुंचे  </p> <p>v. उसके बाद (नाम) ने क्या किया ? क्या (नाम) ने तब कुछ खाया था ? यदि हाँ: कृपया (नाम) ने जोभी खाया वोह सभी खाने के बारे में बताएं   जाँच/ Probe : और कुछ ? जब तक माँ "और कुछ नहीं" बोलती है तब तक जांचे   यदि नहीं: सवाल (iii) पुंचे  </p> <p><i>सवाल बार बार पुंचे, जब तक माँ ये न बोलेन की "बच्चा रात को सो गया और अगले दिन ही उठा" /</i></p> <p><i>अगर माँ कोई मिश्रित भोजन के बारे में बताती है जैसे की किचड़ी या खीर या घोल, जांचे:</i></p> <p>iii. इस मिश्रित भोजन में आपने क्या क्या सामग्री डाला था ? जांचे: और कुछ ? तब तक जब तक माँ और कुछ नहीं बोले माँ जिस खाने के बारे में बताती हैं, उस खाने के निचे एक रेखा खिचे और साथ में दी गयी बॉक्स में "1" (हाँ) रिकॉर्ड करें   अगर कोई खाना या खाने की सामग्री निचे दी गयी फूड ग्रुप में दर्ज नहीं हैं तो आईटम टेबल की आखी में दी गयी "अन्य खाने" के बॉक्स में रिकॉर्ड करें   अगर कोई सामग्री बहुत कम मात्र में खाने के स्वाद के लिए बच्चे के खाने में डाला गया है जैसे नमक, मिर्च, हल्धि, चीनी, हिंग इत्यादि तोह वह आईटम "कोदिमंत" वाले फूड ग्रुप में रिकॉर्ड करें  </p> <p>जब माँने आपको सभी खाने के बारे में बता दिया, उसके बाद आपने जिस फूड ग्रुप में "1" रिकॉर्ड नहीं किया है उस फूड ग्रुप के सभी आईटम उनको पढ़ कर सुनाये   अगर वह किसी खाने को हाँ बोलती हैं तो उस ग्रुप के साथ वाले बॉक्स में "1" रिकॉर्ड करें, नहीं बोलती हैं तो "2" रिकॉर्ड करें और याद नहीं हैं या मालूम नहीं हैं तो "88" रिकॉर्ड करें  </p>					

कल दिन या रात में क्या (नाम) में (फूड ग्रुप आइटम) खाया था ?			
Response codes: Yes/हाँ.....1; No/ नहीं.....2; Don't know/मालूम नहीं.....88			
No.	Question	Response	Skip
A	किचड़ी, हलवा, ब्रेड, चावल, रोटी, साबूदाना, परांठा, पूरी, बाटी, मक्के से बना कोई खाना	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	If all '2' (No)/ अगर सब "2" (नहीं)
B	कद्दू, गाजर, स्कवैश, मीठे आलू	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
C	आलू, अरबी	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	→ Go to 312
D	कोई हरा सब्जी	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	If at least one '1' (Yes) or all '88' (don't know) / अगर
E	पका आम, पका हुआ पपीता, खरबूज, तरबूज	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
F	कोई और फल या सब्जी	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	कोई एक में भी
G	जिगर, गुर्दे, हृदय, या अन्य अंग मांस	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	"1" (हाँ) या सारा
H	कोई मांस/मीत जैसे चिकन, भेड़/बकरी, सूअर का मांस, या बतख का मांस	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	"88" (नहीं
I	अंडा	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	मालूम)
J	ताज़ा या सुखा मछली	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	→ Go to 313
K	सेम, मटर, मसूर, बादाम, काजू, पिस्ता, अखरोड़ या कोई बीज से बना हुआ खाना (जैसे दाल, किचड़ी, हलवा)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
L	दही, लस्सी, चांस	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
M	कोई तेल, घी, देसी घी, बटर, या इनसे बना कोई चीज़	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
N	चीनी डाला हुआ कोई खाना जैसे चक्लत, मिठाई, केक, बिस्कुट, शहद, इत्यादि	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
O	कोदिमंट्स / खाने के स्वाद के लिए - नमक, मिर्ची, लस्सन, हल्धि, लॉन्ग, एलैची, दालचीनी, कोई मसाला, दनिया, जीरा, हिंग, पुदीना, तुलसी	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
P	अन्य कोई खाना (नाम लिखे)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

312	क्या कल (नाम) ने दिन या रात को कोई ठोस या अर्ध ठोस या मसला/गला हुआ खाना खाया था ? यदि हाँ, जांचें: किस तरेह का ठोस या अर्ध ठोस या मसला/गला हुआ खाना (नाम) ने खाया था ?	Yes/ हाँ.....1 सवाल 310 में वापस जाएँ, बताया गया सारा खाना रिकॉर्ड करें और फिर सवाल 312 पुंचे No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	2 or 88 → Go to 314
313	तरल पदार्थ के इलावा, कल (नाम) ने दिन या रात को कितनी बार ठोस या अर्ध ठोस या मसला/गला हुआ खाना खाया था ?	Number of times/ कितनी बार <input type="text"/> Don't know/ मालूम नहीं.....88		
314	क्या कल (नाम) ने दिन या रात को निपल वाले बोतल से कुछ पिया था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
315	(नाम) के लिए खाना बनाने से पहले और उसको खाना खिलने से पहले क्या आप अपना हाथ साबुन से धोती हैं ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
316	जिनको ६ महीने से ऊपर का बच्चा हैं या जिनका किसी भी उम्र का बच्चा अपने आप खाना खता हैं केवल उनको यह सवाल पुंचे   क्या आप खाना खाने से पहले (नाम) का हाथ धुलाती है ? क्या आपने आज खाना खाने से पहले (नाम) का हाथ धुलाया था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
317	(नाम) को खाना खिलने के लिए या (नाम) का खाना बनाने के लिए जो बर्तन आप इस्तमाल करती हैं, क्या वह बर्तन आप उबलती है या गरम पानी से धोती हैं ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't use utensils/ बटन इस्तमाल नहीं करते.....88	<input type="text"/>	

318	आपके परिवार के लोग आमतौर पर जिस जगह अपना हाथ धोते हैं, कृपया वोह स्थान मुझे दिखाएँ निरीक्षण किया	Observed/ निरीक्षण किया.....1 Not observed-not in dwelling/yard/plot/ निरीक्षण नहीं किया - वह स्तन घर या आँगन या घर के पलट में नहीं हैं.....2 Not observed-no permission to see/ निरीक्षण नहीं किया - अनुमति नहीं मिला.....3 Not observed-other reason/ निरीक्षण नहीं किया अन्य कारन 4	<input type="checkbox"/>	2, 3, 4 → Go to 321
319	OBSERVE ONLY/ केवल निरीक्षण करें: स्थान पर पानी का निरीक्षण करें	Water is available/ पानी उपलब्ध हैं.....1 Water is not available/ पानी उपलब्ध नहीं हैं..2	<input type="checkbox"/>	
320	OBSERVE ONLY/ केवल निरीक्षण करें: स्थान पर साबुन, दितार्जित, या और कोई हाथ धोने वाले चीज़ का निरीक्षण करें	Soap/detergent (bar, liquid, powder, paste)/ साबुन/ दितार्जित (बार, लिक्विड, पोवदर, पेस्ट).....1 Ash, mud, sand/ राख, मिट्टी, रेत.....2 None/ कुछ नहीं था.....3	<input type="checkbox"/>	
अब मैं आपसे (नाम) के देखभाल से जुड़े कुछ सवाल पुचुंगी				
321	पिछले ४ हफ्ते में नियमित आधार पर क्या आपके इलावा (नाम) की देखभाल किसी और ने किया था ? मतलब: क्या आमतौर पर कोई और हफ्ते में कभी भी (नाम) को ३ या अधिक घंटे के लिए आपने पास रखता/रखती हैं ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	→ 2 go to the next section
322	पिछले ४ हफ्ते में आमतौर पर किसने (नाम) को अपने पास रखा था ?	(NAME)'s father/ (नाम) के पिता.....1 (NAME)'s grandparent(s)/ (नाम) के दादा या दादी या नाना या नानी.....2 Elder daughter/ आपकी बड़ी लड़की.....3 Elder son/ आपका बड़ा लड़का/ .....4 Other family member/ परिवार के किसी और सदस्य ने....5 Someone not in family/ परिवार से बाहर का कोई सदस्य.6	<input type="checkbox"/> , <input type="checkbox"/> , <input type="checkbox"/> <input type="checkbox"/> , <input type="checkbox"/> , <input type="checkbox"/>	Include more than one response

323	आमतौर पर (नाम) की देखभाल कहाँ होती है ?	At home/ घर पर.....1 Day care (Anganwadi)/ अग्न्यागवादी केंद्र.....2 Other private home/ किसी और के घर पर.....3 Other, specify/ अन्य (स्पष्ट करें) _____4	<input type="text"/> , <input type="text"/> , <input type="text"/> , <input type="text"/>	Include more than one response
324	औसतम हर हफ्ते कितने दिन (नाम) देखभाल प्रदाता के पास देखभाल के लिए रहती/ रहता है ?	Days/ दिन <input type="text"/>		
325	औसतम हर दिन कितने घंटे (नाम) देखभाल प्रदाता के पास देखभाल के लिए रहती/ रहता है ?	Hours/ घंटे <input type="text"/>		
326	जब (नाम) देखभाल के लिए इनके/ देखभाल प्रदाता के पास रहती हैं, तो औसतम एक दिन में कितनी बार वोह (नाम) को खाना खिलाती है? (दूध, ठोस भोजन, नाश्ता, अन्य तरल पदार्थ शामिल करें)	Number of times/ कितनी बार <input type="text"/> Record '00' for none/ एक बार भी नहीं Record '88' for don't know/ मालूम नहीं		
327	कितनी बार आपने पता किया की ये देखभाल प्रदाता / (नाम) की/का देखभाल करने वाली/वाला ब्यक्ति, (नाम) को खाना खिलाता है?	Seldom/never/ बिलकुल नहीं/ बिलकुल नहीं के बराबर.....1 Sometimes/ कभी कभी.....2 Always/most of the time/ हमेशा/ काफी बार.. 3	<input type="text"/>	
328	क्या आप नकद या प्रकार में देखभाल प्रदाता को भुगतान करते हैं ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
<b>SECTION-4: VACCINATION, HEALTH AND HEALTHCARE</b>				
अब मैं आपसे (नाम) के स्वास्थ्य, टीकाकरण और उपचार सम्बन्धी कुछ सवाल पुचुंगी				
401	क्या आपके पास कोई स्वस्थ्य कार्ड है जिसमे (नाम) के टीकाकरण का बिबरण दिया गया है? (यदि हाँ, क्या मैं वोह कार्ड देख सकती हूँ?)	Yes/seen/ हाँ/ कार्ड देखा.....1 Yes/not seen/ हाँ/ कार्ड नहीं देख.2 No card/ कार्ड नहीं है.....3	<input type="text"/>	1 → go to 403 2 → go to 405
402	क्या आपके पास कभी भी कोई टीकाकरण कार्ड था ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	→ go to 405
403	हर टिके की तारीख रिकॉर्ड करें   अगर टीकाकरण किया गया है पर तारिक नहीं लिखी है तो "दिन" वाले बॉक्स में "99" लिखे   अगर टीकाकरण की पूरी तारीख नहीं लिखी है तो जो हिस्सा नहीं है उस में "88" (दिन और महीने के बॉक्स में)			Skip this question if no

	या "8888" (साल वाले बॉक्स में) रिकॉर्ड करें			health card is available or seen
A	बीसीजी	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		अगर कार्ड नहीं हैं
B	पोलिओ - ० (पल्से पोलिओ छोड़कर)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		या आपने कार्ड
C	दीपिटी-१	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		नहीं देखा तो ये
D	दीपिटी-२	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		सवाल छोड़ दे
E	दीपिटी-३	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		
F	पोलिओ - १ (पल्से पोलिओ छोड़कर)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		
G	पोलिओ - २ (पल्से पोलिओ छोड़कर)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		
H	पोलिओ - ३ (पल्से पोलिओ छोड़कर)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		
I	खसरे का टिका	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		
J	विटामिन ए (पहली खुराक)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YYYY		
404	क्या (नाम) को कोई और टिका मिला हैं जो इस कार्ड में दर्ज नहीं हैं ? "हाँ" तभी रिकॉर्ड करें जम माँ बीसीजी, डीपीटी १-३, पोलिओ ०-३ और/या खसरे के टिके के बारे में बोले	Yes/ हाँ.....1 (टिके का नाम पुंचे और सवाल 403 में उस टिके के साथ तारीख (दिन) वाले बॉक्स में "66" रिकॉर्ड करें) No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/> <input type="text"/>	1 → go to 403 2/88 → go to 408
405	बिमारियों से बचाने के लिए पल्से पोलिओ सहित (नाम) को क्या कभी भी कोई टिका लगा हैं?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/> <input type="text"/>	2/88 → go to 407
406	<b>कृपया मुझे ये बताएं की (नाम) को इनमे से कोई टिका लगा हैं क्या?</b>			
A	तपेदिक या टीबी के बचाओं के लिए बीसीजी का टिका, जो बाएं कंधे की उपरी हिस्से में लगती हैं और एक छोटा घाव का निशान बना देती हैं	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/> <input type="text"/>	

B	कोई पोलिओ का टिका, जिसका २ बंध बच्चे के मुह में डाला जाता है, पलसे पोलिओ अभियान में दिये गये टिके सहित	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	2/88 → go to 406 E
C	क्या पोलिओ टिके की पहली खुराक बच्चे को जन्म के पहले दो हफ्ते के अन्दर दिया गया था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
D	बच्चे को पोलिओ की खुराक कितनी बार दी गयी है ? (पोलिओ ० और पलसे पोलिओ छोड़कर) (यदि ५ या ५ से अधिक बार, तो 5 रिकॉर्ड करें)	Number/ कितनी बार Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
E	क्या बच्चे को गलघोटू, काली खांसी और टेटनस से बचाओं के लिए डीपीटी का टिका दिया गया है ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	2/88 → go to 406 G
F	जांघ या कुल्हे पर डीपीटी के कितने इंजक्शन लगे ? यह इंजक्शन / सुई कभी कभी पोलिओ की खुराक के साथ दिया जाता है ।	Number/ कितनी बार Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
G	खसरे से बचाओं के लिए क्या दाहिने कंधे पर कोई सुई बच्चे को लगी थी ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
407	(नाम) को क्यों कोई टिका नहीं दिया गया ? (उपयुक्त अनुसार एक से अधिक उत्तर का चयन करें)	Child to young/ बहुत छोटा है .....1 Unaware of need/ ज़रूरत के बारे में पता नहीं था.....2 Place of vaccination unknown/ टीकाकरण का स्थान मालूम नहीं.....3 Place too far/ टीकाकरण का स्थान बहुत दूर है.....4 Time of vaccination unknown/ टीकाकरण का समय मालूम नहीं.....5 Time inconvenient/ समय सुबिधाजनक नहीं है.....6 Fear of side-effects/ टिके के कु-प्रभाव का दर.....7	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> , <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

		No faith in vaccines/ टिके पर भरोसा नहीं.....8 ANM absent/ ऐनएम नहीं थी.....9 Vaccine not available/ टिका उपलब्ध नहीं था.....10 Mother too busy/ माँ बहुत व्यस्त थी.....11 Cannot spare time from household work/ घर के काम से समय नहीं मिलता है.....12 Cannot spare time from MGNREGA/ other work for pay/ नरेगा या अन्य रोजगार से समय नहीं मिलता है.....13 Child ill/ बच्चा बीमार था.....14 Not a custom/ परंपरा नहीं.....15 Financial problem/ आर्थिक समस्या.....16 Child is a girl/ बच्चा लड़की है.....17 Child is a boy/ बच्चा लड़का है.....18 Others/ अन्य.....19	<div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div> <p style="text-align: center;">'19', स्पस्ट करें</p> <hr style="width: 50%; margin: 0 auto;"/> <hr style="width: 50%; margin: 0 auto;"/>
408	(नाम) का तीकरण कहाँ हुआ था ?	Sub-centre/PHC/CHC/ district hospital/other public health facility/ उप केन्द्र/प्राथमिक स्वास्थ्य केन्द्र/सामुदायिक स्वास्थ्य केन्द्र/जिला अस्पताल/ अन्य सरकारी हस्पताल.....1 Private hospital/clinic/ प्रिवट अस्पताल/क्लिनिक.....2 Anganwadi centre/ अन्गवादी केंद्र.....3 At home/ घर पर.....4 Pulse polio/ पल्से पोलिओ अभियान.....5 Others/ अन्य.....6	<div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div> <p style="text-align: center;">अन्य (स्पस्ट करें)</p> <hr style="width: 50%; margin: 0 auto;"/> <hr style="width: 50%; margin: 0 auto;"/>
409	क्या पिछले ६ महीने में (नाम) को पेट के कीड़े दूर करने के लिए कोई दवाई दी गयी है ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div>
410	क्या (नाम) को पिछले २ हफ्ते में दस्त हुआ था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto;"></div> <p style="text-align: right;">2/88 → go to 416</p>

411	बच्चे को इस बार (पिछली बार) जब दस्त हुआ था तो क्या इनमे से कोई तरल पदार्थ उसे आपने दिया था ?			
A	सदा पानी	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
B	चीनी और नमक का घोल	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
C	फल का रस	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
D	निम्बू का पानी	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
E	चावल या गेहूँ का पानी/ घोल या पतला किचड़ी	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
F	गृह उपचार	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
G	बच्चा स्तनपान कर रहा है/था	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
412	दस्त के दौरान क्या बच्चे को आपने जीवन रक्षक घोल या ओअरएस दिया था?	Yes/ हाँ.....1 No/ नहीं.....2 Child on breast milk/ बच्चा स्तनपान कर रहा है.....3	<input type="checkbox"/>	
413	क्या दस्त के दौरान बच्चे का सामान्य भोजन चालू था?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
414	क्या किसी से या कहीं से आपने दस्त का उपचार या उपचार की सलाह की थी ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → go to 416
415	कहाँ या किसे आपने दस्त का उपचार या उपचार की सलाह की थी ? (record all sources mentioned)	Sub-centre/PHC/CHC/ district hospital/other public health facility/ उप केन्द्र/प्राथमिक स्वास्थ्य केन्द्र/सामुदायिक स्वास्थ्य केन्द्र/जिला अस्पताल/ अन्य सरकारी हस्पताल.....1	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

		Private hospital/clinic/ प्रिवत अस्पताल/क्लिनिक....2 Anganwadi centre/ अन्नवादी केंद्र.....3 ASHA/ आशा.....4 Pharmacy/ फार्मसी.....5 Home remedies/ गृह उपचार.....6 Others/ अन्य.....8	अन्य (स्पस्ट करें) _____ _____	
416	पिछले २ हफ्ते में क्या (नाम) को किसी समय बुखार आया था ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
417	पिछले २ हफ्ते में क्या (नाम) को खांसी की बीमारी हुई थी?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	2/88 → go to 421
418	जब (नाम) को खांसी की बीमारी हुई थी, तब क्या वह सामान्य से अधिक संक्षेप में, छोटी और तेज़ साँस ले रही/रहा था या साँस लेने में मुश्किल हुई थी ?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
419	क्या किसी से या कहीं से आपने बीमारी का उपचार या उपचार की सलाह की थी ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → go to 421
420	कहाँ या किसे आपने बीमारी का उपचार या उपचार की सलाह की थी ? (record all sources mentioned)	Sub-centre/PHC/CHC/ district hospital/other public health facility/ उप केन्द्र/प्राथमिक स्वास्थ्य केन्द्र/सामुदायिक स्वास्थ्य केन्द्र/जिला अस्पताल/ अन्य सरकारी हस्पताल.....1 Private hospital/clinic/ प्रिवत अस्पताल/क्लिनिक.....2 Anganwadi centre/ अन्नवादी केंद्र.....3 ASHA/ आशा.....5 Pharmacy/ फार्मसी.....6 Home remedies/ गृह उपचार.....7 Others/ अन्य.....8	<input type="checkbox"/> अन्य (स्पस्ट करें) _____ _____	
421	(नाम) का पिछला पखाना/	Child used toilet/latrין/ बच्चे ने शौचालय/लात्रिन में किया1	<input type="checkbox"/>	

	मल आपने किस तरह पारित किया / कहाँ फेंका ?	Put/rinsed into toilet/शौचालय में दाल कर बहा दिया.....2 Put/rinsed into drain/ditch/नाली / गड्ढे में दाल दिया.....3 Thrown into garbage/कचरे में फेंक दिया.....4 Buried/गड्ढा खोद कर दफना दिया.....5 Left in the open/खुले में छोड़ दिया.....6 Other/अन्य.....7	अन्य (स्पस्ट करें) _____ _____					
<b>SECTION-5: EMPLOYMENT HISTORY</b>								
अब मैं आपसे आपके परिवार के लोगो के रोज़गार के सम्बन्ध में कुछ सवाल पुचुंगी								
<b>No</b>	<b>Question</b>	<b>Response codes</b>		<b>Response</b>				
501	क्या आप बीपीएल कार्ड धारक हैं?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88						
502	इस घर में बच्चों सहित रहने वाले परिवार के सभी सदस्यों के नाम बताएं (वह सभी लोग जो आपके परिवार के सदस्य हैं और इस घर में रहते हैं, कोई अतिथि या रिश्तेदार जो आपसे मिलने आये हैं उनके नाम ना बताएं) <i>प्रथम पंक्ति में प्रतिवादी का विवरण रिकार्ड करें, उसके बाद घर के अन्य सदस्यों का विवरण रिकार्ड करें - उनके नाम, (नाम) के साथ उनका संबंध, उम्र, लिंग और व्यवसाय/पेशा (जांच: अगर कुछ दिनों या हफ्तों के लिए भी लगे हुए थे तो भी "सदस्य" के नौकरी के बारे में कृपया मुझे जानकारी दें)</i>							
Sl. No.	Name/ नाम	Relation/ (नाम) के साथ उनका संबंध	Age (in years) उम्र (साल)	Sex/ लिंग Male/ पुरुष.....1 Female/ महिला.....2	बच्चों सहित प्रत्येक सदस्य का प्राथमिक (primary) और माध्यमिक/दूसरा (secondary) व्यवसाय/ पेशा, नीचे दिए गए कोड के अनुसार रिकार्ड करें अगर पिछले 12 महीनों में ये व्यक्ति किसी भी समय के लिए ये पेशे से जुदा हुआ था/थी			
					Primary/ प्राथमिक	महीनो की संख्या	Secondary /दूसरा	महीनो की संख्या
01	प्रतिवादी	माँ/ देखभाल प्रदाता						
02								
03								
04								
05								
06								

07							
08							
09							
10							
पेशों के कोड (अगर घर में १० से अधिक सदस्य हैं तो एक दूसरी फार्म में विवरण रिकॉर्ड करें और इस फार्म के साथ जमा करें)							
Agriculture-own land/कृषि- अपनी भूमि.....01		Rearing household live stock/घरेलू पशु पालन करते हैं.....05		Blacksmith/लोहार.....09			
Agriculture labourer/कृषि मजदूर.....02		Rearing live stock for others/दूसरों के लिए पशु पालन करते हैं.....06		Others/अन्य _____			
Non-agriculture, daily wage labourer/गैर - कृषि, दिहाड़ी मजदूर.....03		Teacher/शिक्षक.....07		_____ 10			
Studying in school/ higher education/स्कूल में पढ़ते हैं / उच्च शिक्षा प्राप्त कर रहे हैं.....04		Goldsmith/सुनार.....08		Unemployed/बेरोजगार.....11			
				Don't know/मालूम नहीं .....88			
503	क्या आपके घर का कोई सदस्य नरेगा के माध्यम से कार्यरत हैं?	Yes/ हाँ.....1	No/ नहीं.....2	<input type="checkbox"/>	2 → go to 511		
504	घर के कौन कौन सदस्य नरेगा के माध्यम से कार्यरत हैं?	Record the serial numbers from the list in 502/ 502 में रिकॉर्ड की गयी सूची से सीरियल नंबर रिकॉर्ड करें					
505	अब तक अधिकतम कितने महीने के लिए आपके घर के सदस्य (कोई भी सदस्य) नरेगा द्वारा कार्यरत हुआ है?	Record only the highest figure/ केवल उच्चतम आंकड़ा रिकार्ड करें					
506	किसी एक वर्ष में अधिकतम कितने दिन के लिए आपके घर के सदस्य (कोई भी सदस्य) नरेगा द्वारा कार्यरत हुआ है?	Record only the highest figure/ केवल उच्चतम आंकड़ा रिकार्ड करें					
507	क्या आपको पता है के इन सदस्यों को उनकी मजदूरी कब कब प्राप्त होती है?	Everyday/ हर दिन.....1	Every week/ हर हफ्ते.....2	Every 15 days/ हर १५ दिन में.....3	Every month/ हर महीने.....4	In 2 to 6 months/ २ -६ महीने में.....5	More than 6 months/ ६ महीने के बाद.....6
		Have not received any/ अब तक कोई मजदूरी नहीं मिली.....7		<input type="checkbox"/>			

		Don't know/ मालूम नहीं.....88		
508	कब इस घर के किसी भी सदस्य ने सब से पहली बार नरेगा में काम करना शुरू किया ? (सब से पहले बार वाली डिटेल रिकॉर्ड करें)	5 years ago/2006/५ साल पहले/ २००६.....1 4 years ago/2007/४ साल पहले/ २००७.....2 3 years ago/2008/३ साल पहले/ २००८.....3 2 years ago/2009/२ साल पहले/ २००९.....4 Last year/2010/पिछले साल/ २०१०.....5 This year/2011/इस साल/ २०११.....6	<input type="text"/>	
509	अधिकतम लगातार कितने समय के लिए आपके परिवार का कोई भी सदस्य नरेगा से कार्यरत थे ? (जो लगातार सबसे अधिक समय था वह रिकॉर्ड करें)	Continuous for past 2 years/ पिछले २ साल से.. 1 Continuous for past 3 years/ पिछले ३ साल से...2 Continuous for past 4 years/ पिछले ४ साल से....3 Continuous for past 5 years/ पिछले ५ साल से...4 Don't know/ मालूम नहीं.....88	<input type="text"/>	
510	यह परिवार के कौनसे सदस्य हैं ?	Record the serial numbers from the list in 502 502 में रिकॉर्ड की गयी सूची से सीरियल नंबर रिकॉर्ड करें		→ Go to 514
511	क्या आपने नरेगा के बारे में सुना है ?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
512	क्या आपके घर के किसी भी सदस्य ने नरेगा में रजिस्टर किया था?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
513	क्या आपके घर के किसी भी सदस्य के पास नरेगा का जॉब/नौकरी कार्ड है?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88	<input type="text"/>	
514	<b>अगर सवाल 502 में प्रतिबन्धी के पंक्ति में प्राथमिक (primary) या माध्यमिक/दूसरा (secondary) व्यवसाय/पेशा में आपने "10" रिकॉर्ड किया है तो आगे के प्रश्न पंजे, अन्यथा सवाल 515 में बढे</b>			

A Check	जैसा कि आप जानते हैं, कुछ महिलाएं नौकरि करती हैं जिसके लिए उन्हें नकद या प्रकार में भुगतान होता है। अन्य महिलाएं चीजें बेचती हैं, छोटे सा व्यवसाय करती हैं, या परिवार के खेत पर या परिवार के कारोबार में काम करती हैं। पिछले सात दिनों में, क्या आपने इन में से कोई काम या अन्य कोई काम किया है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	1 → go to 502 and fill the details/ <i>विवरण रिकार्ड करें</i> , then →Go to 515
B Check	क्या पिछले १२ महीनो में आपने कोई काम किया है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	1 → go to 502 and fill the details/ <i>विवरण रिकार्ड करें</i> , then go to 515 2→go to 525
515	आपका व्यवसाय/पेशा क्या है, मतलब, आप मुख्य रूप से किस तरेह का काम करती हैं?	<hr/>		
516	क्या आप पूरा साल काम करती हैं, या साल में कुछ महीने काम करती हैं या कभी कभार काम करती हैं ?	Throughout the year/ पूरा साल1 Seasonally/part of the year/ साल में कुछ महीने.....2 Once in a while/ कभी कभार....3	<input type="text"/>	
517	आप कितना समय काम करती हैं ? (महीने, दिन, हफ्ते और घंटे रिकार्ड करें)	Months per year/ साल में कितने महीने <input type="text"/> <input type="text"/> Weeks per month/ महीने में कितने हफ्ते <input type="text"/> <input type="text"/> Days per week/ हफ्ते में कितने दिन <input type="text"/> <input type="text"/> Hours per day/ दिन में कितने घंटे <input type="text"/> <input type="text"/>		
518	(नाम) की उम्र कितनी थी जब आपने दलिवेरी के बाद सबसे पहले काम करना शुरू किया?	Months/ महीने <input type="text"/> <input type="text"/> OR/ या Weeks/ हफ्ते <input type="text"/> <input type="text"/>		
519	आपको काम करने के लिए किसने प्रेरित किया?	Self motivated/अपने आप.....1 (NAME)'s father/ (नाम) के पिता.....2 (NAME)'s grandparent(s)/ (नाम) के दादा/दादी/नाना/ नानी.....3	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	6,7

		Panchayat member/ पंचायत के सदाशय.....4 Friend/मेरी सहेली.....5 Other family member/ परिवार का कोई और सदस्य.....6 Someone not in family/ परिवार से बाहर का कोई सदस्य.....7	ब्यक्ति से (नाम) का सम्बंध स्पस्ट करें _____	
520	जब आप काम पर जाते हैं तब (नाम) की देखभाल कौन करता है?	Take (NAME) to work place/ (नाम) को काम पर ले जाती हूँ..1 (NAME)'s father/ (नाम) के पिता.....2 (NAME)'s grandparent(s)/ (नाम) के दादा/दादी/नाना/ नानी...3 Elder daughter/ बड़ी बेटी.....4 Elder son/ बड़ा लड़का.....5 Other family member/ परिवार का कोई और सदस्य.....6 Someone not in family/ परिवार से बाहर का कोई सदस्य.....7	<input type="checkbox"/>	
521	कौन से निम्नलिखित परिस्थितियों, पिछले 4 हफ्तों के दौरान आपके स्थिति का वर्णन करती हैं? (यदि आपने स्तनपान बंद कर दिया है, कृपया जब आप स्तनपान कर रहे थे उस समय के बारे में याद करके बताएं)? जितने भी उत्तर उपयुक्त हैं उन सभी का चयन करें	I keep (NAME) with me while I work and breastfeed during my work day/ मैं (नाम) को अपने पास रखती हूँ और काम के दौरान उसको अपना दूध पीतली हूँ.....1 I go to (NAME) and breastfeed her/him during work day/ मैं काम के दौरान (नाम) के पास जाकर उसे दूध पिलाकर आती हूँ.....2 (NAME) is brought to me to breastfeed during work day/ दूध पिलाने के लिए (नाम) को मेरे पास लाया जाता है.....3 I do not breastfeed (NAME) during workday/ मैं काम के दौरान (नाम) को दूध नहीं पिलाती हूँ.....4	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	4 → go to 522
522	क्या आपने पिछले 4 हफ्तों में निम्नलिखित परिस्थितियों का अनुभव किया	A co-worker made negative comments or complained to me about breast feeding/एक सह कार्यकर्ता ने नकारात्मक टिप्पणी की या स्तनपान करने के वाजे से शिकायत की / मना किया.....1 My supervisor/employer made negative comments or complained to me about breast feeding/मेरे पर्यवेक्षक / नियोक्ता ने नकारात्मक टिप्पणी की या स्तनपान करने के वाजे से शिकायत की/मना	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

	<p>है? (यदि आपने स्तनपान बंद कर दिया है, कृपया जब आप स्तनपान कर रहे थे उस समय के बारे में याद करके बताएं)? जितने भी उत्तर उपयुक्त हैं उन सभी का चयन करें</p>	<p>किया.....2 It was hard for me to arrange breaks for breastfeeding/काम के दौरान बच्चे को दूध पिलाने का समय निकालने मेरे लिए मुश्किल था.....3 It was hard for me to find a place for breastfeeding./ काम के दौरान बच्चे को दूध पिलाने के लिए एक स्थान खोजना मेरे लिए मुश्किल था....4 I felt worried about keeping my job because of breastfeeding/मैं चिंतित होने लगी की दूध पिलाने के वजह से मेरी नौकरी चली जाएगी....5 I felt worried about continuing to breastfeed because of my job/मैं चिंतित होने लगी की नौकरी के वजह से बच्चे को दूध पिलाना जरी नहीं रख पाऊँगी .....6 I am embarrassed among co-workers, supervisors, or my employer because of breastfeeding/दूध पिलाने के वजह से मुझे सह कार्यकर्ता, पर्यवेक्षकों, या मेरे नियोक्ता के आगे शर्मिंदा होना पड़ता है....7 Family member did not allow me to breastfeed during working hours/परिवार के सदस्य ने काम के दौरान स्तनपान की अनुमति नहीं दी.8</p>	<p style="text-align: center;"> <input type="text"/>  <input type="text"/> </p> <p>If '8' व्यक्ति से (नाम) का सम्बंध स्पस्ट करें</p> <p>_____</p> <p>_____</p> <p>_____</p>	
523	<p>क्या आपको इस काम के लिए नकद या प्रकार में भुगतान होता है या कुछ नहीं मिलता है?</p>	<p>Cash only/ सिर्फ नकद.....1 Kind only/ सिर्फ प्रकार में.....2 Both cash and kind/ नकद और प्रकार दोनों.....3 Not paid/ कुछ नहीं मिलता.....4</p>	<p style="text-align: center;"> <input type="text"/> </p>	<p>2/4 → go to 525</p>
524	<p>आपकी आमदनी किस प्रकार इस्तेमाल की जाएगी, आमतौर पर यह निर्णय कौन लेता है?</p>	<p>Respondent/ स्वयंम.....1 Husband/ आपके पति.....2 Respondent and husband jointly/ आप और आपके पति मिलकर.....3 Others/ अन्य.....4</p>	<p style="text-align: center;"> <input type="text"/>  अन्य (स्पस्ट करें)  _____ </p>	
525	<p>आपके हिसाब से क्या आपकी आमदनी आपके पति से अधिक है, या कम है, या बराबर है?</p>	<p>More than him/ अधिक है.....1 Less than him/ कम है.....2 Same as his/ बराबर है.....3 No earnings/ कोई आमदनी नहीं.....4</p>	<p style="text-align: center;"> <input type="text"/> </p>	

		Don't know/ मालूम नहीं.....88		
526	आपके पति की आमदनी किस तरह इस्तेमाल होगी यह निर्णय कौन करता है?	Respondent/ स्वयंम.....1 Husband/ आपके पति.....2 Respondent and husband jointly/ आप और आपके पति मिलकर.....3 Others/ अन्य.....4	<input type="checkbox"/>	
527	कौन आम तौर पर आपके स्वास्थ्य देखभाल के बारे में निर्णय करता है?	Respondent/ स्वयंम.....1 Husband/ आपके पति.....2 Respondent and husband jointly/ आप और आपके पति मिलकर.....3 Others/ अन्य.....4	<input type="checkbox"/>	
528	कौन आम तौर पर (नाम) के स्वास्थ्य देखभाल के बारे में निर्णय करता है?	Respondent/ स्वयंम.....1 Husband/ आपके पति.....2 Respondent and husband jointly/ आप और आपके पति मिलकर.....3 Others/ अन्य.....4	<input type="checkbox"/>	
529	घर के मुख्या सामग्री खरीदने का निर्णय कौन करता है?	Respondent/ स्वयंम.....1 Husband/ आपके पति.....2 Respondent and husband jointly/ आप और आपके पति मिलकर.....3 Others/ अन्य.....4	<input type="checkbox"/>	
530	आपका अपने रिश्तेदार या सहेली के पास जाने का निर्णय कौन करता है?	Respondent/ स्वयंम.....1 Husband/ आपके पति.....2 Respondent and husband jointly/ आप और आपके पति मिलकर.....3 Others/ अन्य.....4	<input type="checkbox"/>	

531	क्या ये घर या अन्य कोई घर आपने खुदसे या किसी और के साथ मिलकर खरीदा है (या आपका है)?	Alone/खुदसे.....1 Jointly with husband/पति के साथ.....2 Jointly with someone else/अन्य किसी के साथ....3 Does not own/खरीदा नहीं.....4	<input type="text"/>	
532	क्या आपने कोई ज़मीन खुदसे या किसी और के साथ मिलकर खरीदा है (या आपका है)?	Alone/खुदसे.....1 Jointly with husband/पति के साथ.....2 Jointly with someone else/अन्य किसी के साथ....3 Does not own/खरीदा नहीं.....4	<input type="text"/>	
<b>SECTION-6: HOUSEHOLD (WATER, SANITATION, HOUSING, FOOD SECURITY &amp; SOCIOECONOMIC STATUS)</b>				
No.	Question	Response codes	Response	Skip
601	कितनी बार कोई भी ब्यक्ति आपके घर के अंदर धूम्रपान करता है?? दैनिक, साप्ताहिक, मासिक, मासिक तुलना में कम, या कभी नहीं?	Daily/ दैनिक.....1 Weekly/ साप्ताहिक.....2 Monthly/ मासिक.....3 Less than monthly/ मासिक तुलना में कम.....4 Never/ कभी नहीं.....5	<input type="text"/>	
602	आपके परिवार के सदस्यों का पीने के पानी का मुख्य स्रोत क्या है? (OBSERVE/ निरीक्षण करें)	Piped water/ पाईप द्वारा प्राप्त पानी Piped into dwelling/ घर में पाईप द्वारा.....11 Piped into yard/plot/ घर के आँगन / पलट में पाईप द्वारा...12 Public tap/stand pipe/ सार्वजनिक नल/ खाड़ी पाईप.....13 Tube well/borehole/ हैंडपंप/ ट्यूब वेल/बोर वेल.....21 Dug well/ कुआ Protected well/ सुरक्षित कुआ.....31 Unprotected well/ अशुद्ध कुआ.....32 Water from spring/ झरने का पानी Protected spring/ सुरक्षित झरने.....41 Unprotected spring/ अशुद्ध झरने.....42 Rain water/ बरसाती पानी.....51	<input type="text"/>           अन्य (स्पष्ट करें) <input type="text"/>	

		Tanker truck/ टैंकर ट्रक.....61 Cart with small tank/ गाड़ी के साथ छोटी टंकी.....71 Surface water/ सतह के पानी (River/dam/pond/lake/ stream /canal/irrigation cana)/ (नदी/बांध/झील/तालाब/झरना/नहर/सिंचाई वाला नहर)।.....81 Bottled water/ बोतल का पानी.....91 Others/ अन्य.....99		
603	पानी का स्रोत कहाँ पर है?	In own dwelling/अपने घर पर.....1 In own yard/plot/अपने आंगन/पलट में.....2 Elsewhere/और कहीं.....3		
604	वहां जाकर पानी लाने में कितना समय लगता है?	Minutes/मिनिट <input type="text"/> <input type="text"/> <input type="text"/> Don't know/मालूम नहीं.....888		
605	क्या आप पीने के पानी को सुरक्षित बनाने के लिए कुछ करती हैं?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....88		
606	आम तौर पर पीने के पानी को सुरक्षित करने के लिए आप क्या करती हैं?  और कुंच? (सरे जवाब रिकॉर्ड करें)	Boil/उबालकर.....1 Alum/फिटकिरी का प्रयोग.....2 Add bleach/chlorine/ब्लीच/क्लोरीन मिला कर.....3 Strain through a cloth/कपड़े से चान कर.....4 Use water filter (ceramic/ sand/composite/etc)/ पानी का फ़िल्टर (सिरामिक/मिट्टी/मिश्रित/ आदि).....5 Solar disinfection/सोलर शुद्धिकरण.....6 Let it stand and settle/जल के अवशुधि निचे बैठ जाने पर.7 Others/अन्य.....8 Don't know/मालूम नहीं.....88	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> अन्य (स्पस्ट करें) <input type="text"/> <input type="text"/>	
607	आपके परिवार के सदस्य किस प्रकार का शौचालय इस्तेमाल	Flush toilet/septic tank/फ्लश शौचालय / सेप्टिक टैंक... .1 Pit latrine in household/घर में गद्दे वाली (पित) शौचालय.2	<input type="text"/> अन्य (स्पस्ट करें)	

	करते हैं?	Pit latrine (communal)/ गद्दे वाली पिट शौचालय (सांप्रदायिक.....3 Field/bush/फील्ड / झाड़ी.....4 Others/ अन्य.....5	<input type="text"/> <input type="text"/>	
608	खाना पकाने के लिए आपके घर में मुख्यात किस प्रकार कर इंधन इस्तेमाल किया जाता है?	Wood/ लकड़ी.....1 Kerosene/paraffin/ मिटटी का तेल/घासलेट/पराफिन.....2 Charcoal/ लकड़ी का कोइला.....3 Gas/electricity/ गैस/बिजली.....4 Coal/ कोइला.....5 Cow dung/ उपला.....6 Others/ अन्य.....7	<input type="text"/> अन्य (स्पस्ट करें) <input type="text"/>	
609	क्या आपके गढ़ में खाना पकाने के लिए एक अलग कमरा/रसोई घर है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
610	क्या ये घर आपके परिवार के किसी सदश्य का है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
611	क्या आपके परिवार के किसी सदश्य का कहीं और कोई घर है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
612	आपका घर जिस ज़मीन में है, क्या ये ज़मीन आपके परिवार में से किसी सदश्य की है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
613	घर में कितने कमरे हैं?	Number of rooms/ कमरों की संख्या	<input type="text"/> <input type="text"/>	
614	क्या आपके घर में बिजली है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
615	घर के लिए प्रयुक्त मुख्य सामग्री पर अमल करने (जो आपने निरिक्षण किया केवल वह लिखने)			
A	दीवार	Brick/concrete/ ईंट.....1 Mud/ मिटटी.....2 Wood/branches/ लकड़ी.....3	<input type="text"/> अन्य (स्पस्ट करें) <input type="text"/>	

		Galvanised iron/ लोहा.....4 Matting/ चटाई.....5 Thatch/straw/ घांस फूस/आल.....6 Others/अन्य.....7			
B	छत	Straw/thatch/ घांस फूस/आल.....1 Earth/mud/ मिटटी.....2 Wood/planks/ लकड़ी.....3 Galvanised iron/ लोहा.....4 Concrete/cement/ सीमांत/ठोस सामग्री5 Tiles/slate/ ताईल/सलेट.....6 Others/ अन्य.....7	<input type="checkbox"/> अन्य (स्पस्ट करें) _____		
C	फर्श	Earth/mud/ मिटटी.....1 Wood/ लकड़ी.....2 Stone/brick/ पत्थर /ईंट.....3 Cement/tile/ सीमांत/ ताईल.....4 Laminated material/ लामिनातेद सामग्री.....5 Others/ अन्य.....6	<input type="checkbox"/> अन्य (स्पस्ट करें) _____		
616	क्या इस घर में किसी के पास निम्नलिखित सामग्री हैं? [Yes/ हाँ.....1; No/ नहीं.....2]				
A	Working radio/ रेडियो (चालू स्थिति में)	<input type="checkbox"/>	I	Working cell/mobile telephone/ मोबाइल फोन (चालू स्थिति में)	<input type="checkbox"/>
B	Working refrigerator/ फ्रीज (चालू स्थिति में)	<input type="checkbox"/>	J	Working landline telephone/ टेलिफोन (चालू स्थिति में)	<input type="checkbox"/>
C	Working bicycle/ साइकल (चालू स्थिति में)	<input type="checkbox"/>	K	Working sewing machine/ कपडा सिने वाली मशीन (चालू स्थिति में)	<input type="checkbox"/>
D	Working television/ टीवी (चालू स्थिति में)	<input type="checkbox"/>	L	Working fan/ पंखा (चालू स्थिति में)	<input type="checkbox"/>

E	Working motorbike/scooter/ मोटर बाईक/ स्कूटर (चालू स्थिति में)	<input type="text"/>	M	Working almairah/ अलमारी (चालू स्थिति में)	<input type="text"/>
F	Working car/truck/ गाड़ी/ट्रक (चालू स्थिति में)	<input type="text"/>	N	Working clock/ घड़ी (चालू स्थिति में)	<input type="text"/>
G	Working tractor/ तरेक्टर (चालू स्थिति में)	<input type="text"/>	O	Working bullock cart/ बैल गाड़ी (चालू स्थिति में)	<input type="text"/>
H	Farm equipment/ खेत में इस्तेमाल करने वाला उपकरण (चालू स्थिति में)	<input type="text"/>	P	Working thresher/ थ्रेसर (चालू स्थिति में)	<input type="text"/>
अब मैं आपसे पिछले १२ महीने में आपके घर के किसी सदस्य ने कोई ज़मीन खरीदा या किदायें पे लिया हैं, इसके बारे में कुछ सवाल पुचुंगी					
617	आपके इस घर के ज़मीन के इलावा क्या आपके घर के किसी सदस्य ने पिछले १२ महीने में कोई ज़मीन खरीदा या किदायें पे लिया हैं?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	2 → go to 626	
618	कृपया मुझे पिछले १२ महीने में आपके घर के किसी सदस्य ने जो ज़मीन खरीदा या किदायें पे लिया हैं उसके बारे में बताएं   सबसे बड़े वाले प्लॉट से शुरू करके सबसे छोटे वाले में खतम करें:				
	E. प्लॉट का कुल क्षेत्रफल कितना हैं?	F. माप की स्थानीय इकाई (जैसे एकड़ / गज / सेंट) दर्ज करें	G. क्या यह प्लॉट आपने किदायें पर लिया हैं या किसीसे उधर लिया हैं या किसी के साथ मिलकर खेती करने के लिए लिया हैं या आपका अपना हैं ? Rented/ किदायें पर लिया....1 Borrowed/ उधर लिया.....2 Sharecropped/ मिलकर खेती करने के लिए.....3 Owned/ अपना हैं.....4	H. यह प्लोय आप किस काम के लिए इस्तेमाल कर रहे हैं? Farming/ खेती.....1 Pasture/ भैर बकड़ी चडाने के लिए.....2 Forestry/ वानिकी.....3 Building (house/shop)/ बिल्डिंग (घर / दुकान).....4 Industry/ उद्योग.....5 Rented out/ किराए पर दिया.....6 Nothing or left fallow/ कुछ भी नहीं या सिर्फ हल चला कर छोड़ दिया.....7 Others, specify below/ अन्य, नीचे निर्दिष्ट करें.....8	

Plot-1	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-2	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-3	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-4	_____		<input type="checkbox"/>	<input type="checkbox"/>
Plot-5	_____		<input type="checkbox"/>	<input type="checkbox"/>
अगर इनमे से कोई भी प्लाट खेती बरी (खेती, भैर बकड़ी चडाने, वानिकी) के लिए इस्तेमाल नहीं हो रहा है तो → skip to 626				
<b>अगर इनमे से कोई भी प्लाट खेती बरी के लिए इस्तेमाल हो रहा है तो आगे के सवाल करें:</b>				
619	क्या पिछले १२ महीने में आपने इनमे से किसी भी ज़मीन में सिंचाई की है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
620	आपके के पास जितनी ज़मीन है उसमे से कितने “माप की स्थानीय इकाई” में आपने सिंचाई की है?	_____		
621	क्या पिछले १२ महीनों में आपने रासायनिक उर्वरक का इस्तेमाल किया है? (खाद शामिल न करें)	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
622	पिछले १२ महीनों में आपने कितनी मात्र में रासायनिक उर्वरक का इस्तेमाल किया है?	_____		
623	प्रयुक्त माप की इकाई (स्थानीय श्रेणियों में)			
624	क्या पिछले १२ महीनों में कभी भी आप या आपके घर के किसी सदस्य ने समुदाय में अन्य लोगों के साथ मिल बाँट कर (share) एक ट्रैक्टर या अन्य कृषि वाहनों का इस्तेमाल किया है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
625	क्या पिछले १२ महीनों में कभी भी आप या आपके घर के किसी सदस्य ने समुदाय में अन्य लोगों के साथ मिल बाँट कर (share) कृषि श्रमिकों से काम काराया है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	

626	क्या पिछले १२ महीने में आपके पास कोई पशु था?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	2 → go to 628
627	अब मैं आपसे पिछले १२ महीने में आपके परिवार के सदस्यों के पास जो पशु थे उनके बारे में जानकारी लेना चाहूंगी			
F. पशु के प्रकार	क्या पिछले १२ महीने में आपके घर के किसी सदस्य के पास "पशु का नाम" था? Yes/ हाँ .....1 No/ नहीं .....2	G. अगर हाँ, तो वर्तमान में इस घर में कितने "पशु का नाम" हैं?	H. पिछले १२ महीने में आपके परिवार ने कितना "पशु का नाम" खरीदा?	I. पिछले १२ महीने में आपके परिवार ने कितना "पशु का नाम" बेचा?
Camel/ऊँट	<input type="text"/>			
Drought animals (donkey, horse, mules, bullocks)/ सूखे का जानवर (गधा, घोड़ा, खच्चर, बैल)	<input type="text"/>			
Cattle (Cow and calf, buffalo)/ मवेशी (गाय और बछड़ा, भैंस)	<input type="text"/>			
Goat/sheep/pigs/बकरी / भेड़/ सूअर	<input type="text"/>			
Rabbits/ poultry (duck, chicken, hen)/ खरगोश /पॉल्ट्री बत्तख, मुर्गी, चिकन)	<input type="text"/>			
628	क्या आपके परिवार को सार्वजनिक वितरण प्रणाली से खाद्यान्न प्राप्त होता है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="text"/>	
अब मैं आपसे घर में भोजन की उपलब्धता से संबंधित कुछ सवाल पूछना चाहूंगी				
629	Question	Response code/ कोड Yes/ हाँ.....1	630. ये कितनी बार हुआ हैं? Rarely (once or twice in the past four weeks)/ बहुत काम(एक या पिछले चार सप्ताह	

		No/ नहीं.....2	में दो बार).....1 Sometimes (three to ten times in the past four weeks)/ कभी-कभी (पिछले चार सप्ताह में तीन से दस बार).....2 Often (more than ten times in the past four weeks)/ अक्सर (पिछले चार सप्ताह में दस बार से अधिक).....3
A	पिछले चार हफ्तों में, क्या आपको ये चिंता हुई थी कि आपके घर/परिवार के लिए पर्याप्त खाना नहीं होगा?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
B	पिछले चार हफ्तों में, क्या आप या घर का कोई सदस्य संसाधनों की कमी की वजह से आपनी पसंदीदा खाने नहीं खा पाया था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
C	पिछले चार हफ्तों में, क्या आप या आपके घर के किसी सदस्य को संसाधनों की कमी के कारण सीमित किस्म का खाना खाना पड़ा था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
D	पिछले चार हफ्तों में, क्या आप या आपके घर के किसी सदस्य को अन्य भोजन/या भोजन की सामग्री खरीदने का संसाधन ना होने के वजह से कोई नापसंद खाना खाना पड़ा था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
E	पिछले चार हफ्तों में, क्या आप या आपके घर के किसी सदस्य को पर्याप्त मात्रा में खाना नहीं होने के वजह से ज़रूरत से कम मात्रा में भोजन खाना पड़ा था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
F	पिछले चार हफ्तों में, क्या आप या आपके घर के किसी सदस्य को पर्याप्त मात्रा में खाना नहीं होने के वजह से सामान्य दिन के मुकाबले कम बार भोजन खाना पड़ा था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
G	पिछले चार हफ्तों में, क्या कभी भी संसाधनों की कमी के कारण कोई भी प्रकार/किस्म का खाने घर पर उपलब्ध नहीं था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
H	पिछले चार हफ्तों में, क्या आप या आपके घर का कोई सदस्य घर पर पर्याप्त मात्रा में खाना न होने के कारन भूखा सोया था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>

I	पिछले चार हफ्तों में, क्या आप या आपके घर के किसी सदस्य को घर पर पर्याप्त मात्रा में खाना न होने के कारण एक पूरा दिन और रात बिना खाना खाए रहना पड़ा था?	<input type="checkbox"/> 1 <input type="checkbox"/> 2	<input type="checkbox"/>
631	अब मैं आपसे जो आप या आपके घर के सदस्यों ने कल दिन और रात के दौरान खाया, उन सभी खानों के प्रकार जानना चाहूंगी खाने का लिस्ट पढ़ कर सुनाएँ   अगर घर के किसी भी सदस्य ने फूड ग्रुप का कोई चीज़ खाया था तो बॉक्स में "1" दर्ज करें		Response codes/ कोड Yes/ हाँ.....1 No/ नहीं.....2
A	किसी प्रकार का रोटी, चपाती, परांठा, बाटी, पूरी, मक्का, ब्रद, बिस्कुट, चावल, या चावल, गेहूं, मक्का से बना हुआ कोई और आइटम?		<input type="checkbox"/>
B	आलू, अरबी, या आलू जैसा कोई और सब्जी		<input type="checkbox"/>
C	किसी की प्रकार के सब्जी (आलू या आलू की तरह छोड़ कर)		<input type="checkbox"/>
D	किसी भी प्रकार का फल?		<input type="checkbox"/>
E	कोई मांस/मीत जैसे चिकन, भेड़/बकरी, सूअर का मांस, या बतख का मांस, जिगर, गुर्दे, हृदय, या अन्य अंग मांस		<input type="checkbox"/>
F	अंडा?		<input type="checkbox"/>
G	ताज़ा या सुखा मछली?		<input type="checkbox"/>
H	सेम, मटर, मसूर, बादाम, काजू, पिस्ता, अखरोड़ या कोई बीज से बना हुआ खाना (जैसे दाल, किचड़ी, हलवा)?		<input type="checkbox"/>
I	दही, दूध, लस्सी, चांस, खीर, या अन्य दूध से बनी हुई चीज़?		<input type="checkbox"/>
J	तेल, घी, देसी घी, या बत्तर से बना हुआ कोई खाना?		<input type="checkbox"/>
K	किसी प्रकार की मिठाई, केक, चीनी या शहद?		<input type="checkbox"/>
L	अन्य कोई खाना जैसे खाने के स्वाद के लिए (condiments) मसाला, जीरा, नमक, आदि, कोफ़ी, चाय?		<input type="checkbox"/>

अब मैं आपसे पिछले १२ महीनो की अलग अलग महीनो में आपके घर में खाने की उपलब्धता के बारे में कुछ सवाल करूँगी   जवाब देने से पहले कृपया पिछले पुरे साल के बारे में ध्यान से सोचे, अभी से लेकर पिछले साल इस समय तक के बारे में सोच कर जवाब दें				
632	क्या पिछले १२ महीनो में ऐसा कोई महिना था जिस में आपके परिवार के ज़रूरत के हिसाब से घर पर पर्याप्त मात्रा में खाना नहीं था?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → Go to 701
633	अगर हाँ, तो वह कौन से महिना थे जिन में आपके परिवार के ज़रूरत के हिसाब से घर पर पर्याप्त मात्रा में खाना नहीं था? किसी भी प्रकार का खाना, किसी भी स्रोत से उपलब्ध जैसे अपने उत्पादन, खरीद, या किसी और सामग्री के बदले में मिला हुआ खाना, खाद्य सहायता, या मांग का मिला हुआ खाना इसमें शामिल करें   महीने का लिस्ट पढ़ कर न सुनाएँ   प्रतिवादी को अपने आप सोच कर वह महीने बताने दे जिनमे उनके घर के जरूरतों को पूरा करने के लिए पर्याप्त खाना नहीं था   उस महीने के साथ वाले बॉक्स में "1" दर्ज करें   अन्य महीनो में "2" दर्ज करें   अगर ज़रूरत पड़ी तो प्रतिवादी को याद दिलाने में मदद के लिए एक मौसमी कैलेंडर का उपयोग करें, होली, दिवाली,दशेरा, बैसाखी, अन्य स्थानीय त्योहारों का उल्लेख करें क्या प्रतिवादी ने समस्त पिछले १२ महीनों के बारे में सोचा है इस बारे में जांच करना जरूरी है	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	
	AUGUST/ अगस्त		<input type="checkbox"/>	
	JULY/ जुलाई		<input type="checkbox"/>	
	JUNE/ जून		<input type="checkbox"/>	
	MAY/ मई		<input type="checkbox"/>	
	APRIL/ अप्रैल		<input type="checkbox"/>	
	MARCH/ मार्च		<input type="checkbox"/>	
	FEBRUARY/ फेब्रुअरी		<input type="checkbox"/>	
	JANUARY/ जनुअरी		<input type="checkbox"/>	
	DECEMBER/ दिसम्बर		<input type="checkbox"/>	
	NOVEMBER/ नवम्बर		<input type="checkbox"/>	

	OCTOBER/ अक्टूबर		
	SEPTEMBER/ सितम्बर		
<b>SECTION 7: GENERAL HEALTH OF MOTHERS / CARE GIVERS (GHQ-12)</b>			
अंत में, पिछले कुछ हफ्तों में आपकी स्वस्थ्य कैसी रही हैं इस बारे में जानना चाहूंगी <b>क्या आप पिछले कुछ दिन या हफ्ते में:</b>			
701	जो काम करते हैं उसमें ध्यान दे पा रहे हैं?	<p>Response code for all questions /कोड सारे सवालों के लिए</p> <p>Not at all/ बिलकुल नहीं .....0</p> <p>No more than usual / सामान्य से अधिक नहीं.....1</p> <p>More than usual / सामान्य से अधिक..2</p> <p>Much more than usual / सामान्य से काफी मात्रा में अधिक.....3</p>	<input type="text"/>
702	चिंता की वजह से नींद नहीं आती हैं?		<input type="text"/>
703	लगा कि आप हर चीज में एक उपयोगी भूमिका निभा रहे हैं?		<input type="text"/>
704	कोई भी चीज़ में निर्णय लेने में अपने आप को सक्षम महसूस किया?		<input type="text"/>
705	लगातार तनाव महसूस किया?		<input type="text"/>
706	लगा आप अपनी कठिनाइयों को दूर नहीं कर सकती?		<input type="text"/>
707	सामान्य दिन के गतिविधियों का आनंद ले पा रही हैं?		<input type="text"/>
708	अपने समश्यों का सामना कर पा रही हैं?		<input type="text"/>
709	आप दुखी या उदास महसूस कर रही हैं?		<input type="text"/>
710	अपने आप पर विश्वास खो रही हैं?		<input type="text"/>
711	आप को लगता है की आप एक बेकार औरत हैं?		<input type="text"/>
712	जब सब बातों पर विचार करती हैं तो यथोचित अपने आप को खुश महसूस करती है?		<input type="text"/>
प्रतिबादी को अपना मूल्यवान समय देने के लिए धन्यवाद करें और उनके बच्चे का वजन और लम्बाई मापने की अनुमति ले			
<b>Record end time</b>		<input type="text"/> : <input type="text"/>	<b>Hours: Minutes</b>

**EFFECT OF MGNREGA ON INFANT MALNUTRITION / COMMUNITY QUESTIONNAIRE (HINDI VERSION)**

**शिशु कुपोषण पर रोजगार (MGNREGA) के प्रभाव / सामुदायिक प्रश्नावली**

STUDY SITE INFORMATION				
Name of administrative block / प्रशासनिक ब्लॉक का नाम		Cluster number <input type="text"/> <input type="text"/> <input type="text"/>		
Name of village / गाँव का नाम		Interviewer's name		
<b>भागीदार जानकारी पत्रक प्रदान करें और साक्षात्कार/इन्तर्विऊ शुरू करने से पहले लिखित सहमति ले</b>				
Date of Interview: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> DD/MM/YY		Start time <input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> Hours: Minutes		
No.	Questions	Response codes	Response	Skip
101	प्रतिवादी/ इन्फोर्मत का नाम			
102	प्रतिवादी का लिंग (Observe)	Male/पुरुष.....1 Female/ महिला.....2	<input type="text"/>	
103	कितने समय से आप इस गाँव में रह रहे हैं?	Months/ महीने <input type="text"/> <input type="text"/> Years/ साल <input type="text"/> <input type="text"/>		
104	इन्फोर्मत कौन हैं और इस गाँव में उनका क्या स्थान है?	Panchayat leader/पंचायत अध्यास्क.....1 ANM/एएनएम्.....2 Anganwadi worker/अन्गवादी कार्यकर्ता.....3 ASHA/आशा.....4 Village head (appointed)/ गाँव के मुखिया.....5 Others/ अन्य.....6	<input type="text"/> <input type="text"/> अन्य, स्पस्ट करे _____	
105	गाँव की वर्तमान जनसंख्या:	Census figure (Copy from district records) Census figures according to respondent (if district record not available)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
106	गाँव में कुल कितने घर हैं?	Figures from district records Figures according to respondent (if district record not available)	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
107	गाँव में प्रमुख जाति समूह क्या है?	Schedule tribe/अनुसूची जनजाति.....1	<input type="text"/>	

		Schedule caste/अनुसूची जाति.....2 Other backward caste/अन्य पिछड़ी जाति.....3 General caste/जनरल जाति.....4		
108	गांव में प्रमुख धार्मिक समूह क्या है?	Hindu/ हिंदू.....1 Muslim/मुस्लिम.....2 Christian/ईसाई.....3 Sikh/ सिख.....4 Buddhist/ बौद्ध.....5 Jain/ जैन.....6 Parsi/पारसी.....7 Others/ अन्य.....8	<input type="checkbox"/> अन्य, स्पस्ट करे _____	
109	इस गांव में मुख्य बोली जाने वाली भाषा क्या है			
110	गांव में रहने वाले लोगों के तीन प्रमुख पेशे / व्यवसाय का नाम	First/ पहला _____ Second/ दूसरा _____ Third/ तीसरा _____		
111	आपके समुदाई में पीने के पानी का प्रमुख स्रोत क्या है? (OBSERVE/ निरिक्षण करें)	Piped water/ पाईप द्वारा प्राप्त पानी.....1 Tube well/borehole/ हैंडपंप/ ट्यूब वेल/बोर वेल.2 Dug well/ कूआ.....3 Water from spring/ झरने का पानी.....4 Rain water/ बरसाती पानी.....5 Tanker truck/ टैंकर ट्रक.....6 Cart with small tank/ गाड़ी के साथ छोटी टंकी.7 Surface water/ सतह के पानी (River/dam/pond/lake/ stream /canal/irrigation canal)/( नदी/बांध/झील/तालाब /झरना/नहर/सिंचाई वाला नहर).....8	<input type="checkbox"/> , <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> , <input type="checkbox"/> अन्य (स्पस्ट करें) _____	

		Others/ अन्य.....9		
112	गांव में जल निकासी की सुविधा उपलब्ध है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → go to 114
113	गांव में प्रमुख जल निकासी की सुविधा: <b>(RECORD ALL MENTIONED)</b>	Underground drainage/भूमिगत जल निकासी..1 Open with outlet/खुला नाला.....2 Open without outlet/खुला बिना नाले का.....3	<input type="checkbox"/> , <input type="checkbox"/> , <input type="checkbox"/>	
<b>अब में आपसे इस गाँव में लोगों के लिए उपलब्ध सेवाओं के बारे में कुछ सवाल पूछना चाहूंगी</b>				
114	Services/सेवाएँ	D. क्या इन में से कोई भी सेवा बर्तमान गाँव में चालित हैं और गांववालों के लिए उपलब्ध हैं?? <b>Yes/ हाँ.....1 →</b> <b>No/ नहीं.....2</b>	E. लगभग "सेवा का नाम" गाँव के केंद्र से कितनी दूर हैं?? <b>&lt;1 KM.....1</b> <b>1-5 KM.....2</b> <b>5-10 KM.....3</b> <b>&gt;10 KM.....4</b> <b>Don't know/मालूम नहीं.....8</b>	F. परिवहन का सबसे आम माध्यम से निकटतम "सुविधा के नाम" तक पहुँचने के लिए लगभग कितना समय लगता है? <b>&lt; ½ hour.....1</b> <b>½ to 1 hour.....2</b> <b>1-2 hours.....3</b> <b>&gt;2 hours.....4</b> <b>Don't know/मालूम नहीं...8</b>
114.1	Police station/थाना	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.2	Cinema/Video/सिनेमा /वीडियो	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.3	Post office/पोस्ट ऑफिस	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.4	Shop selling basic provision/Kirana/किरणे की दुकान	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.5	Haat/market/बाज़ार/हात	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.6	Public telephone/ सरकारी टेलीफोन	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.7	Telephone network/टेलीफोन नेटवर्क	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.8	Primary school (Govt.)/ प्राथमिक स्कूल (सरकारी)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

114.9	Primary school (Pvt.)/ प्राथमिक स्कूल (प्राइवेट)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.10	High school (Govt.)/ हाई स्कूल (सरकारी)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.11	High school (Pvt.)/ हाई स्कूल (प्रिवत)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.12	Technical college/तकनीकी कॉलेज	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.13	University/विश्वविद्यालय	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.14	Religious school/धार्मिक स्कूल	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.15	Adult literacy centre/वयस्क साक्षरता केंद्र	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.16	Sub centre/ उपकेन्द्र	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.17	PHC/ प्राथमिक स्वस्थ केंद्र	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.18	CHC/ सामुदायिक स्वस्थ केंद्र	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.19	District hospital (public)/ सरकारी जिला हॉस्पिटल	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.20	Private hospital/ प्रिवत हॉस्पिटल	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.21	Drug store/seller/ दवाई की दुकान	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.22	Bus stand/ बस स्टैंड	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.23	Anganwadi centre (ICDS)/ अन्गवादी केंद्र	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.24	Railway station/ रेलवे स्टेशन	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
114.25	Bank/ बैंक	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
115	क्या गाँव में बिजली है?	Yes/ हाँ.....1 No/ नहीं.....2 Yes/ हाँ, for <6 hours.....3		<input type="checkbox"/>

		Yes/ हाँ, for ≥6 hours.....4		
116	गांव में उगाई प्रमुख फसलें (Write "00" in all if no crops are grown in the village)	First/ पहला _____ Second/ दूसरा _____ Third/ तीसरा _____		"00" in all → go to 118
117	गांव में सिंचाई के मुख्य स्रोत	Rain water/बरसात का पानी.....1 Tank/pond/टैंक / तालाब.....2 Stream/river/नदी/धारा.....3 Canal/नहर.....4 Well/कुआँ.....5 Tube well/तिउब्वेल.....6 Water harvesting systems/जल संचयन प्रणाली.....7 Others/ अन्य.....8	<input type="checkbox"/> अन्य (स्पस्ट करें) _____	
118	कृषि और गैर कृषि उत्पादों के विपणन में इस गांव को कौन से समस्याओं का सामना करना पड़ता है?	No problems/समस्या नहीं.....1 Don't have any production/कोई भी उत्पादन नहीं.....2 No storage facility/भंडारण की सुविधा नहीं.....3 No transport facility/कोई परिवहन की सुविधा नहीं.....4 Non remunerative price/लाभदायक मूल्य नहीं मिलता.....5 Others/ अन्य.....6	<input type="checkbox"/> अन्य (स्पस्ट करें) _____	
119	गाँव के मुख्य परिवहन मार्गों कौन से हैं? (OBSERVE/ निरिक्षण करें)	Cement/tar/सीमेंट/टार.....1 Gravel/बजरी/पत्थर.....2 Dirt/mud road/मिटटी की सड़क.....3 River/lake/नदी/झील.....4	<input type="checkbox"/>	

		None/कोई नहीं.....5		
120	जिले का मुख्यालय गाँव से कितनी दूर हैं?		Kms	
121	पिछले दो वर्षों में, क्या इस गांव को किसी भी प्राकृतिक आपदाओं का सामना करना पड़ा?	Yes/हाँ.....1 No/ नहीं.....2	<input type="text"/>	2 → go to 123
122	किस प्रकार के प्राकृतिक आपदाएं? [select as many as appropriate]	Drought/सूखा.....1 Cyclone/tornado/hurricane/चक्रवात /बवंडर तूफान .....2 Flooding/बाढ़.....3 Earthquake/भूकंप.....4 Others/ अन्य.....5	<input type="text"/> , <input type="text"/> , <input type="text"/> अन्य (स्पष्ट करें)	
123	अब मैं आपसे गांव में रहने वाले या गाँव में आकर सेवा प्रदान करने वाले स्वास्थ्य प्रदाता की उपलब्धता के बारे में कुछ सवाल पूछना चाहूंगी	Responses Yes/हाँ.....1 No/ नहीं.....2	यदि हाँ (1), स्वस्थ्य प्रदाताओं की संख्या	हफ्ते में कितने दिन गाँव में उपलब्ध होते हैं?
A	Anganwadi worker (ICDS)/ अन्नगांवादी कार्यकर्ता	<input type="text"/>	<input type="text"/>	<input type="text"/>
B	Village Health Guide (VHG)/ ग्राम स्वास्थ्य गाइड	<input type="text"/>	<input type="text"/>	<input type="text"/>
C	Accredited Social Health Activist (ASHA)/ आशा	<input type="text"/>	<input type="text"/>	<input type="text"/>
D	Trained birth attendant (TBA)/ प्रशिक्षित दाई	<input type="text"/>	<input type="text"/>	<input type="text"/>
E	Auxiliary nurse midwife (ANM)/ ऐएनएम	<input type="text"/>	<input type="text"/>	<input type="text"/>
F	Lady doctor/महिला डॉक्टर	<input type="text"/>	<input type="text"/>	<input type="text"/>
G	Private doctor/प्रिवट डॉक्टर	<input type="text"/>	<input type="text"/>	<input type="text"/>
H	Registered medical practitioner – alternative medicines/पंजीकृत डॉक्टर (आरएमपि) - वैकल्पिक दवाओं के डॉक्टर	<input type="text"/>	<input type="text"/>	<input type="text"/>

I	Untrained Dai/अप्रशिक्षित दाई	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
J	अन्य (स्पस्ट करें) _____	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
124	क्या इस गाँव में स्वास्थ्य और स्वच्छता समिति है?	Yes/ हाँ.....1 No/ नहीं.....2 Don't know/ मालूम नहीं.....8	<input type="text"/>	<input type="text"/>	2 / 8 → go to 126
125	पिछले छह महीने के दौरान कितनी बार सफाई, फॉगिंग ड्राइव गांव में किया गया है?	Cleaning/ सफाई <input type="text"/>	Fogging/ फॉगिंग <input type="text"/>	<input type="text"/>	<input type="text"/>
126	क्या वर्तमान निम्नलिखित कार्यक्रम आपके गांव में लागू हैं/चल रहे हैं? Yes/ हाँ.....1; No/ नहीं.....2 Don't know/ मालूम नहीं.....8				
A	Janani Suraksha Yojana (JSY)	<input type="text"/>	M	MGNREGA	<input type="text"/>
B	Kishori Shakti Yojana	<input type="text"/>	N	National Food for work Programme (NFFWP)	<input type="text"/>
C	Balika Samridhi Yojana	<input type="text"/>	O	Public Distribution system	<input type="text"/>
D	Mid-day Meal Programme	<input type="text"/>	P	National Social Assistance programme	<input type="text"/>
E	Intergrated Child Development scheme (ICDS)	<input type="text"/>	Q	Swarnjayanti Gram Swarozgar Yojana	<input type="text"/>
F	Mahila Mandal Protsahan Yojana (MMPY)	<input type="text"/>	R	Minimum Needs Programme (MNP)	<input type="text"/>
G	Sanitation Programme (SP)	<input type="text"/>	S	Prime Minister Rojgar Yojana (PMRY)	<input type="text"/>
H	Rajiv Gandhi National Drinking Water Mission	<input type="text"/>	T	Jawahar Rozgar Yojana (JRY)	<input type="text"/>
I	Indira Awas Yojna (IAY)	<input type="text"/>	U	Sanjay Gandhi Niradhar Yojana (SGNY)	<input type="text"/>
J	Samagra Awas Yojana (SAY)	<input type="text"/>	V	Jawahar Gram Samridhi Yojana (JGSY)	<input type="text"/>
K	Water shed programmes	<input type="text"/>	W	अन्य (स्पस्ट करें)	<input type="text"/>
127	क्या इस गाँव में कोई एनजीओ काम कर रहा है?	Yes/ हाँ..1 No/ नहीं..2 2 → go to 129	<input type="text"/>	127 A. अगर हैं, कितनी?	<input type="text"/>

128	ये एनजीओ कौन से क्षेत्र में काम कर रहे हैं? [select as many options required]	Health/स्वास्थ्य.....1 Water/जल.....2 Food & nutrition/खाद्य और पोषण.....3 Agrculture/seeds/fertilizers/कृषि/ बीज/उर्वरक4 Self Help Groups/स्वयं सेवी संस्थान.....5 Mahila mandals/महिला मण्डलों.....6 Loans/credit/ऋण /क्रेडिट.....7 Community association /सामुदायिक संघ..... 8 Mazdoor Kalyan Samiti/मजदूर कल्याण समिति.....9 Religious groups/धार्मिक समूहों.....10 Others/ अन्य.....11	<table border="1"> <tr> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> </table> <p>अन्य (स्पष्ट करें)</p> <hr/>																								
129	निचे दिए गए सवाल तभी करें अगर गाँव में नरेगा कार्यक्रम चल रहा है, अन्यथा go to 130																										
A	नरेगा कार्यक्रम कब लागू हुआ?	Month/ महीने <input type="text"/>	Year/ साल <input type="text"/>																								
B	इस गाँव में से कितने परिवार नरेगा द्वारा कार्यरत हैं?	Number/ संख्या _____																									
C	इस गाँव में कितनी महिलाएं नरेगा द्वारा कार्यरत हैं?	Number/ संख्या _____																									
D	दैनिक मजदूरी दर क्या है?	Rupees _____																									
E	मजदूरी भुगतान की आवृत्ति क्या है?	Everyday/ हर दिन.....1 Every week/ हर हफ्ते.....2 Every 15 days/ हर १५ दिन में.....3 Every month/ हर महीने.....4 In 2 to 6 months/ २ -६ महीने में.....5. More than 6 months/ ६ महीने के बाद.....6 Have not received any/ अब तक कोई मजदूरी	<table border="1"> <tr> <td></td><td></td> </tr> </table>																								

		नहीं मिली.....7 Don't know/ मालूम नहीं.....8				
F	गांव में क्या एक सक्रिय नरेगा काम का साइट है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>	2 → go to 130		
G	OBSERVE ONLY/ केवल निरीक्षण करें क्या नरेगा काम के क्षेत्र में एक छायादार जगह है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>			
H	OBSERVE ONLY/ केवल निरीक्षण करें क्या नरेगा काम के क्षेत्र में पीने के पानी की सुविधा है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>			
I	OBSERVE ONLY/ केवल निरीक्षण करें क्या नरेगा काम के क्षेत्र में एक क्रेच/बच्चों के देखभाल के लिए कोई सुविधा है?	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>			
J	OBSERVE ONLY/ केवल निरीक्षण करें क्या नरेगा काम के क्षेत्र में महिला कर्मचारी हैं??	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>			
K	OBSERVE ONLY/ केवल निरीक्षण करें क्या नरेगा काम के क्षेत्र में मास्टर रोल हैं??	Yes/ हाँ.....1 No/ नहीं.....2	<input type="checkbox"/>			
130	<b>Record any important observation/ कोई भी महत्वपूर्ण अवलोकन रिकार्ड करें</b>					
<hr/> <p><b>Thank the informant for the information and ask permission to re-visit her/him in the future to conduct focus group discussion or for any other purpose if required/जानकारी देने के लिए इन्फोर्मंत को धन्यवाद करें और भविष्य में किसी प्रकार के मदत लेने के लिए (जैसे फोकस ग्रुप के लिए) उनसे मिलने की अनुमति लें</b></p>						
	Record end time	<input type="text"/>	<input type="text"/>	: <input type="text"/>	<input type="text"/>	Hours: Minutes

## Appendix 3.5: Participant information sheet and consent forms for the cross-sectional study (English and Hindi versions)



### EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY

#### DEPARTMENT OF PUBLIC HEALTH, UNIVERSITY OF OXFORD

#### PARTICIPANT INFORMATION SHEET

Namaste. My name is Dr. Manisha Nair. I am a doctoral (PhD) student at the Department of Public Health, University of Oxford, UK. I am conducting a study which aims to understand the impact and role of employment through Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on the health and nutritional status of babies between the age of 1 and 12 months. I would like to enrol you and your baby into this study.

Description of the study: This study has three parts:

**Part-1:** A research staff will fill out a questionnaire by asking you some questions about the baby, its health, feeding practices and hygiene. There will be questions about you and your husband's background related to education, religion and occupation and some questions about your household in general (questions related to water and sanitation, health service utilisation and household assets). There are no right or wrong answers and you are free to refuse to answer any question.

**Part-2:** I will measure the length and weight of your baby and will review his/her birth records or health card if available. I and a research assistant will measure your baby's weight and recumbent length. In order to measure your baby, all his/her clothes including diaper will be removed. The baby will be first put on a weighing scale and then on a long board to measure his/her length which are clean and hygienic. To measure the length I will hold your baby's legs and will apply a very minimal pressure on his/her knees to straighten them and my colleague will position the head on the board. The measurement will be taken twice for precision. This process will take 15-18 minutes. The procedures will be demonstrated to you before taking the measurements. You will be with the baby throughout the process and at any point if you or the baby is uncomfortable, we will stop the measurements. However, this should cause not more than a slight discomfort to the baby. The recordings taken will be used to calculate and derive indicators of nutritional status of the infants. In case baby's nutritional status is found to be grossly compromised, you will be advised to seek appropriate medical care from the local hospital. Further, I wish to inform you that your or your baby's future standard of care will not be affected in any way if you decide to withdraw or refuse to enter the study, or do not give approval to measure your baby.

**Part-3:** As part of this study, we will organise a focus group discussion of mothers/caregivers like you in your village on \_\_\_\_\_ (a specified date), at \_\_\_\_\_ (time), and request you to participate. In this meeting we will discuss about your customs and rituals related to feeding and care of babies and you will have an opportunity to share with the group your practices and concerns about baby care. You will also hear the same from other mothers many of whom you are likely to know. You will receive a reminder about this discussion meeting one day prior to the scheduled date.

The questionnaire will take 30-40 minutes and about 15-18 minutes will be required to measure your baby. The mothers/caregivers meeting will be longer (about one to one and a half hours), but it will be organised at a convenient location and time with refreshments provided.

Compensation for participation in the study: If you are working on the day of interview / discussion, you will be compensated for your loss of wage for the time that you spent in the interview / discussion. This will be according to the per hour wage norms of your job.

Confidentiality and data protection: The information that you provide will not be shared with anyone else and the interview sheets will be locked in cabinets. All data will be anonymous. Participants will be assigned unique identifying codes and all information related to your identity will be deleted before the data is analysed. All data will be stored in password protected databases. Your identity or your baby's will not be disclosed in any reports, publications or conferences.

The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy and, in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate degree programme. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research.

If you agree to participate in this project, the research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be published with open access meaning anyone can read the document through the internet.

Risks and benefits: Apart from the time that you will have to spare for the interview and the discussion, and slight discomfort to the baby during the measurement of his/her weight and length, there is no other risk to you or your baby for participating in this study. However, your time and your inputs will be very valuable to understand the prevailing health and nutritional conditions of babies between the age of 1 and 12 months, the role of employment, the feeding practices, the cultural norms and rituals and concerns of many mothers/ caregivers like you. This will contribute to generation of knowledge on role of employment as a determinant of health of infants and inform policies for better infant care.

Project approval: This research project has been reviewed and approved by the University of Oxford's Oxford Tropical Research Ethics Committee (OXTREC), OXTREC Reference: 43-11.

Voluntary participation: Participation in this study is completely voluntary and you are free to refuse to participate in total or in any of the above mentioned parts of this study or refuse to answer any question or opt out of the study at any time.

If at any point, you need any other information related to the study, please contact me. My phone number is \_\_\_\_\_. If you are still not satisfied with the answers, or wish to raise a concern or make a formal complaint with regards to anything related to the study, then you can contact my supervisor, Dr Premila Webster or the head of the Department of Public Health, Professor Ray Fitzpatrick, at the University of Oxford, UK.

If you are willing to participate in this study and give permission to take measurements of weight and length of your baby, please provide your consent by signing on the consent forms.

Thank you.



**Dr. Manisha Nair (Student researcher)**

**Date:**

**EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**

**DEPARTMENT OF PUBIC HEALTH, UNIVERSITY OF OXFORD**



**CONSENT FORM FOR PARTICIPATING IN THE INTERVIEW**

1. I confirm that I have read the participant information sheet / the participation information sheet was read out to me by a research staff and I understand all aspects of the study and all information related to the study.
2. I understand that my participation in this survey is completely voluntary and I can refrain from answering any question or can leave the study at any time without giving reasons.
3. I understand that all information collected through the questionnaire will be kept confidential. The questionnaire and data will be stored in locked cabinets and password protected files, respectively and will not be accessible to anyone other than the researcher.
4. I understand that my identity will not be disclosed, published or presented in reports, papers or conferences by the researcher.
5. I understand that this study will be written up as a thesis and if successfully submitted, will be deposited both in print and online archives of Oxford University and will be accessible through the internet.
6. I understand that, this research project has been reviewed and approved by the University of Oxford Central University Research Ethics Committee.
7. I understand the process to raise concerns and make complaints.
8. I was given adequate opportunity to ask questions and I have received satisfactory answers for all my queries and concerns.
- 9. I give my consent to participate in the survey.**

\_\_\_\_\_  
Signature / left thumb impression  
of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of participant

\_\_\_\_\_  
Signature of research staff

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of research staff

**EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**  
**DEPARTMENT OF PUBIC HEALTH, UNIVERSITY OF OXFORD**



**CONSENT FORM FOR MEASURING THE WEIGHT AND LENGTH OF INFANTS**

- . I confirm that I have read the participant information sheet / the participation information sheet was read out to me by a research staff and I understand all aspects of the study and all information related to the study.
- . I understand that it is not compulsory for me to allow the research staff to measure my baby's weight and length and as such this is completely voluntary.
- . I understand that my baby will be measured by trained research staff and that there will be no major problems apart from a slight discomfort to the baby when s/he is placed on the weighing and length measuring scales. I will be present during the measurement and can advise the research staff from taking the measurements at any time even after giving my consent.
- . I have understood the procedures for measuring the weight and length of my baby and I am happy with the information provided by the research staff.
- . I understand that the measurement records will not be shared with anyone and the data will be stored in password protected files which only the researcher can access.
- . I understand that my baby's identity will not be disclosed, published or presented in reports, papers or conferences by the researcher.
- . I understand that this study will be written up as thesis and if successfully submitted, will be deposited both in print and online archives of Oxford University and will be accessible through the internet.
- . I understand that, this research project has been reviewed and approved by the University of Oxford Central University Research Ethics Committee.
- . I understand the process to raise concerns and make complaints.

0. I was given adequate opportunity to ask questions and I have received satisfactory answers for all my queries and concerns.

**1. As mother/legal guardian/care giver of \_\_\_\_\_ (NAME), I give my consent to measure his/her weight and length**

Signature / left thumb impression of mother/legal guardian/care giver	Date	Name of mother/legal guardian/care giver

Signature of research staff	Date	Name of research staff

## EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY

### शिशु कुपोषण पर रोजगार (MGNREGA) के प्रभाव

जन स्वास्थ्य विभाग, ऑक्सफोर्ड विश्वविद्यालय



#### भागीदार जानकारी पत्रक

नमस्ते | मेरा नाम डा. मनीषा नायर है। मैं ऑक्सफोर्ड विश्वविद्यालय, जन स्वास्थ्य विभाग में एक डॉक्टर छात्र (पीएचडी) हूँ। मैं एक अध्ययन कर रही हूँ जिसका उद्देश्य है महात्मा गांधी राष्ट्रीय ग्रामीण रोजगार गारंटी अधिनियम (नरेगा) का १ से १२ महीने के बच्चों के पोषण की स्थिति पर प्रभाव को समझने। मैं आप और आपके बच्चे को इस अध्ययन में शामिल करना चाहती हूँ।

अध्ययन के विवरण: इस अध्ययन में तीन भाग हैं:

**१-भाग:** एक अनुसंधान स्टाफ आपके बच्चे के स्वास्थ्य, भोजन, देखभाल और स्वच्छता के बारे में कुछ सवाल पूछ कर एक प्रश्नावली पूरा करेंगी। आपके और आपके पति एवं घर परिवार के बारे में कुछ सामान्य प्रश्न पूछे जायेंगे (जैसे पानी और स्वच्छता, स्वास्थ्य सेवा उपयोग और घरेलू संपत्ति संबंधित सवाल)। इन सवालों के कोई सही या गलत जवाब नहीं हैं।

**२-भाग:** बच्चे की वजन और लम्बाई नापी जाएगी और अगर उपलब्ध हैं तो बच्चे का जन्म रिकॉर्ड या स्वास्थ्य कार्ड की समीक्षा की जाएगी। मैं और एक अनुसंधान स्टाफ आपके बच्चे की वजन और लम्बाई का नाप लेंगे। नाप लेने के लिए आपको बच्चे का सारा कपडा एवं कच्चा खोलना पड़ेगा। आपके बच्चे को हम पहले एक वजन लेने वाले स्केल में रखेंगे और उसके बाद एक लम्बे बोर्ड में लेतायेंगे। यह सामग्री बिल्कुल साफ़ और स्वास हैं। नाप लेने से पहले उसकी प्रक्रिया आपको पूरी तरह समझाई जाएगी। नाप लेने के समय आप बच्चे के पास होंगे और बच्चे को कोई समाश्या हुई या वोह ज्यादा बेचैन हुआ तो हम उसकी नाप नहीं लेंगे जब तक वोह शांत नहीं हो जाता/जाती हैं। आमतौर पर इस प्रक्रिया से बच्चे को कोई असुबिधा या कस्त नहीं होता है। हम बच्चे की लम्बाई दो बार नपेंगे। वजन और लम्बाई के नाप की संख्या से हम बच्चे का पोषण मालूम करेंगे। अगर बच्चा बहुत कमज़ोर हैं या उसके पोषण की स्थिति काफी खराब हैं तो हम आपको उसके पोषण और देखभाल के बारे में सलाह देंगे एवं पास के सरकारी हॉस्पिटल में जाने के लिए अनुरोध करेंगे। इस अध्ययन में भाग लेने का निर्णय आपका अपना हैं। इस अध्ययन में भाग नहीं लेने के वजह से आपके और आपके बच्चे की स्वास्थ्य देखभाल में कोई असर नहीं परेगा। प्रश्नवाली को भरने में करीब आधा घंटा लगेगा और बच्चे का नाप १० से १५ मिनिट में लिया जायेगा।

**३-भाग:** इस अध्ययन के अंतर्गत हम कुछ गाँव में १ से १२ महीने के बच्चों के माँ के साथ एक समूह चर्चा का आयोजन करेंगे। समूह चर्चा का स्थान एवं समय आपको पहले से सूचित कर दी जाएगी। हम आपसे इस समूह चर्चा में भाग लेने का अनुरोध करते हैं। इस समूह चर्चा में बच्चे के देखभाल, खाने पीने, स्वास्थ्य आदि सम्बंधित रीती-रिवाजों और प्रथायों के बारे में चर्चा की जाएगी। यह समूह चर्चा १ से देर घंटे तक चलेगी पर हम आपकी सुबिधा अनुसार इसका आयोजन एक उचित जगह और समय पर करेंगे। आशा या अन्गवादी कार्यकर्ता आपको इसके बारे में सूचित करेंगी।

अध्ययन में भाग लेने के लिए मुआवजा: यदि आप काम पर जाते हैं तो साक्षात्कार / चर्चा में भाग लेने के वजह से हुई आपकी दिनभर की मजदूरी की हानि के लिए मुआवजा दिया जाएगा। यह आपके काम के प्रति घंटा मजदूरी के मानदंडों के अनुसार किया जाएगा। गोपनीयता और डेटा संरक्षण: जो जानकारी आप हमें देते हैं वोह किसी और को बताया या दिखाया नहीं जायेगा। इन्तेर्विऊ के बाद सारे साक्षात्कार पत्र अलमारी में बंद रखा जाएगा। सभी डेटा गुमनाम रखा जाएगा। प्रतिभागियों को अद्वितीय पहचान कोड आवंटित किया जाएगा और सभी आपके पहचान से संबंधित जानकारी डेटा का विश्लेषण करने से पहले हटा दिया जाएगा। और सभी डेटा को पासवर्ड संरक्षित डेटाबेस में संग्रहीत किया जाएगा। आपकी या आपके बच्चे की पहचान को किसी भी रिपोर्ट, प्रकाशन, या सम्मेलन में खुलासा नहीं किया जाएगा।

ऑक्सफोर्ड विश्वविद्यालय समाज और अर्थव्यवस्था के लाभ के लिए अपने अनुसंधान के प्रसार के लिए प्रतिबद्ध है और इस प्रतिबद्धता के समर्थन में, अनुसंधान सामग्री का एक ऑनलाइन संग्रह की स्थापना की गयी हैं। इस संग्रह में ऑक्सफोर्ड विश्वविद्यालय के स्नातकोत्तर/ पोस्ट-ग्राजुअत डिग्री कार्यक्रम में सफलतापूर्वक जमा किया गया छात्रों के अध्ययन पुष्टिका/रिपोर्ट की डिजिटल प्रतियां

शामिल हैं | संग्रह ऑनलाइन आज़ादी से उपलब्ध होने के वजह से अध्ययन पुष्टिका/रिपोर्ट का पूरा पाठ शोधकर्ताओं को आसानी से उपलब्ध होता है जिससे की अनुसंधान के सही उपयोग में वृद्धि होती हैं |

यदि आप इस परियोजना में भाग लेने के लिए सहमत हैं, तो ये अध्ययन एक शोध के रूप में लिखा जायेगा | थीसिस को सफलता पूर्वक प्रस्तुत करने पर, यह विश्वविद्यालय अभिलेखागार में प्रिंट और ऑनलाइन में जमा हो जाएगा, जिससे की भविष्य के अनुसंधान में इसके उपयोग की सुविधा प्राप्त होगी | थीसिस खुले उपयोग के साथ प्रकाशित किया जाएगा जिसका अर्थ है किसी दस्तावेज़ को इंटरनेट के माध्यम से पढ़ सकते हैं |

जोखिम और लाभ: साक्षात्कार/इन्तर्विऊ और चर्चा के लिए दिए गए आपके समय और बच्चे को उसके वजन और लंबाई के माप के दौरान मामूली असुविधा के अतिरिक्त इस अध्ययन में भाग लेने के वजह से आपके और आपके बच्चे को कोई लुकसन या हनी नहीं होगी | आपके समय और आपके आदान बहुत मूल्यवान होंगे १ से १२ महीने के बच्चों के प्रचलित स्वास्थ्य, पोषण की स्थिति, रोजगार की भूमिका, खिलने पिलाने की प्रथाओं, सांस्कृति के मानदंडों और अनुष्ठानों को समझने में, एवं आपके जैसे कई माताओं की चिंता दूर करने में सहायक होंगे | यह शिशुओं के स्वास्थ्य का एक कारक के रूप में रोजगार की भूमिका पर जान ब्रिधि करेगा और शिशु के देखभाल के लिए बेहतर नीतियों को सूचित करने में योगदान देगा |

परियोजना अनुमोदन: इस अनुसंधान परियोजना को ऑक्सफोर्ड विश्वविद्यालय के ऑक्सफोर्ड उष्णकटिबंधीय अनुसंधान आचार समिति (OXTREC) द्वारा समीक्षा कर अनुमोदित की गई है, OXTREC संदर्भ: 43-11

स्वैच्छिक भागीदारी: इस अध्ययन में भागीदारी पूरी तरह स्वैच्छिक है और आप इस पुरे अध्ययन या इसके उपर्युक्त भागों में से किसी में भी भाग लेने या किसी भी सवाल का जवाब देने से माना कर सकते हैं और किसी भी समय बिना कोई सूचना या कारण दर्शाए अध्ययन से बहार जाने के लिए स्वतंत्र हैं |

यदि किसी भी समय आपको अध्ययन से संबंधित कोई अन्य जानकारी की जरूरत है, तो कृपया मुझसे संपर्क करें | मेरा फोन नंबर \_\_\_\_\_ है |

यदि आप इस अध्ययन में भाग लेने के लिए और अपने बच्चे का वजन और लंबाई की माप लेने की अनुमति देने के लिए तैयार हैं, तो सहमति फॉर्म पर हस्ताक्षर या अंगूठे का निशान लगाकर आपकी अनुमति प्रदान करें |

धन्यवाद

डॉ. मनीषा नायर (छात्र शोधकर्ता)

दिनांक:

## **EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**

**शिशु कुपोषण पर रोजगार (MGNREGA) के प्रभाव, जन स्वास्थ्य विभाग, ऑक्सफोर्ड विश्वविद्यालय**

### **साक्षात्कार में भाग लेने के लिए सहमति फार्म**

१. मैं पुष्टि करती हूँ कि मैंने भागीदार जानकारी पत्रक पढ़ा है / भागीदारी सूचना पत्रक एक अनुसंधान कर्मचारि द्वारा मुझे पढ़ कर सुनाया गया है और मैंने अध्ययन के सभी पहलुओं और अध्ययन संबंधित सभी जानकारी को सही से समाज लिया है |
२. इस अध्ययन में मेरी भागीदारी पूरी तरह स्वैच्छिक है और इस अध्ययन से जुरा कोई भी सवाल का जवाब देने से माना कर सकती हूँ और किसी भी समय बिना कोई सूचना या कारण दर्शाए अध्ययन से बहार जाने के लिए स्वतंत्र हूँ |
३. मैं समझती हूँ कि प्रश्नावली के माध्यम से एकत्र सभी जानकारी को गोपनीय रखा जाएगा | प्रश्नावली बंद अलमारि में और सारा डेटा पासवर्ड संरक्षित फाइलों में संग्रहीत किया जाएगा, और शोधकर्ता के अलावा अन्य किसी को भी यह जानकारी उपलब्ध नहीं होगी |
४. मैं समझती हूँ कि सभी डेटा बेनाम रखा जायेगा और शोधकर्ता द्वारा मेरी पहचान का खुलासा किसी भी प्रकाशित रिपोर्ट, कागजात, या सम्मेलनों में नहीं किया जायेगा |
५. मैं समझती हूँ कि इस अध्ययन को एक शोध के रूप में लिखा जाएगा और अगर सफलतापूर्वक जमा होता है तो यह ऑक्सफोर्ड विश्वविद्यालय के अभिलेखागार में प्रिंट और ऑनलाइन, दोनों प्रकार में जमा हो जाएगा और इंटरनेट के माध्यम से सभी को प्राप्त होगा |
६. मैं समझती हूँ की इस अनुसंधान परियोजना को ऑक्सफोर्ड विश्वविद्यालय के ऑक्सफोर्ड उष्णकटिबंधीय अनुसंधान आचार समिति (OXTREC) द्वारा समीक्षा कर अनुमोदित किया गया है |
७. मैंने सवाल करने की और शिकायत दर्ज करने की प्रक्रिया को समझ लिया है |
८. मुझे सवाल पूछने के लिए पर्याप्त अवसर दिया गया था और मुझे अपने सभी प्रश्नों और चिंताओं के लिए संतोषजनक जवाब मिला है |
९. मैं इस सर्वेक्षण/अध्ययन में भाग लेने की सहमति देती हूँ |

भागीदार का हस्ताक्षर/ बाईं अंगूठे का निशान

दिनांक

भागीदार का नाम

अनुसंधान स्टाफ का हस्ताक्षर

दिनांक

अनुसंधान स्टाफ का नाम

**EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**

**शिशु कुपोषण पर रोजगार के प्रभाव, जन स्वास्थ्य विभाग, ऑक्सफोर्ड विश्वविद्यालय**

**शिशु के वजन और लंबाई को मापने के लिए सहमति फार्म**

१. मैं पुष्टि करती हूँ कि मैंने भागीदार जानकारी पत्रक पढ़ा है / भागीदारी सूचना पत्रक एक अनुसंधान कर्मचारि द्वारा मुझे पढ़ कर सुनाया गया है और मैंने अध्ययन के सभी पहलुओं और अध्ययन संबंधित सभी जानकारी को सही से समाज लिया है ।
२. मैं समझती हूँ कि अनुसंधान स्टाफ को मेरे बच्चे का वजन और लंबाई को मापने के लिए अनुमति देना मेरे लिए अनिवार्य नहीं है और यह पूरी तरह से स्वैच्छिक है ।
३. मैं समझती हूँ कि मेरे बच्चे को प्रशिक्षित अनुसंधान कर्मचारियों द्वारा मापा जाएगा और बच्चे को वजन और लंबाई मापने के तराजू पर रखने के वजह से आई मामूली असुविधा के अतिरिक्त कोई और समस्या नहीं होगी । मैं बच्चे का माप लेने के दौरान बच्चे के साथ रहूंगी और इस दौरान, अनुमति देने के उपरांत भी अनुसंधान कर्मचारियों को माप लेने से किसी भी समय माना कर सकती हूँ ।
४. मैंने मेरे बच्चे के वजन और लंबाई को मापने की प्रक्रियाओं को समझ लिया है और मैं अनुसंधान कर्मचारियों द्वारा उपलब्ध कराई गई जानकारी से संतुष्ट हूँ ।
५. मैं समझती हूँ कि बच्चे के माप की रिकॉर्ड किसी और को नहीं दिया जाएगा और डेटा पासवर्ड संरक्षित फाइलों में संग्रहीत किया जाएगा । शोधकर्ता के अलावा अन्य किसी को भी यह जानकारी उपलब्ध नहीं होगी ।
६. मैं समझती हूँ कि सभी डेटा बेनाम रखा जायेगा और शोधकर्ता द्वारा मेरे बच्चे की पहचान का खुलासा किसी भी प्रकाशित रिपोर्ट, कागजात, या सम्मेलनों में नहीं किया जायेगा ।
७. मैं समझती हूँ कि इस अध्ययन को एक शोध के रूप में लिखा जाएगा और अगर सफलतापूर्वक जमा होता है तो यह ऑक्सफोर्ड विश्वविद्यालय के अभिलेखागार में प्रिंट और ऑनलाइन, दोनों प्रकार में जमा हो जाएगा और इंटरनेट के माध्यम से सभी को प्राप्त होगा ।
८. मैं समझती हूँ की इस अनुसंधान परियोजना को ऑक्सफोर्ड विश्वविद्यालय के ऑक्सफोर्ड उष्णकटिबंधीय अनुसंधान आचार समिति (OXTREC) द्वारा समीक्षा कर अनुमोदित किया गया है ।
९. मैंने सवाल करने की और शिकायत दर्ज करने की प्रक्रिया को समझ लिया है ।
१०. मुझे सवाल पूछने के लिए पर्याप्त अवसर दिया गया था और मुझे अपने सभी प्रश्नों और चिंताओं के लिए संतोषजनक जवाब मिला है ।
११. मैं बच्चे की माँ / कानूनी अभिभावक / देखभाल प्रदाता के नाते से \_\_\_\_\_ (बच्चे का नाम) का/की वजन और लम्बाई मापने की अनुमति देती हूँ ।

बच्चे की माँ /कानूनी अभिभावक /देखभाल प्रदाता  
के हस्ताक्षर/ बाई अंगूठे का निशान

दिनांक

बच्चे की माँ /कानूनी अभिभावक  
/देखभाल प्रदाता का नाम

अनुसंधान स्टाफ का हस्ताक्षर

दिनांक

अनुसंधान स्टाफ का नाम

**EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**

**DEPARTMENT OF PUBIC HEALTH, UNIVERSITY OF OXFORD**



**PARTICIPANT INFORMATION SHEET FOR COMMUNITY INFORMATION**

Namaste. My name is Dr. Manisha Nair. I am a doctoral (PhD) student at the Department of Public Health, University of Oxford, UK. I am conducting a study which aims to understand the impact and role of employment through Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on the health and nutritional status of babies between the age of one and twelve months.

Purpose of the study: I am interested in learning about the customs and rituals of people living in this village with regards to child-birth, feeding and care of babies aged 1-12 months. I am also interested in knowing mother's views on employment and its role in child care and health. Your village has been randomly selected and we will select households within the village to participate in the study. As part of the study, you are requested to provide some general information about the village such as, the total population, population composition, water and toilet facilities, participation in MGNREGA programme etc. You will be asked questions and the research staff will fill out a questionnaire. There are no right or wrong answers and the questionnaire will take about 10-15 minutes.

Confidentiality and data protection: The information that you provide will not be shared with anyone else and the interview sheets will be locked in cabinets. Participants will be assigned unique identifying codes and all information related to your identity will be deleted before the data is analysed. All data will be stored in password protected databases. Your identity will not be disclosed in any report, publication or conference.

The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy and, in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate degree programme. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research.

If you agree to participate in this project, the research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be published with open access meaning anyone can read the document through the internet.

Risks and benefits of participation: There is no risk to you for participating in this study however; you will have to spare some time to answer questions for a research staff to fill up a short questionnaire. Your time and your inputs will be very valuable to understand the prevailing health and nutritional conditions of babies between the age of 1 and 12 months, the role of employment, the feeding practices, the cultural norms and rituals and concerns of mothers/ caregivers. This will contribute to generation of knowledge on role of employment as a determinant of health of infants and inform policies for better infant care.

This research project has been reviewed and approved by the University of Oxford Central University Research Ethics Committee.

Participation in this study is completely voluntary and you are free to refuse to participate or refuse to answer any question or opt out of the study at any time. If at any point, you need any other information related to the study or have any question, please contact me. My phone number is \_\_\_\_\_. If you are still not satisfied with the answers, or wish to raise a concern or make a formal complaint with regards to anything related to the study, then you can contact my supervisor, Dr Premila Webster or the head of the Department of Public Health, Professor Ray Fitzpatrick, at the University of Oxford, UK.

If you are willing to participate in this study, please provide your consent by signing on the consent form.

**Thank you**

**Dr. Manisha Nair (Principal researcher)**

**Date:**

**EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**  
**DEPARTMENT OF PUBIC HEALTH, UNIVERSITY OF OXFORD**



**CONSENT FORM FOR PARTICIPATING IN THE INTERVIEW**

1. I confirm that I have read the participant information sheet / the participation information sheet was read out to me by a research staff and I understand all aspects of the study and all information related to the study.
2. I understand that my participation in the survey is completely voluntary and I can refrain from answering any question or can leave the study at any time without giving reasons.
3. I understand that all information collected through the questionnaire will be kept confidential. The questionnaire and data will be stored in locked cabinets and password protected files, respectively and will not be accessible to anyone other than the principal researcher.
4. I understand that my identity will not be disclosed, published or presented in reports, papers or conferences by the researcher.
5. I understand that this study will be written up as a thesis and if successfully submitted, will be deposited both in print and online archives of Oxford University and will be accessible through the internet.
6. I understand that, this research project has been reviewed and approved by the University of Oxford Central University Research Ethics Committee.
7. I understand the process to raise concerns and make complaints.
8. I was given adequate opportunity to ask questions and I have received satisfactory answers for all my queries and concerns.
- 9. I give my consent to participate in the survey.**

\_\_\_\_\_  
Signature / left thumb impression  
of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of participant

\_\_\_\_\_  
Signature of research staff

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of research staff

## Appendix 3.6: Description of the study villages

Table A.3.6: Characteristics of the study clusters (villages)

Characteristics	Proportion of villages (%) N=44
Predominant social class group in the village	
Schedule tribe	70.4
Schedule caste	7.4
Other backward caste or OBC	14.8
General	7.4
Religion followed was Hinduism in all villages	100
Major spoken language	
Wagri	96.3
Gujarati	3.7
Primary occupation was farming in all villages	100
Secondary occupation was agricultural labour in all villages	100
Primary source of drinking water	
Tube-well/Hand-pumps	77.8
Piped water	18.5
River/canal	3.7
Drainage facility available	11.5
Type of drainage facility was open drains without outlet	100
<b><i>Access to health services</i></b>	
Sub-centre	
Within the village	92.6
Can be reached in < 1 hour	7.4
1-2 hours	-
>2 hours	-
Primary Health Centre	
In the village	33.3
Can be reached in < 1 hour	29.7
Can be reached in 1-2 hours	33.3
Can be reached in >2 hours	3.7
Community Health Centre (Secondary level centres)	
In the village	37.0
Can be reached in < 1 hour	18.6
Can be reached in 1-2 hours	18.5
Can be reached in >2 hours	25.9
District hospitals (Tertiary level centres)	
In the village	-
Can be reached in < 1 hour	12.0
Can be reached in 1-2 hours	20.0
Can be reached in >2 hours	68.0
Private health centres	

Characteristics	Proportion of villages (%) N=44
In the village	18.5
Can be reached in < 1 hour	44.5
Can be reached in 1-2 hours	3.7
Can be reached in >2 hours	33.3
<b>Drug stores/sellers</b>	
In the village	11.1
Can be reached in < 1 hour	65.0
Can be reached in 1-2 hours	19.1
Can be reached in >2 hours	4.8
<b>Anganwadi Centres (AWC)</b>	
In the village	96.3
Can be reached in < 1 hour	3.7
Can be reached in 1-2 hours	-
Can be reached in >2 hours	-
Village nurse (Auxiliary Nurse and Midwife or ANM) available in the village for >5 days a week	86.3
In the remaining ANM was available for at least 5 days in a week	
Anganwadi worker (nutrition worker at the Integrated Child Development Services centres) available in the village for >5 days a week	100
ASHA (Accredited Social Health Activist - Community health worker) available in the village for >5 days a week	95.7
Trained Birth Attendant available in the village for >5 days a week	100
<b>Access to educational institutions</b>	
<b>Government primary school</b>	
In the village	96.3
Can be reached in < 1 hour	3.7
Can be reached in 1-2 hours	-
Can be reached in >2 hours	-
<b>Private primary school</b>	
In the village	48.2
Can be reached in < 1 hour	29.6
Can be reached in 1-2 hours	22.2
Can be reached in >2 hours	-
<b>Government secondary school</b>	
In the village	51.9
Can be reached in < 1 hour	25.9
Can be reached in 1-2 hours	11.1
Can be reached in >2 hours	11.1
<b>Private secondary school</b>	
In the village	14.8
Can be reached in < 1 hour	44.0
Can be reached in 1-2 hours	11.8

Characteristics	Proportion of villages (%) N=44
Can be reached in >2 hours	29.4
<b>Bus stand</b>	
In the village	44.4
Can be reached in < 1 hour	37.1
Can be reached in 1-2 hours	18.5
Can be reached in >2 hours	-
<b>Bank</b>	
In the village	25.9
Can be reached in < 1 hour	48.2
Can be reached in 1-2 hours	18.5
Can be reached in >2 hours	7.4
A small railway station was present only in the Dungarpur urban	
<b>Post office</b>	
In the village	55.6
Can be reached in < 1 hour	44.4
Can be reached in 1-2 hours	-
Can be reached in >2 hours	-
<b>Police station</b>	
In the village	11.0
Can be reached in < 1 hour	40.9
Can be reached in 1-2 hours	7.4
Can be reached in >2 hours	40.7
<b>Market</b>	
In the village	11.1
Can be reached in < 1 hour	37.1
Can be reached in 1-2 hours	18.5
Can be reached in >2 hours	33.3
<b>Basic provisional store</b>	
In the village	96.3
Can be reached in < 1 hour	3.7
Can be reached in 1-2 hours	-
Can be reached in >2 hours	-
Telephone network – in the village	100
Electricity – in the village	100
<b>Major crops</b>	
Maize	63
Wheat	25.9
Pulses	7.4
Rice	3.7
<b>Main source of irrigation</b>	
Rain	55.6
Canal/stream	22.2
Well	22.2

Characteristics	Proportion of villages (%) N=44
Problems in selling agricultural and non-agro products (reported)	
No problem	74.1
No transport facility	18.5
Don't have any production	7.4
Type of road	
Cement/tar	55.6
Gravel	18.5
Dirt/mud	25.9
Villages that had drought in the past 2 years	29.6
Village health and sanitation committee available	74.1
Cleaning drive conducted in the past 6 months	37
Fogging done in the past 6 months	32
Government programmes implemented	
Janani Suraksha Yojana (JSY)	96.3
Kishori Shakti Yojana	74.1
Mid-day Meal Programme	100
Integrated Child Development Services scheme (ICDS)	100
Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)	100
Public Distribution system	77.8
National Social Assistance programme	0
Mahila Mandal Protsahan Yojana (MMPY)	77.8
Rajiv Gandhi National Drinking Water Mission	0
Sanitation Programme (SP)	7.4
Indira Awas Yojna (IAY)	92.6
Villages in which Non-Governmental Organisations (NGO) were working	22.7
Type of NGO: An NGO working in health was found in only 1 village, others were 'Marriage Stop' (in 1 village) and Self-Help groups	
Year of implementation of MGNREGA	
2006	81.5
2007	18.5
Daily wage rate	INR 5 to 100
Frequency of wage payment	
Every month	19.2
In 2-6 months	65.4
>6 months	15.4

### Appendix 3.7: Factors associated with participation in MGNREGA

The outcome variable was participation in MGNREGA. The proportion of households participating in MGNREGA (MGNREGA-households) was 53.2% (number of households=281) and proportion not participating in MGNREGA between August 2010 and September 2011 (non-MGNREGA households) was 46.8% (number of households=247). Participation in MGNREGA is through self-selection, such that only those who are willing to do manual labour participate in the programme, thus socio-economic status and primary occupation of the households would be important determinants. Further, education level of parents of the infants in this study, preference of households to benefit from other government programmes such as the Public Distribution System, and the differential characteristics of the households in terms of their health seeking behaviour (institutional delivery of mothers, vaccination of children, seeking treatment for children) could be other factors that influence participation in MGNREGA.

#### *Univariable logistic regression*

MGNREGA was regressed on the factors that were likely to influence households to participate in the programme. The regressions were controlled for cluster sampling design using the method of robust estimation of standard errors. The results show that the households categorised as below poverty line were two times more likely to participate in the MGNREGA ( $p=0.003$ ) and households belonging to the uppermost quintile of the asset index were 47% less likely to participate ( $p=0.071$ ). In addition, the factors found to be associated with increased likelihood of households' participation in MGNREGA at the 10% level of significance were seasonal employment and receiving food through the Public Distribution System. However, the variables 'below poverty line' and 'Public Distribution System' were highly correlated ( $r=0.833$ ).

**Table A.3.7.1: Univariable logistic regression results of the factors influencing participation in MGNREGA**

Factors influencing participation	Household participation in MGNREGA		
	OR (95% CI)	p-value	p-value (Chi-square test for trend)
Socioeconomic status			
Lowest 2 quintiles	1	-	0.110
Third quintile	1.10 (0.66-1.86)	0.702	
Fourth quintile	1.04 (0.61-1.77)	0.885	
Fifth quintile	0.53 (0.27-1.06)	0.071	
Below poverty line			
No	1	-	NA
Yes	2.30 (1.36-3.88)	0.003	
Primary occupation of household			
Regular	1	-	NA
Seasonal	1.49 (0.96-2.33)	0.077	
Caste			
Non Schedule Tribe/Schedule Caste	1	-	NA
Schedule Tribe/Schedule Caste	1.41 (0.73-2.72)	0.304	

<b>Mother's level of education</b>			
Illiterate	1	-	
Primary education	0.84 (0.54-1.32)	0.447	NA
Secondary and higher	0.59 (0.28-1.23)	0.155	
<b>Father's level of education</b>			
Illiterate	1	-	
Primary education	1.06 (0.60-1.88)	0.833	NA
Secondary and higher	0.96 (0.52-1.79)	0.904	
<b>Receive food through Public Distribution System</b>			
No	1	-	
Yes	1.77 (0.96-2.57)	0.073	NA
<b>Health seeking behaviour</b>			
<b>Treatment for diarrhoea/URTI [n=119]</b>			
No	1	-	
Yes	1.01 (0.44-2.34)	0.982	NA
<b>Institutional delivery</b>			
No	1	-	
Yes	1.20 (0.78-1.85)	0.396	NA
<b>Household at least one sibling died</b>			
No	1	-	
Yes	1.23 (0.69-2.18)	0.479	NA
<b>Adequate vaccination (age specific)</b>			
No	1	-	
Yes	0.89 (0.56-1.42)	0.615	NA

URTI – Upper Respiratory Tract Infection; OR = Odds ratio; CI = Confidence Interval; NA = Not applicable; MGNREGA = Mahatma Gandhi National Rural Employment Guarantee Act

### ***Multivariable exploratory logistic regression model***

Multivariable exploratory logistic regression model was used to identify the factors that determined participation in MGNREGA in the sampled households. Only the factors that were found to be significantly associated with MGNREGA in the univariable analysis at the 10% level were included in the model. Since the variables ‘below poverty line’ and ‘Public Distribution System’ were highly correlated, Public Distribution System was not included in the model. Three variables (socioeconomic status, below poverty line and primary occupation) were included in the final model. All three variables were entered together in a single model instead of a step-wise approach. The logistic regression model was adjusted for cluster sampling using the method of robust estimation of standard errors. The results suggested that only the households categorised as below poverty line were 98% more likely to participate in MGNREGA ( $p=0.006$ ) after controlling for the other two factors and cluster sampling. Apart from this, participation and non-participation in MGNREGA was not significantly different in terms of any other known factor.

**Table A.3.7.2: Multivariable logistic regression results of factors influencing participation in MGNREGA**

Factors influencing participation	Household participation in MGNREGA	
	aOR (95% CI)	P-value
Below poverty line (BPL)		
No	1	-
Yes	1.98 (1.22-3.19)	0.006
Socioeconomic status		
Lowest 2 quintiles	1	-
Third quintile	1.12 (0.66-1.89)	0.672
Fourth quintile	1.07 (0.65-1.78)	0.785
Fifth quintile	0.71 (0.34-1.52)	0.373
Primary occupation of household		
Regular	1	-
Seasonal	1.14 (0.74-1.75)	0.549

aOR = adjusted odds ratio; CI = Confidence Interval; MGNREGA = Mahatma Gandhi National Rural Employment Guarantee Act

## Appendix 3.8: Multivariable logistic regression models to estimate the effect of MGNREGA on the anthropometric outcomes

The methods used to fit the variables in the three models – underweight, wasting and stunting are described in chapter 3. The odds ratio of association between MGNREGA and the outcomes and its two-tailed p-values for each step of variable entry in the three models are shown in tables A.3.8.1, A.3.8.2 and A.3.8.3. The models are described below.

### *Logistic regression model for underweight*

**Table A.3.8.1: Description of steps in building the multivariable logistic regression model for underweight**

Fitted variables (New variable entered in each step is highlighted in bold)	OR for MGNREGA*	P-value (Wald Test)*
<b>Non-health policy</b>		
Underweight, <b>MGNREGA</b>	<b>0.64</b>	<b>0.051</b>
<b>Distal / structural determinants</b>		
Underweight, MGNREGA, <b>SES</b>	<b>0.51</b>	<b>0.006</b>
Underweight, MGNREGA, SES, <b>proper sanitation</b>	0.50	0.005
Underweight, MGNREGA, SES, <b>household density</b>	0.50	0.006
Underweight, MGNREGA, SES, <b>mother's level of education</b>	0.50	0.005
Underweight, MGNREGA, SES, <b>father's level of education</b>	0.51	0.008
Underweight, MGNREGA, SES, <b>mother worked</b>	0.49	0.003
Underweight, MGNREGA, SES, <b>BPL</b>	0.49	0.004
Underweight, MGNREGA, SES, <b>PDS</b>	0.50	0.006
<b>Intermediate / socio-cultural determinants</b>		
Underweight, MGNREGA, SES, <b>caste</b>	<b>0.50</b>	<b>0.005</b>
Underweight, MGNREGA, SES, caste, <b>gender</b>	0.50	0.005
<b>Intermediate / behavioural determinants</b>		
Underweight, MGNREGA, SES, caste, <b>proper disposal of infant faeces</b>	0.50	0.004
Underweight, MGNREGA, SES, caste, <b>duration of care by other carers</b>	<b>0.46</b>	<b>0.001</b>
Underweight, MGNREGA, SES, caste, duration of care by other carers, <b>institutional delivery</b>	0.46	0.001
<b>Demographic variables</b>		
Underweight, MGNREGA, SES, caste, duration of care by other carers, <b>mother's age</b>	0.47	0.002
Underweight, MGNREGA, SES, caste, duration of care by other carers, institutional delivery, <b>child's age</b>	<b>0.47</b>	<b>0.002</b>
Underweight, MGNREGA, SES, caste, duration of care by other carers, child's age, <b>pregnancy desired</b>	0.46	0.001
Underweight, MGNREGA, SES, caste, duration of care by other carers, child's age, <b>birth order</b>	<b>0.48</b>	<b>0.002</b>
<b>Final model MGNREGA, SES, caste, duration of care by other carers, child's age, birth order</b>		

Sample size=528 households; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System; \*OR and p-value of association between MGNREGA and outcome, some values are highlighted in bold to indicate that the independent variable at the step of entry was significantly associated with the outcome

The crude odds ratio of association between MGNREGA and underweight (0.64; 95% Confidence Interval (CI) = 0.41-1.00;  $p=0.051$ ); reduced to 0.51 (95% CI = 0.32-0.82) and the p-value reached the level of statistical significance ( $p=0.006$ ) on adding the variable 'socioeconomic status', which was also found to be significantly associated with the outcome. Thus, 'socioeconomic status' was found to be a negative confounder. The other variables of the distal determinants group did not further change the magnitude and the level of significance of the estimated effect of MGNREGA (table A.3.8.1). The variable 'primary occupation' was not entered in the model because it was moderately correlated with 'socioeconomic status' ( $r=0.43$ ;  $p<0.001$ ) (chapter 3, table 3.7).

The variable 'caste' did not change the magnitude or the level of statistical significance of the odds ratio of association between MGNREGA and underweight (table A.3.8.1) probably because of its correlation with 'socioeconomic status' (the effect being possibly mediated by socioeconomic status). However, the likelihood of infants being underweight was higher in the Schedule Tribe/Schedule Caste group compared with the non-Schedule Tribe/Schedule Caste group (adjusted odds ratio (aOR) at the step of variable entry in the model = 2.47; 95% CI = 1.19-5.14;  $p=0.017$ ). The variable 'gender' was not found to be a confounder and was also not significantly associated with underweight, thus eliminated from the model (table A.3.8.1).

Among the behavioural factors, only 'duration of care by other carers' was found to be a negative confounder. Controlling for this variable further improved the magnitude and the strength of statistical significance of the estimated effect of MGNREGA (table A.3.8.1). In addition, duration of care by other carers for >20 hrs/week was found to be associated with greater odds of underweight among infants than being cared for by the mothers alone (aOR at the step of variable entry = 1.81; 95% CI = 1.16-2.82;  $p=0.010$ ).

Among the demographic variables, none were found to confound the association between MGNREGA and underweight (table A.3.8.1). However, child's age (aOR for child's age at the step of variable entry = 1.56; 95% CI = 1.01-2.39;  $p=0.043$ ) and birth-order (aOR for the four+ order of birth = 1.82; 95% CI = 1.13-2.93;  $p=0.014$ ) were independently associated with underweight and were thus retained in the model.

The final model comprised of six independent variables (MGNREGA, socioeconomic status, caste, duration of care by other carers, child's age and birth-order) which were found to either significantly confound the estimated effect of MGNREGA on underweight and/or were independently associated with the outcome, underweight. The p-value of the likelihood ratio test comparing the fit of the final model with that of the 20-variable model was 0.815, suggesting that the final six variable model best fitted the data.

*Logistic regression model for wasting*

**Table A.3.8.2: Description of steps in building the multivariable logistic regression model for wasting**

Fitted variables (New variable entered in each step is highlighted in bold)	OR for MGNREGA*	P-value (Wald Test)*
<b>Non-health policy</b>		
Wasting, <b>MGNREGA</b>	<b>0.69</b>	<b>0.092</b>
<b>Distal / structural determinants</b>		
Wasting, MGNREGA, <b>SES</b>	<b>0.61</b>	<b>0.022</b>
Wasting, MGNREGA, SES, <b>proper sanitation</b>	0.60	0.022
Wasting, MGNREGA, SES, <b>household density</b>	0.60	0.020
Wasting, MGNREGA, SES, <b>mother's level of education</b>	0.60	0.023
Wasting, MGNREGA, SES, <b>father's level of education</b>	0.61	0.027
Wasting, MGNREGA, SES, <b>mother worked</b>	0.59	0.023
Wasting, MGNREGA, SES, <b>BPL</b>	<b>0.58</b>	<b>0.013</b>
<b>Intermediate / socio-cultural determinants</b>		
Wasting, MGNREGA, SES, BPL, <b>caste</b>	<b>0.57</b>	<b>0.011</b>
Wasting, MGNREGA, SES, BPL, caste, <b>gender</b>	0.57	0.011
<b>Intermediate / behavioural determinants</b>		
Wasting, MGNREGA, SES, BPL, caste, <b>proper disposal of infant faeces</b>	0.57	0.010
Wasting, MGNREGA, SES, BPL, caste, <b>duration of care by other carers</b>	<b>0.55</b>	<b>0.007</b>
Wasting, MGNREGA, SES, BPL, caste, duration of care by other carers, <b>institutional delivery</b>	0.55	0.008
<b>Demographic variables</b>		
Wasting, MGNREGA, SES, BPL, caste, duration of care by other carers, <b>mother's age</b>	<b>0.56</b>	<b>0.013</b>
Wasting, MGNREGA, SES, BPL, caste, duration of care by other carers, mother's age, <b>child's age</b>	<b>0.57</b>	<b>0.018</b>
Wasting, MGNREGA, SES, BPL, caste, duration of care by other carers, mother's age, child's age, <b>pregnancy desired</b>	0.57	0.015
Wasting, MGNREGA, SES, BPL, caste, duration of care by other carers, child's age, <b>birth order</b>	<b>0.57</b>	<b>0.014</b>
<b>Final model MGNREGA, SES, BPL, caste, duration of care by other carers, child's age, birth order</b>		

Sample size=528 households; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System; \*OR and p-value of association between MGNREGA and outcome, some values are highlighted in bold to indicate that the independent variable at the step of entry was significantly associated with the outcome

Similar to the underweight model, on adding ‘socioeconomic status’ the OR of association between MGNREGA and wasting reduced from 0.69 (95% CI = 0.44-1.06) to 0.61 (95% CI = 0.40-0.93), and the level of statistical significance improved to 0.022 (p-value for the crude OR = 0.092). Thus, socioeconomic status was negatively confounding the effect of MGNREGA on wasting. Further, belonging to the highest quintile (fifth quintile) of the asset index (socioeconomic status variable) was associated with significant lower odds of infant wasting compared with the lowest two quintiles

(OR at the step of variable entry = 0.25; 95% CI = 0.12-0.51;  $p < 0.001$ ). Adjusting for the variable 'Below Poverty Line' further improved the magnitude and statistical significance of the association between MGNREGA and wasting (table A.3.8.2). Since 'Below Poverty Line' and 'Public Distribution System' were highly correlated ( $r = 0.83$ ;  $p < 0.001$ ) (chapter 3, table 3.7), 'Public Distribution System' was not entered in the model. Thus, from the distal determinants group only two variables 'socioeconomic status' and 'Below Poverty Line' were retained in the model. Similar to the underweight model, the variable 'primary occupation' was not entered in the model due to its correlation with 'socioeconomic status' (chapter 3, table 3.7).

The effect of 'caste' in the wasting model was found to be similar to the underweight model. Although the variable did not confound the association between MGNREGA and wasting (table A.3.8.2), it was an independent risk factor for wasting among infants (aOR at the step of variable entry = 2.70; 95% CI = 1.32-5.50;  $p = 0.007$ ). Thus, it was retained in the model. Infant's gender was neither found to alter the estimated effect of MGNREGA (table A.3.8.2), nor was it independently associated with the outcome at a  $p$ -value of  $< 0.05$ , thus eliminated from the model.

Like the underweight model, duration of care by other carers for  $> 20$  hrs/week was associated with increased odds of infant wasting in the study population (aOR at the step of variable entry = 1.66; 95% CI = 1.03-2.67;  $p = 0.039$ ) and also improved the magnitude and the statistical significance of the OR of association between MGNREGA and wasting (table A.3.8.2). Thus, this behavioural factor was retained in the model. The other two variables in this determinant group were neither associated with the outcome (at  $p < 0.05$ ), nor did they influence the estimated effect of MGNREGA on the outcome (table A.3.8.2).

Among the demographic factors, 'mother's age' was found to independently affect wasting. Mother's age  $> 30$  years was found to be associated with increased odds of infant wasting compared with age  $\leq 20$  years (aOR at the step of variable entry = 3.03; 95% CI = 1.33-6.90;  $p = 0.009$ ). However, the variable 'mother's age' was significantly correlated with 'birth-order' ( $r = 0.60$ ;  $p < 0.001$ ) (chapter 3, table 3.7). Although neither variables were found to confound the association between MGNREGA and wasting, considering the importance of birth-order with regards to care and feeding of the infants, it was entered in the model after eliminating 'mother's age' to avoid over adjusting. As was observed for the underweight model, child's age  $\geq 6$  months was associated with increased risk of wasting compared with age  $< 6$  months (aOR at the step of variable entry = 1.54; 95% CI = 1.03-2.33;  $p = 0.037$ ), but it did not alter the magnitude and the level of statistical significance of the estimated effect of MGNREGA on wasting. Thus, among the demographic variables 'child's age' and 'birth-order' were retained in the model.

The final model comprised of seven independent variables (MGNREGA, socioeconomic status, below poverty line, caste, duration of care by other carers, child's age and birth-order) which were found to either significantly influence the estimated effect of MGNREGA on wasting and/or were independently associated with the outcome, wasting. The final set of variables was comparable to that of the underweight model, except that 'below poverty line' was found to be an additional negative confounder for the wasting model. The  $p$ -value of the likelihood ratio test comparing the fit of the final model with that of the 20-variable model was 0.325, suggesting that the final seven-variable model best fitted the data.

*Logistic regression model for stunting*

**Table A.3.8.3: Description of steps in building the multivariable logistic regression model for stunting**

Fitted variables (New variable entered in each step is highlighted in bold)	OR of MGNREGA*	P-value (Wald Test)*
<b>Non-health policy</b>		
Stunting, <b>MGNREGA</b>	<b>0.79</b>	<b>0.222</b>
<b>Distal / structural determinants</b>		
Stunting, MGNREGA, <b>socioeconomic status (SES)</b>	<b>0.69</b>	<b>0.078</b>
Stunting, MGNREGA, SES, <b>proper sanitation</b>	0.69	0.076
Stunting, MGNREGA, SES, <b>household density</b>	0.69	0.079
Stunting, MGNREGA, SES, <b>mother's level of education</b>	0.69	0.074
Stunting, MGNREGA, SES, <b>father's level of education</b>	0.70	0.084
Stunting, MGNREGA, SES, <b>mother worked</b>	<b>0.64</b>	<b>0.043</b>
Stunting, MGNREGA, SES, mother worked, <b>primary occupation</b>	0.63	0.039
Stunting, MGNREGA, SES, mother worked, <b>BPL</b>	0.65	0.056
Stunting, MGNREGA, SES, mother worked, <b>PDS</b>	0.64	0.044
<b>Intermediate / socio-cultural determinants</b>		
Stunting, MGNREGA, SES, mother worked, <b>caste</b>	0.64	0.042
Stunting, MGNREGA, SES, mother worked, <b>gender</b>	0.64	0.043
<b>Intermediate / behavioural determinants</b>		
Stunting, MGNREGA, SES, mother worked, <b>proper disposal of infant faeces</b>	0.64	0.043
Stunting, MGNREGA, SES, <b>duration of care by other carers</b>	<b>0.65</b>	<b>0.044</b>
Stunting, MGNREGA, SES, duration of care by other carers, <b>institutional delivery</b>	0.65	0.052
<b>Demographic variables</b>		
Stunting, MGNREGA, SES, duration of care by other carers, <b>mother's age</b>	0.65	0.047
Stunting, MGNREGA, SES, duration of care by other carers, <b>child's age</b>	<b>0.68</b>	<b>0.067</b>
Stunting, MGNREGA, SES, duration of care by other carers, child's age, <b>pregnancy desired</b>	0.67	0.064
Stunting, MGNREGA, SES, duration of care by other carers, child's age, <b>birth order</b>	<b>0.70</b>	<b>0.086</b>
<b>Final model MGNREGA, SES, duration of care by other carers, child's age, birth order</b>		

Sample size=528 households; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System; \*OR and p-value of association between MGNREGA and outcome, some values are highlighted in bold to indicate that the independent variable at the step of entry was significantly associated with the outcome

The crude OR of association between MGNREGA and stunting was 0.79 (95% CI = 0.54-1.16); p = 0.222. Similar to the underweight and wasting models, 'socioeconomic status' was found to be a negative confounder and its category fifth quintile (of asset index) was found to be associated with reduced odds of stunting compared with the lowest two quintiles (aOR at the step of variable entry = 0.18; 95% CI = 0.08-0.41; p<0.001). Adjusting for the variable 'mother worked' further improved

the magnitude and the statistical significance of the association between MGNREGA and stunting (table A.3.8.3), although was not itself significantly associated with stunting (at  $p < 0.05$ ). Apart from 'socioeconomic status' and 'mother worked', none of the other variables in the distal determinants group altered the estimated effect of MGNREGA (table A.3.8.3) and were also not found to be significantly associated with the outcome, stunting.

Unlike the other two models, 'caste' was not found to be independently associated with stunting and also did not affect the association between MGNREGA and stunting (table A.3.8.3), thus eliminated from the model. 'Gender' was not found to be significant for the stunting model as was the case with the other two models (table A.3.8.3).

Among the behavioural determinants, 'duration of care by other carers' was found to improve the magnitude and the strength of statistical significance of the effect of MGNREGA on stunting, however this variable was positively correlated with 'mother worked' ( $r = 0.49$ ;  $p < 0.001$ ). Considering the importance of mother's time devoted to care which was influenced by her employment status as well as by other factors, it was decided to select the variable 'duration of care by other carers' instead of 'mother worked' for the model. Thus, 'mother worked' was removed from the model at this stage before entering 'duration of care by other carers' to avoid over adjusting the model. The effect of 'duration of care by other carers' on the association between MGNREGA and stunting was found to be similar to that of 'mother worked' (table A.3.8.3). Other variables of this group were neither associated with the outcome, nor did they alter the effect of MGNREGA on the outcome (table A.3.8.3).

Among the demographic variables, 'child's age' altered the magnitude of the effect of MGNREGA on stunting (table A.3.8.3) and increased the p-value above the desired level of 0.05 ( $p = 0.067$ ). The variable was also independently associated with the outcome such that infants  $\geq 6$  months of age were 69% more likely to be stunted compared with infants  $< 6$  months of age ( $p = 0.045$ ). Thus, 'child's age' was retained in the model. Unlike the other two models, 'birth-order' was found to alter the effect of MGNREGA on stunting (table A.3.8.3), although not itself associated with stunting, thus retained in the model.

The final model comprised of five variables, namely; MGNREGA, socioeconomic status, duration of care by other carers, child's age and birth-order which were found to either significantly influence the estimated effect of MGNREGA on stunting and/or were independently associated with the outcome, stunting. The final set of variables was comparable to that of the underweight and wasting models, except that 'caste' (relevant for the underweight and wasting models) and 'below poverty line' (relevant for the wasting model) were not observed to confound the estimated effect of MGNREGA on stunting. The p-value of the likelihood ratio test comparing the fit of the final model with that of the 20-variable model was 0.872, suggesting that the final seven-variable model best fitted the data.

### Appendix 3.9: Multivariable explanatory logistic regression models to estimate the effect of mother’s employment through MGNREGA on the anthropometric outcomes

The method used to fit the variables in the three models – underweight, wasting and stunting was the same as described for the multivariable model for estimating the effects of households’ participation in MGNREGA on the outcomes. The odds ratio of association between mother-MGNREGA and the outcomes and its two-tailed p-values for each step of variable entry in the three models are shown in tables A.3.9.1, A.3.9.2 and A.3.9.3. The correlation between the independent variables for this sub-sample is shown in table A.3.9.4. The models are described below.

#### *Mother-MGNREGA logistic regression model for underweight*

**Table A.3.9.1: Description of steps in building the mother-MGNREGA multivariable logistic regression model for underweight**

Fitted variables (New variable entered in each step is highlighted in bold)	OR for mother-MGNREGA*	P-value (Wald Test)*
<b>Non-health policy</b>		
Underweight, <b>mother-MGNREGA</b>	<b>1.23</b>	<b>0.489</b>
<b>Distal / structural determinants</b>		
Underweight, mother-MGNREGA, <b>SES</b>	<b>1.31</b>	<b>0.403</b>
Underweight, mother-MGNREGA, SES, <b>proper sanitation</b>	1.30	0.417
Underweight, mother-MGNREGA, SES, <b>household density</b>	1.31	0.403
Underweight, mother-MGNREGA, SES, <b>primary occupation</b>	1.33	0.385
Underweight, mother-MGNREGA, SES, <b>mother’s level of education</b>	1.29	0.436
Underweight, mother-MGNREGA, SES, <b>father’s level of education</b>	1.29	0.437
Underweight, mother-MGNREGA, SES, <b>BPL</b>	1.34	0.355
Underweight, mother-MGNREGA, SES, <b>PDS</b>	1.31	0.391
<b>Intermediate / socio-cultural determinants</b>		
Underweight, mother-MGNREGA, SES, <b>caste</b>	<b>1.47</b>	<b>0.247</b>
Underweight, mother-MGNREGA, SES, caste, <b>gender</b>	1.48	0.240
<b>Intermediate / behavioural determinants</b>		
Underweight, mother-MGNREGA, SES, caste, <b>proper disposal of infant faeces</b>	1.43	0.278
Underweight, mother-MGNREGA, SES, caste, <b>institutional delivery</b>	1.41	0.305
<b>Demographic variables</b>		
Underweight, mother-MGNREGA, SES, caste, <b>mother’s age</b>	1.44	0.279
Underweight, mother-MGNREGA, SES, caste, institutional delivery, <b>child’s age</b>	<b>1.16</b>	<b>0.675</b>
Underweight, mother-MGNREGA, SES, caste, child’s age, <b>pregnancy desired</b>	<b>1.09</b>	<b>0.801</b>
Underweight, mother-MGNREGA, SES, caste, child’s age, pregnancy desired, <b>birth order</b>	1.05	0.897
<b>Final model mother-MGNREGA, SES, caste, child’s age, pregnancy desired</b>		

Sample size=272 households; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System; \*OR and p-value of association between MGNREGA and outcome, some values are highlighted in bold to indicate that the independent variable at the step of entry was significantly associated with the outcome

The crude odds ratio of association between mother-MGNREGA and underweight (1.23; 95% Confidence Interval (CI) = 0.68-2.23) changed slightly to 1.31(95% CI = 0.69-2.50) and the p-value from 0.489 to 0.403 on adding the variable 'socioeconomic status'. As was seen for the MGNREGA model, higher socioeconomic status (fifth quintile) was associated with lower odds of underweight among infants compared with the lowest two quintiles (aOR at the step of variable entry for the fifth quintile = 0.15; 95% CI=0.04-0.56; p = 0.006). Thus, 'socioeconomic status' was retained in the model. The other variables of the distal determinants group did not further change the magnitude and the level of significance of the estimated effect of mother-MGNREGA (table A.3.9.1). These were also not significantly associated with the outcome.

The variable 'caste' changed the magnitude and the p-value of the odds ratio of association between mother-MGNREGA and underweight (table A.3.9.1) and infants in the Schedule Tribe/Schedule Caste group were significantly more likely to be underweight than those belonging to the non-Schedule Tribe/Schedule Caste groups (aOR at the step of variable entry in the model = 3.09; 95% CI = 1.24-7.70; p=0.017). The variable 'gender' was not found to be a confounder and was also not significantly associated with underweight, thus eliminated from the model (table A.3.9.1). None of the behavioural factors were found to alter the effect of mother-MGNREGA on underweight and these were also not significantly associated with the outcome underweight, thus removed from the model. Considering that the 'duration of care by other carers' would be in the pathway of effect of mother-MGNREGA on the anthropometric indicators of malnutrition, this variables was not included in model building.

Among the demographic variables, child's age was found to be a positive confounder. On controlling for the variable the magnitude of the adjusted OR of association between mother-MGNREGA and underweight was reduced towards null (table A3.9.1) and the p-value increased (p = 0.675). It was independently associated with the outcome (aOR for child's age at the step of variable entry = 1.83; 95% CI = 1.03-3.22; p = 0.039). The variable 'pregnancy desired' was also found to be significantly associated with underweight, such that mother's desire to have the infant was associated with lower odds of underweight among the infants (aOR at the step of variable entry = 0.25; 95% CI = 0.07-0.91; p = 0.036). 'Pregnancy desired' also altered the estimated effect of mother-MGNREGA on underweight (table A.3.9.1).

The final model comprised of five independent variables (mother-MGNREGA, SES, caste, child's age and pregnancy desired) which were found to either significantly confound the estimated effect of MGNREGA on underweight and/or were independently associated with the outcome, underweight. The p-value of the likelihood ratio test comparing the fit of the final model with that of the 17-variable model was 0.219, suggesting that the final five-variable model best fitted the data.

*Mother-MGNREGA logistic regression model for wasting*

**Table A.3.9.2: Description of steps in building the mother-MGNREGA multivariable logistic regression model for wasting**

Fitted variables (New variable entered in each step is highlighted in bold)	OR for mother-MGNREGA*	P-value (Wald Test)*
<b>Non-health policy</b>		
Wasting, <b>mother-MGNREGA</b>	<b>1.28</b>	<b>0.423</b>
<b>Distal / structural determinants</b>		
Wasting, mother-MGNREGA, <b>SES</b>	<b>1.38</b>	<b>0.308</b>
Wasting, mother-MGNREGA, SES, <b>proper sanitation</b>	1.36	0.325
Wasting, mother-MGNREGA, SES, <b>household density</b>	1.38	0.303
Wasting, mother-MGNREGA, SES, <b>primary occupation</b>	1.37	0.320
Wasting, mother-MGNREGA, SES, <b>mother's level of education</b>	1.39	0.297
Wasting, mother-MGNREGA, SES, <b>father's level of education</b>	1.34	0.347
Wasting, mother-MGNREGA, SES, <b>BPL</b>	<b>1.42</b>	<b>0.266</b>
<b>Intermediate / socio-cultural determinants</b>		
Wasting, mother-MGNREGA, SES, BPL, <b>caste</b>	<b>1.59</b>	<b>0.161</b>
Wasting, mother-MGNREGA, SES, BPL, caste, <b>gender</b>	1.58	0.161
<b>Intermediate / behavioural determinants</b>		
Wasting, mother-MGNREGA, SES, BPL, caste, <b>proper disposal of infant faeces</b>	1.54	0.191
Wasting, mother-MGNREGA, SES, BPL, caste, <b>institutional delivery</b>	1.53	0.194
<b>Demographic variables</b>		
Wasting, mother-MGNREGA, SES, BPL, caste, <b>mother's age</b>	1.54	0.194
Wasting, mother-MGNREGA, SES, BPL, caste, <b>child's age</b>	<b>1.48</b>	<b>0.305</b>
Wasting, mother-MGNREGA, SES, BPL, caste, child's age, <b>pregnancy desired</b>	1.42	0.355
Wasting, mother-MGNREGA, SES, BPL, caste, child's age, <b>birth order</b>	<b>1.30</b>	<b>0.517</b>
<b>Final model mother-MGNREGA, SES, BPL, caste, child's age, birth order</b>		

Sample size=272 households; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System; \*OR and p-value of association between MGNREGA and outcome, some values are highlighted in bold to indicate that the independent variable at the step of entry was significantly associated with the outcome

Similar to the underweight model, on adding ‘socioeconomic status’, the OR of association between mother-MGNREGA and wasting changed from 1.28 (95% CI = 0.69-2.38) to 1.38 (95% CI = 0.73-2.60), and the p-value decreased (p = 0.308), but did not reach the desired level of <0.05. Further, belonging to the highest quintile (fifth quintile) of the asset index (socioeconomic status variable) was associated with significant lower odds of infant wasting compared with the lowest two quintiles (aOR at the step of variable entry = 0.30; 95% CI = 0.10-0.89; p = 0.031). The variable ‘below poverty line’ was found to further improve the magnitude of the association between mother-MGNREGA and wasting (table A.3.9.2) and was itself significantly associated with higher odds of infant wasting (aOR at the step of variable entry = 2.74; 95% CI = 1.09-6.91; p = 0.033). Since

‘below poverty line’ and ‘public distribution system’ were highly correlated ( $r = 0.86$ ;  $p < 0.001$ ) (table A.3.9.4), ‘public distribution system’ was not entered in the model. Thus, from the distal determinants group two variables ‘socioeconomic status’ and ‘below poverty line’ were found to negatively confound the estimated effect of mother-MGNREGA and were retained in the model.

The variable ‘caste’ was found to be a negative confounder which when controlled for in the model improved the magnitude and the level of statistical significance of the effect of mother-MGNREGA on wasting (table A.3.9.2). Like the underweight model, belonging to the Schedule Tribe/Schedule Caste group was associated with increased odds of wasting among infants (aOR at the step of variable entry = 3.10; 95% CI = 1.25-7.64;  $p = 0.016$ ). Thus, it was retained in the model. Infant’s gender was neither found to alter the estimated effect of mother-MGNREGA (table A.3.9.2), nor was it independently associated with the outcome at a p-value of  $< 0.05$ , thus eliminated from the model. Like the underweight model behavioural factors were not relevant for the wasting model.

Among the demographic factors, ‘child’s age’ was found to be a positive confounder (table A.3.9.2), although not independently associated with wasting at a p-value of  $< 0.05$ . Unlike the underweight model, the variable ‘birth-order’ was found to be a positive confounder (table A.3.9.2) and was also significantly associated with the outcome, wasting.

The final model comprised of six independent variables (MGNREGA, socioeconomic status, below poverty line, caste, child’s age and birth-order) which were found to either significantly influence the estimated effect of mother-MGNREGA on wasting and/or were independently associated with the outcome, wasting. The p-value of the likelihood ratio test comparing the fit of the final model with that of the 17-variable model was 0.706, suggesting that the final six-variable model best fitted the data.

*Mother-MGNREGA logistic regression model for stunting*

**Table A.3.9.3: Description of steps in building the mother-MGNREGA multivariable logistic regression model for stunting**

Fitted variables (New variable entered in each step is highlighted in bold)	OR of mother- MGNREGA*	P-value (Wald Test)*
<b>Non-health policy</b>		
Stunting, <b>mother-MGNREGA</b>	<b>1.68</b>	<b>0.154</b>
<b>Distal / structural determinants</b>		
Stunting, mother-MGNREGA, <b>SES</b>	<b>1.72</b>	<b>0.138</b>
Stunting, mother-MGNREGA, SES, <b>proper sanitation</b>	1.72	0.139
Stunting, mother-MGNREGA, SES, <b>household density</b>	1.73	0.135
Stunting, mother-MGNREGA, SES, <b>primary occupation</b>	1.71	0.150
Stunting, mother-MGNREGA, SES, <b>mother's level of education</b>	1.71	0.142
Stunting, mother-MGNREGA, SES, <b>father's level of education</b>	1.72	0.163
Stunting, mother-MGNREGA, SES, <b>BPL</b>	1.72	0.143
Stunting, mother-MGNREGA, SES, <b>PDS</b>	1.72	0.137
<b>Intermediate / socio-cultural determinants</b>		
Stunting, mother-MGNREGA, SES, <b>caste</b>	<b>1.81</b>	<b>0.121</b>
Stunting, mother-MGNREGA, SES, caste, <b>gender</b>	1.82	0.118
<b>Intermediate / behavioural determinants</b>		
Stunting, mother-MGNREGA, SES, caste, <b>proper disposal of infant faeces</b>	1.83	0.117
Stunting, mother-MGNREGA, SES, caste, <b>institutional delivery</b>	<b>1.71</b>	<b>0.162</b>
<b>Demographic variables</b>		
Stunting, mother-MGNREGA, SES, caste, institutional delivery, <b>mother's age</b>	1.74	0.148
Stunting, mother-MGNREGA, SES, caste, institutional delivery, <b>child's age</b>	<b>1.51</b>	<b>0.346</b>
Stunting, mother-MGNREGA, SES, caste, institutional delivery, child's age, <b>pregnancy desired</b>	1.48	0.365
Stunting, mother-MGNREGA, SES, caste, institutional delivery, child's age, <b>birth order</b>	1.48	0.357
<b>Final model mother-MGNREGA, SES, caste, institutional delivery, child's age</b>		

Sample size=272 households; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System; \*OR and p-value of association between MGNREGA and outcome, some values are highlighted in bold to indicate that the independent variable at the step of entry was significantly associated with the outcome

The crude OR of association between mother-MGNREGA and stunting was 1.68 (95% CI = 0.823-3.44); p = 0.154. Similar to the underweight and wasting models, ‘socioeconomic status’ was found to be a negative confounder, but was not independently associated with the outcome. Apart from ‘socioeconomic status’, none of the other variables in the distal determinants group altered the estimated effect of mother-MGNREGA (table A.3.9.3) and was also not found to be significantly associated with the outcome, stunting.

Like the other two models, 'caste' was found to be a negative confounder (table A.3.9.3), but unlike the other two models it was not independently associated with stunting at a p-value of <0.05. 'Gender' was not found to be significant for the model as was the case with the other two models (table A.3.9.3). Among the behavioural determinants, 'institutional delivery' was found to reduce the magnitude of the effect of mother-MGNREGA on stunting (table A.3.9.3), thus retained in the model.

Among the demographic variables, 'child's age' was found to be a positive confounder which reduced the magnitude of the effect of mother-MGNREGA on stunting (table A.3.9.3), thus retained in the model. No other demographic variables were found to alter the estimated effect of mother-MGNREGA on stunting.

The final model comprised of five variables, namely; MGNREGA, socioeconomic status, caste, institutional delivery and child's age which were found to either significantly influence the estimated effect of mother-MGNREGA on stunting and/or were independently associated with the outcome, stunting. The p-value of the likelihood ratio test comparing the fit of the final model with that of the 17-variable model was 0.759, suggesting that the final five-variable model best fitted the data.

**Table A.3.9.4: Coefficient of correlation between the independent variables for the mother-MGNREGA sub-sample**

Variables	Mother - MGNREGA	SES	Proper sanitation	Household density	Mother's education	Father's education	Primary occupation	BPL	PDS	Caste	Gender	Proper disposal_ infant stool	Institutional Delivery	Care_other carers	Mother's age	Child's age	Pregnancy desired	Birth order
Mother - MGNREGA	1																	
SES	0.03	1																
Proper sanitation	-0.04	0.35*	1															
Household density	-0.03	-0.41*	-0.17*	1														
Mother's education	-0.03	0.27*	0.17*	-0.17*	1													
Father's education	-0.14*	0.36*	0.12*	-0.15*	0.43*	1												
Primary occupation	-0.01	0.39*	0.14*	-0.12*	0.20*	0.19*	1											
BPL	-0.04	-0.25	-0.16*	0.08	-0.07	-0.06	-0.18*	1										
PDS	-0.00	-0.22*	-0.15*	0.07	-0.04	-0.01	-0.17*	0.86*	1									
Caste	-0.12	-0.52*	-0.32*	0.18*	-0.23*	-0.22*	-0.25*	0.34*	0.27*	1								
Gender	-0.02	-0.02	-0.05	-0.03	-0.02	-0.03	-0.02	-0.03	-0.01	0.06	1							
Proper disposal_ infant stool	-0.08	0.26*	0.62*	-0.16*	0.15*	0.10	0.18*	-0.26*	-0.25*	-0.27*	-0.06	1						
Institutional Delivery	-0.06	0.15*	0.03	-0.11	0.10	0.07	0.13*	-0.06	-0.10	-0.21*	0.02	0.01	1					
Care_other carers	0.49*	0.12*	-0.01	-0.05	0.00	-0.03	-0.03	0.00	0.02	-0.21*	0.05	-0.02	0.12*	1				
Mother's age	0.04	-0.15*	0.04	0.03	-0.20*	-0.21*	-0.10	0.04	-0.00	0.05	0.04	0.01	-0.11	-0.04	1			
Child's age	0.32*	0.07	0.01	0.01	-0.05	-0.05	0.12*	-0.10	-0.08	-0.09	-0.03	0.06	0.03	0.30*	-0.07	1		
Pregnancy desired	-0.11	0.05	0.04	-0.11*	0.05	0.09	-0.04	-0.09	-0.09	-0.03	-0.03	0.04	-0.02	-0.11	-0.07	-0.07	1	
Birth order	0.08	-0.12	-0.02	0.15*	-0.18*	-0.17*	-0.11	0.02	-0.01	0.07	0.02	-0.03	-0.14*	0.04	0.61*	-0.13*	-0.19*	1

Sample size = 272; \*p-value <0.05; SES - Socioeconomic Status; BPL – Below Poverty Line; PDS – Public Distribution System

## Appendix 4.1: Description of participants of the focus group discussions

Table A.4.1.1: Characteristic of the study participants of the focus group discussions

Participant ID	Age of mother (in years)	Education level	Caste	Socioeconomic status	Mother worked in MGNREGA	Household participated in MGNREGA
01	29	Primary	non-ST/SC	5th quintile	Never worked	non-MGNREGA
02	25	Illiterate	ST/SC	5th quintile	Worked currently	MGNREGA
03	20	Primary	non-ST/SC	5th quintile	Never worked	MGNREGA
04	28	Illiterate	non-ST/SC	5th quintile	Never worked	MGNREGA
05	32	Illiterate	ST/SC	3rd quintile	Worked currently	MGNREGA
06	25	Illiterate	ST/SC	3rd quintile	Worked currently	MGNREGA
07	25	Illiterate	ST/SC	4th quintile	Never worked	MGNREGA
08	25	Illiterate	ST/SC	5th quintile	Worked before delivery	MGNREGA
09	22	Illiterate	ST/SC	5th quintile	Never worked	MGNREGA
10	28	Illiterate	ST/SC	3rd quintile	Never worked	MGNREGA
11	25	Primary	ST/SC	4th quintile	Never worked	non-MGNREGA
12	22	Illiterate	ST/SC	5th quintile	Never worked	MGNREGA
13	23	Secondary+	ST/SC	5th quintile	Never worked	non-MGNREGA
14	23	Illiterate	ST/SC	3rd quintile	Worked before delivery	non-MGNREGA
15	19	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	non-MGNREGA
16	22	Illiterate	ST/SC	Lowest 2 quintiles	Never worked	non-MGNREGA
17	22	Illiterate	ST/SC	Lowest 2 quintiles	Never worked	MGNREGA
18	20	Primary	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
19	21	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
20	Not known	Secondary+	non-ST/SC	4th quintile	NA	non-MGNREGA
21	25	Primary	non-ST/SC	5th quintile	Never worked	MGNREGA
22	23	Primary	non-ST/SC	3rd quintile	Worked currently	MGNREGA
23	24	Primary	non-ST/SC	3rd quintile	Worked currently	MGNREGA

<b>Participant ID</b>	<b>Age of mother (in years)</b>	<b>Education level</b>	<b>Caste</b>	<b>Socioeconomic status</b>	<b>Mother worked in MGNREGA</b>	<b>Household participated in MGNREGA</b>
24	30	Illiterate	non-ST/SC	4th quintile	Worked currently	MGNREGA
25	Not known	Primary	ST/SC	4th quintile	Never worked	non-MGNREGA
26	25	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
27	28	Illiterate	ST/SC	3rd quintile	Worked before delivery	non-MGNREGA
28	22	Secondary+	ST/SC	Lowest 2 quintiles	Never worked	MGNREGA
29	23	Primary	ST/SC	4th quintile	Never worked	MGNREGA
30	28	Illiterate	ST/SC	Lowest 2 quintiles	Never worked	non-MGNREGA
31	20	Illiterate	ST/SC	3rd quintile	Never worked	MGNREGA
32	Not known	Illiterate	non-ST/SC	Lowest 2 quintiles	Worked currently	MGNREGA
33	25	Illiterate	non-ST/SC	5th quintile	Worked currently	MGNREGA
34	26	Secondary+	non-ST/SC	5th quintile	Never worked	non-MGNREGA
35	22	Primary	non-ST/SC	5th quintile	Never worked	MGNREGA
36	23	Secondary+	non-ST/SC	4th quintile	Never worked	MGNREGA
37	26	Illiterate	ST/SC	3rd quintile	Worked currently	MGNREGA
38	22	Primary	ST/SC	Lowest 2 quintiles	Never worked	MGNREGA
39	30	Illiterate	ST/SC	Lowest 2 quintiles	Never worked	MGNREGA
40	32	Illiterate	ST/SC	5th quintile	Never worked	non-MGNREGA
41	25	Secondary+	non-ST/SC	4th quintile	Worked currently	MGNREGA
42	22	Primary	ST/SC	Lowest 2 quintiles	Never worked	MGNREGA
43	22	Illiterate	non-ST/SC	5th quintile	Worked currently	MGNREGA
44	30	Illiterate	non-ST/SC	4th quintile	Worked currently	MGNREGA
45	25	Primary	non-ST/SC	5th quintile	Never worked	MGNREGA
46	30	Illiterate	non-ST/SC	NA	Worked currently	MGNREGA
47	25	Illiterate	ST/SC	5th quintile	Worked currently	MGNREGA
48	27	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
49	21	Primary	ST/SC	Lowest 2 quintiles	Worked currently	MGNREGA
50	28	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA

<b>Participant ID</b>	<b>Age of mother (in years)</b>	<b>Education level</b>	<b>Caste</b>	<b>Socioeconomic status</b>	<b>Mother worked in MGNREGA</b>	<b>Household participated in MGNREGA</b>
51	35	Primary	ST/SC	3rd quintile	Worked before delivery	MGNREGA
52	28	Illiterate	ST/SC	Lowest 2 quintiles	Worked currently	MGNREGA
53	Not known	Secondary+	non-ST/SC	4th quintile	Never worked	non-MGNREGA
54	NA	Secondary+	ST/SC	5th quintile	NA	non-MGNREGA
55	40	Illiterate	non-ST/SC	5th quintile	Worked before delivery	non-MGNREGA
56	22	Secondary+	ST/SC	4th quintile	Never worked	MGNREGA
57	25	Illiterate	non-ST/SC	4th quintile	Never worked	non-MGNREGA
58	28	Primary	non-ST/SC	5th quintile	Worked before delivery	non-MGNREGA
59	29	Primary	ST/SC	4th quintile	NA	non-MGNREGA
60	Not known	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
61	Not known	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
62	Not known	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
63	Not known	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
64	Not known	Illiterate	ST/SC	Lowest 2 quintiles	Worked before delivery	MGNREGA
65	Not known	Illiterate	ST/SC	4th quintile	Worked before delivery	MGNREGA

NA – Not applicable, ST/SC – Schedule Tribe/Schedule Caste, non-ST/SC – non- Schedule Tribe/Schedule Caste, Worked currently means worked at the time the study was conducted

## Appendix 4.2: Topic guide for the focus group discussions

Discussion sections	Topics and [prompts]	Time
General discussion	<p>Customs and traditional practices related to</p> <ul style="list-style-type: none"> <li>➤ Pregnancy and child birth</li> <li>➤ Breast feeding</li> <li>➤ Weaning</li> <li>➤ Other practices related to 1-12 months old children</li> </ul> <p>[Prompts: Are they different for boys and girls? Why? Are they different for any section of the society – socioeconomic status?]</p>	15 minutes
Brainstorm round I	<p>Imagine that you are the leader of this community and have been authorised to make changes to these customs and practices.</p> <ul style="list-style-type: none"> <li>➤ What would you do? [Prompts: First-second-third...]</li> <li>➤ Would you like to change something? What? [Prompt: Why? Or Why not?]</li> <li>➤ Would you like to introduce something new? What? [Prompt: Why? Or Why not?]</li> </ul>	15 minutes
Brainstorm round II	<ul style="list-style-type: none"> <li>➤ Women should be employed / work to earn money – discuss [Prompt: Why?]</li> <li>➤ Effect on babies, especially 1-12 months if mothers are employed [Prompts: MGNREGA specific issues, anything else?]</li> <li>➤ Effect of having a baby 1-12 months on work and employment status of mothers [Prompts: MGNREGA specific issues, who motivated them to join the programme, do they feel empowered, anything else?] [Prompts: Do you want to work (unemployed group / stop working (employed group), why?]</li> </ul>	20 minutes
'Rate the importance' round	<ul style="list-style-type: none"> <li>➤ What do you think is the role of mother in child care? [Prompts: feeding, caring, nutrition, development, anything else?]</li> <li>➤ Who else facilitates this role? [Prompts: baby's father? Grandmother? Relatives? Health provider? Community health worker? Anganwadi worker, ASHA? Anyone else?] – How? Rate their importance</li> <li>➤ What according to you are essential for adequate care of 1-12 months old babies? [Prompts: mother's knowledge? Education – father's/mother's /others? Income / earnings? Food? Religion? Customs? Family members? Health services? MGNREGA? Other welfare services? Anything else? ] Rate their importance</li> </ul>	30 minutes
Conclusion and debrief	<p>Summarize the discussion</p> <p>Ask each participant if they would like to add anything more</p> <p>Thank the participants for their valuable inputs</p>	10 minutes

## **Appendix 4.3: Participant information sheet and consent form for the focus group discussions**

### **EFFECT OF MGNREGA ON INFANT MALNUTRITION: A MIXED METHODS STUDY**

#### **FOCUS GROUP DISCUSSION**

##### **INTRODUCTORY INFORMATION FOR PARTICIPANTS**

Namaste

Thank you all for coming and agreeing to participate in this focus group discussion.

I am Dr. Manisha Nair, a doctoral student from the Department of Public Health, University of Oxford. Introduce discussion coordinator and translator: Names and affiliation

**Purpose of the study:** We are conducting a study which aims to understand the impact and role of employment through Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on the health and nutritional status of babies between the age of 1 and 12 months. We are interested in learning about your customs and rituals related to child-birth, feeding and care of babies aged 1-12 months and you will have an opportunity to share with the group your best practices and concerns about baby care. We also want to know your views about women's employment and its role in child care and health. There are no right or wrong answers, we are merely interested in your views and opinions.

**Process of participation:** This discussion will last for one to one and a half hours. We will first discuss about the customs related to pregnancy and child birth, breast feeding, weaning and other practices related to babies aged 1-12 months. Following this there will be three group tasks / brainstorming rounds. In the end we will have another short discussion to summarise and clarify points, and you will be given the opportunity to add more points if you want to or ask questions and raise concerns if any. If agreed by all, the discussions will be audio-recorded using a tape-recorder. If anyone has concerns or objections regarding this, you are free to discuss with us now.

**Voluntary participation:** Your participation is completely voluntary and you can refuse to share information or not disclose your views on any given topic if you do not wish to or if you are not comfortable. You can leave the discussion group at any time without giving reasons.

**Data protection and confidentiality:** The tapes and notes from this discussion will not be shared by either the researcher, coordinator or the translator with anyone else and all data will be stored in password protected electronic database. Your names will be either removed, coded or changed and any information that identifies you will be deleted before the data is analysed. Your identity will not be disclosed, published or presented in reports, papers or conferences. However, your comments may be used as anonymous quotes for the researcher's dissertation, publication and presentation in conferences. The transcribed notes from the tapes will be shared with you and you are free to remove any part or all your comments if you are un-comfortable about them at that

stage. As part of the process, you will have to sign on a consent form to indicate that you have understood all aspects of the study and that you freely give consent to participate in the focus group discussion.

Each participant's view including yours is personal and therefore, ought to be respected and kept confidential. Whatever we discuss here stays here and you will not share the contents of this discussion in part or whole or any comments made during this group discussion either by you or by any other member of this group with anyone outside this room. You will have to sign a confidentiality form, which states that you agree to keep all information and comments shared during this discussion confidential and not share with anyone outside this discussion room.

The University of Oxford is committed to the dissemination of its research for the benefit of society and the economy, and in support of this commitment, has established an online archive of research materials. This archive includes digital copies of student theses successfully submitted as part of a University of Oxford postgraduate degree programme. Holding the archive online gives easy access for researchers to the full text of freely available theses, thereby increasing the likely impact and use of that research.

This research project has been reviewed and approved by the University of Oxford Central University Research Ethics Committee.

If you agree to participate in this project, the research will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be published with open access, meaning anyone can read the document through the internet.

You can ask questions and clarify doubts or concerns about the study, the discussion format or anything else. We will be happy to answer. If you are not satisfied with the answers, or wish to raise a concern or make a formal complaint with regards to anything related to the study, you can contact my supervisor, Dr Premila Webster or the head of the Department of Public Health, Professor Ray Fitzpatrick, at the University of Oxford, UK.



**CONSENT FORM FOR FOCUS GROUP DISCUSSION**

1. I have understood all aspects of the study and all information related to the study and agree to take part in the focus group discussion.
2. I understand that my participation is completely voluntary and that I can refuse to share any information or not disclose my views on any given topic if I do not wish to/if I am not comfortable. I also understand that I can leave the discussion group at any time without giving reasons.
3. I understand that the transcribed notes from the tape will be shared with me and I am free to remove any part or all my comments if I am un-comfortable about them at that stage.
4. I understand that if I take part in this discussion, any comment that I make and information that I give may be used as anonymous quotes by the researcher in her dissertation and may be published or presented in conferences.
5. I understand that I cannot be indentified by any of these quotes and all data that identifies me will be removed or changed.
6. I understand that this study will be written up as a thesis and if successfully submitted, will be deposited both in print and online archives of Oxford University and will be accessible through the internet.
7. I understand that this research project has been reviewed and approved by the University of Oxford Central University Research Ethics Committee.
8. I understand the process to raise concerns and make complaints.
9. I was given adequate opportunity to ask questions and I have received satisfactory answers for all my queries and concerns.
10. I give my consent for this discussion to be audio-recorded by the researcher. I understand that the tapes and notes from this discussion will not be shared by the researcher and the translator with anyone else and all data will be protected and kept confidential.

**11. I give my consent to participate in the discussion**

\_\_\_\_\_  
Signature / left thumb impression  
of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of participant

\_\_\_\_\_  
Signature of research staff

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of research staff

## Appendix 4.4: Confidentiality agreement form for the focus group discussions

<b>CONFIDENTIALITY AGREEMENT FOR FOCUS GROUP DISCUSSION</b>		
<p>I have understood the instructions from the coordinator and agree to keep the discussions that will take place here, today, confidential. I understand that each participant's view including mine are personal and therefore, ought to be respected and kept confidential. I will not share this discussion in part or in whole or any comments made during this group discussion either by me or by any other member of this group outside this room.</p>		
_____	_____	_____
Signature / left thumb impression of participant	Date	Name of participant
_____	_____	_____
Signature of research staff	Date	Name of research staff

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