National Nutrition Survey
2015

Nutrition Programme
Department of Public Health
Ministry of Health
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TABLE OF CONTENTS

Appendices

List of Figures

List of tables

Acknowledgement

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Last but not the least, households need to be thanked for their immense support and cooperation in providing information requested during the survey.

Dedicated to the Women and Children of Bhutan

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གསོལ་བཅུན་ལས།
ཐིམ་ཕུ།

ROYAL GOVERNMENT OF BHUTAN
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བློན་པོMINISTER

Foreword

It is my great pleasure to bring out the reports of the National Nutrition Survey (NNS) 2015 which mark the outcome of development, field work and analysis, brought about by a successful collaboration between Ministry of Health, National Statistics Bureau, Khesar Gyalpo University of Medical Sciences of Bhutan and UNICEF Bhutan.

The report provides definitive information on the nutritional and anaemia status of women and children in Bhutan. Nationally, stunting in children under five years of age has reduced to 21.2%, down from 33.5% in 2010 but still remains high in the rural and eastern parts of the country. Although, anaemia in both the women and children have reduced since the last nationally representative survey of 2002, it still remains a public health challenge. Infant and Young Child Feeding Practices in Bhutan still needs significant improvements as only about half the women of Bhutan are exclusively breastfeeding their children as per the WHO/UNICEF guidelines; and dietary diversity in the complementary foods of our children are still very low.

The National Nutrition Survey 2015 represents a major investment in nutrition information as up-to-date knowledge about the nutritional and anaemia status of women and children is critical in achieving the goal of improving the health of the Bhutanese. This report will be used for making evidence based decisions for improved policies and programming. Ultimately, this report will help achieve the nutrition and health goals committed by Ministry of Health in both the National and International arena.

Tandin Wangchuk
HEALTH MINISTER

Acronyms

ANC	: Antenatal Care
BIRD	: Bhutan Interdisciplinary Research & Development
BMIS	: Bhutan Multiple Indicator Survey
EA	: Enumeration Area
FCS	: Food Consumption Score
HKI	: Helen Keller Internationals
IFA	: Iron Folic Acid
IYCF	: Infant and Young Child Feeding
JMP	: Joint Monitoring Programme
KGUMSB	: Khesar Gyalpo University of Medical Sciences of Bhutan
LBW	: Low Birth Weight
MDG	: Millennium Development Goals
MoH	: Ministry of Health
NNS	: National Nutrition Survey
NSB	: National Statistics Bureau
ORC	: Outreach Clinic
PPS	: Probability Proportional to Size
PSU	: Primary Sampling Unit
RGoB	: Royal Government of Bhutan
TWG	: Technical Working Group
UNICEF	: United Nations Children's Fund
WASH	: Water Sanitation and Hygiene
WFP	: World Food Programme
WHO	: World Health Organization

Table of Findings

Indicator	National	Region			Area		Unit of measure
		West	Central	East	Urban	Rural	
Household and Nutrition status							
Average size of household	4.5	4.6	4.4	4.4	4.2	4.7	number of members
Stunting prevalence	21.2	16.2	18.5	29.1	16.0	26.1	Percent
Wasting prevalence	4.3	4.6	4.0	4.2	3.2	5.4	Percent
Underweight prevalence	9.0	11.1	7.7	7.6	5.6	12.4	Percent
Anemia							
Anemia prevalence in children (6-59 months)	43.8	49.6	38.9	40.6	44.4	43.4	Percent
Anemia prevalence in adolescent girls (10-19 years)	31.3	35.2	35.3	32.6	32.4	30.2	Percent
Anemia prevalence in non-pregnant women (15-49 years)	34.9	39.8	35.3	29.0	35.9	33.8	Percent
Anemia prevalence in pregnant women	27.3	25.6	19.2*	33.2*	29.3	24.7	Percent
Care during Pregnancy							
1-3 ANC visit	13.3	10.6	12.1	17.7	12.6	13.9	Percent
4-7 ANC visit	59.0	54.4	64.5	62.0	56.3	61.4	Percent
8 ANC visits or more	25.9	33.5	22.4	17.7	31.1	21.4	Percent
Any number of ANC visits	98.2	98.5	99.2	97.4	100	96.7	Percent

*Sample size less than 50

Indicator	National	Region			Area		Unit of measure
		West	Central	East	Urban	Rural	
Low birth weight baby and child feeding							
Proportion of babies with low birth weight	7.8	9.6	4.6	7.9	5.7	10.2	Percent
Prelacteal feeding	4.6	4.4	3.2	5.7	4.9	4.2	Percent
Early initiation of breast-feeding	77.9	77.7	77.9	78.1	81.3	74.8	Percent
Exclusive breastfeeding under 6 months	51.4	33.8	48.8*	77.7*	51.1	52.0	Percent
Continued breastfeeding at 1 year	92.0	91.7*	94.0*	91.0*	95.0*	89.1	Percent
Continued breastfeeding at 2 years	60.0	59.9*	70.3*	55.6*	49.8*	69.3	Percent
Introduction of solid, semi-solid or soft foods	86.9	92.8*	70.3*	99.5*	88.0*	86.2	Percent
Percentage receiving 4 or more food groups	15.3	18.4	7.4	16.8	21.2	11.1	Percent
Percentage receiving iron rich foods	16.6	18.6	12.3	16.9	20.1	14.0	Percent
Minimum dietary frequency for all children (6-23 months)	66.9	-	-	-	-	-	Percent
Minimum acceptable diet for breastfeeding children	11.7	-	-	-	-	-	Percent
Child morbidity							
Prevalence of fever	26.3	28.7	26.8	23.2	27.8	24.8	Percent
Prevalence of Diarrhea	5.2	3.9	6.6	5.8	4.4	6.0	Percent
Prevalence of ARI	1.8	1.3	1.0	3.0	2.2	1.5	Percent
VAC coverage	87.0	89.9	83.9	85.8	88.9	85.1	Percent
Deworming coverage	89.0	90.1	90.0	87.2	93.0	84.7	Percent
Water Sanitation and Hygiene							
Access to improved water sources(JMP criteria)	98.3	98.9	99.6	97.0	97.0	99.5	Percent
Piped water inside the dwelling (Bhutan Standard)	85.8	85.6	88.8	84.0	85.8	85.9	Percent
Access to improved sanita-tion facilities	70.6	70.8	71.6	69.6	79.9	61.2	Percent
Percentage of households safely disposing of child's stool	72.5	70.5	77.9	71.5	73.1	72.0	Percent
Households with access to hand washing station	87.4	81.5	89.5	92.3	89.5	85.3	Percent

*Sample size less than 50

Executive Summary

Executive Summary

Introduction

Previous studies reported persistent signs of malnutrition in the country, especially among vulnerable groups like women and children. The National Nutrition Survey (NNS) 2015 was designed to track progress on nutrition indicators in the country, particularly figures for malnutrition and anaemia in children and women in Bhutan.

The target indicators for the survey were nutritional status and anemia rates of children under-5, and anemia rates in adolescent girls and women of reproductive age. The survey provides high quality data on nutritional and anemia status in a representative sample of target populations from across the country.

Sample Coverage

The sample for the survey was designed to produce statistically reliable estimates at the national level and for the three regions of Bhutan, viz., Western, Central, and Eastern. Representative samples from the highest and lowest performing districts were also selected to analyse the equity profile.

A total of 3,571 households were surveyed for this study, stratified in alignment with estimates of urban and rural population sizes (30:70). All adolescent girls, women, and children under 5 years of age were included in this survey, resulting in a total of 5,176 women aged 10-49 years, 148 pregnant women and 1,449 children less than five years of age.

Household Characteristics

- Average household size was larger in rural areas (4.7 members) than in urban areas (4.2 members).
- Urban households were the majority in the wealthiest quintiles and rural households were predominately in the poorest quintiles.
- Education level of household heads was higher in urban than rural areas.
- Combined, two-thirds of household heads in urban areas completed some form of formal education (primary school, secondary school or further studies) compared to less than one-fifth in rural areas.
- More than half of main income earners in rural households had no education (57%) compared to only a quarter of urban household heads (24%). Wages and salary were the main sources of income for households nationally. Around half of rural households derived income from wages and salary (48%), however 81% still derived income from agriculture.

Child Growth

- 21.2% of children aged 0-59 months were stunted (chronic undernutrition). According to the WHO definition, child stunting in Bhutan can be classified as of "moderate public health significance" (above 20%). Certain groups had higher than average stunting rates – over a quarter of children in rural areas were stunted (26.1%) and a larger percentage of children in Eastern region were stunted (29.1%).
- Stunting in children 6 to 59 month of age had fallen since the last two national nutrition surveys – from 37% in NNS 2008 and 34.8% in BMIS 2010 to 22.3% in NNS 2015.
- Stunting prevalance were higher among children in poorer quintiles of the population. In Q1 (the least wealthy quintile) 35.1% of children were stunted compared to 5.7% of children in Q5 (the wealthiest quintile). Similarly, severe stunting was much higher in the poorer quintiles of the population. In the poorest quintile it was 23.3% among children 6-23 months.

Anemia

- Based on the WHO categorization anemia represents a "severe" public health issue if affecting more than 40% of the population. Based on this definition, anemia prevalance of 43.8% in children aged 6-59 months fell into this category. The prevalance of anemia in women and adolescent girls indicated a moderate public health problem with rate between 30% and 40%.
- There was a significant decline in anemia rates in the last twelve years, since the last national anemia survey of 2003 for both woman and children.
- The anemia rate for children aged 6 to 59 months had dropped from 80.6% in 2003 to 43.8% in 2015.
- For non pregnant women the prevalance of anemia dropped in the same period from 54.8% to 31.1%.
- Most anemic children were mildly anemic (around 25% of all children) and a smaller percentage were moderately anemic (18.4%). Severe anemia is extremely low at 0.4% of children less than five year of age nationally.
- Anemia among pregnant women was lower than in non-pregnant women despite the higher requirement of iron during pregnancy.
- Anemia rates in urban areas were slightly higher than in rural areas for all groups in the survey.

Diet and Food Security

- Rural households had much less diverse diets than urban households, and diets that were less rich in iron and micronutrients. Dietary diversity was also directly related to wealth, with households in higher wealth quintiles having substantially more diverse diets than households in the poorer quintiles.
- According to the WFP Food Consumption Score (FCS) index 8% of households in Bhutan had a "poor" or "borderline" FCS
- Low food consumption scores are related with wealth as the poorest group has 14% of households with "poor" or "borderline" FCS, and only 1% in the wealthiest quintile.
- Rural households and households in the Eastern region had lower than average FCS, with 10% of households in each area with "poor" or "borderline" FCS.
- The percentage of households suffering food insecurity, including food shortages was extremely low (2% of households) and was found to occur only in households in exceptional circumstances.
- Food insecurity is usually affected by seasonal trends and harvest patterns so conducting the survey from March-May may have increased the rate of food insecurity experienced by households relying on stored foods.

Care during pregnancy

- Overall the percentage of women who made antenatal care appointments was very high, 98% of women nationally. A majority of women, 85%, made the recommended minimum of 4 appointments during their pregnancy.
- Over one-fourth of women were attending eight or more ANC sessions recommended in Bhutan.
- The number of ANC vistis was closly related to wealth. Among the richest quintile 39% of women made 8 or more visits, compared to only 17% in the poorest quintile.
- Around two-thirds of women reported that they received dietary advice and nutrition counselling during their ANC visits.
- There was wide coverage of IFA supplemantation among pregnant women with almost 90% of women reporting that they took IFA during their pregnancy at least once a week.
- 16% of pregnant women, reported consuming alcohol during the week before the survey, while 42% reported consuming betel nut.

Child Care and Feeding Practices

- Around half of women (51%) were exclusively breastfeeding their children as per the WHO guidelines.
- Some IYCF indicators were promising: low rate of prelacteal feeding (5%), high rates of early initiation of breastfeeding (78%), good rates of introduction of complementary foods (87%), and the vast majority of children still being breastfed at 1 year of age (92%).
- A major challenge was the low dietary diversity for children 6-23 months based on number of food groups given, including the low percentage being given iron rich foods (17%) as part of complementary feeding. Less than a fifth of parents were feeding children 6-23 months 4 food groups or more in their diet.
- Fever was the most common illness reported in children in the 15 days prior to the survey (26.5%), followed by diarrhea (5.2%) and ARI (1.8%).
- Diarrhea in children was not treated adequately with only a third of caregivers (36%) following the guidelines on administration of ORS, continued feeding and provision of liquids to children ill with diarrhea in the period prior to the survey.
- Vitamin A capsule supplementation (VAC) and deworming coverage was high with 87.0% chilldren reviving VAC in the last 6 months and 89.0 % of children recieving deworming tablets.

Hygiene and Sanitation

- A majority of households in Bhutan had improved water sources (98%) by the international JMP definition.
- In addition, Bhutan has set a more specific standard for improved water source which was also measured in the survey, and nationally 86% of households met the standard.
- Almost three-quarters of households had access to improved sanitation facilities (71%). A similarly high percentage reported behaviors for disposal of child stools that are sanitary and in line with WASH guidelines.
- Access to hand washing stations, based on observation by enumerators, was also high (87.4% of households).

Photo courtesy: UNICEF Bhutan

1

Introduction

Introduction

Bhutan is a landlocked nation with characteristically rugged terrain and scattered settlements occupying a land area of 38,394 sq. km. Its altitude ranges from as low as 200 meters above sea level in the south to as high as 7500 meters in the north. Temperature varies according to elevation with a warm and humid climate in the south and a cold and dry climate in the north. Administratively, Bhutan is divided into 20 districts (Dzongkhags) and 205 blocks (Gewogs).

The country is largely an agrarian economy with 79% of its population engaged in agriculture and livestock farming. The majority of the population lives in rural areas (65.5%) but the urban population (34.5%) is increasing through rapid rural – urban migration (1).

According to the Dzongkhags Population Projection 2006-2015, the population of Bhutan is projected to increase by 19% from 2005 (634,982) reaching 757,042 in 2015 (1). About 41% of the population is under 19 years of age and one third is below 15 years. Approximately 60% of the population is in the economically active age group of 15-64 years, and a little less than 5% is older than 64 years.

Background

The last comprehensive nationwide nutrition survey in Bhutan that included key nutrition indicators was the Bhutan Multiple Indicator Survey (BMIS) conducted in 2010 by National Statistics Bureau (NSB) (2). The BMIS report showed 33.5% of children under 5 years to be stunted, 12.7% underweight, and 5.9% to be wasted based on the international standards of child undernutrition. Prior to the 2010 BMIS a National Nutrition, Infant and Young Child Feeding Survey was conducted in 2008 (3). This survey showed higher undernutrition rates among children with 37% of children less than five years of age stunted, 6% wasted and 11% underweight.

The last national survey of anaemia prevalance in Bhutan was the National Anaemia Survey in 2003 (4). This survey showed that 55% of women (10-49 years of age), 28% of men and 81% of children aged 6-59 months to be anaemic. The survey showed that anaemia in women was already high before they entered childbearing age, and carried over into pregnancy. Further, the rates of anaemia among children were also high before the age for complementary feeding, and remained high as they aged. The National Nutrition Survey (NNS) 2015 was designed to track progress on nutrition indicators in the country, particularly figures for malnutrition and anaemia in women and children in Bhutan. It aimed to generate evidence and to create awareness among Bhutanese policymakers, programme managers, government officials and development partners for policy and programming.

The target indicators for the survey were nutritional status and anemia rates of children under-5 years of age, and anemia rates in adolescent girls and women of reproductive age. The survey provides high quality data on nutritional and anemia status in a representative sample of target populations from across the country.

Objectives

The objective of the survey was to update the information on nutritional status of women and children in Bhutan, and to generate useful evidence for use in nutrition policymaking and programming.

The specific objectives were:

- To estimate the prevalence of malnutrition among children under 5 years of age.
- To estimate the prevalence of anaemia among women aged (10-49 years), pregnant women and children under 5 years of age.

2
Methodology

Methodology

The NNS 2015 was conducted by the Nutrition Programme, Department of Public Health, Ministry of Health (MoH) with financial support from UNICEF. The Technical Working Group (TWG) consisted of members from the National Statistical Bureau (NSB), Khesar Gyalpo University of Medical Sciences of Bhutan (KGUMSB), United Nations Children's fund (UNICEF), the Nutrition Programme and the Research Unit of MoH. The TWG was formed to provide technical inputs and to draw up detailed plans for the study including questionnaire design, training and fieldwork supervision. Technical expertise from Helen Keller International (HKI) was sought to support the TWG during data analysis and report writing. A local firm Bhutan Interdisciplinary Research & Development (BIRD) was contracted to digitize the survey and manage the data, including processing tablet based data from the field.

Sampling strategy

Bhutan is divided into 20 administrative units called Dzongkhags; and each Dzongkhag is subdivided into either Gewogs in rural settings or Towns in urban settings. Gewog are further sub-divided into 1044 Chiwogs; the number of Chiwogs in each Gewog varies between 5 and 7. The towns are subdivided into 311 Enumeration Areas by NSB.

The 2005 census frame (with adjustments made to changes that occurred during the redrawing of boundaries for election purposes in 2008) was used for the selection of clusters in the rural areas. The urban frame used was updated during the urban listing exercise carried out in 2012 in preparation for the Bhutan Living Standard Survey 2012 performed by the NSB.

The sample for the survey was designed to produce statistically reliable estimates of most indicators at the national level and for the three regions of Bhutan, viz., Western, Central, and Eastern. A multi-stage sampling method was used to select clusters; households and eligible participants were selected via the following four stages:

- **Stage 1.** From each region, two Dzongkhags were selected with probability proportional to size (PPS) sampling using the number of household in each Dzongkhag.
- **Stage 2.** The Chiwogs in rural areas and Enumeration Areas in urban areas were defined as primary sampling units (PSUs), and were selected from each of the sampling strata by using PPS sampling procedures; this methodology was based on the estimated sizes (number of households) of the enumeration areas from the above mentioned frames for rural and urban areas. Given the urban and rural population proportion of 30:70, 1812 (72.9%) households were taken from the rural areas while 672 (27.1%) households were taken from urban areas (out of the total sample size of 2484 households). While 49 PSUs from rural settings and 20 PSUs from urban settings

were selected using PPS sampling method from western and central regions, 53 PSUs from rurral settings and 16 PSUs from urban areas were selected from eastern region. Thus, in total 151 out of 1044 PSUs were selected in rural settings, while 56s out of 311 PSUs were selected in urban settings.

- **Stage 3.** Lists of households with unique identification number (IDs) were prepared by the enumerating teams in the field for selected PSUs; 12 households were selected from each selected PSU using circular systematic random sampling technique.
- **Stage 4.** Eligible respondents were selected at the household level, different modules were administered to different household members.

The survey contained 4 modules, which were administered to the relevant household members

- **Module 1:** The Household Module consisted of questions pertaining to household demographic information, household socio-economic status, water supply sanitation and hygiene, household food security and household dietary diversity. The household module was asked to any responsible member of the household, usually the head of the household. Module 1 was administered to the head of the household (HH) or his/her spouse, or any other available family member above 18 years who was knowledgeable about the household.
- **Module 2:** The Women and Child Module consisted of questions pertaining to both the knowledge and practice of child feeding. Module 2 was administered to the woman in the household with the youngest child, and in cases when the mother of the youngest child were not available for interview, the woman with the next youngest child in the household was selected.
- **Module 3:** The Pregnant Women Module consisted of questions pertaining to the dietary intake information of pregnant women and was administered to all pregnant women in selected households during the survey period.
- **Module 4:** The Anthropometry Module consisted of taking height/length and weight measurements, edema assessment and hemoglobin readings from eligible women and children from selected households. Anthropometry was conducted on all children below five years of age in the household, while hemoglobin tests were conducted on all women aged 10-49 years and all children between 6-59 months of age. Where women aged 10-49 years in selected households were absent at the time of survey (for example in boarding schools, or nunneries) they were mapped and followed by the survey team using a mapping form. The enumerators then visited

their institutions where these women were residing to conduct the hemoglobin test.

To assess the equity between the highest performing dzongkhag (Punakha) and the lowest performing dzongkhag (Lhuntse), representative samples were selected from these two dzongkhags (The equity profiles are not presented in this report). From Punakha Dzongkhag 720 households (60 PSUs) were selected, while in Lhuntse Dzongkhag 660 households (55 PSUs) were selected using PPS method. Since Lhuntse was one of the selected Dzongkhags for eastern region, an additional 34 PSUs were selected from the remaining PSUs of Lhuntse.

Sample size

The sample size to estimate the number of households to be surveyed with a 95% confidence level was calculated using following formula:

Step 1. Initial Calculation:

$$n = \frac{(Z^2_{1-\alpha} P(1-P))}{d^2}$$

Where:

Z^2_{1-a} = level of confidence that represents the number of standard errors away from mean. This describes the uncertainty in the sample mean or prevalence as an estimate of the population mean (normal deviate if α = 0.05, then Z = 1.96 for 95% confidence level).

P = Baseline level of indicator.

d = the acceptable margin of error in estimating P; set at 0.05 for this study.

Step 2. Design effect of 1.368 was considered to address the issue of cluster sampling.

Step 3. Finite Population Corrections (FPC). FPC for the three regions and two Dzongkhags were applied to the sample size calculated in Step 2.

Step 4: The expected response rate was 95%. In order to adjust for expected non-response, the sample size from Step 3 was divided by the expected response rate (0.95) to get the final sample size.

The proposed cluster size was 8 individuals or 12 households. Therefore, the calculation yielded a sample size of 828 households for western region, and 816 households each for the central and eastern regions. However, it was proposed and decided that an equal number of 828 households was to be included from all three regions. Thus, the total sample size at the national level was 2484 households. However, if we consider the additional 720 households from Punakha and additional 408 households from Lhuntse, the total sample size at the national level was 3612 households.

Exclusion criteria

For the anaemia test, children below 6 months old were excluded. Where possible all household members were followed up for anaemia testing if they were absent from the household during the survey period; only those household members who were out of the country were excluded.

Questionnaire design

The survey tools for the NNS were based on existing global standards. The questionnaire modules for the NNS were developed in English, as experience from previous surveys indicated that use of an English questionnaire for data collection did not pose major problems. The questionnaire was developed in consultation with stakeholders from UNICEF, MoH and NSB.

When completed the questionnaire was digitized, coded and uploaded onto a commercially available Android based tablet (SymphonyTM). The tablet based questionnaire was field tested in both urban and rural areas of Punakha Dzongkhag. After each field test, field coordinators and supervisors refined the questionnaires. Initially, the NNS questionnaire consisted of a single module divided into different sections, but was later separated into four modules based on experiences from the field test. The final questionnaires was reviewed and approved by the National Technical Working Group (TWG) and sent to consultants from Helen Keller International (HKI) for further review.

Survey Implementation

Data for NNS was collected by 63 health officials from MoH divided into 21 teams. Each team consisted of a Health Assistant, a Laboratory Technician and a Dietician. Seven teams each were sent to each of the 3 regions. The survey teams in each region were supervised by two supervisors, selected from among the members of TWG.

Enumerators Training

All survey teams were trained for seven days on data collection before the start of the survey. The training included sessions on tablet use, administering the questionnaires, taking anthropometric measurements, haemoglobin measurement using the Hemocue 301 machine and addressing problems in the field. It included role play and practical sessions on filling up the questionnaires in the tablet and mock interviews in different local dialects. As part of the training exercise, the enumerators were taken to Serbithang and Namseling to get a real time experience in using the tablet, haemoglobin testing and taking measurements for height and weight. All training was provided by TWG members who were involved in the development of the study questionnaire.

Data Collection, monitoring and quality control

Immediately after the completion of the training, the enumerators were directed to collect the date from urban areas of Thimphu to gain more practice and the supervisors to enable for easier supervision. The enumerators were then directed to their respective sites along with their supervisors.

Two supervisors were assigned to each region to ensure data quality by guiding interviewers during data collection, checking data collection in randomly chosen households, checking all the filled-in tablets and holding discussion with the team members. Any problems in data collection were discussed with the team members, and remedial measures taken accordingly. The supervisors were also given the responsibility of extracting the data from the tablets and sending to a cloud based server managed by BIRD.

NNS engaged high ranking officials of MoH and UNICEF to spot check data collection in the three regions.

Anthropometric measurement

From each selected household, anthropometric measurements were carried out in all children falling within the age range of 0-59 months. The weight of the child was measured to the nearest 0.1 kg using a portable weighing scale (Seca 881) and the height/length was measured to the nearest 0.1 cm using a standard UNICEF supplied wooden measuring board.

Edema assessment

For children 0-59 months, oedema was assessed holding one foot in each hand and applying pressure with the thumbs to the top of each foot for three seconds. The child was recorded as having oedema if both feet showed pitting or impression after the pressure was released.

Hemoglobin measurements

For children 6-59 months, and in women (10-49) years of age, hemoglobin was measured using Hemocue machine 301 and recorded to the nearest 0.1 g/dL. A sizable portion of the women 10-49 years were in schools during the time of the survey, so in order not to miss these women for hemoglobin testing, the individual women were mapped and followed up to their schools and tested for hemoglobin levels.

Consent and ethical clearance

Approval for the study methodology and sampling strategy was obtained from the National Statistical Bureau of Bhutan, and ethical clearance for the study was sought from the Research Ethical Board of Health, MoH. Administrative permissions to conduct the survey was obtained from the Ministry of Home and Cultural Affairs.

During the survey, the enumerators explained the respondents on the survey objectives before beginning the survey, and the written informed consent was sought from the respondent prior to their participation.

Statistical analysis

Data analysis was done using Stata (StataCorp, v13.0). In this report, the data are described using proportions.

Sampling weights

To construct these estimates while accounting for the highly complex sampling design and unequal population levels across Bhutan, estimates were weighted using sampling weights that were constructed based on each household's estimated probability of selection. These weights were constructed using projected population file, the same file that was used by Ministry of Health in sample selection, as well as the household listings that were taken in every chiwog surveyed. The process for constructing these weight was based on guidelines found in the Sampling Guide by Robert Magnani (5). Due to the complexity added by the somewhat purposeful section of the equity districts for oversampling, a few assumptions were required during the process of calculating weights.

Multiple survey weights were constructed depending on the type of analysis being undertaken. Because of the non-proportional allocation of the sample to the four areas of interest (the regions individually, the nation as a whole and the two equity dzongkhags), sampling weights are required to ensure the representativeness of the sample at the national and regional level. As all sample selection was made with probability proportional to size by household population, the household population was considered in each stage of sampling weight construction. General formulas for weight design are given below. Further details on additional assumptions are given in the appendix.

The probability of dzongkhag selection varied by region but was calculated as follows:

However, for Punakha, which was selected into the sample as an equity district, the probability of selection was one as it was not selected using probability sampling.

Subsequently, the probability of chiwog selection is calculated as follows though the number of chiwog selected varied if a chiwog was rural or urban as indicated by:

In the equity dzongkhag a given number of chiwogs were selected in addition to or instead of the sample disaggregated by rural and urban areas. In this case the probability of this area was calculated separately and added to the disaggregated probability.

If population of a chiwog permitted 12 household were selected randomly per chiwog. Subsequently, the probability of overall household selection is calculated as follows:

$$P_{dzongkhag} = \frac{2_{dzongkhag\ selected} \times hh\ population_{dzongkhag}}{\#\ dzongkhag_{region} \times hh\ population_{region}}$$

However, for Punakha, which was selected into the sample as an equity district, the probability of selection was one as it was not selected using probability sampling.

Subsequently, the probability of chiwog selection is calculated as follows though the number of chiwog selected varied if a chiwog was rural or urban as indicated by:

$$P_{chiwag\ rural} = P_{dzongkhag} \times \frac{\#\ selected_{chiwag\ rural} \times hh\ population_{chiwag}}{\#\ chiwag_{dzongkhag\ rural} \times hh\ population_{dzongkhag\ rural}}$$

$$P_{chiwag\ urban} = P_{dzongkhag} \times \frac{\#\ selected_{chiwag\ urban} \times hh\ population_{chiwag}}{\#\ chiwag_{dzongkhag\ urban} \times hh\ population_{dzongkhag\ urban}}$$

In the equity dzongkhag a given number of chiwogs were selected in addition to or instead of the sample disaggregated by rural and urban areas. In this case the probability of this area was calculated separately and added to the disaggregated probability.

If population of a chiwog permitted 12 household were selected randomly per chiwog. Subsequently, the probability of overall household selection is calculated as follows:

$$P_{household} = P_{dzongkhag} \times P_{chiwag} \times \frac{\#\ hh\ selected_{chiwag}}{\#\ hh\ listed_{chiwag}}$$

Sampling weights was calculated as the inverse of its overall selection probability, as follows:

$$W_i = \frac{1}{P_i}$$

Since information on all women and children in households were sampled the same household weight was maintained in all datasets, but it was normalized separately. The final sets of weights were normalized to equal the total number of unweighted cases at the national level. No adjustment was made for household non-response.

Accounting for survey design

The multistage sampling structure that was used NNS 2015 resulted in a dataset clustered within selected households, villages, and dzongkhags. Throughout the sampling process selection was done without replacement (each chiwog and households will only be sampled once, there were not double samples from selected chiwogs). In order to properly estimate the confidence intervals in the prevalence estimates in subsequent reports, the Stata svy commands will be used throughout the analysis. All analysis and estimations were performed utilizing the svy commands in Stata, taking into account the complex sampling design. Further details are given in the appendix.

Limitations

This survey improved upon the methods used in the 2003 anemia survey, but due to cost and logistical challenges, NNS 2015 was not able to completely replicate the excellent methods used in the 2010 BMIS. Data were only collected from selected dzongkhags instead of sampling from each dzongkhag as was done in the 2010 BMIS. Data was only collected at the district level for two districts - Punakha and Lhuntse which was used to construct equity profiles. The urban and rural population proportion of 30:70 used for sampling may not represent the ground reality espicially since there may have been many rural urban migration since this proportion was estimained in 2005. At the time of the survey there was no new data on the rural and urban proportion,so the NSB's 2005 sampling frame was used. In addition to these sampling limitations, it is also possible that the altitude corrections used may not be completely accurate as altitude information was not collected by household. However, the methodology used to adjust for altitude improved on the 2003 anemia study which used district level averages for altitude. This previously used methodology includes many uninhabited high altitude

regions in the averages, whereas this study used chiwog level averages for altitude thus including only regions where populations actually live.

Report structure

The findings from the survey are summarized in the following thematic chapters:

- Household Characteristics
- Child Growth
- Anemia
- Diet and Food Security
- Care During Pregnancy
- Child Care and Feeding Practices
- Hygiene and Sanitation

The Household Characteristics section presents key background information about the households in the study including household size, education level and main household sources of income. This section also presents the wealth index, a composite indicator based on asset ownership and other measures of wealth, which divides households into quintiles from least wealthy (Q1) to most wealthy (Q5). These wealth quintiles are used throughout the report to show the relationship between wealth and outcomes across a range of indicators.

The Child Nutrition and Anemia sections presents the findings on a range of outcome indicators including wasting, stunting and underweight among children under 5, and anemia rates among the key groups targeted in this study – children under 5, adolescent girls and women of childbearing age (including both pregnant and non-pregnant women).

Following this, each section presents findings from the survey thematically starting with Diet and Food Security, then Care during Pregnancy, Infant and Young Child Feeding (IYCF) Practices, and finally Hygiene and Sanitation.

Photo courtesy: UNICEF Bhutan

3

Household Characteristics

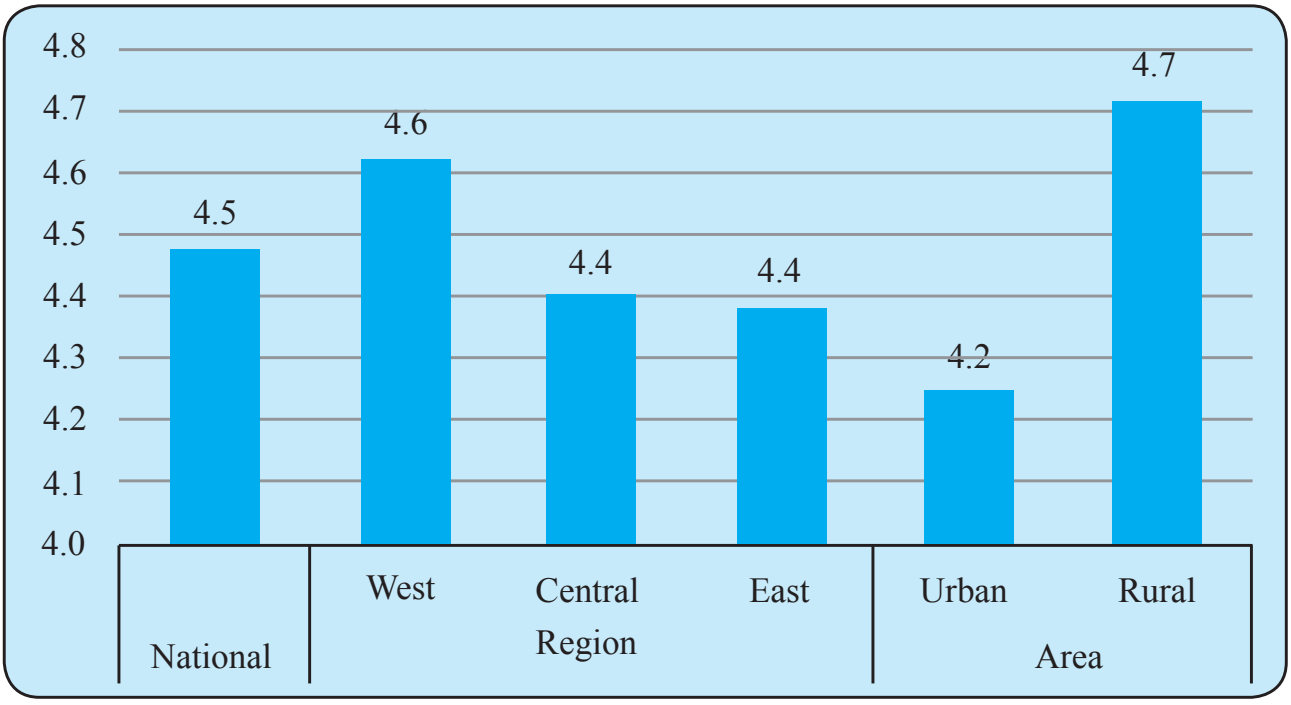
Household Characteristics

- Average household size was larger in rural areas (4.7 members) than in urban areas (4.2 members).
- Urban households were the majority in the wealthiest quintiles and rural households were predominately in the poorest quintiles.
- Education level of household heads was higher in urban than rural areas.
- Combined, two-thirds of household heads in urban areas completed some form of formal education (primary school, secondary school or further studies) compared to less than one-fifth in rural areas.
- More than half of main income earners in rural households had no education (57%) compared to only a quarter of urban household heads (24%). Wages and salary were the main sources of income for households nationally. Around half of rural households derived income from wages and salary (48%), however 81% still derived income from agriculture.

Household Characteristics

A total of 3,571 households were surveyed for this study, stratified in alignment with estimates of urban and rural population sizes (30:70). All adolescent girls, women, pregnant women and children under 5 years of age were included in this survey, resulting in a total of 5,176 women aged 10-49 years,1,449 children less than five years of age and 148 pregnant women. As shown in Figure 1 the average size of households was 4.5 members per household, with average household size higher in rural areas.

Figure 1. Average size of household (number of members)



Household Wealth Index

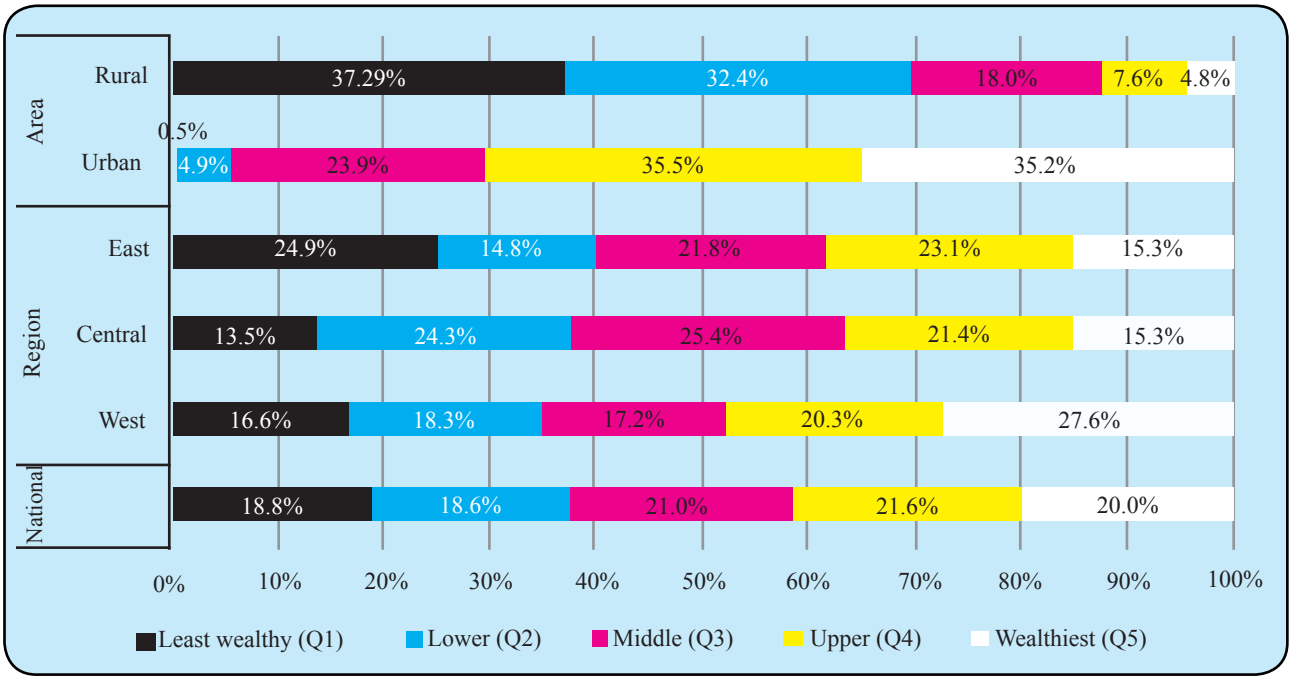
The NNS 2015 collected information on the quality of household structures, cooking, water and sanitation systems, and asset ownership. These household characteristics are typically associated with overall health and nutritional outcomes and the ability to weather periods of crises. Additionally, using standard methodology, these assets can be used to determine the relative wealth status of households (6). The wealth index is a "composite measure of a household's cumulative living standard" that places individual households on a "continuous scale of relative wealth." The index is vital for analyzing public health questions as it allows for identification of problems and patterns that occur in different sections of the population, like increased risk of anemia and exposure to diseases relating to poor housing among poorer households.

The method used for developing the wealth index in this survey was based on the model used by the

National Statistics Bureau. The index is derived using a range of indictors related to living standards and asset ownership including quality of housing, access to land, ownership of assets such as livestock, type of water sources in the home and others. Then using the wealth index all households are divided into quintiles, each containing an equal number of individuals. This results in the proportion of households varying between wealth quintiles as the size of households vary.

In NNS 2015, less wealthy households tended to be larger, leading to a lower percentage of households falling into the lowest two wealth quintiles. The wealthiest households were concentrated in urban areas (Figure 2). Two-thirds of urban households fell into the two wealthiest quintiles while only 0.5% urban households fell in the least wealthy quintile. Conversely, over two-thirds of rural households fell in the lowest two income quintiles. In addition, there was regional variation in wealth. In the Western region over one fourth of households were in the wealthiest quintile compared to less than one-sixth households in the other two regions. The Eastern region had the highest proportion of households in the poorest quintile (nearly one-quarter) with 24.9%. These regional differences may relate to the varying levels of urbanization in the different regions.

Figure 2. Proportion of households in each wealth category by region



Education

NNS 2015 measured the education level of all households' members including the education level of mothers of young children and household heads. These indicators are important determinants of health status (7). Results show little variation in the level of educational attainment of household heads across the three regions of Bhutan, but significant difference between rural and urban households (Figure 3, regional variable not shown). More than half of the household heads in rural areas did not complete any education compared to only a quarter in urban areas. Combined, more than two-thirds of respondents in urban areas completed some form of formal education (primary school, secondary school or further studies) compared to only 29% in rural areas.

Figure 3. Education level of household heads

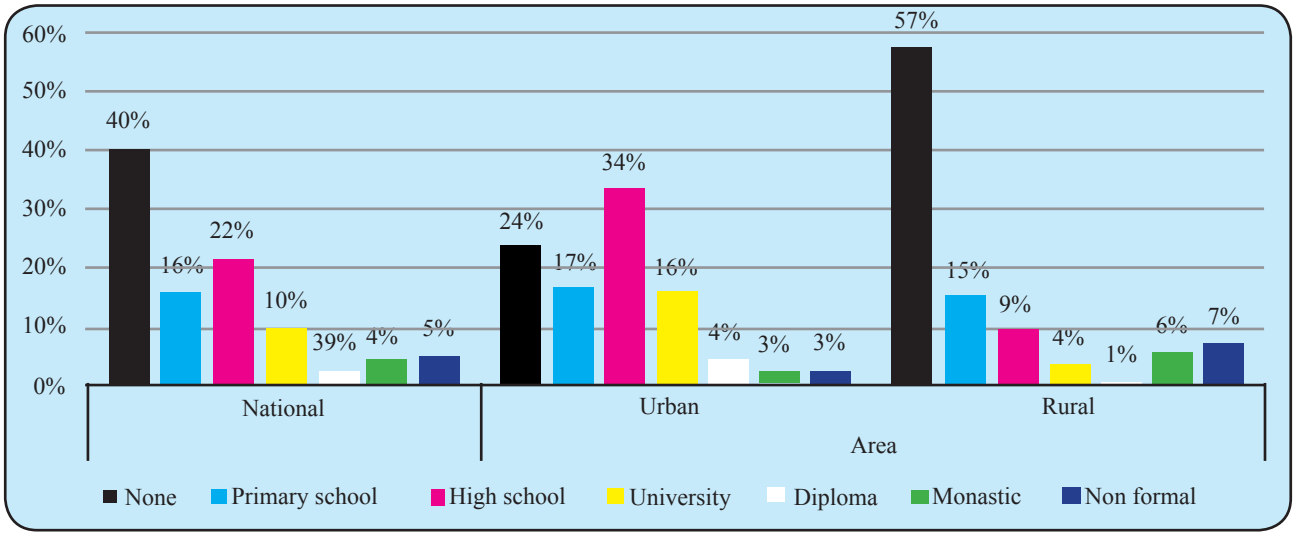
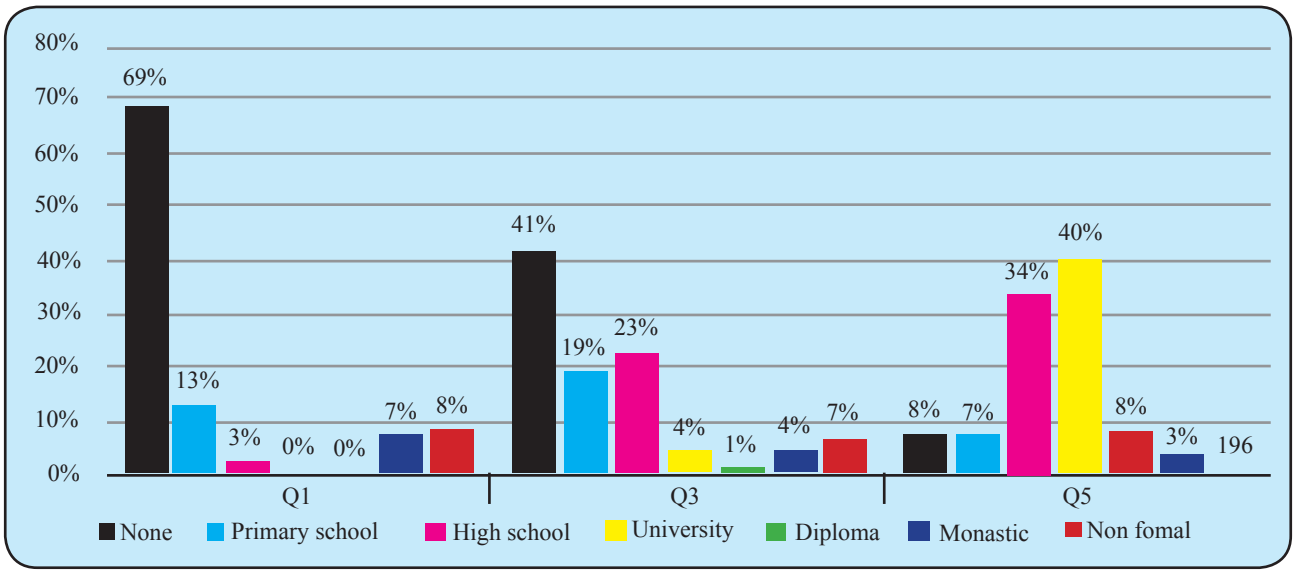


Figure 4 shows the difference in educational attainment of household heads by wealth quintile (only the lowest, middle, and wealthiest quintiles are shown for ease of formatting). Unsurprisingly, there was an association between wealth quintile and educational attainment. More than two-thirds of household heads in the poorest wealth quintile had no formal education, compared to two-fifths in the middle income quintile, and less than one-tenth in the wealthiest quintile. Monastic and non-formal education was more prevalent among household heads in the poorest wealth quintile.

Figure 4. Education level of household head by wealth quintile



Household income

NNS 2015 allowed the coding of multiple sources of income for households. Results indicate that waged/salaried jobs were the most common means of acquiring an income across all regions and in both urban and rural areas. Well over three-fifths of households nationally earn income from regularly salaried occupations and this was the only income source supporting over half of households. The next most common sources of income was agricultural activity, with over two-fifths of households being supported by this income source, and business income, with a little less than one-fourth of households supported through this means. Unsurprisingly, urban areas had a higher proportion of households earning income from salaried occupations and a lower proportion earning income from agriculture. Regionally, a greater proportion of households in the central region relied on agriculture than in the other regions (Figure 5).

Figure 5. Household Main Sources of Income

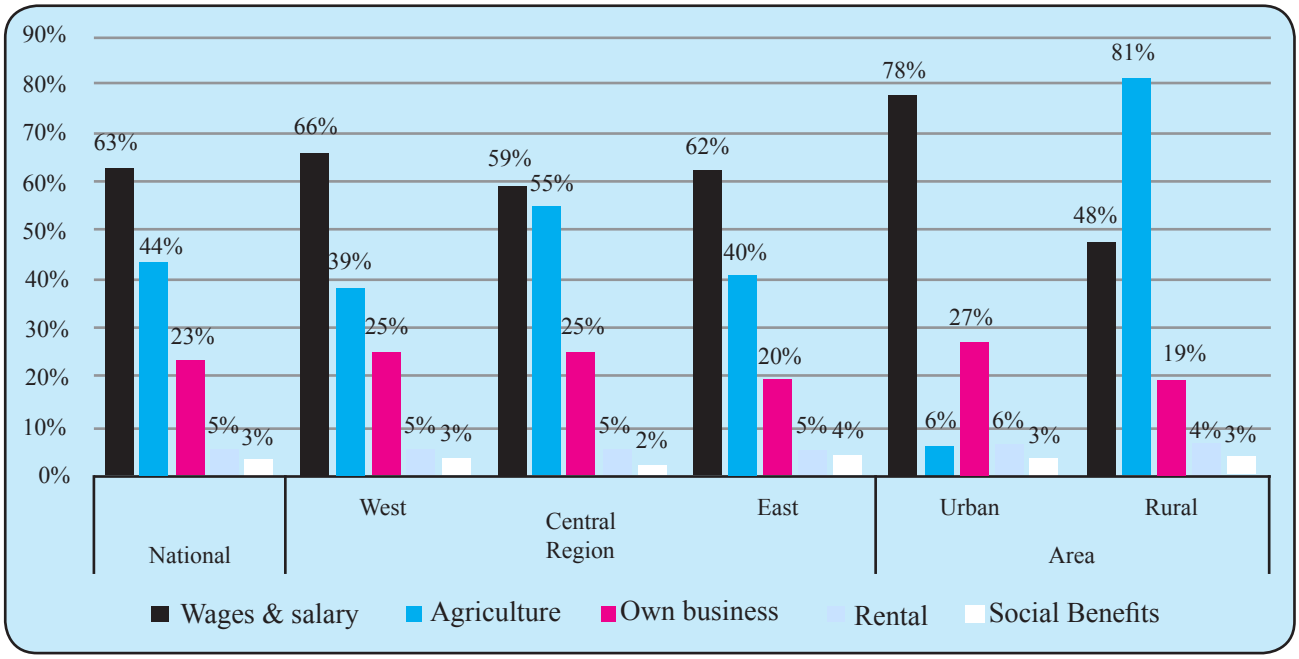
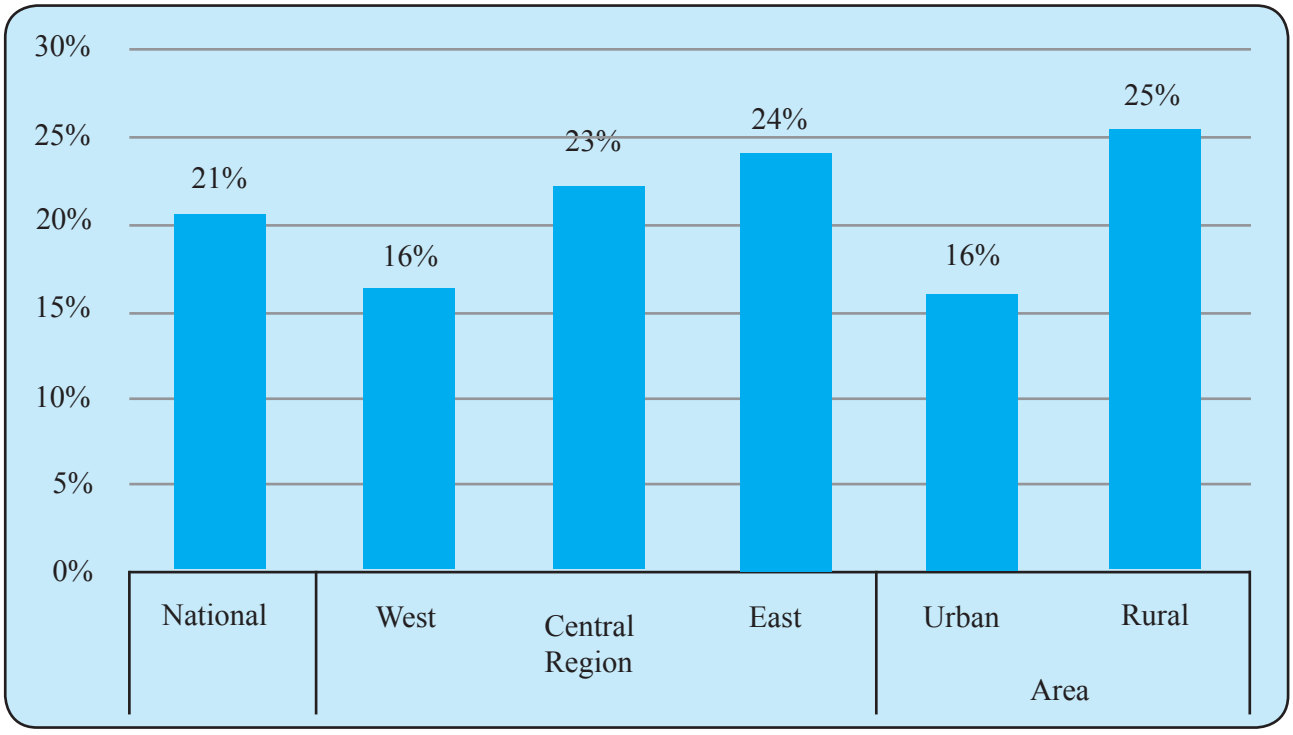


Figure 6. Households Receiving Remittances

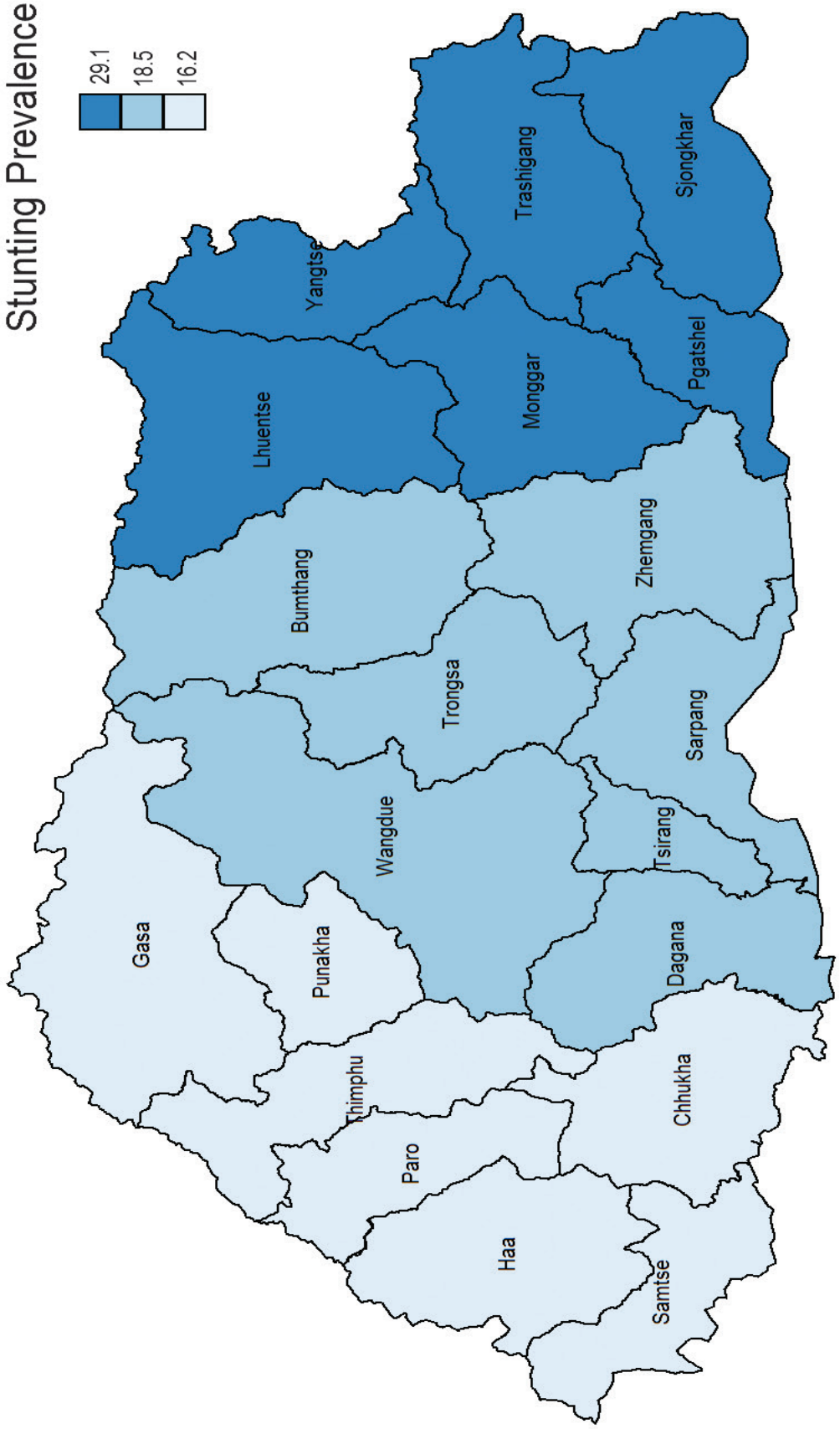


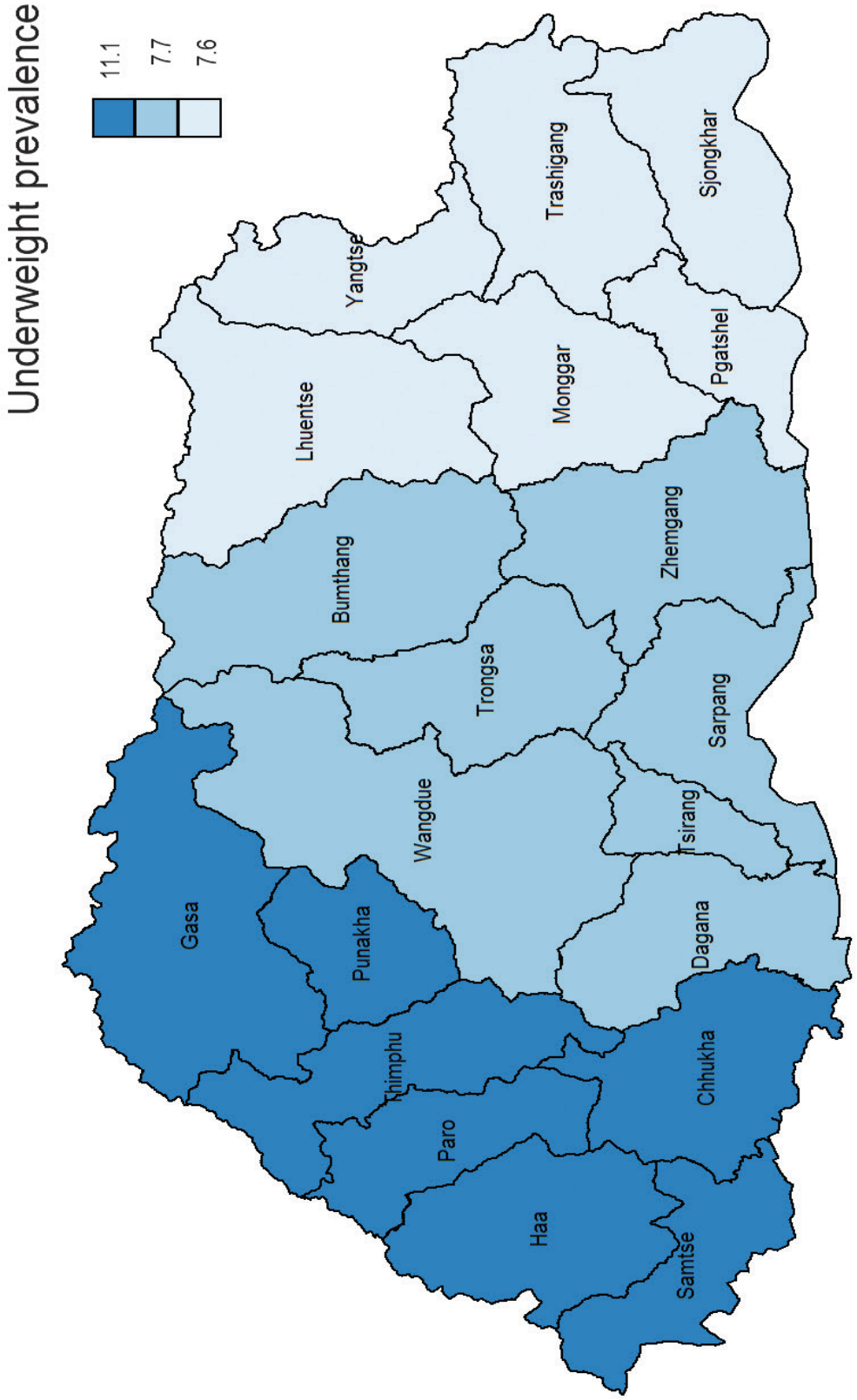
Among all households surveyed, around one-fifth reported that individuals who did not permanently live with their household sent money to support the household (Figure 6). The vast majority of remittances were from work within Bhutan, and not from work abroad. As shown in Figure 6 a higher percentage of households from rural areas receive income from remittances which is not surprising due to better paid work opportunities in the towns. Regionally, more households in the Eastern and Central regions receive income from remittances than in the Western region.

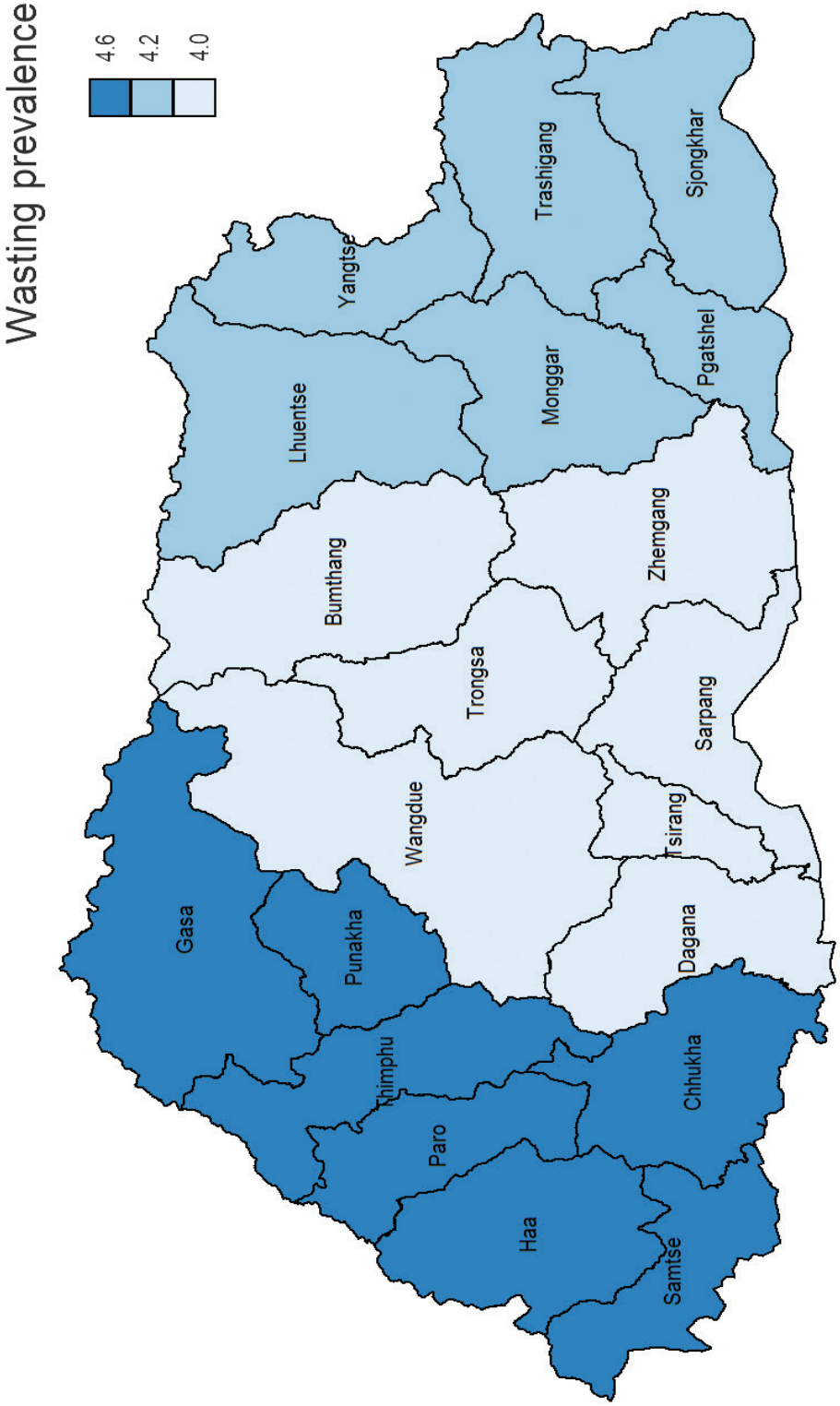
Photo courtesy: UNICEF Bhutan

4

Child Growth


Stunting Prevalence
29.1
18.5
16.2
Lhuentse
Yangtse
Trashigang
Sjongkhar
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse


Underweight prevalence
11.1
7.7
7.6
Trashigang
Sjongkhar
Yangtse
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse


Wasting prevalence
4.6
4.2
4.0
Trashigang
Sjongkhar
Yangtse
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse

Child Growth

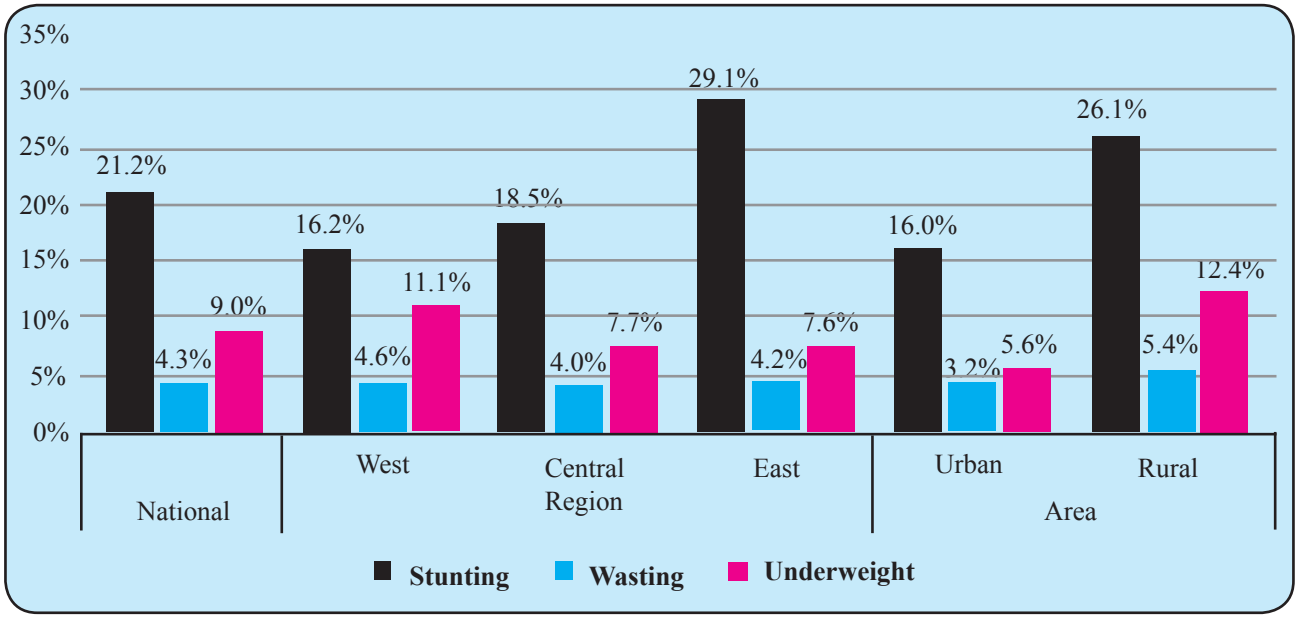
- 21.2% of children aged 0-59 months were stunted (chronic undernutrition). According to the WHO definition, child stunting in Bhutan can be classified as of "moderate public health significance" (above 20%). Certain groups had higher than average stunting rates – over a quarter of children in rural areas were stunted (26.1%) and a larger percentage of children in Eastern region were stunted (29.1%).
- Stunting in children 6 to 59 month of age had fallen since the last two national nutrition surveys – from 37% in NNS 2008 and 34.8% in BMIS 2010 to 22.3% in NNS 2015.
- Stunting prevalance were higher among children in poorer quintiles of the population. In Q1 (the least wealthy quintile) 35.1% of children were stunted compared to 5.7% of children in Q5 (the wealthiest quintile). Similarly, severe stunting was much higher in the poorer quintiles of the population. In the poorest quintile it was 23.3% among children 6-23 months.

Child Growth

This section presents data on child growth indicators including stunting, wasting and underweight for children less than five years of age. All of these indicators are defined based on the WHO 2006 reference population where a child's growth attainment is categorized using standard deviations (SDs) from the mean for a child of a given type. Moderate under nutrition is defined as between -3 and -2 SDs from the mean while severe under nutrition is defined as less than -3 SDs from the mean. Stunting, also known as chronic malnutrition, is defined using height-for-age or the height of the child given the child's age. Wasting, also known as acute malnutrition, is defined using weight-for-height or the weight of the child given the child's height. In comparison to stunting, wasting describes more recent malnutrition and/or severe instances of weight loss (like in the case of illness). Acutely malnourished children are at a higher risk of mortality and may develop mental impairments. Because of its acute nature, wasting highlights the need for regular monitoring and evaluation so as to better prevent malnutrition as a whole (8). Underweight is defined using weight-for-age or the weight of the child given the child's age. Child underweight can be caused by wasting or stunting or a combination of the two and as such it is a less precise measure.

Stunting is a primary public health concern because it irreversibly impedes a child's development and learning capacity, having effects that last into adulthood and negatively impact on an individual's overall productivity. The "window of opportunity" to intervene to prevent stunting closes at the end of a child's first 24 months of life (the '1000 Golden Days' beginning at conception) highlighting the need for early interventions to prevent stunting. After two years of age it is virtually impossible to reverse the effects of stunting in early life or allow for catch-up growth and development (8).

Figure 7. Prevalence of stunting, wasting, and underweight by region (0-59 months)



For all three indicators of undernutrition, Bhutan can be classified according to World Health Organization criteria as having a public health problem of low or moderate significance. However, certain vulnerable populations such as rural children and children in the Eastern region of the country, still suffer high rates of undernutrition, particularly stunting. The WHO classification cut-off for a moderate public health problem is 20% for stunting, 10% for underweight, and 5% for wasting (9). Through this classification crietria the eastern region had a moderate public health problem of stunting and rural areas had moderate public health problem by all three indicators.

Nationally 21.2% of children aged 0-59 months were stunted. Regionally, there were large variation in child stunting rates, followed by rates of child underweight, with limited variation in child wasting rates (Figure 7). Nearly twice as many children are stunted in rural areas compared to urban areas while the relative difference is even larger for child underweight.

Rates of under nutrition varied greatly by the age of the child, especially for stunting as the cumulative effects of linear growth retardation accumulated (Figure 8). Child stunting increased rapidly between the first and second year of life. Almost one-third of children in their fourth year of life were stunted. In contrast, child wasting, declined after 3 years of age. The proportion of children underweight only increased slightly with age.

Figure 8. National prevalence of stunting, wasting, and underweight by age of child

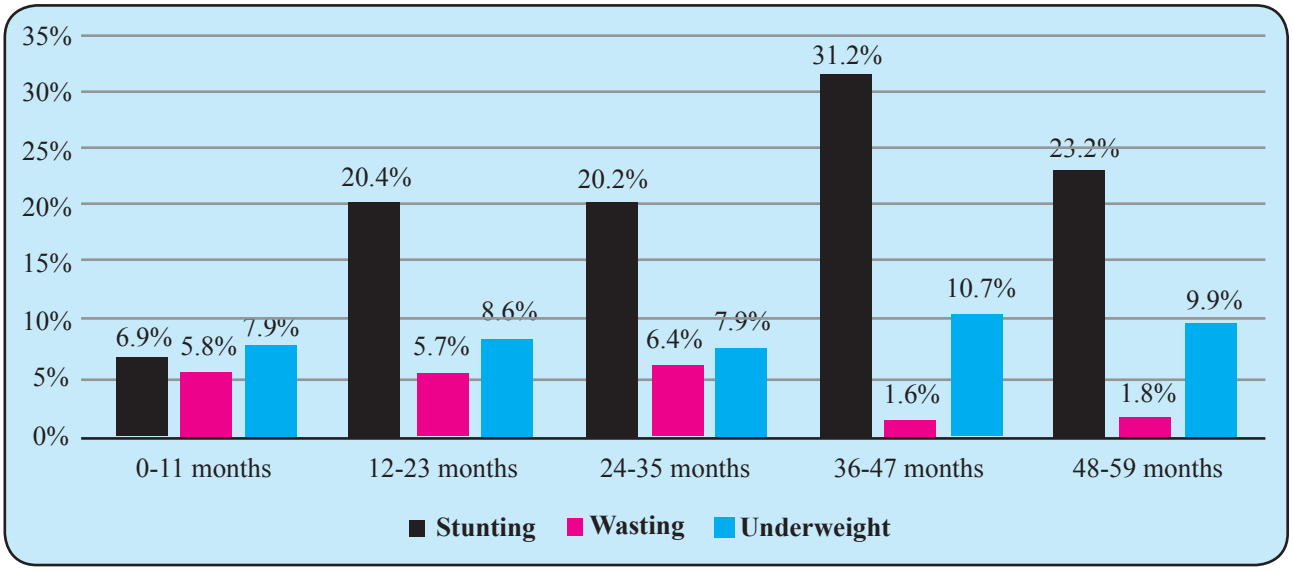


Table 1: Child under nutrition by wealth quintile

Wealth Quintile		Moderate	Severe	Total
Least (Q1)	Stunting	23.3%	11.8%	35.1%
	Wasting	2.7 %	4.3 %	7.0 %
	Underweight	9.8%	5.1%	14.9%
Lower (Q2)	Stunting	16.6%	5.0%	21.6%
	Wasting	1.8%	1.8%	3.6 %
	Underweight	5.6%	3.0%	8.6%
Middle(Q3)	Stunting	17.4%	3.8%	21.2%
	Wasting	1.7%	1.2%	2.9%
	Underweight	5.1%	2.1%	7.2%
Upper(Q4)	Stunting	11.7%	6.8%	18.5%
	Wasting	3.3%	2.6%	5.9%
	Underweight	3.5%	4.7%	8.2%
Wealthiest(Q5)	Stunting	3.8%	1.9%	5.7%
	Wasting	1.0%	0.8%	1.7%
	Underweight	1.3%	4.4%	5.6%

Stunting was strongly related to the relative wealth of the household. Children in the lowest wealth group were stunted at over six times the rate as children in the wealthiest quintile (table 1). Severe stunting was also much higher in the poorer quintiles of the population; in the least wealth quintile nearly six times the proportion of children were severely stunted as in the wealthiest quintile. A similar relationship existed between child underweight and household wealth quintile, however the ratio between the wealthiest and the least wealth was much smaller at only a little more than double the proportion of children underweight in the least wealthy quintile compared to the most wealthy.

Historical trends.

The results from NNS 2015, with some minor adjustments the excludes children under 6 months, are compared to findings from the previous two national nutrition surveys, the BMIS 2010 and NNS 2008. Notably, the NNS in 2008 did not collect measurements of children under 6 months of age, so comparisons with that survey was made excluding this age group as the prevalence of undernutrition was found to be the lowest in that age group (Figure 8). Nationally, stunting prevalence had declined in Bhutan between 2010 and 2015 for this age group from over one-third of children to a less than one-quarter. Decline in the rateof wasting and child underweight were also seen during this period (Figure 9).

Figure 9. Trends in stunting, wasting, and child underweight (6-59 months)

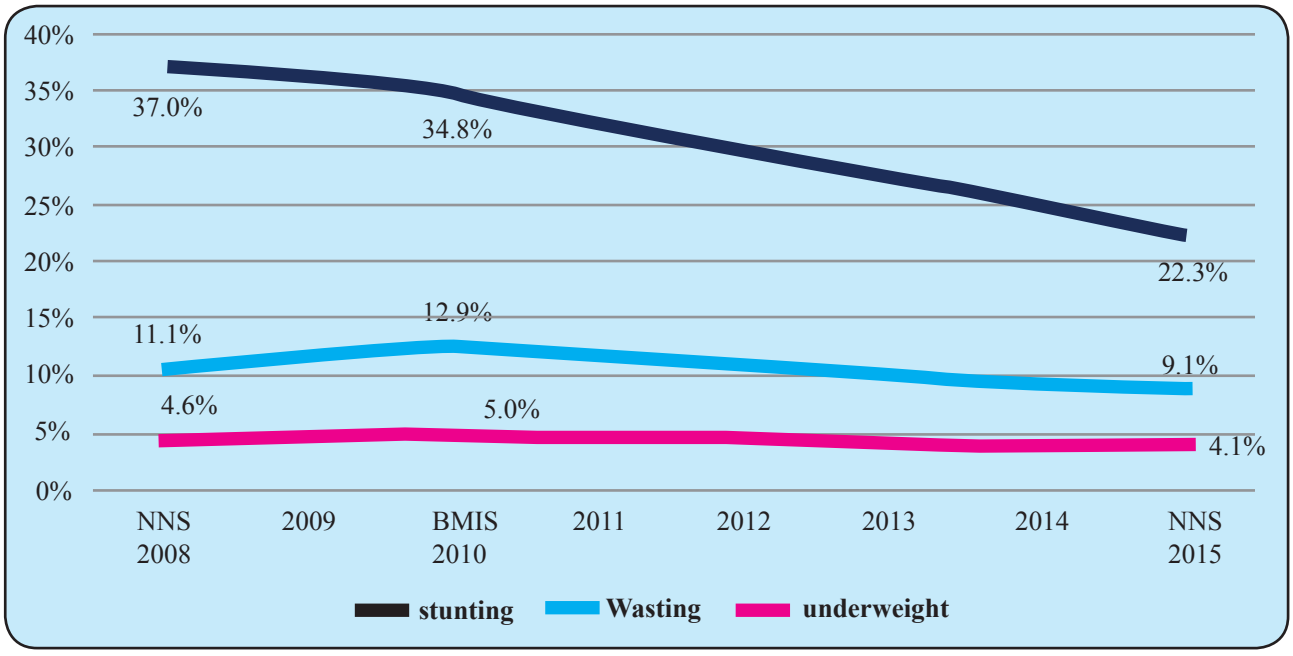
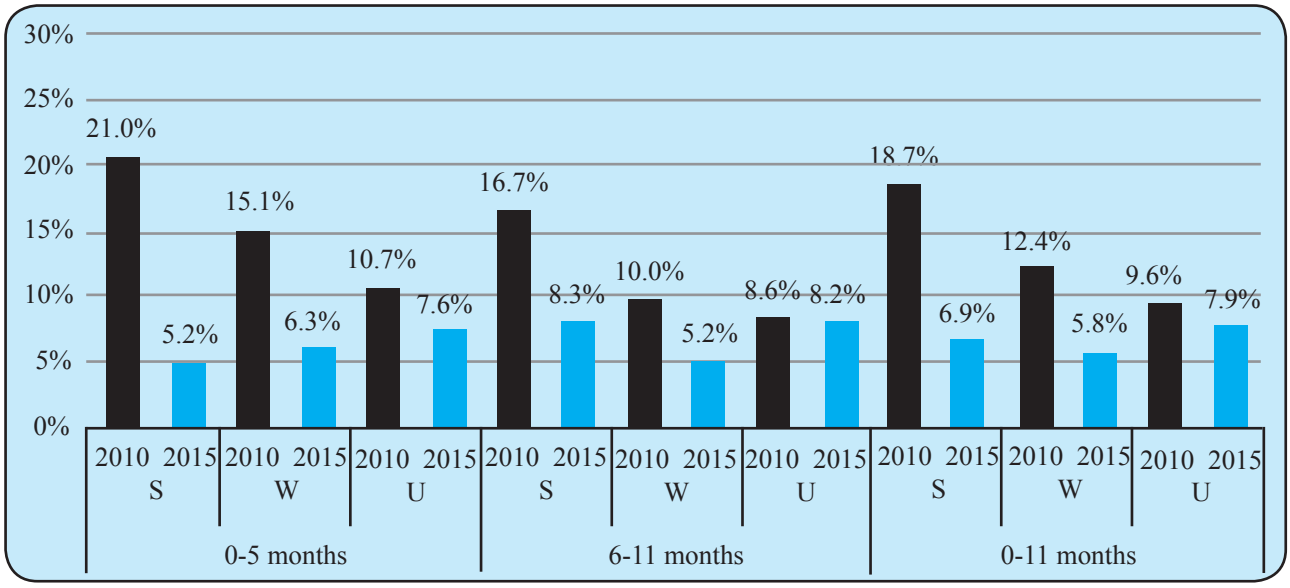


Figure 10 compare the rates of under nutrition in the BMIS 2010 and NNS 2015 for the youngest children in the sample. Notably, the size of the decline among these children was much larger than the decline in all age groups. While BMIS 2010 had a large proportion of children who were stunted, in 2015 the rate of stunting was less than one-quarter of the 2010 level for children zero to five months of age. Among slightly older children of six to eleven months of age, the decline in stunting was almost by half. Notably, stunting wasting and underweight improved more for the youngest age group compared to the older age group.

Figure 10. Under nutrition among children 0-11 months in 2010 and 2015 by age

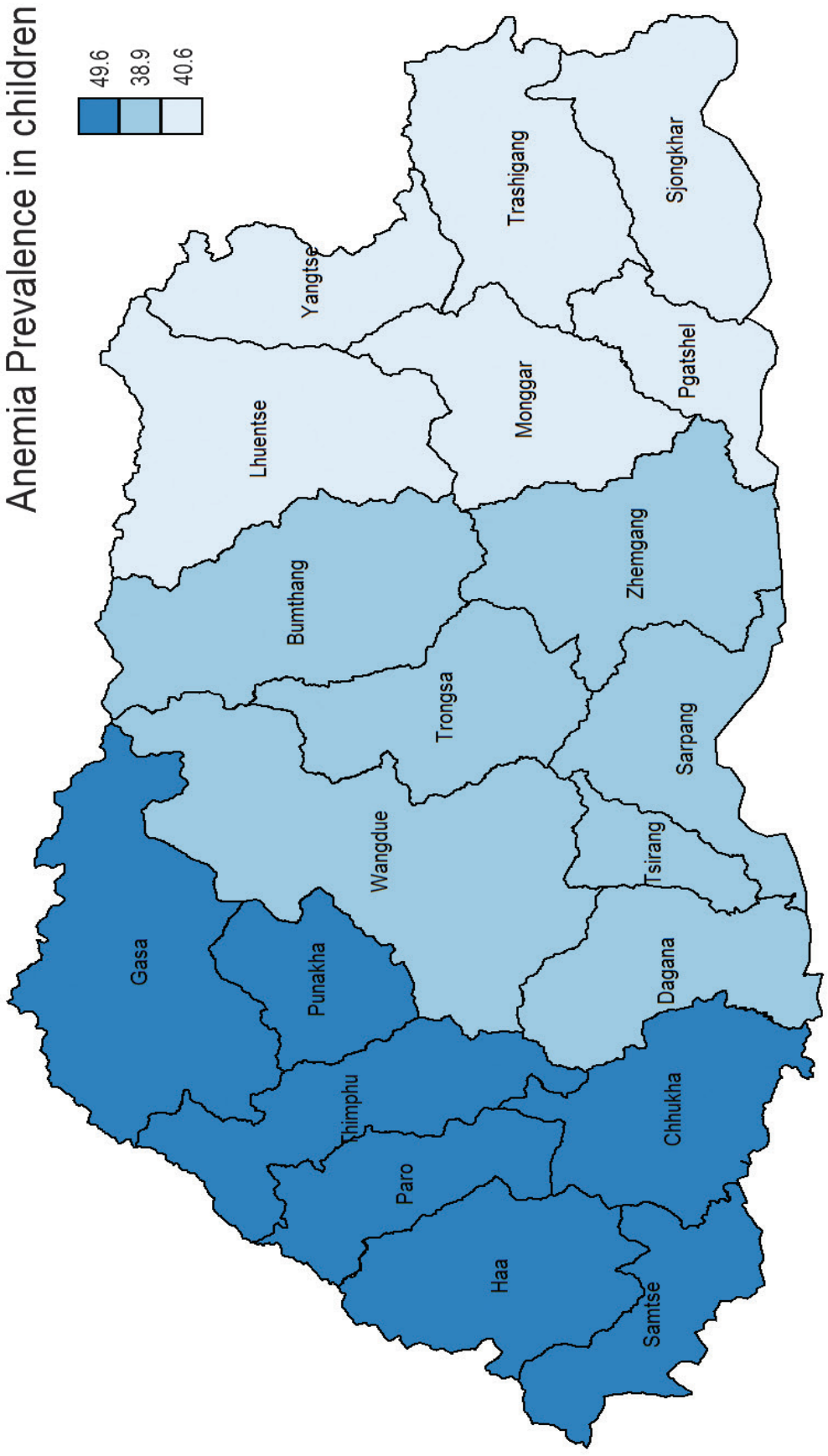


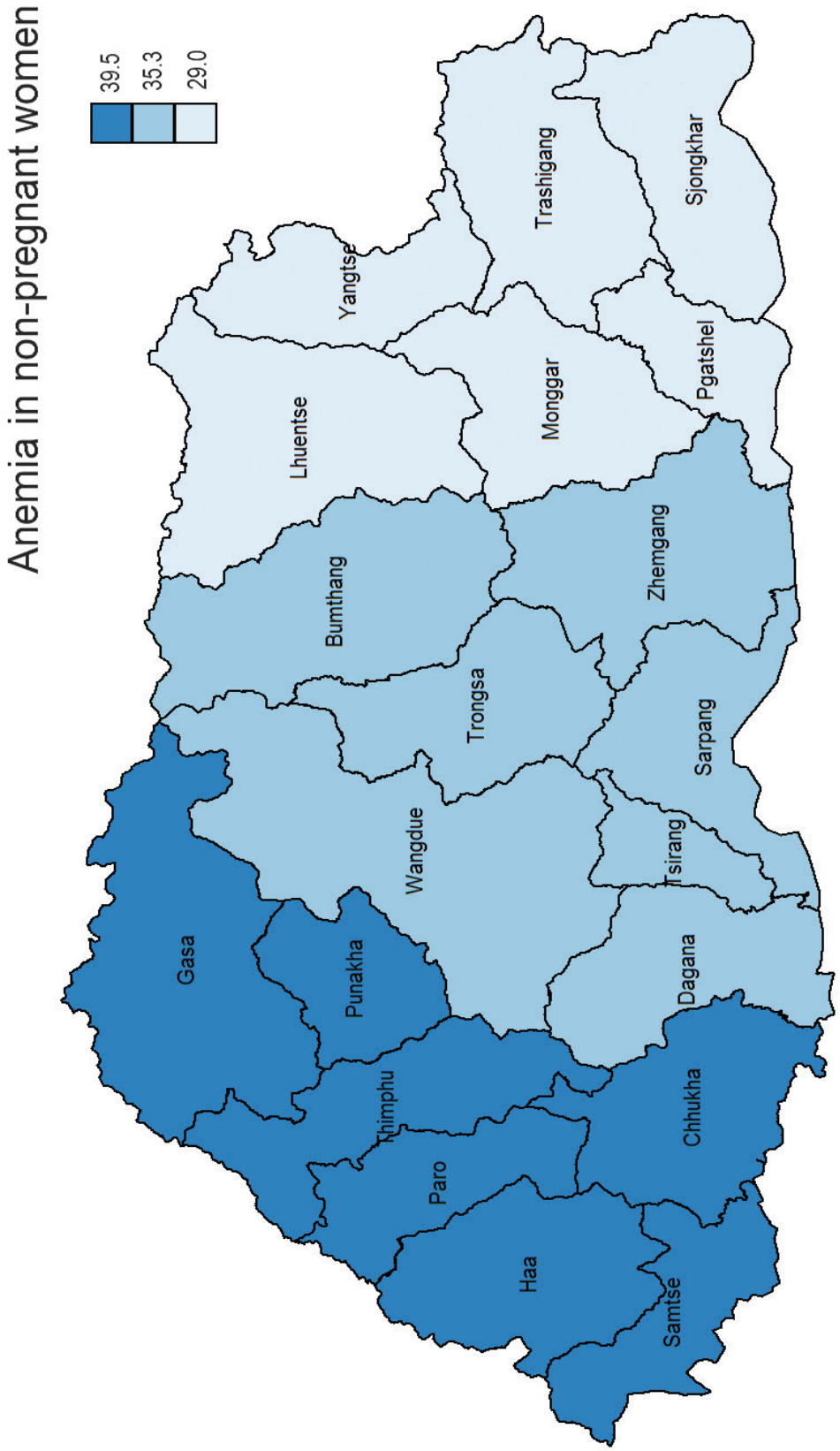
Despite the progress in reducing childunder nutrition in Bhutan, the findings from NNS 2015 showed that there are still regions and demographic group that remain vulnerable and had high rates of stunted, wasted and underweight children. Notably, compared to the 2010 BMIS, the relative differential in stunting rate between the wealthiest and the least wealthy children had increased in the last five years, even as overall rates of under nutrition had declined. While in 2010, stunting in children in the least wealthy quintile was less than twice the rate as the wealthiest, however in 2015 this gap increased to over six times the rate.

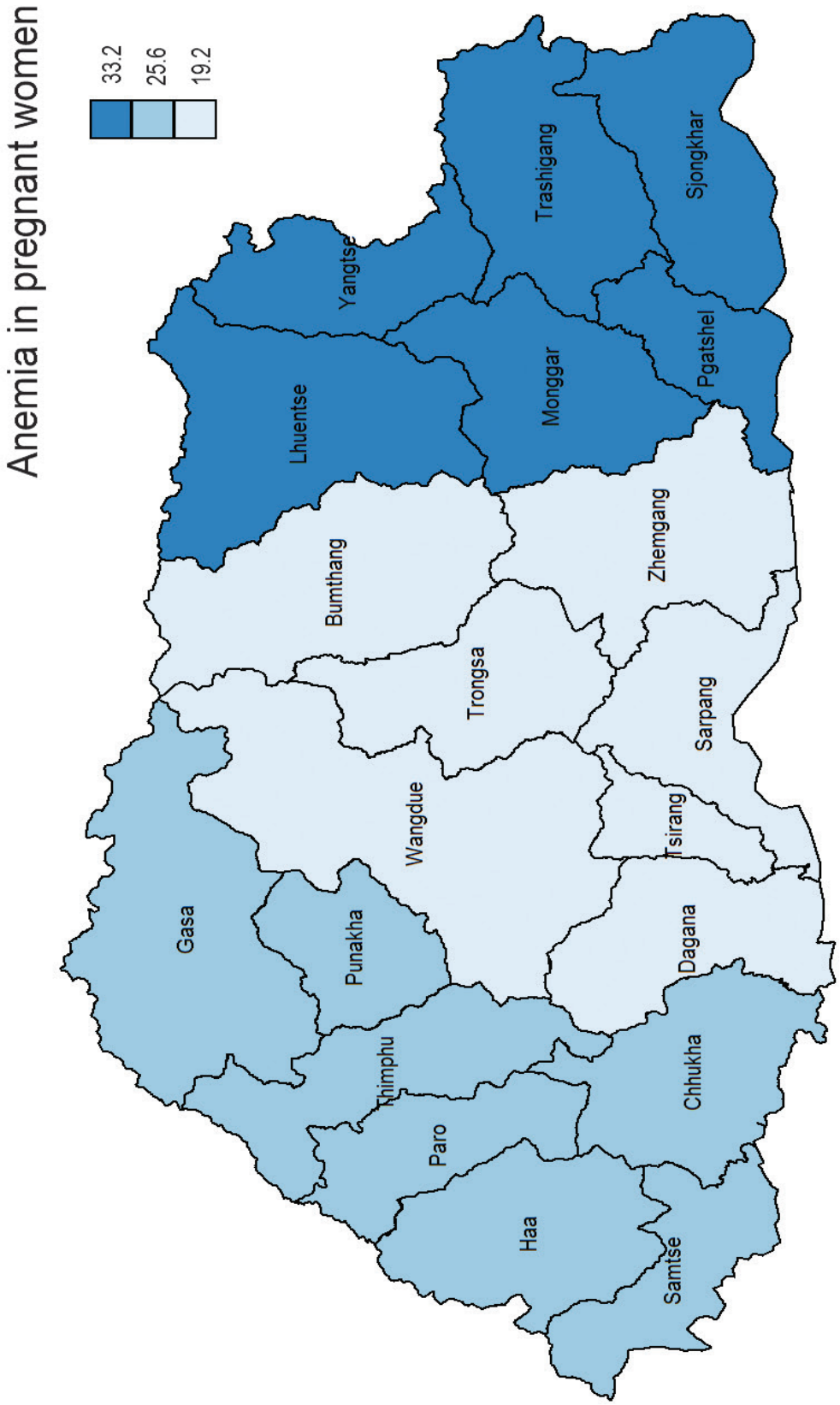
Photo courtesy: Pemba Yangchen, MoH

5

Anemia


Anemia Prevalence in children
49.6
38.9
40.6
Trashigang
Sjongkhar
Yangtse
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse


Anemia in non-pregnant women
39.5
35.3
29.0
Trashigang
Sjongkhar
Yangtse
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse


Anemia in pregnant women
33.2
25.6
19.2
Lhuentse
Yangtse
Trashigang
Sjongkhar
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse

Anemia

- Based on the WHO categorization anemia represents a “severe” public health issue if affecting more than 40% of the population. Based on this definition, anemia prevalance of 43.8% in children aged 6-59 months fell into this category. The prevalance of anemia in women and adolescent girls indicated a moderate public health problem with rate between 30% and 40%.
- There was a significant decline in anemia rates in the last twelve years, since the last national anemia survey of 2003 for both woman and children.
- The anemia rate for children aged 6 to 59 months had dropped from 80.6% in 2003 to 43.8% in 2015.
- For non pregnant women the prevalance of anemia dropped in the same period from 54.8% to 31.1%.
- Most anemic children were mildly anemic (around 25% of all children) and a smaller percentage were moderately anemic (18.4%). Severe anemia is extremely low at 0.4% of children less than five year of age nationally.
- Anemia among pregnant women was lower than in non-pregnant women despite the higher requirement of iron during pregnancy.
- Anemia rates in urban areas were slightly higher than in rural areas for all groups in the survey.

Anemia

Anemia is the most common micronutrient deficiency and has major consequences for human health resulting in reduced social and economic development. Iron deficiency anemia can occur at any stage of life, but is usually more prevalent in women, due to their higher iron needs during menstruation and pregnancy, and young children, due to higher iron needs for growth and often limited dietary intakes at the youngest ages.

Anemia is a "condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiological needs;" common side effects include fatigue, weakness, and dizziness (10). The main causes of anemia include dietary iron deficiency, infectious diseases (like malaria or hookworm), inherited disorders of hemoglobin structure, and other nutritional deficiencies (such as vitamin B12). Interventions to prevent and correct iron deficiency anemia include measures to increase iron intake through food-based approaches, namely dietary diversification and food fortification with iron, iron supplementation, and by improved health services and sanitation. For pregnant women, neonates, and children, anemia can cause a range of problems varying from increased risk of mortality to cognitive and physical developmental problems throughout life (10).

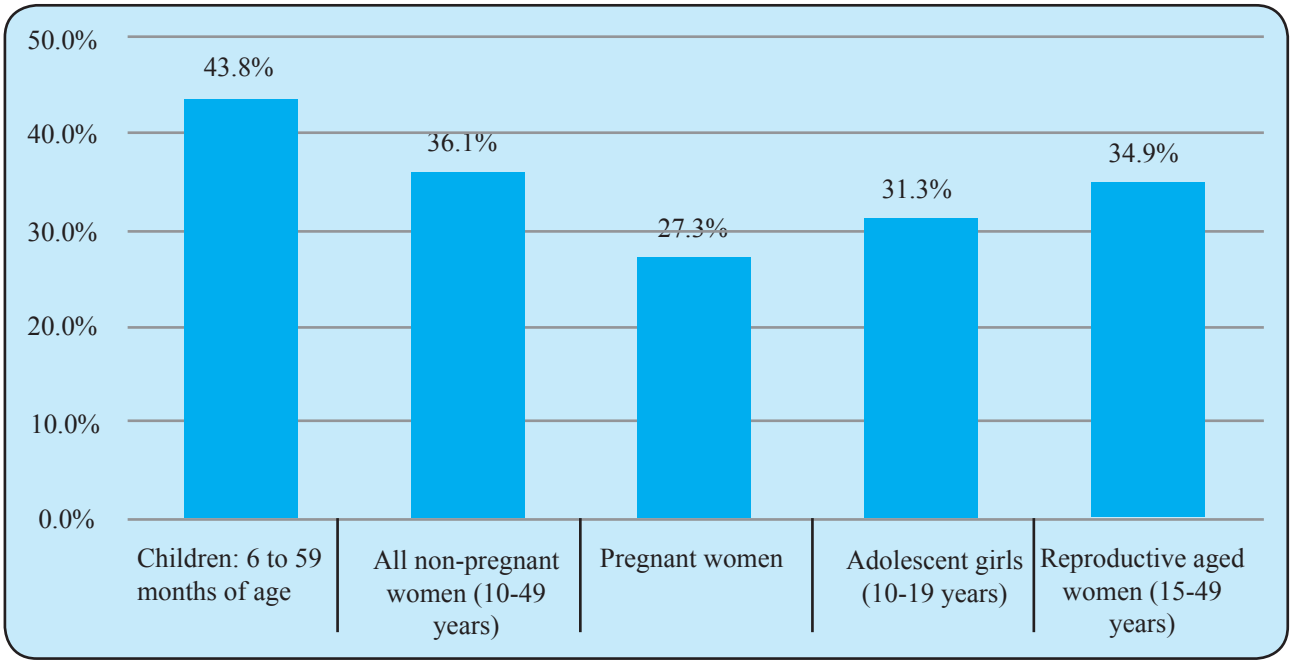
Anemia is measured by assessing the amount of hemoglobin, a protein in red blood cells that carries oxygen throughout the body, in the blood. Rates of hemoglobin are expressed in grams per deciliter (g/dL). Module 4 of the survey included use of Hemocue machines to test the blood of relevant groups: children aged 6 to 59 months; adolescent girls aged 10 to 19 years; and all reproductive aged women (pregnant and non-pregnant) aged 15 to 49 years. Cut-offs for anemia classification by population group are given below in Table 2. As the amount of hemoglobin required for good health increases in the oxygen poor air of higher altitudes, hemoglobin measures obtained from NNS 2015 were adjusted in line with WHO recommendations using the altitudes of each chiwog surveyed.

Table 2 Anemia Classification by Population Groups

Age group		Definition of Anemia at sea level		
Mild		Moderate	Severe	
Children (6-59) months		10-10.9g/dL	7-9.9g/dL	< 7g/dL
Adolescent girls (10-19 years)		11-11.9g/dL	8-10.9g/dL	< 8g/dL
Pregnant women	Trimester 1	10-10.9g/dL	7-9.9g/dL	< 7g/dL
	Trimester 2	9.5-10.4g/dL	6.5-9.4g/dL	<6.5g/dL
	Trimester 3	10-10.9g/dL	7-9.9g/dL	< 7g/dL
Non-pregnant women (15-49)		11-11.9g/dL	8-10.9g/dL	< 8g/dL

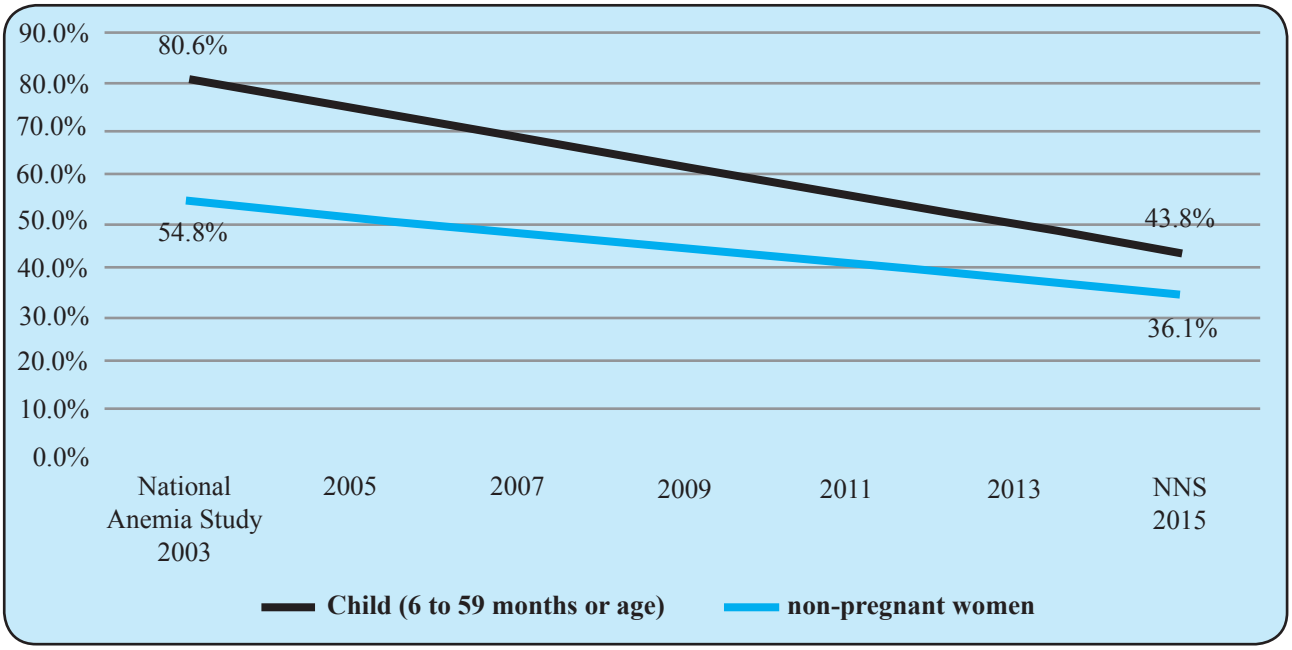
The findings from assessment of anemia are summarized in Figure 11. As shown, children aged 6-59 months were the group most severely affected by anemia, with nearly half of children affected. Among women and adolescent girls, the proportion anemic was lowest among pregnant women, with slightly over one-quarter affected, and greatest among women of reproductive age (15 to 49 years), with over one-third anemic.

Figure 11. Anemia prevalence among different groups



Though there was high burden of anemia in children under 5 years of age, Bhutan has made significant gains in reducing the national anemia prevalence over the past 12 years. Since the National Anemia Study in 2003, prevalence of anemia among children less than five years of age had dropped to a little over half of its 2003 level. Similarly, anemia prevalence among non-pregnant women (10-49 years old) had fallen by over a third of its 2003 level (Figure 12).

Figure 12. Anemia prevalence, 2003 & 2015



Anemia in children (6-59 months)

Anemia in young children can lead to impaired mental and physical development and reduced productivity in adult life (11). Nationally a little less than half of children were anemic. According to the WHO's classification, anemia among children in Bhutan represents a "severe" public health issue (prevalence above 40%) (9). Among children six months to five years of age, anemia prevelance were slightly greater in the Western Region. Anemia prevalence did not differ between urban and rural areas (Figure 13).

Figure 13. Anemia prevalence by region, children 6-59 months

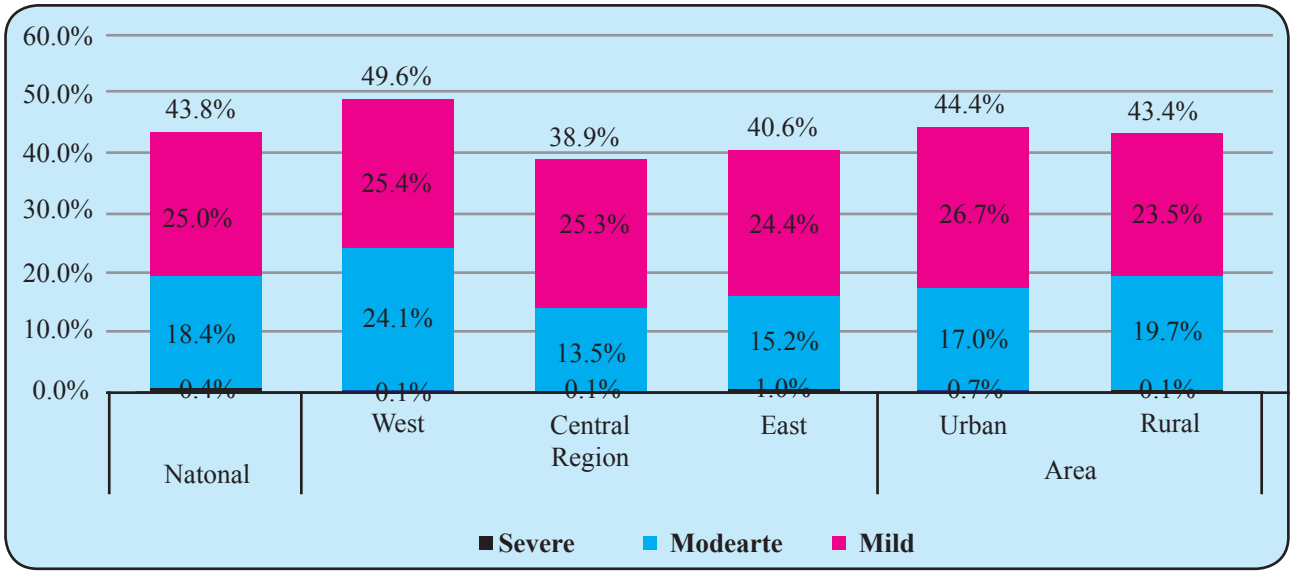
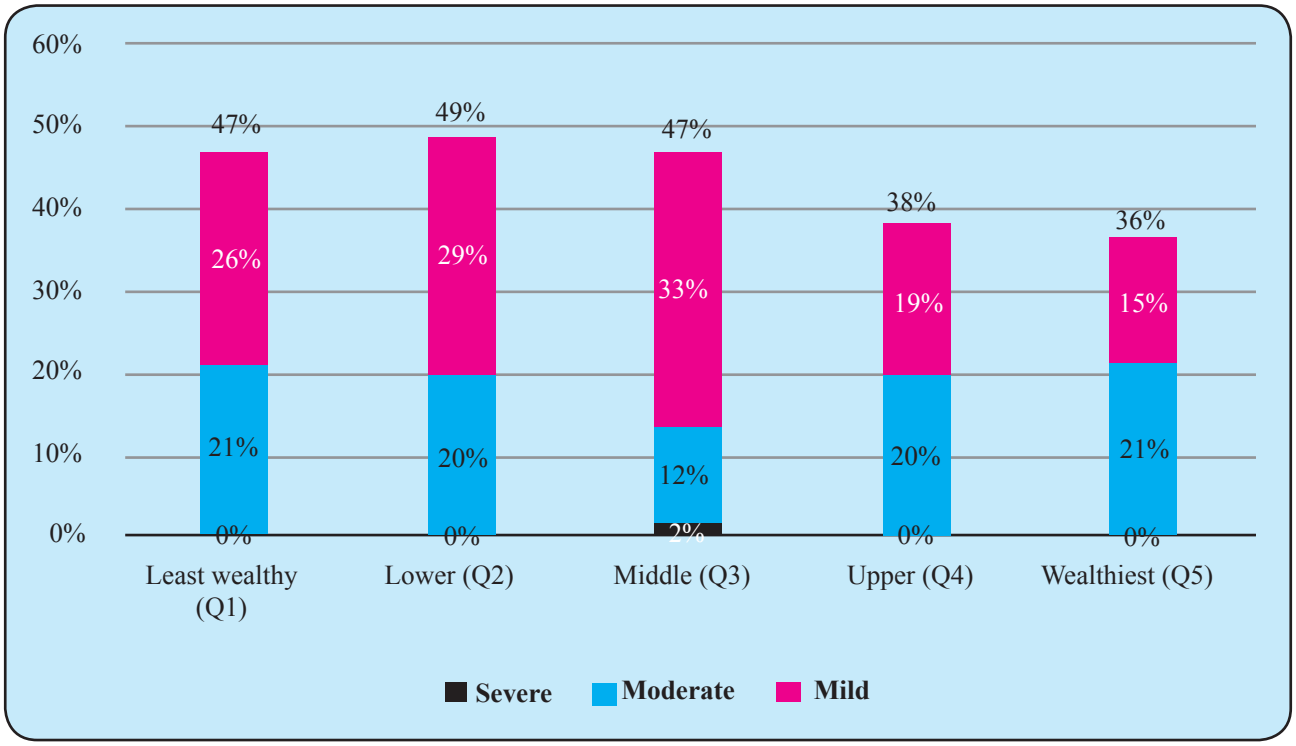


Figure 14. Anemia prevalence by wealth quintile, children 6-59 months

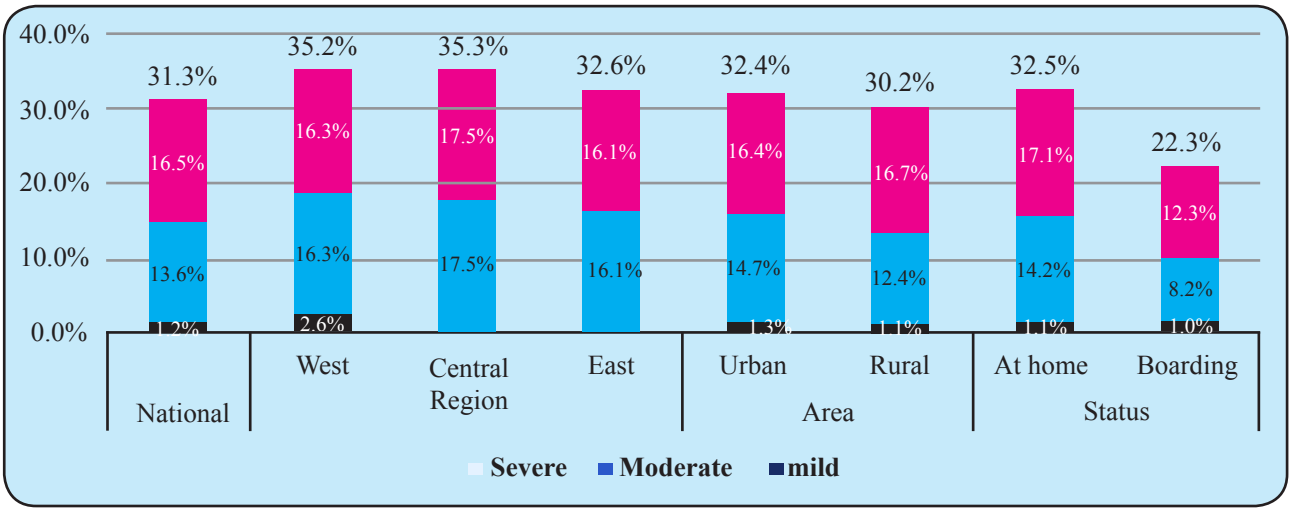


A relationship between anemia levels in children and wealth was shown, but it was much weaker than that between stunting and wealth, as shown in the previous chapter. Overall, children in the least wealthy quintile were anemic about one-third more than children in the wealthiest quintile. There was nearly no variation in overall anemia rates among the lowest three quintiles. Additionally, the proportion of children severely anemic did not vary greatly across quintiles (Figure 14).

Anemia in adolescent girls (10-19 years old)

In non-pregnant adolescent girls, according to the WHO definition aged 10 to 19 years, anemia is defined as hemoglobin concentrations less than 12g/dL at sea level (12). The health and nutritional status of adolescent girls is an important indicator of the nutritional status of future child health as undernourished and anemic women are more likely to give birth to low weight babies. As shown in Figure 15, anemia prevalance among adolescent girls 10-19 years were slightly lower in the eastern region of the country. There was no significant difference between anemia rates among urban and rural adolescent girls. Overall a less than one-third of adolescent girls in Bhutan were anemic. There was no variation in anemia rates by wealth quintile (graph not shown).

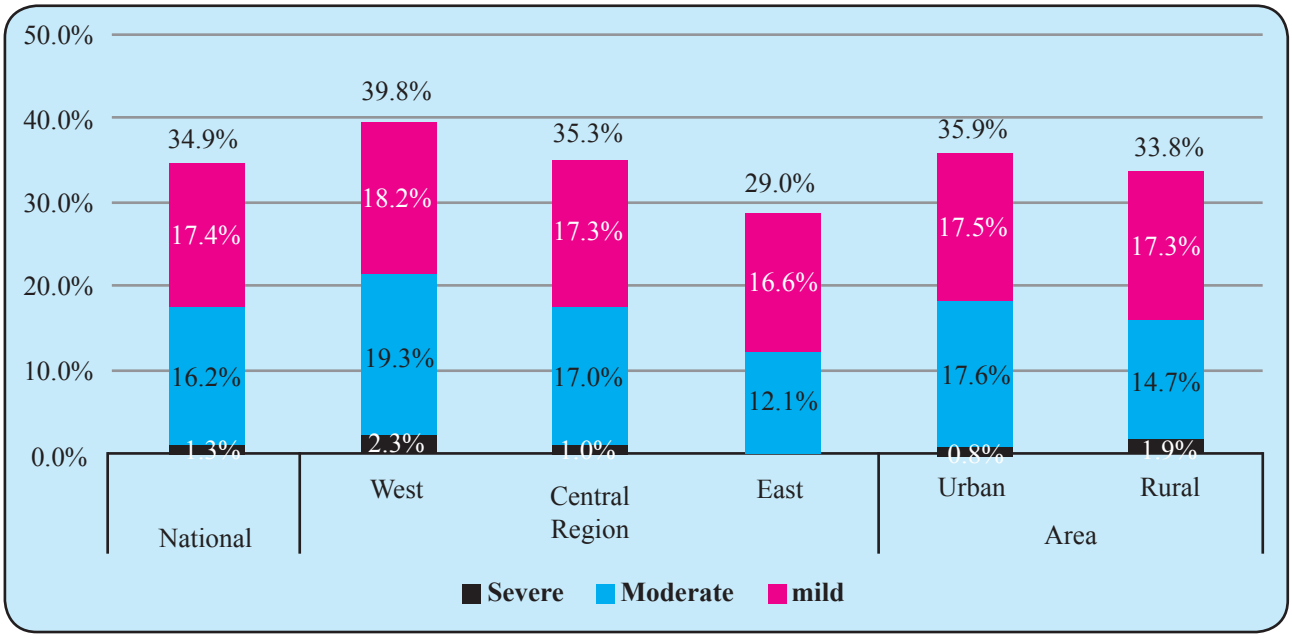
Figure 15. Anemia prevalence, adolescent girls



Anemia among reproductive age women (15-49 years old)

In non-pregnant women , anemia is defined as hemoglobin concentrations less than 12g/dL at sea level (12). As shown in figure 16, more than a third of non-pregnant women aged 15-49 were anemic, which is about 5 percentage points higher than the global prevalence for non-pregnant women (30.2%) (13). Anemia rates were slightly greater in urban areas than rural areas and the eastern Region had the lowest percentage of anemic non-pregnant women, while the western region had the highest (Figure 16). There was no discernable relationship between anemia rates and household wealth (graph not shown).

Figure 16. Anemia prevalence, non-pregnant women 15-49 years



Anemia among pregnant women

In pregnant women, anemia results in increased risk of maternal mortality, and increases risks to the child including increased perinatal mortality, low birth weight, impaired cognitive and physical development, and reduced productivity throughout adult life (11). As shown in figure 17, over one-fourth of pregnant women were anemic nationally, with 23% mildly anemic and 5% moderately anemic. No severe anemia was recorded among pregnant women. Regionally, the eastern region had the highest percentage of anemic pregnant women and anemia prevalence was slightly greater in urban areas compared to rural areas (Figure 17).

Anemia prevalence for pregnant women in Bhutan is about 14 percentage points lower than the global prevalence for pregnant women (41.8%) (14). The prevalence of anemia increased as pregnancy progressed. There was no discernable relationship between anemia rates and household wealth (graph not shown).

Figure 17. Anemia prevalence, pregnant women

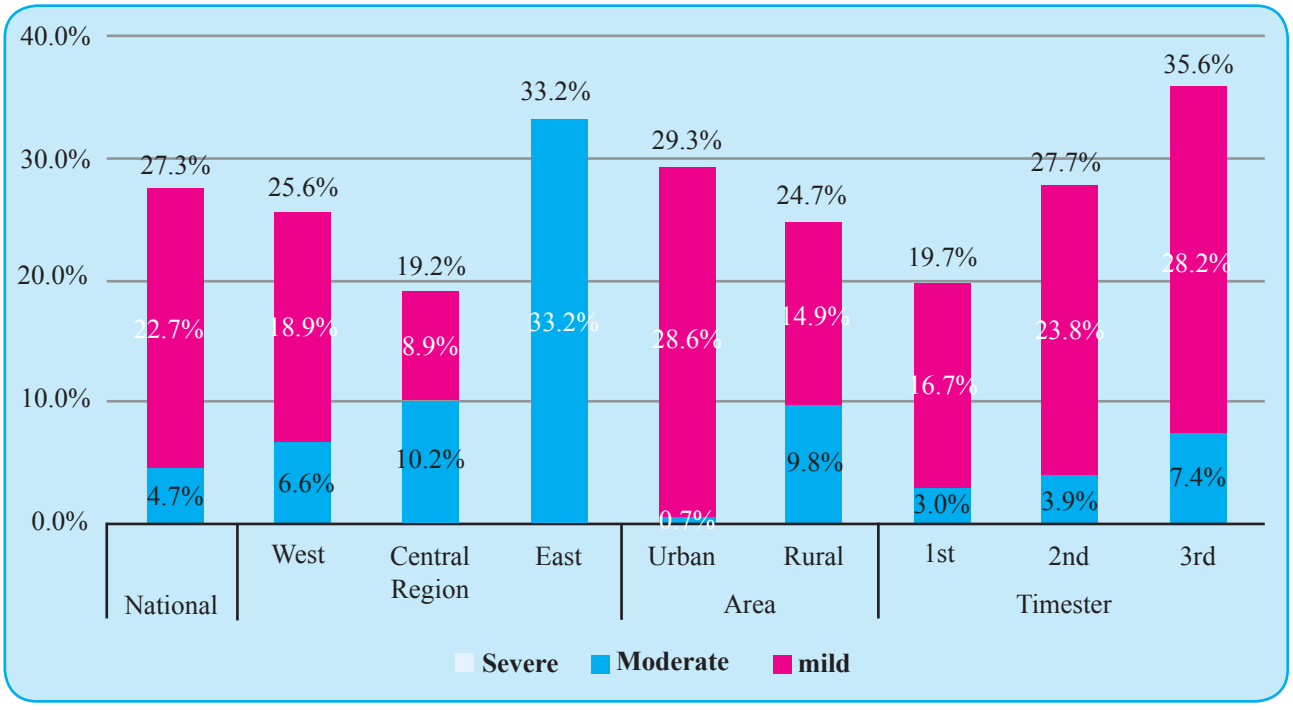


Photo courtesy: UNICEF Bhutan

6

Diet and Food Security

Diet and Food Security

- Rural households had much less diverse diets than urban households, and diets that were less rich in iron and micronutrients. Dietary diversity was also directly related to wealth, with households in higher wealth quintiles having substantially more diverse diets than households in the poorer quintiles.
- According to the WFP Food Consumption Score (FCS) index 8% of households in Bhutan had a "poor" or "borderline" FCS
- Low food consumption scores are related with wealth as the poorest group has 14% of households with "poor" or "borderline" FCS, and only 1% in the wealthiest quintile.
- Rural households and households in the Eastern region had lower than average FCS, with 10% of households in each area with "poor" or "borderline" FCS.
- The percentage of households suffering food insecurity, including food shortages was extremely low (2% of households) and was found to occur only in households in exceptional circumstances.
- Food insecurity is usually affected by seasonal trends and harvest patterns so conducting the survey from March-May may have increased the rate of food insecurity experienced by households relying on stored foods.

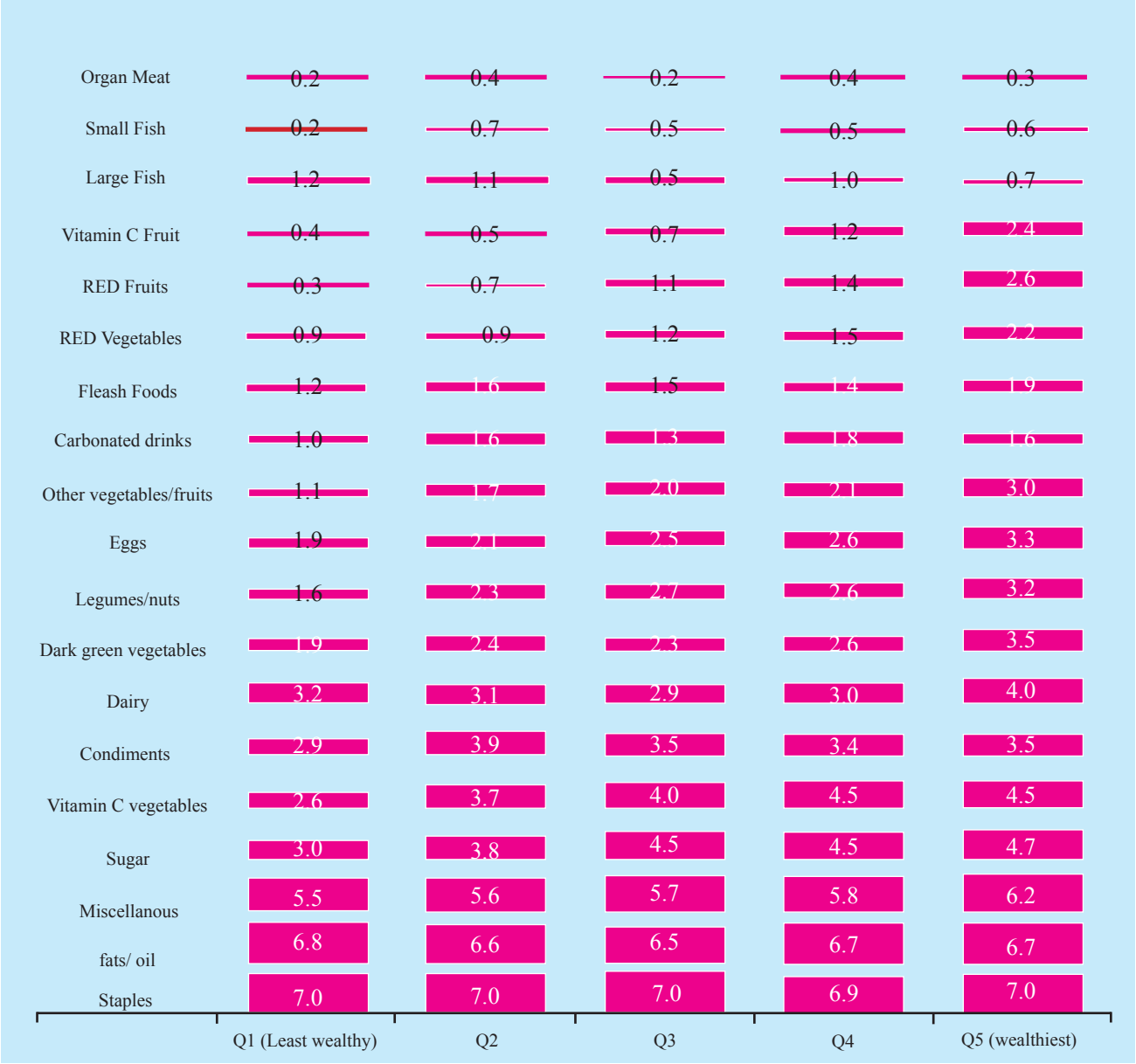
Diet and Food Security

This section contains findings on household dietary diversity, food consumption score, and food security using a range of established dietary indicators as accurately assessing nutritional deficiencies relies on an understanding of the patterns of food consumption within households. Food consumption patterns can provide important information about vitamin and iron deficiencies and other diet related problems that can lead to or exacerbate a range of nutrition related health outcomes. Figure 18, shows the average number of times that foods from each food group were eaten by households in the week before the interview.

Figure 18. Household dietary diversity by area

According to the dietary diversity patterns shown nationally, starchy staples were the most consumed food group with the average household eating starchy staple foods 7 days/week. The starchy staples most commonly eaten in Bhutan include rice, wheat, potatoes, and sweet potatoes. Fats and oils were the second most frequently eaten food group with households consuming in on average 6.7 days/week. The miscellaneous category of foods includes drinks like tea and coffee and were also widely consumed. Generally, diets were more diverse in urban areas with a wider range of food groups. Among the food groups most infrequently consumed include the four meat food groups: organ meats, small and large fish and flesh foods. Flesh foods were eaten on average only 1.5 days per week on average. The low consumption of meat was fairly consistent among rural and urban populations, and across the different regions.

Figure 19. Household dietary diversity by wealth quintile



There was more variation in diet between households based on wealth quintiles than by region which is shown in Figure 19. Households in richer wealth quintiles reported eating many more different types of foods, and eating them more frequently on average than those in poorer wealth quintiles. The lower dietary diversity in poorer households is likely have an impact on the nutritional status and growth outcomes for members of these households, including young children. The discrepancy between diet in households based on wealth quintile, specifically relating to the consumption of foods that provide vital micronutrients and iron as is shown in Table 3. Comparatively the wealtheir households had better intake of fruits/vegetables and meats. There is a seasonal element to diets as the availability of certain foods changes throughout the year' this survey reflects diets eaten in March-April in spring.

Table 3: Dietary diversity count by wealth quintile

	Fruit/veg	Meats
Q1 (Least wealthy)	19.1	5.12
Q2	22.5	7.14
Q3	22.9	7.69
Q4	23.8	7.92
Q5 (Wealthiest)	26.3	9.73

Food Consumption Score (FCS)

Food Consumption Score (FCS) is a "composite score based on dietary diversity, food frequency, and relative nutritional importance of different food groups" developed by the World Food Programme (WFP) in order to capture food security in households. The FCS divides households into three categories based on their food consumption: poor, borderline, and acceptable which indicated household food security. Households with a poor FCS tend to only consume staples (like rice) and vegetables while those with borderline FCS incorporate some amounts of meat and other food sources into their diet; households with acceptable FCS have better food intake which indicate food secure households(15). The FCS helps to further highlight the degree of food insecurity that households are experiencing based on an externally verifiable indicator.

Figure 20. Percentage of households with poor and borderline FCS by region

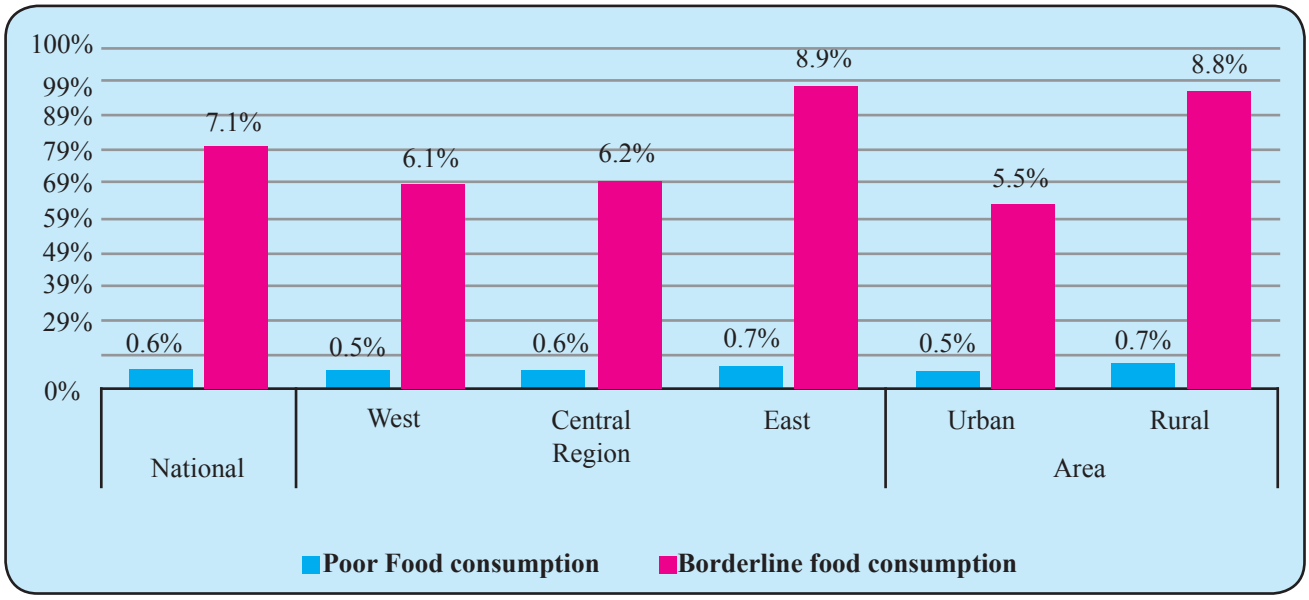
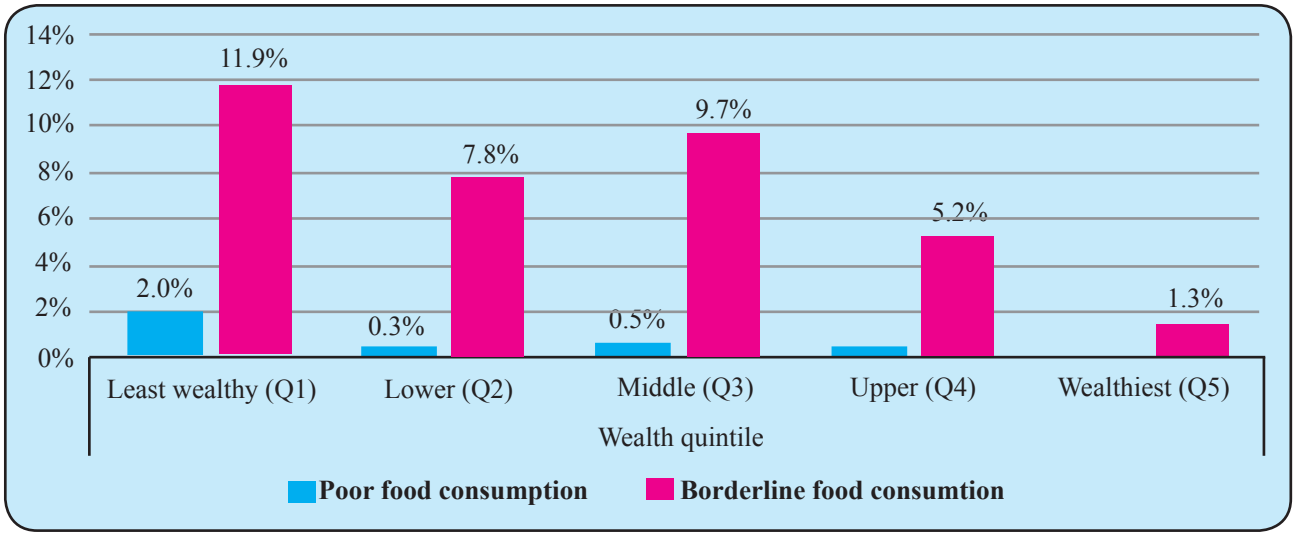


Figure 20 shows the percentage of households that were classified as having "poor" or "borderline" diets using FCS. Households with "poor" scores were rare with less than 1% of households falling in this category, in contrast 7% of households had a "borderline" diet. According to this measure the vast majority of households in Bhutan had acceptable FCS (92%, nationally). A greater proportion of rural households and those in the Eastern region have poor or borderline FCS. A household's food consumption category was related to the wealth of a household (Figure 21). Over one-tenth of households in the poorest wealth quintile had poor or borderline FCS compared to less than two percent of households in the wealthiest quintile.

Figure 21. Percentage of households with poor and borderline FCS by wealth quintile

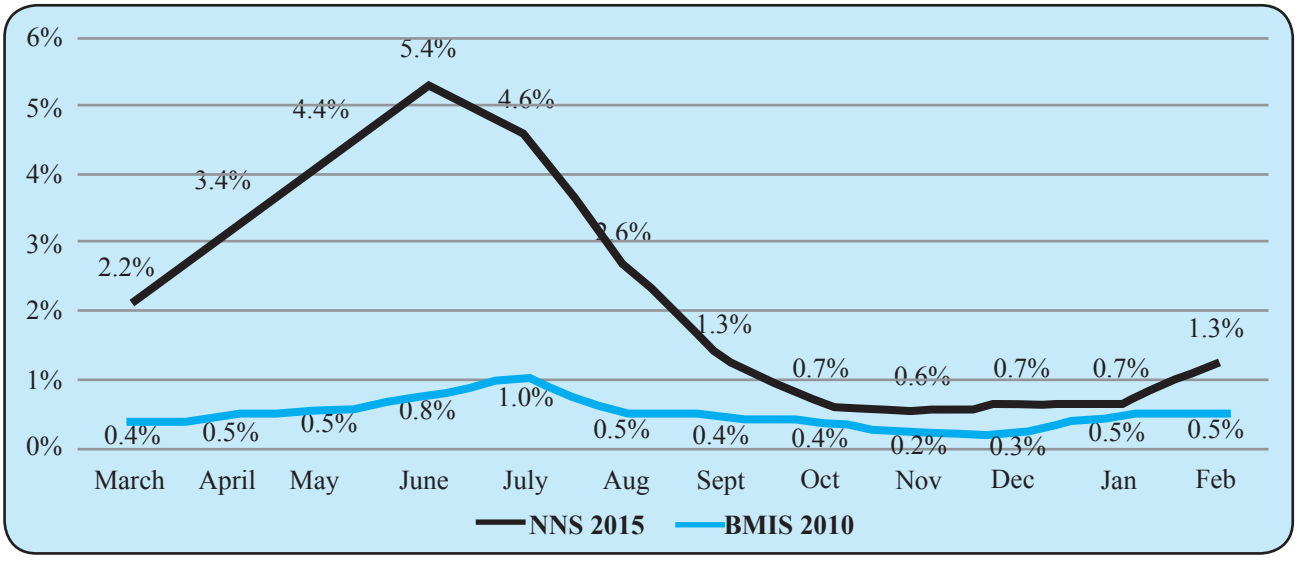


Household food insecurity

Food nutrition security is achieved when "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 insecurity occurs when these conditions are not met (16). Food insecurity can arise from a number of separate but related causes including whether households receive enough food, how that food is distributed within the household, and if it satisfies nutritional requirements.

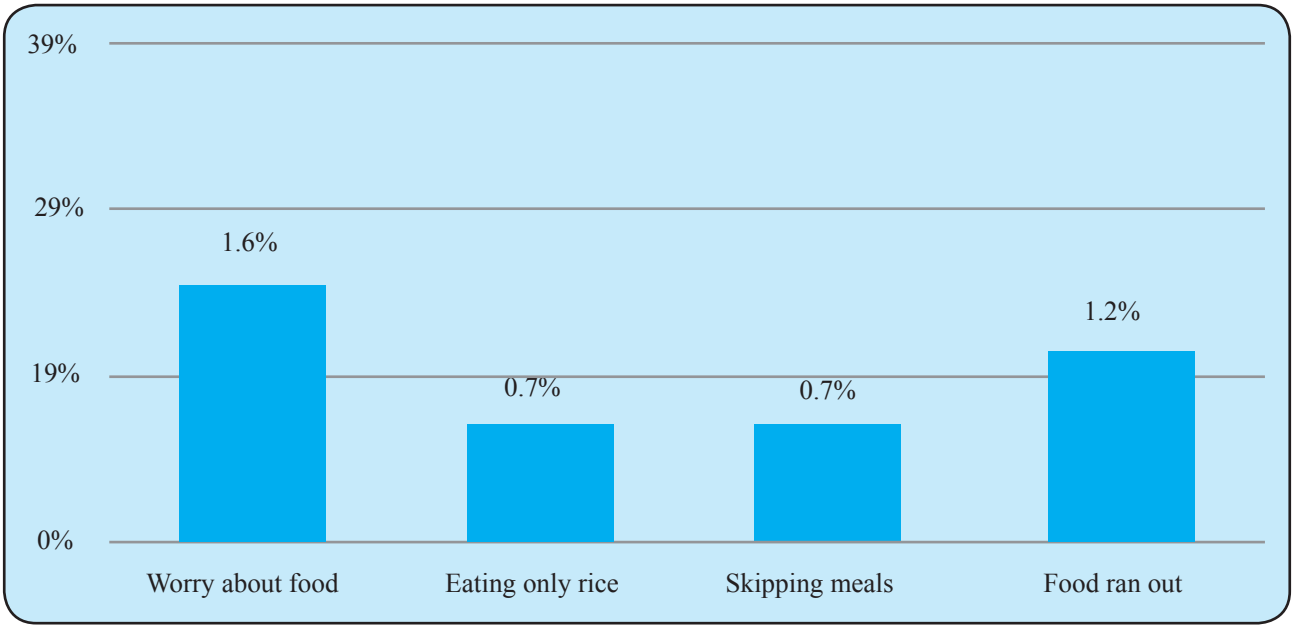
NNS 2015 asked all households if they had faced any difficulties related to food provisioning in the year before the interview. Nationally, only 2.2% of households reported that they had faced difficulties providing food over the past year in contrast to the 10.8% of households who reported facing such difficulties in BMIS 2010 (graph not shown). This is a five-fold reduction, similar to that seem in stunting.

Figure 22. Prevalence of food insecure activities over 1 year period



Households that reported they had faced difficulties were then asked to outline in what months over the last year they had face difficulties. This trend line is shown in Figure 22 and compared to the results of BMIS 2010. Notably, there was a much lower peak of food insecurity in the monsoon months of 2014 compared to 2010.

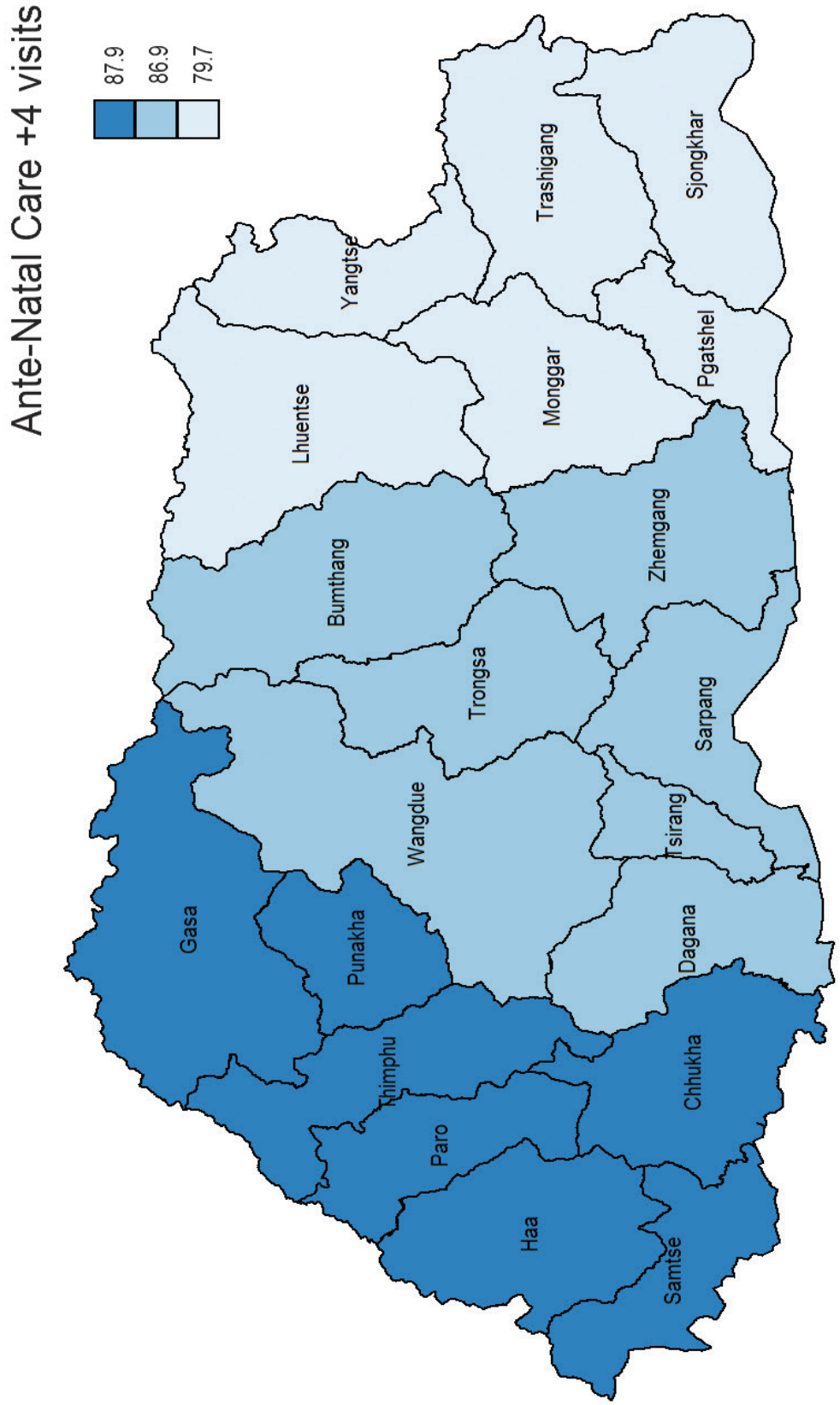
Figure 23. Prevalence of food insecure behaviors



Households that answered affirmatively to the food provisioning difficulty question were then also asked additional questions about practicing behaviors or actions related food insecurity in the month before the interview. Less than two percent of households reported worrying about food. These households that worried were asked an additional three questions: 1) In the last month, did anyone in the household eat only rice/cereal due to food constraint?, 2) In the last month, did anyone in the household skip a meal or meals due to food constraint?, and 3) In the last month did food run out in the household and the household was unable to purchase more that day due to a lack of money or resources? More people worried about food than reported practicing these behaviors, but notably the most common behavior was food running out in the household (Figure 23). It is possible that this behavior was reported more frequently due to the seasonality of the survey.

Photo courtesy: HPD, MoH

7
Care during pregnancy


Ante-Natal Care +4 visits
87.9
86.9
79.7
Yangtse
Trashigang
Sjongkhar
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse

Care during pregnancy

- Overall the percentage of women who made antenatal care appointments was very high, 98% of women nationally. A majority of women, 85%, made the recommended minimum of 4 appointments during their pregnancy.
- Over one-fourth of women were attending eight or more ANC sessions recommended in Bhutan.
- The number of ANC vistis was closly related to wealth. Among the richest quintile 39% of women made 8 or more visits, compared to only 17% in the poorest quintile.
- Around two-thirds of women reported that they received dietary advice and nutrition counselling during their ANC visits.
- There was wide coverage of IFA supplemantation among pregnant women with almost 90% of women reporting that they took IFA during their pregnancy at least once a week.
- 16% of pregnant women, reported consuming alcohol during the week before the survey, while 42% reported consuming betel nut.

Antenatal care

Optimal pregnancy outcomes can only happen if women are well nourished and healthy throughout their lifetime and women receive special care before, during, and after pregnancy. This section looks at care of pregnant women including their antenatal care visits (ANC), consumption of iron and folic acid during pregnancy, and the eating and rest patterns of pregnant women. These indicators are important as WHO estimates that globally 25% of maternal deaths occur during pregnancy.

Given the high risk to pregnant women the WHO developed standardized antenatal care (ANC) packages to improve maternal health outcomes, promote safer births, and ensure neonatal survival. The basic ANC regimen is designed to "prevent, detect, alleviate, or manage" pregnancy complications, pre-existing conditions, and adverse side effects associated with disease and/or unhealthy lifestyles. Accordingly, the WHO recommends a minimum of four spaced ANC visits during the duration of pregnancy to ensure improved health outcomes with the first visit occurring before the end of the first trimester (17; 18). In Bhutan, the Ministry of Health introduced guidelines in 2009 that recommended eight ANC visits as the national standard of care (19). For NNS 2015, care received was measured against both of these standards.

Figure 24. Prevalence of ANC checkups during recently completed pregnancy by area

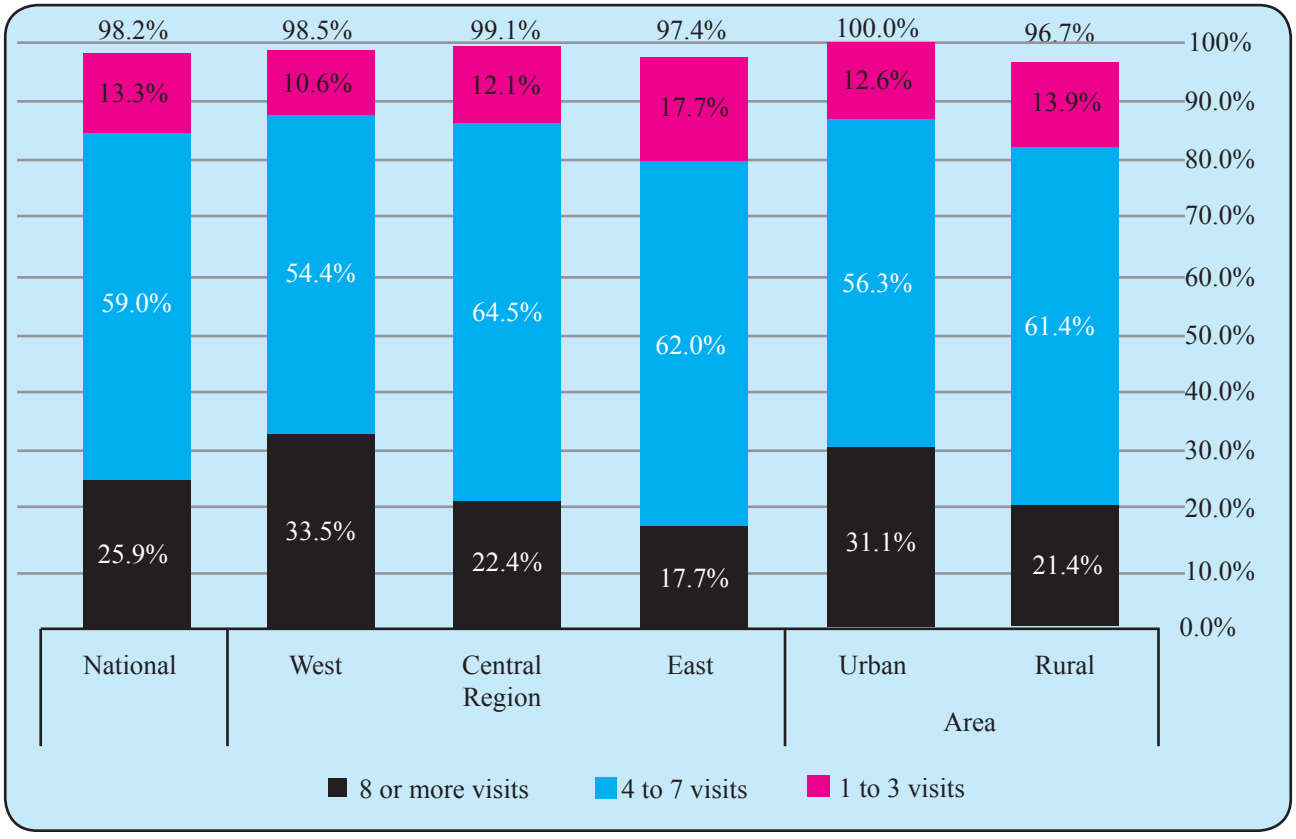


Figure 24 shows that nearly all women with a recently completed pregnancies (defined as child 0 to 23 months of age) reported receiving some ANC care. In addition, over four-fifths (84.9%) of women attended the recommended WHO minimum of four appointments. However, only one-fourth (25.9%) of women met the Bhutan standard of eight or more ANC appointments. Women in urban areas and in the central region attended a greater number of ANC session.

In order to achieve eight ANC visits, pregnant women would have to attend an ANC every month of their pregnancy starting in the second month as in many rural parts of Bhutan the only opportunity for ANC are monthly outreach clinics. To better understand why women are not obtaining eight ANC visits, the survey asked women with completed pregnancies when they started attending ANC and asked women who were pregnant at the time of the survey about what ANC they had received to the date of interview. Both indicators indicate that women are delayed in starting ANC care and this may be the cause of the low attainment of eight ANC visits during pregnancy. Only a little over half of women attended any ANC session in the first trimester (Figure 25). Similarly, women who were pregnant during the survey report few visits in both their first and second trimesters (Figure 26). Moreover, the information from currently pregnant women suggested that fewer were starting early ANC or completing enough ANC

visits as is recommended in the WHO guidelines. In addition, wealth was closely related to how many ANC visits a woman makes and how early she starts seeking ANC. Among the richest quintile two-fifths of women made 8 or more ANC visits, as per the standard in Bhutan compared to less than one fifth of women in the poorest quintile (Figure 27).

Figure 25. Women with recent deliveries who reported ANC during their first trimester

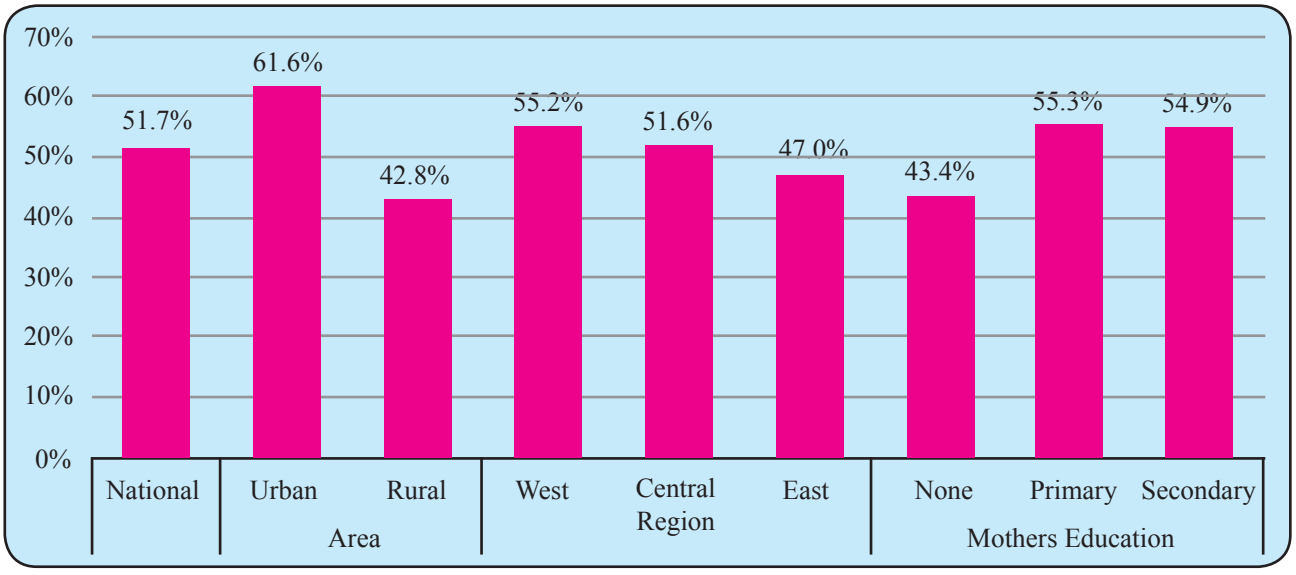
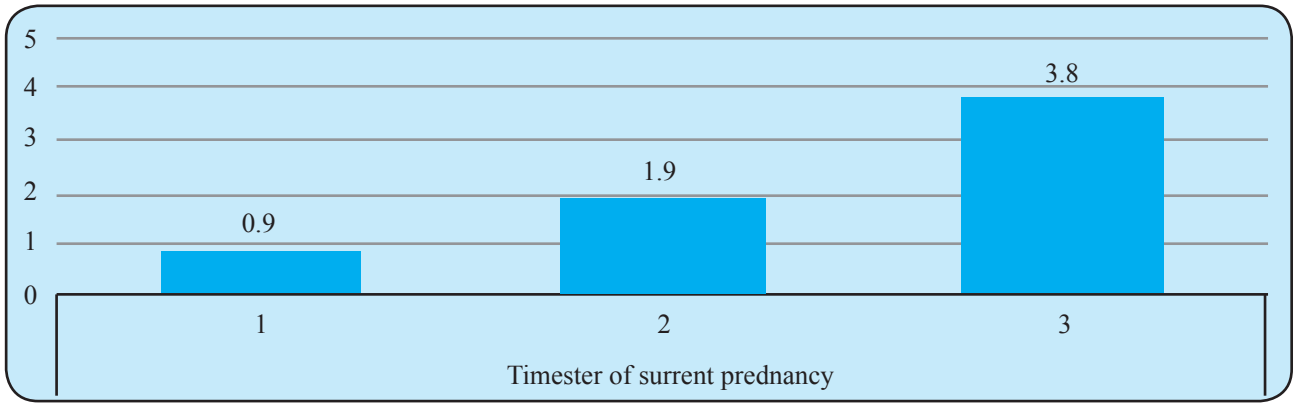


Figure 26. Average number of ANC visits for currently pregnant women by trimester



While only half of women reported that they had their first ANC visit during the first trimester of pregnancy, this percentage was higher among urban women than rural women and higher among women with a higher level of education. Figure 28 shows that the vast majority of women in the highest wealth quintile attended the first ANC visit in the first trimester, over four-fifths of women, compared to only two-fifths of women in the poorest quintile. Targeting pregnant women in the lowest wealth quintiles and providing improved access for them to ANC care could improve health outcomes for themselves and their children. Women and children in this group were the most vulnerable to poor nutrition and health which adequate early interventions through ANC could help mitigate.

Figure 27. Prevalence of ANC checkups during pregnancy by wealth quintile

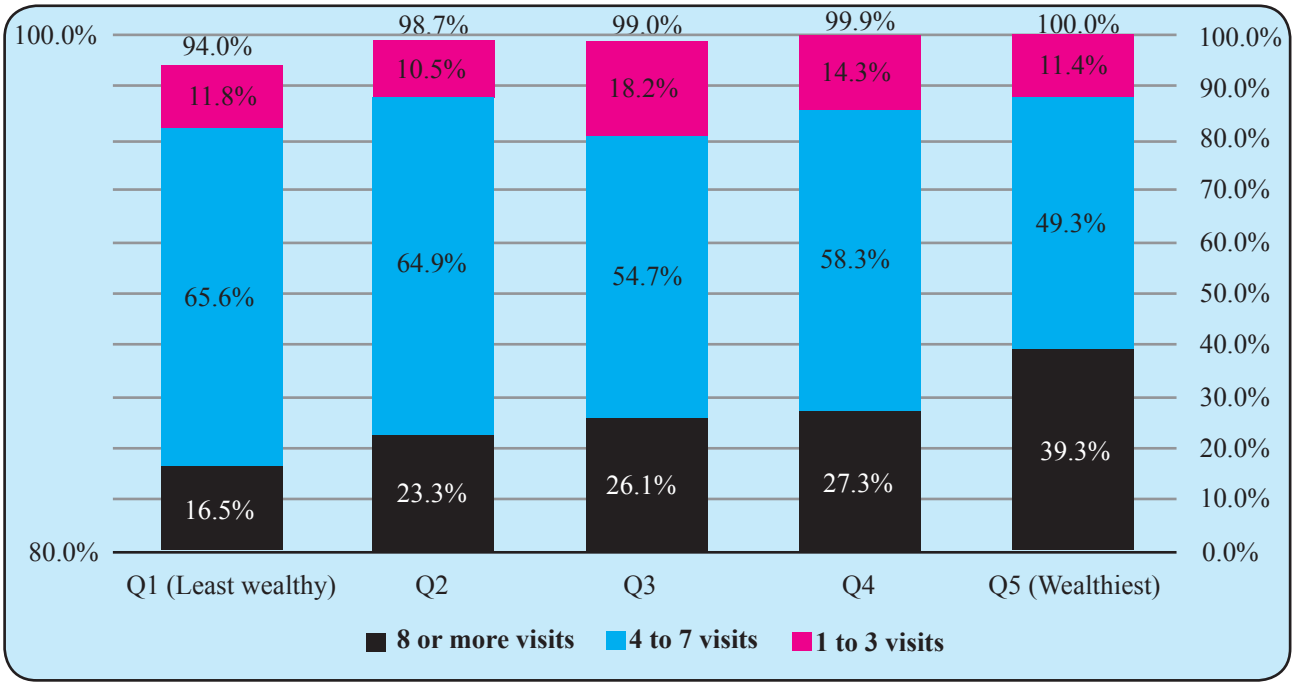
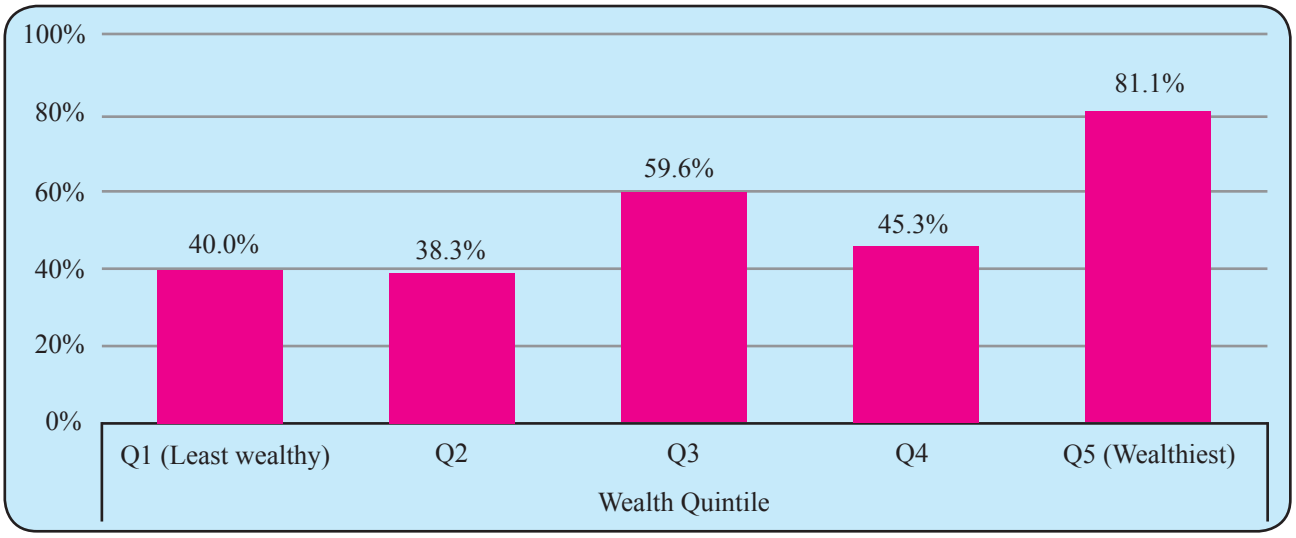
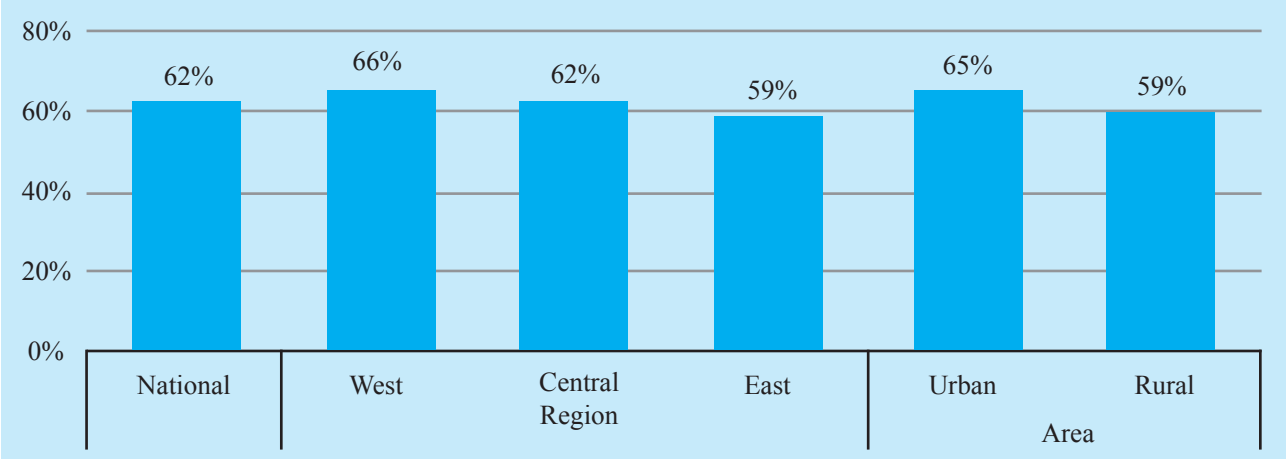


Figure 28. Early ANC by wealth quintile (ANC during first trimester)



Although antenatal care (ANC) is traditionally seen as focusing on pelvic exams, ultrasounds, and other clinical operations, discussions on nutrition, vitamin supplementation, and weight gain is equally important for ensuring maternal health and safe childbirth. It is important to ensure that health workers are discussing nutrition during ANC checkups so that women understand their nutritional needs during pregnancy. Figure 29 shows that the majority of households (regardless of region or urban/rural status) reported that they received nutrition and diet related information during their ANC checkups (62% nationally). The survey did not collect information on the quality or accuracy of the counseling and information provided. There is very little variation in this indicator across regions of Bhutan.

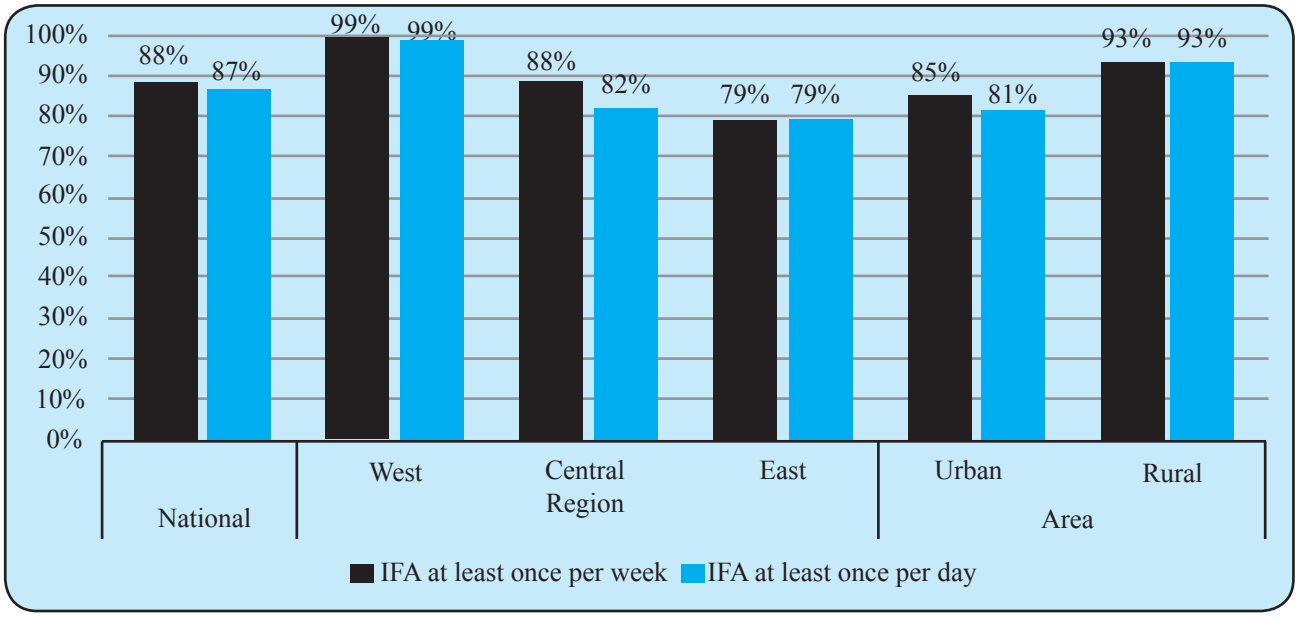
Figure 29. Pregnant women receiving nutrition counselling during ANC checkups



Home care during pregnancy

In addition to ANC, women must change their behaviour during pregnancy to ensure optimum health. A pregnant woman's household should support her to reduce heavy work and increase the quantity and quality of her diet. In addition, women should take iron and folic acid tablets in line with the health workers' advice. Increased iron-folic acid (IFA) consumption is important during pregnancy because pregnant women need to meet their own nutritional needs in addition to those of the unborn child. Iron assists in the prevention of anemia and associated complications during pregnancy and delivery – such as pre-term and low-birth weight births as well as increased risk of hemorrhage during delivery – and folic acid reduces the risk of serious neural tube defects in the infant while helping the body fight anemia defects (20). IFA supplementation has been shown to reduce the incidence of anemia by 69% for pregnant women as well as reduce the incidence of low child birth weight by 20% (21). The WHO therefore recommends daily IFA supplementation as part of a standard antenatal care regimen (22).

Figure 30. Iron intake weekly and daily by women pregnant at the time of survey



In Bhutan, women are given IFA tablets from health facilities for free of charge. The recommendation is twice daily full-dose IFAs if hemoglobin is low (below 9g/dL). As shown in figure 30, the vast majority, nearly nine in ten pregnant women, reported taking IFA daily during their pregnancy during the survey (Figure 30).

In addition, during pregnancy, women's nutritional and metabolic demands change as they need to provide for themselves as well as their unborn child. Improper eating and resting habits can put both mother and child at increased risk of mortality or lead to long-term complications, including developmental problems for the child. Measuring eating and resting patterns of pregnant women provides important information about woman's health during pregnancy and the likely health outcomes for the child. The '1000 Golden Days' period begins at conception of the child until 2 years of age, focuses on the importance of nutrition from the very beginning of life. The survey found that resting habits of pregnant women were fairly good, only 15% of women reported sleeping less than usual during their pregnancy and the majority reported resting as much or more than usual while pregnant (graph not shown).

More worryingly, a sizable proportion of women who were pregnant at the time of interview reported drinking alcohol and chewing betel nut regularly during the week before the survey. Shockingly, Alcohol consumption peaked in the second trimester with nearly one quarter of women drinking one to two days per week. Betel nut consumption was much more prevalent in all trimesters but frequency of consumption declined as the pregnancy progressed (Table 4).

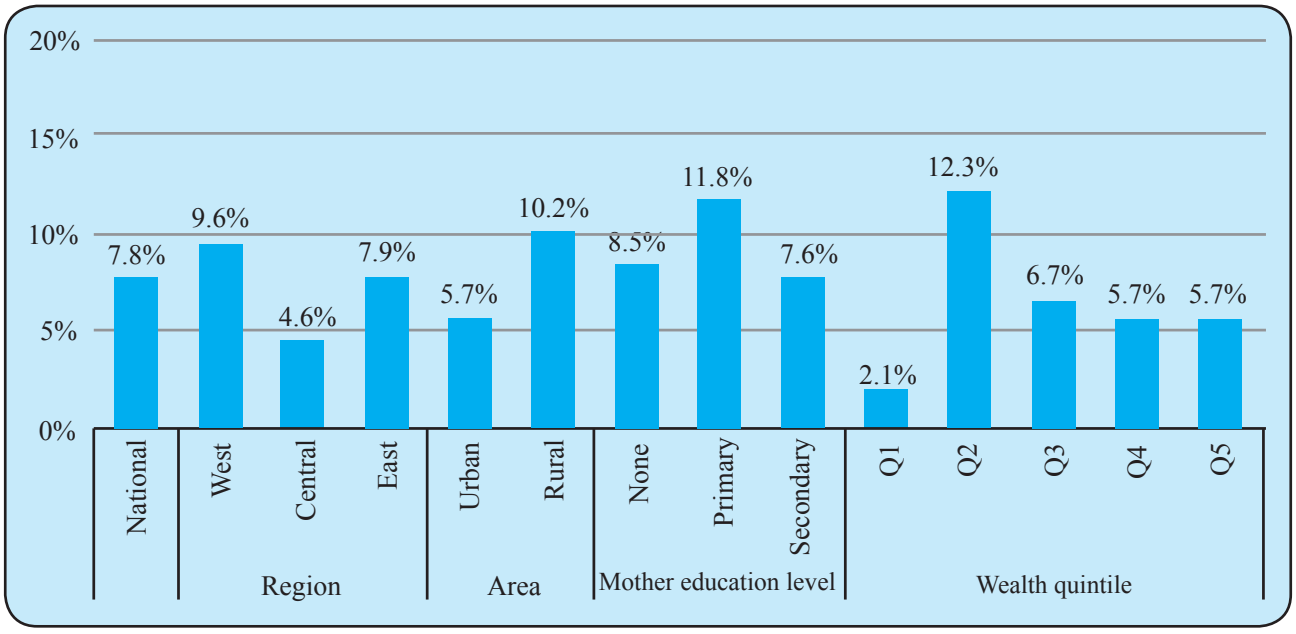
Table 4: Currently pregnant women who consume alcohol or betel nut by trimester

			1 or 2 days	3 to 6 days	Everyday	All
Alcohol	Trimester	Overall	10.2%	5.6%	0.0%	15.9%
		1st	3.1%	4.7%	0.1%	7.9%
		2nd	23.9%	0.0%	0.0%	23.9%
		3rd	0.3%	13.7%	0.0%	13.9%
Betel nut	Trimester	Overall	22.0%	8.2%	11.9%	42.2%
		1st	30.6%	2.0%	17.6%	50.1%
		2nd	7.7%	13.7%	11.1%	32.5%
		3rd	27.2%	8.7%	7.3%	43.1%

Low birth weight

A key indicator of poor nutrition of mothers during pregnancy, and a determinant of stunting for children later in life is low birth weight (LBW), defined as babies who are born weighing 2500gms or less. Children for whom birth weight was not available can be used as a proxy for children who was not born in as institution or a health check-up shortly after birth. This gap is likely the reason why the prevalence of LBW was lowest in the poorest wealth quintile where only 70% of babies had weights recorded. Nationally, only a little less than 8% of children were born LBW, however the proportion was much greater among women in rural areas and the western region(Figure 31).

Figure 31. Proportion of children with LBW by area, region, maternal education, and wealth



* The % of low birth weight babies is probably an underestimate as the percentage of babies not weighed at birth among these groups is quite high. For example, in the poorest quintile (Q1) only 75.6% of babies were weighed at birth so the 6.1% shows only LBW babies that were actually weighed. Conversely, 100% of babies in Q4 and Q5 were weighed so this data accurately reflects the number of LBW babies.

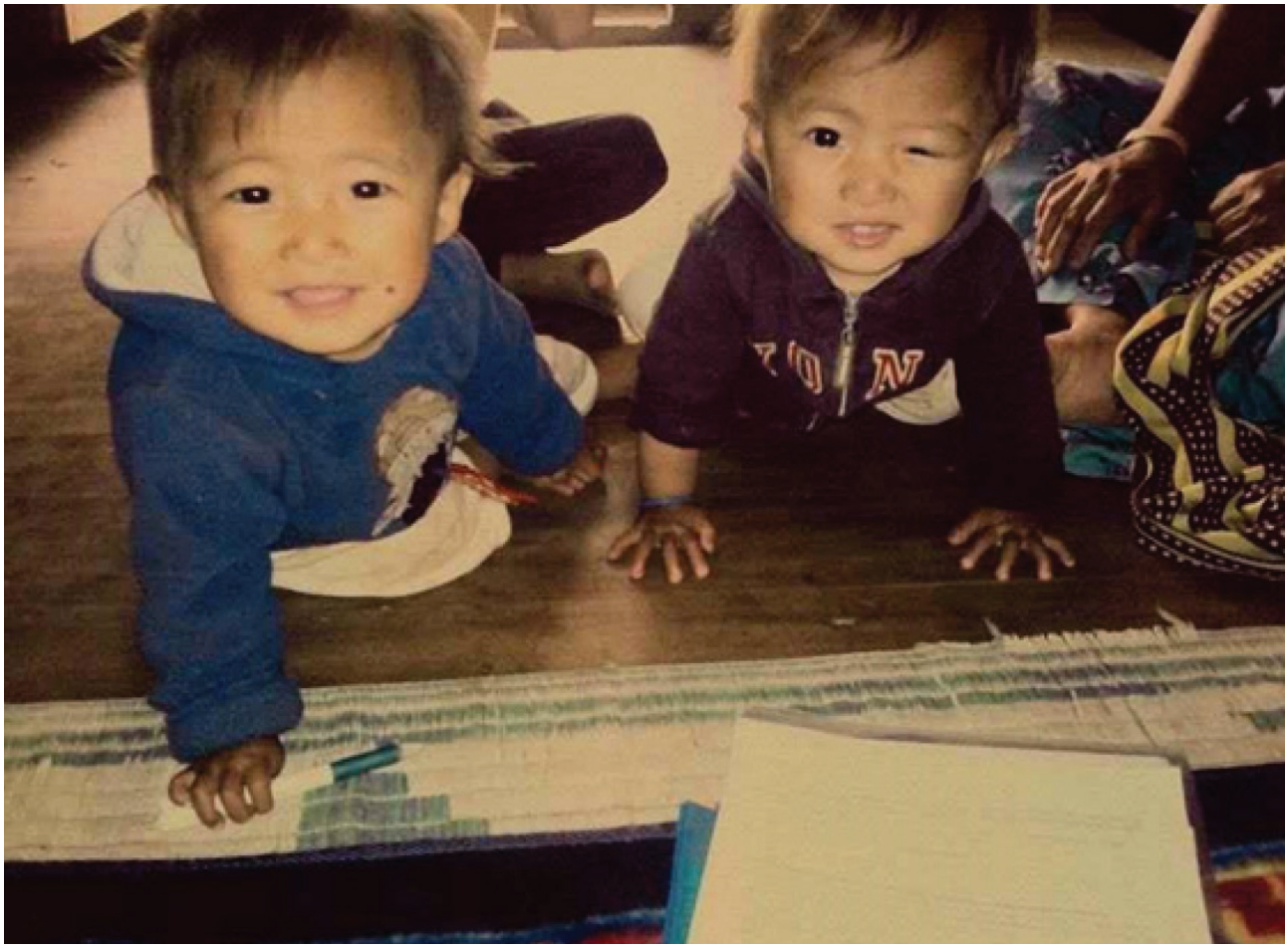
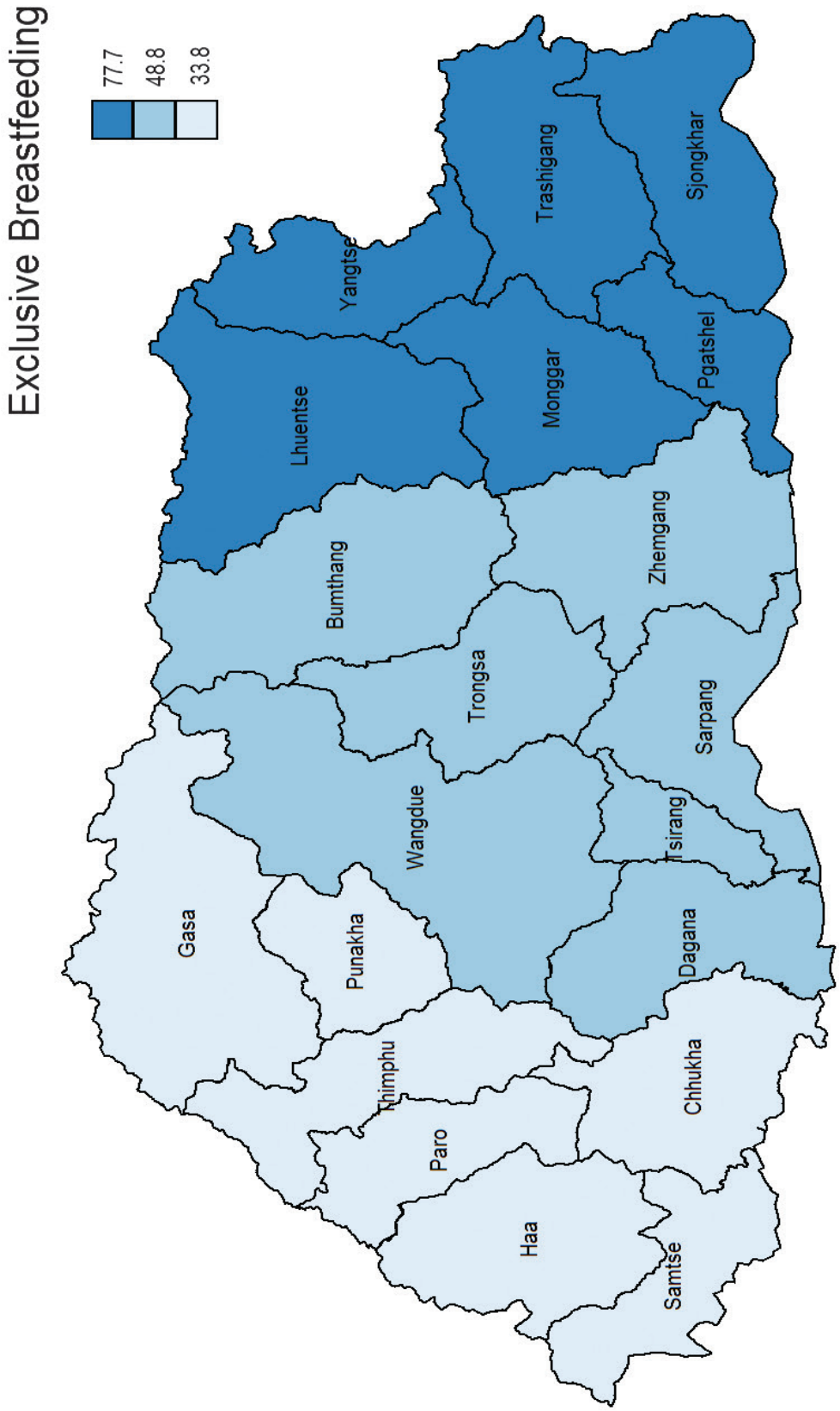
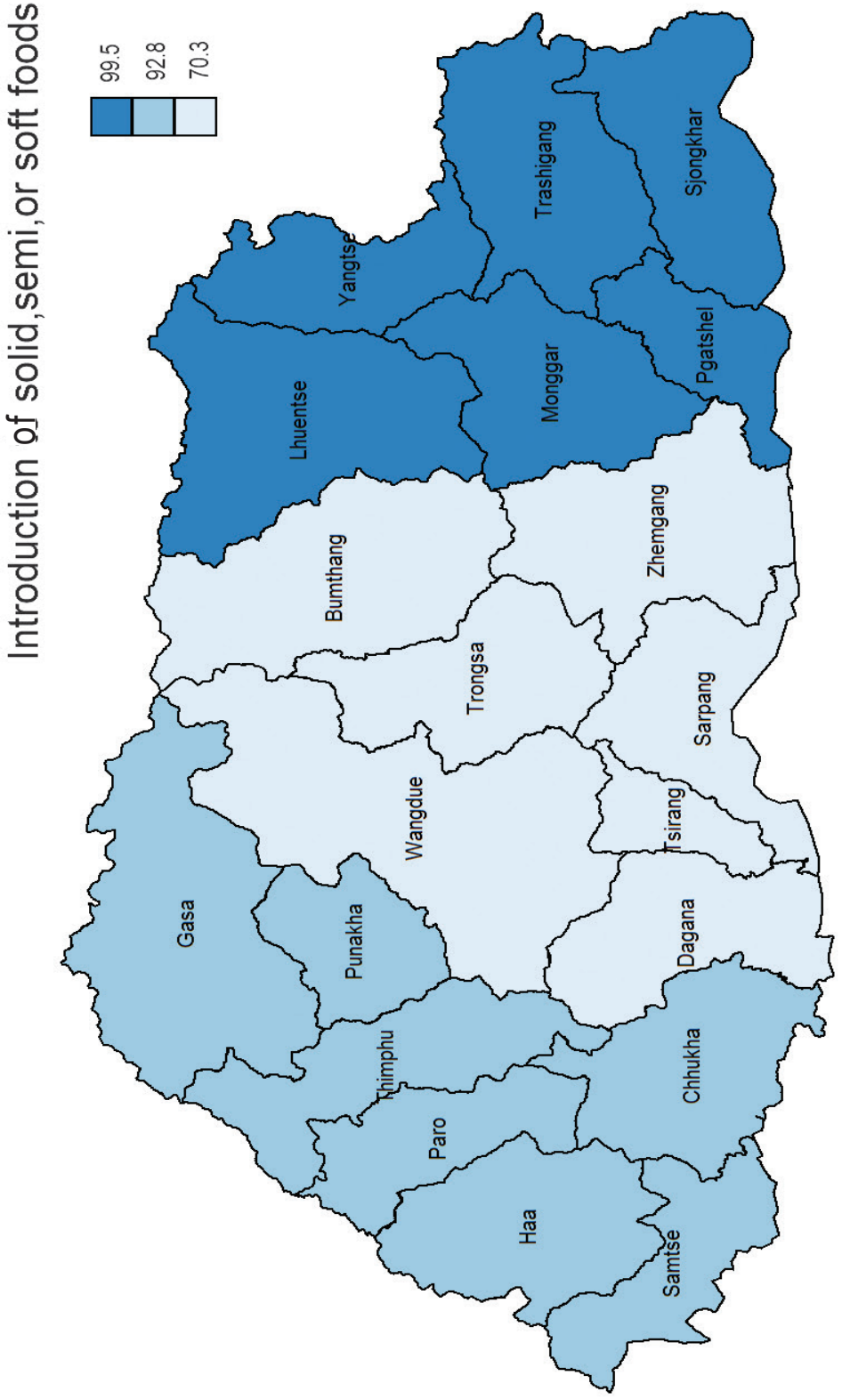


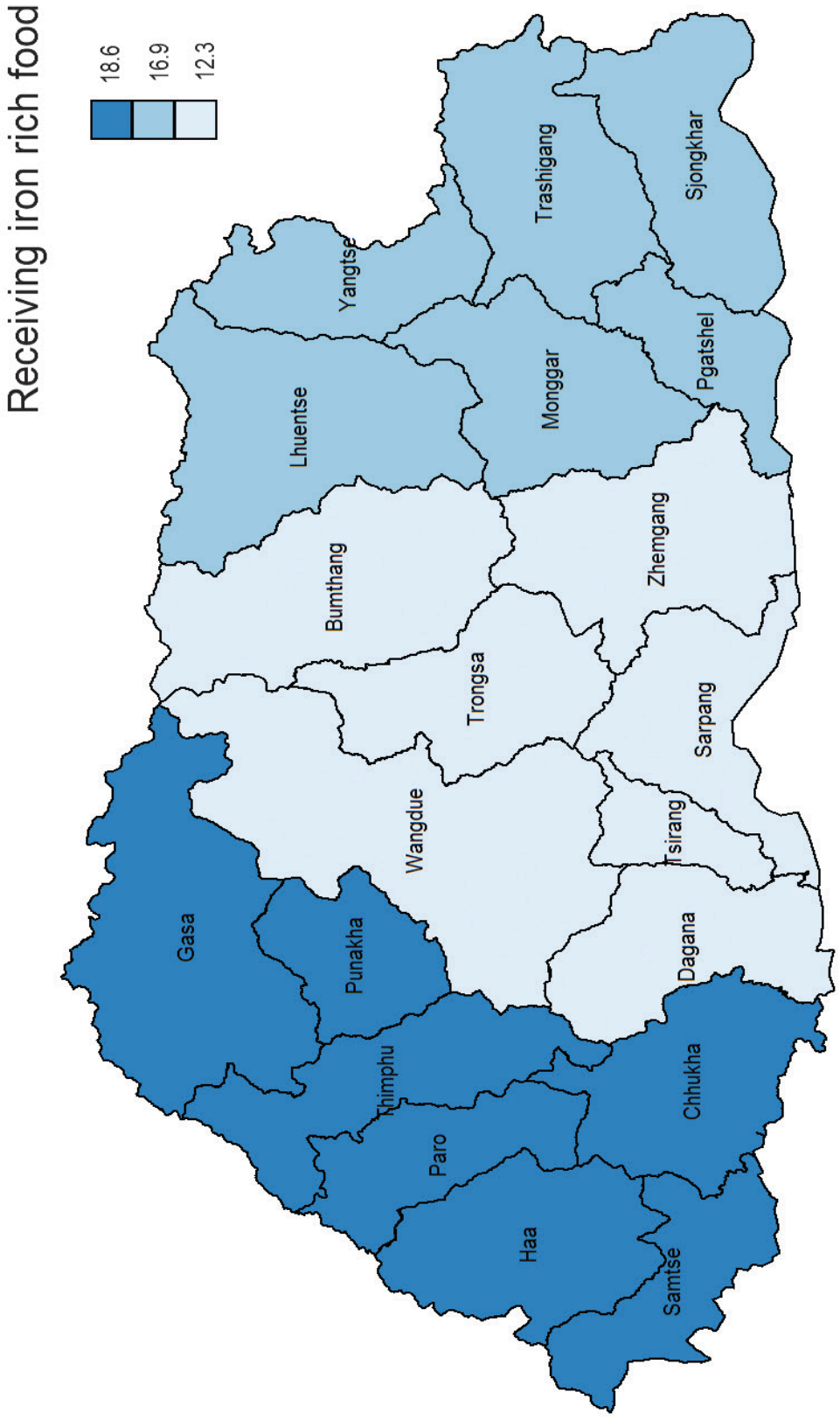
Photo courtesy: Tenzin Wangchuk, P/Gatshel Hospital

8
Child Care and Feeding Practices

Photo courtesy:HPD, MoH


Exclusive Breastfeeding
77.7
48.8
33.8
Lhuentse
Yangtse
Trashigang
Sjongkhar
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse


Introduction of solid,semi,or soft foods
99.5
92.8
70.3
Lhuentse
Yangtse
Trashigang
Sjongkhar
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse


Receiving iron rich food
18.6
16.9
12.3
Trashigang
Sjongkhar
Yangtse
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse

Child Care and Feeding Practices

- Around half of women (51%) were exclusively breastfeeding their children as per the WHO guidelines.
- Some IYCF indicators were promising: low rate of prelacteal feeding (5%), high rates of early initiation of breastfeeding (78%), good rates of introduction of complementary foods (87%), and the vast majority of children still being breastfed at 1 year of age (92%).
- A major challenge was the low dietary diversity for children 6-23 months based on number of food groups given, including the low percentage being given iron rich foods (17%) as part of complementary feeding. Less than a fifth of parents were feeding children 6-23 months 4 food groups or more in their diet.
- Fever was the most common illness reported in children in the 15 days prior to the survey (26.5%), followed by diarrhea (5.2%) and ARI (1.8%).
- Diarrhea in children was not treated adequately with only a third of caregivers (36%) following the guidelines on administration of ORS, continued feeding and provision of liquids to children ill with diarrhea in the period prior to the survey.
- Vitamin A capsule supplementation (VAC) and deworming coverage was high with 87.0% chilldren reviving VAC in the last 6 months and 89.0 % of children recieving deworming tablets.

Infant and young child feeding

Infant and young child feeding (IYCF) practices are critical in the prevention of both chronic and acute malnutrition in children under 2 years of age. The core behaviors as recommended by the WHO include the following collected in NNS 2015 (23; 24):

- Early initiation of breastfeeding
- Exclusive breastfeeding under 6 months
- Continued breast feeding at 1 year
- Introduction of solid, semi-solid, or soft foods
- Minimum dietary diversity
- Minimum meal frequency (only for breastfed children)
- Minimum acceptable diet (only for breastfed children)
- Children ever breastfed
- Consumption of iron-rich food (iron-fortified food was not included in NNS 2015)

In addition, NNS 2015 included an indicator on bottle-fed and "prelacteal feeding". Prelacteal feeding, defined as consumption of food or water prior to initiation of breast feeding, is discouraged by UNICEF and the WHO as it adversely affects consistent breastfeeding behavior and introduces pathogens into the digestive system. The findings in this section are based on the youngest child within the household.

Figure 32. Prevalence of IYCF behaviors, among the youngest child in household

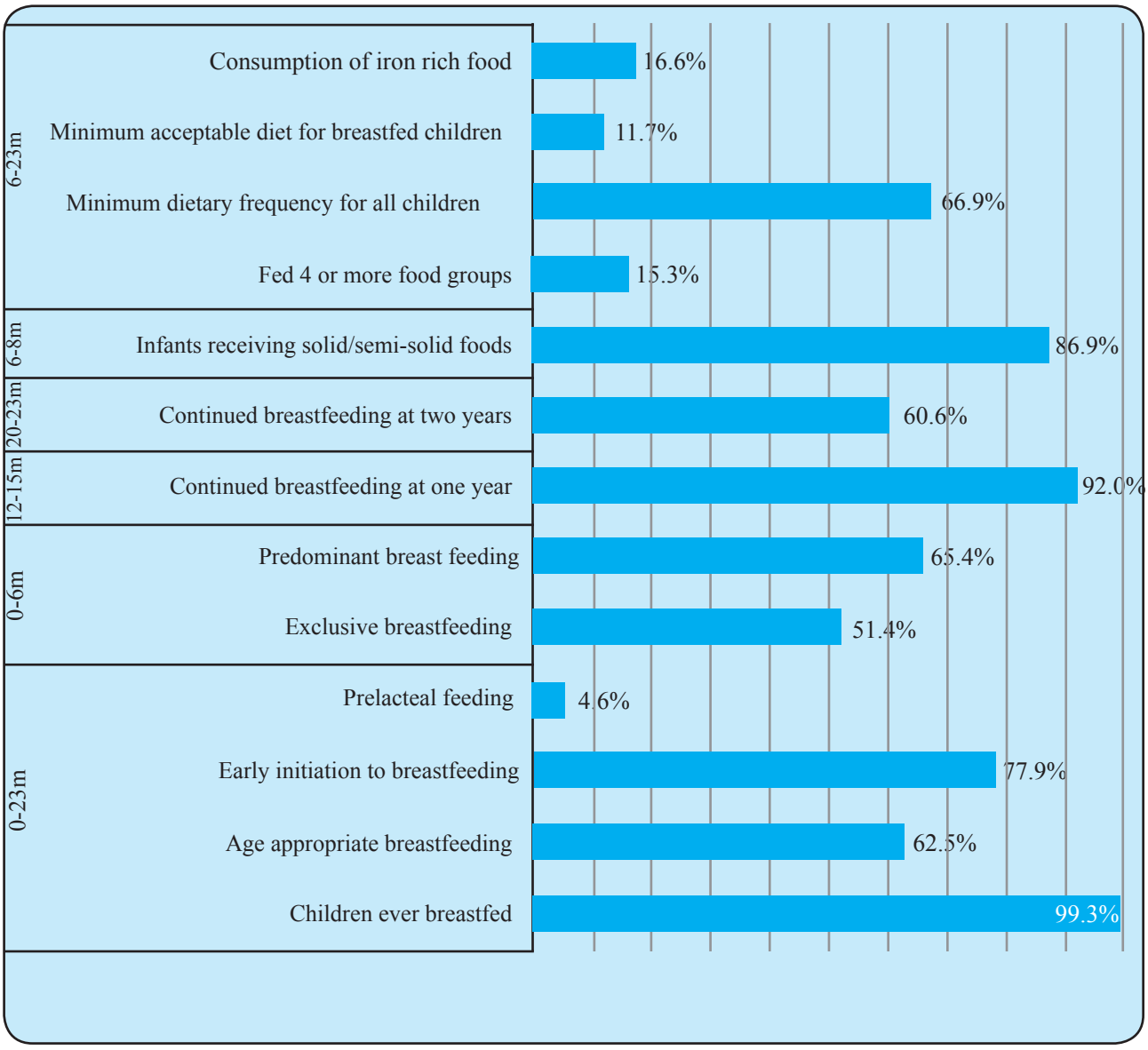
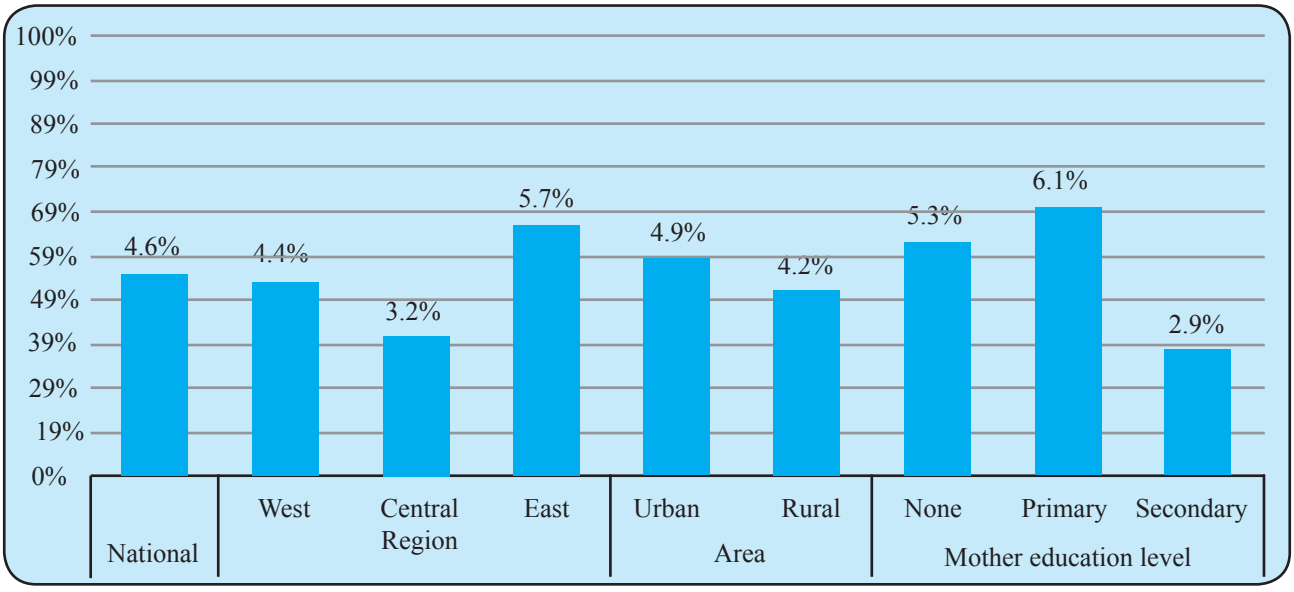


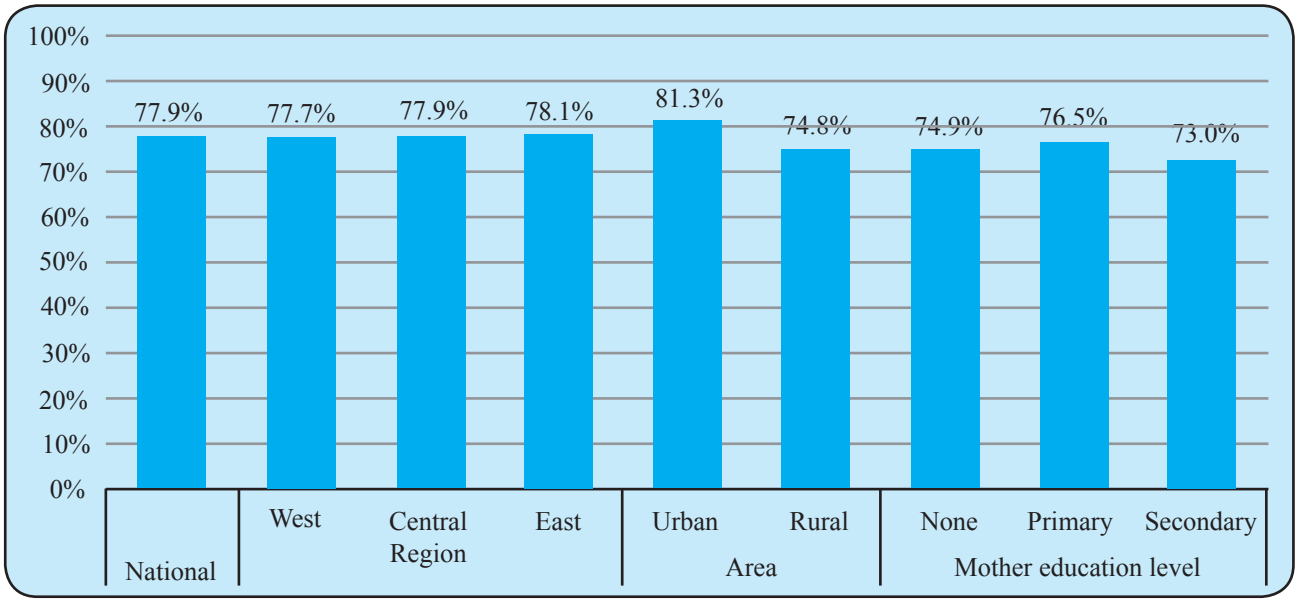
Figure 32 shows the proportion of children fed in line with WHO guidelines nationally. Bhutan had high rates of early initiation of breastfeeding and low rates of prelacteal feeding. While exclusive breastfeeding during the first six months of life needs to be improved from its current rate of 51%, almost all children had been breastfed at least once in their lives and most were breastfed continuously until two years of age. Indicators for complimentary feeding showed room for improvement. Though the introduction of solid/semi-solid foods was largely on time (86.9%) and the frequency of feeding was fairly adequate (66.9%), the dietary diversity was low and notably only less than one-sixth (16.6%) of children were fed iron rich food.

Figure 33. Percentage of children given pre-lacteal feeds



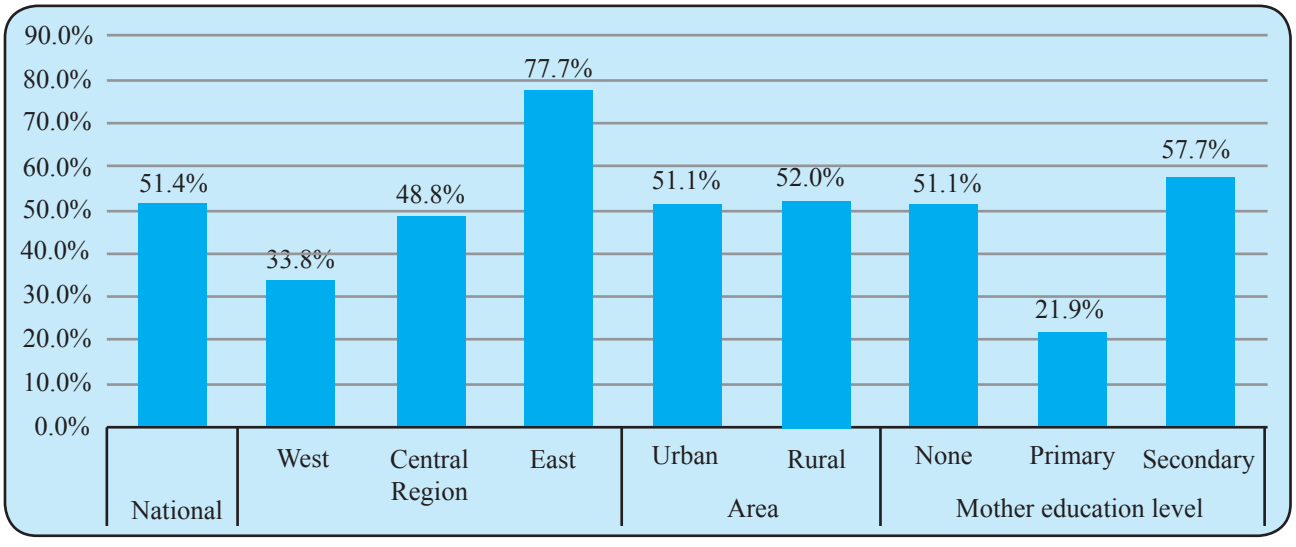
For pre-lacteal feeding, less than one in twenty children were given pre-lacteal feeds, women with at least a secondary education were far less likely to engage in this behavior. The practice was most common in the Eastern Region and was more common in urban rather than rural areas (Figure 33).

Figure 34. Percentage breastfed within an hour of birth



Early initiation of breast feeding "within the first hour after delivery is globally associated with the prevention of about 22% of neonatal deaths" while initiation within the first day can prevent about 16% of neonatal deaths (25). Early initiation of breastfeeding helps ensure that infants consume the first milk, colostrum that is rich in antibodies and contains a larger percentage of protein, minerals and fat soluble vitamins than mature milk. Over three-fourths of children in Bhutan were breastfed within the first hour of life (Figure 34). There was not a large amount of variation between different groups, though a slightly higher percentage of women in urban areas reported early initiation of breastfeeding.

Figure 35. Percentage of children exclusively breastfed



Exclusive breastfeeding is associated with the prevention of 13% of neonatal deaths while continued breastfeeding up to two years of age helps to strengthen the immune system and prevent diarrhea and pneumonia (25). Exclusive breastfeeding is one of the hardest behaviors to change as it requires a significant time commitment on the part of the mother and the support of her whole family. Exclusive breastfeeding is important as it provides all the nutrients that a child need in their first 6 months of life, and it means that the child is not given any foods or drink that may introduce pathogens into their system. Except in extreme cases where there is a risk of communicable disease between a mother and child (such as in the case of a HIV positive mother) all children should be exclusively breastfed from birth until 6 months of age, in line with guidelines provided by MoH, Bhutan.

As shown in figure 35, overall, a little over half (51.4%) of women reported that their child was exclusively breastfed in the 24 hours preceding the survey, leaving significant room for improvement on this indicator. The most and least educated women reported exclusive breastfeeding in a greater proportion than women with Primary education. There was regional variation in percentage of women exclusively breastfeeding; in the East almost two-thirds of women exclusively breastfed their children compared to just over one-third in the West.

Figure 36. Continued breastfeeding of children at 1 and 2 years of age

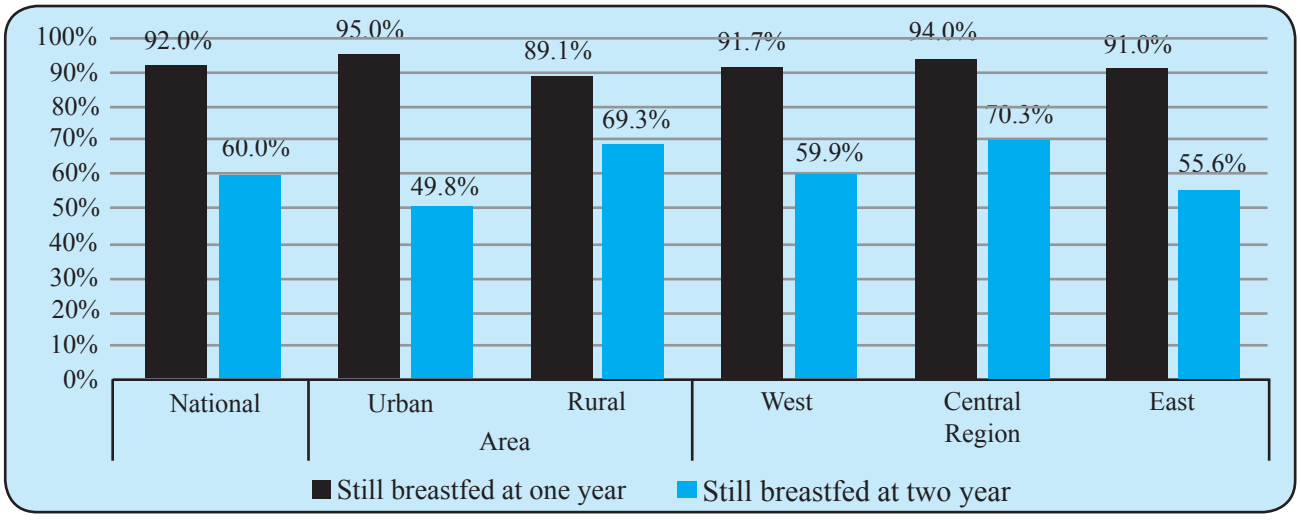
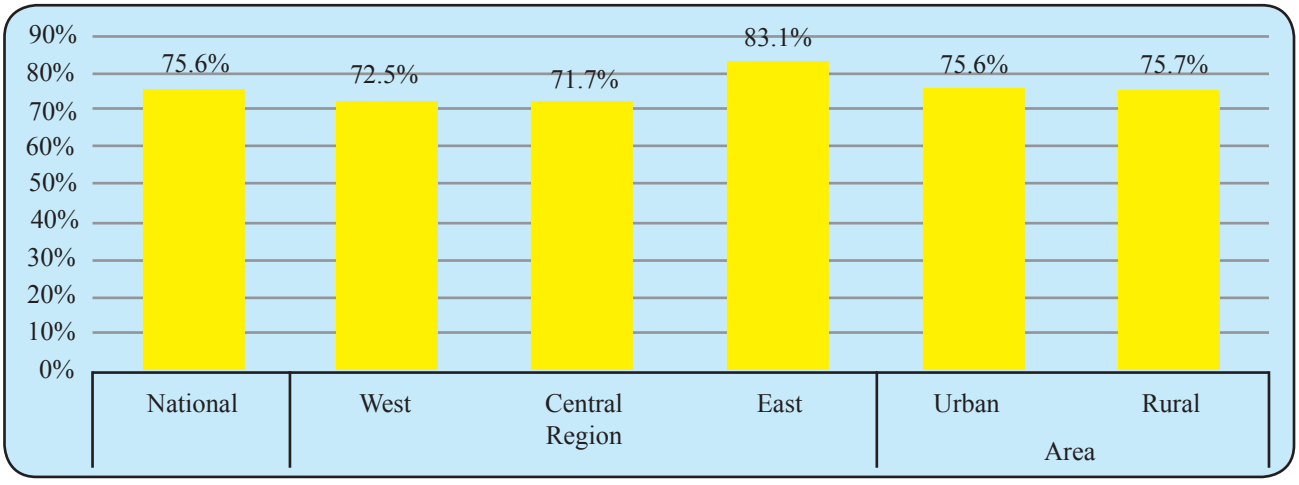


Figure 36 shows the rates of continued breastfeeding of children at one year and two years of age. Over nine in ten children were being breastfed at one year of age, but this figure fell to only six out of ten by the age of two years. Women in urban areas were breastfeeding at one year of age in a greater proportion than rural women, but the reverse is true for children at two years of age. Regionally, there was little variation in continued breastfeeding.

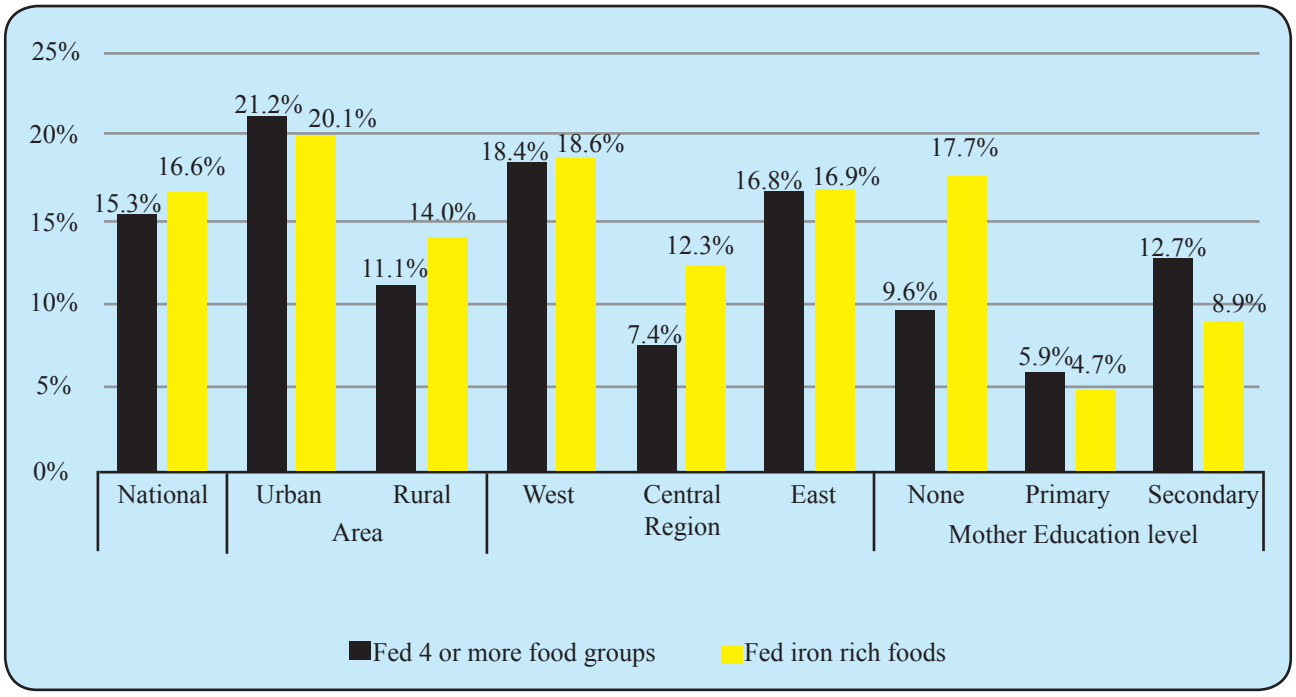
Three-fourths of breastfed children (six months to two years of age) were fed with the minimum frequency outlined by WHO: two times for breastfed children six to eight months of age and three times for breastfed children nine to twenty-three months of age (Figure 37). The proportion fed with adequate frequency was greater in the Eastern region.

Figure 37. Breastfed children who received food with adequate frequency (6-23 months)



Though the majority of children were receiving food with adequate frequency, the vast majority of children had diets that were not adequately diverse and in lacking important nutrients such as iron (Figure 38). Nationally, less than one in five children were fed diets that are minimally diverse or were fed an iron rich food the day before the interview. Compared to rural children, urban children had greater dietary diversity and a more iron rich diet.

Figure 38. Proportion of children fed with minimum dietary diversity and iron rich foods



Child morbidity

Morbidity is defined as the presence of illness or disease in a population; morbidity was measured for this survey because infection and nutritional status are closely related. For example, child malnutrition leads to impaired immune function which in turn leads to increased risk of infection which in turn leads to worsened nutritional status and impaired development. Diarrheal diseases, in particular, can result in severe dehydration and weight loss so adequate food and liquids must be administered in order to reduce the short and long term impacts of this illness of child health and growth. The NNS 2015 sought to measure child morbidity as well as health care seeking behaviors of parents for sick children and child eating and drinking habits during illness.

The survey questions were asked for the youngest child in the household regarding any illness that they suffered in the 15 day period prior to the interview. As shown in Figure 39 fever was the most commonly reported illness suffered by the youngest child in the household in the previous 15 days. Nationally, a little over one-fourth of children had suffered from fever in the previous 15 days and one-twentieth from diarrhea. Less than 2% of children were reported ill with an acute respiratory infections (ARI).

Figure 39. Prevalence of child morbidity

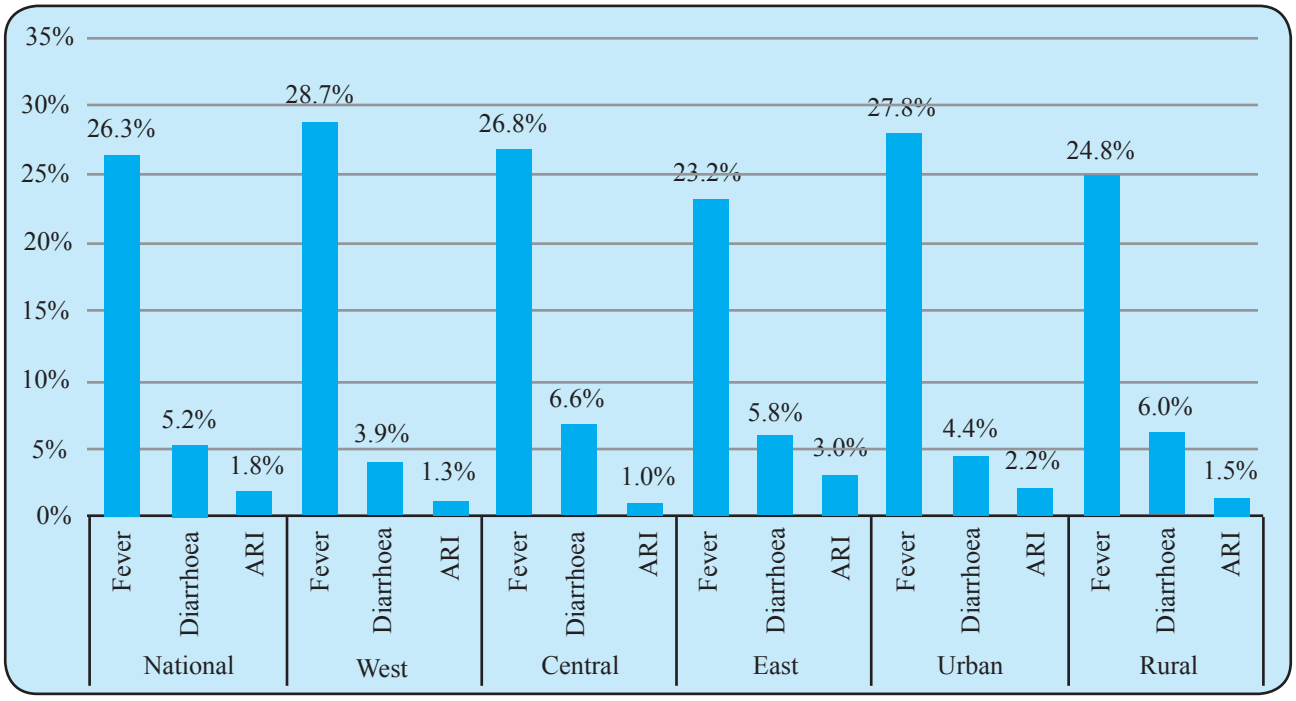
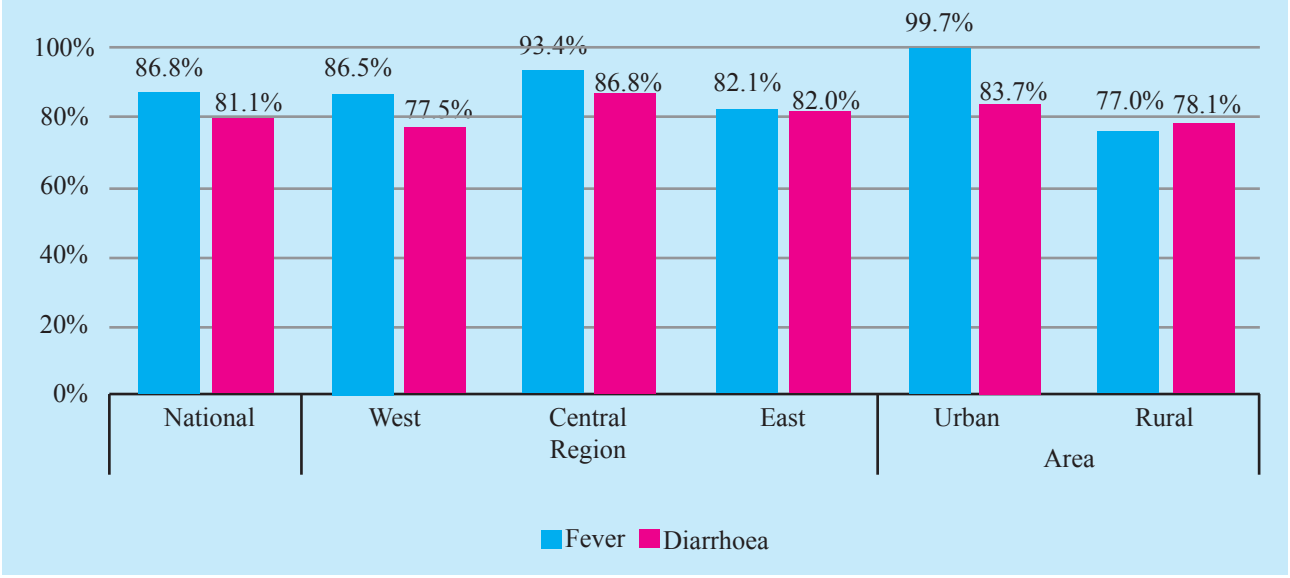


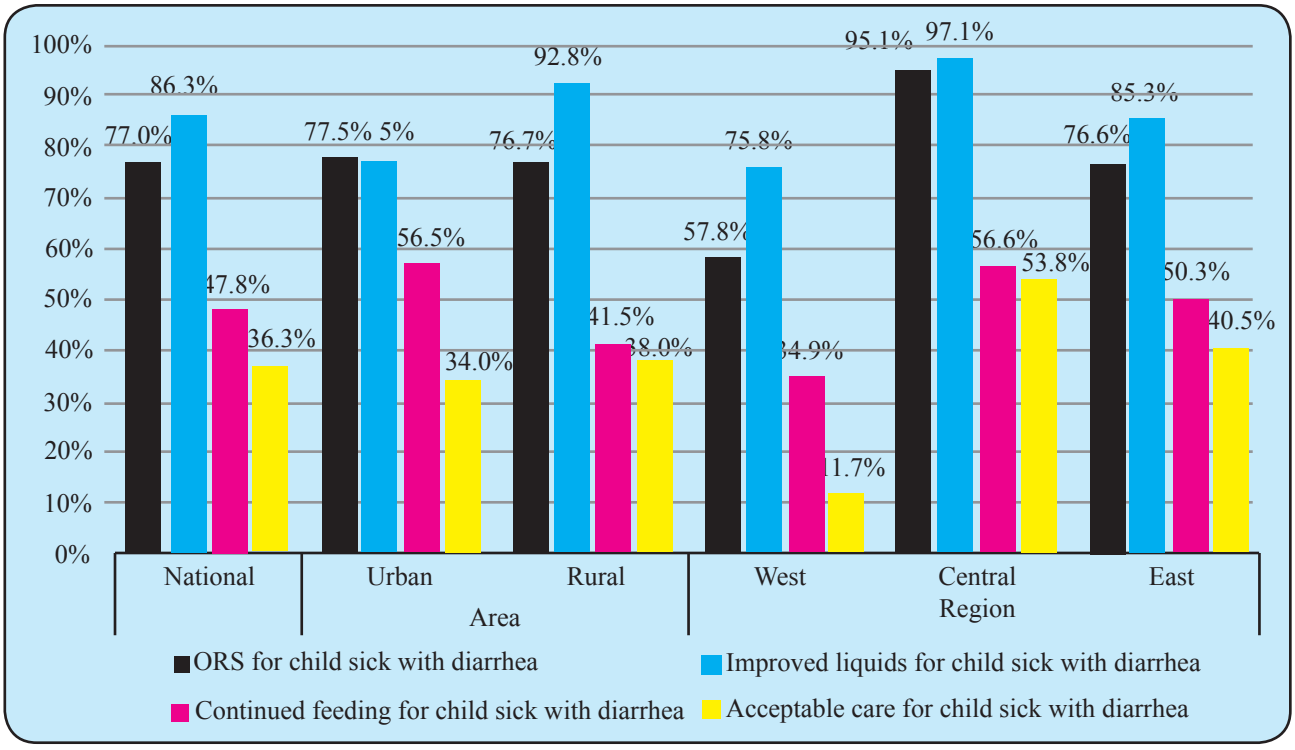
Figure 40. Percentage of ill children who were taken for medical care by illness



Of those children who were ill, the majority of caregivers reported that they sought medical advice or care for the child (Figure 40). A higher percentage of children with fever were taken for medical care than children with diarrhea. Of those who sought medical care for their children, 90% went to a government health provider and a smaller percentage sought treatment from others (Graph not shown). More urban parents took their children for medical care than rural parents if the child was sick (Figure 40).

Though the majority of children were taken to medical care, too few children received adequate home care for diarrheal disease (Figure 41). Adequate home care is defined as increased liquids, either just more to drink or a specialized beverage like ORS, and continues feeding during illness. Notably the bottleneck in acceptable care appears to be the low proportion of children who are continually offered food during an illness – less than half of sick children. Only a little over one third of children were given adequate care nationally, and the rate does not vary between rural and urban areas but is much lower in the West.

Figure 41. Treatment of child with diarrhea by area



Preventative care

Provision of vitamin A capsules and deworming is vital for proper immune system functioning and disease prevention. Among children, helminthes infections (specifically hookworm) are known to be highly associated with anemic status; therefore, deworming programmes are interventions aimed at reducing the burden of anemia among children (as well as other vulnerable groups). The benefits of deworming are almost immediate and have substantial impact: studies have shown large improvements in hemoglobin and albumin levels in children just two months after deworming with these concentrations normalizing after about one year (26).

Figure 42 displays the proportion of children 6 to 59 months of age who had received vitamin A capsules in 6 months prior to the interview. In Bhutan, nearly nine out of ten children received a VAC supplement in the six months before the survey; the level of coverage does not differ greatly across the regions but is slightly higher in between urban areas and the West. Figure 43 displays proportion of children 15 to 59 months of age who received deworming medicines in 6 months before the interview. Similar to VAC coverage nine out of ten children had received an anti-helminthes tablet and the receipt of an anti-helminthes was slightly lower in the East and rural areas.

Figure 42. Proportion of children 6-59 months of age who receive Vitamin A capsule in the last 6 months

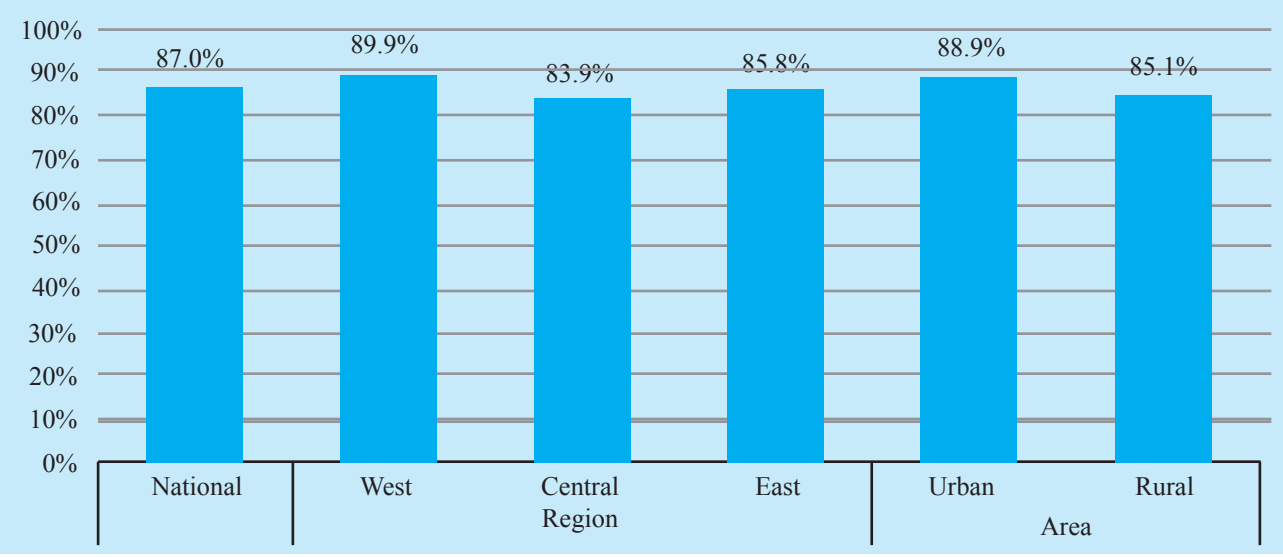


Figure 43. Proportion of children 15-59 months who received deworming in the last 6 months

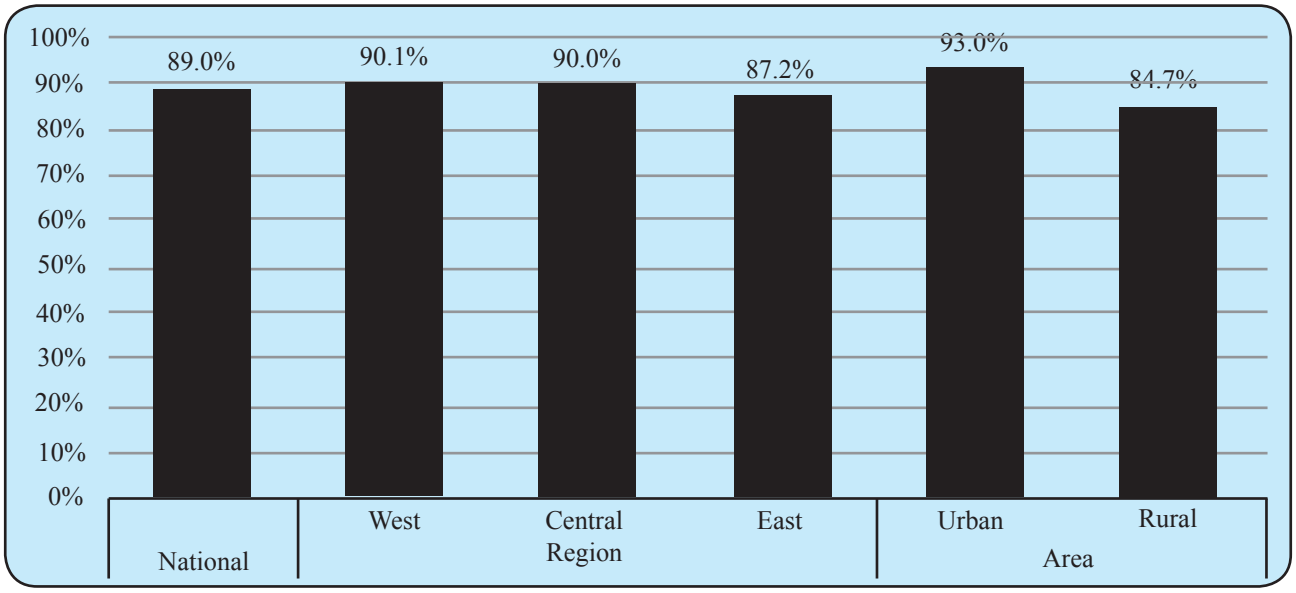
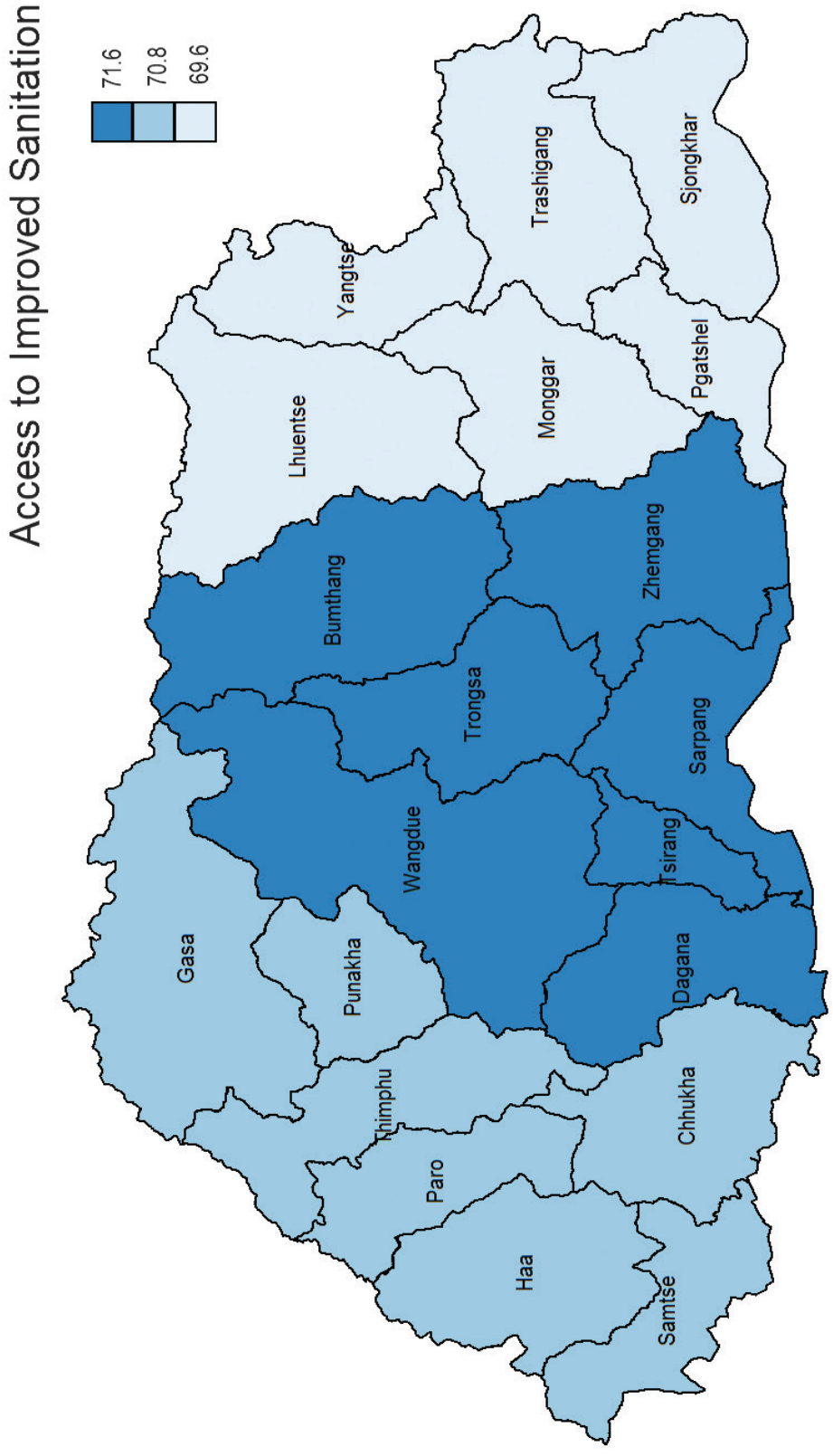
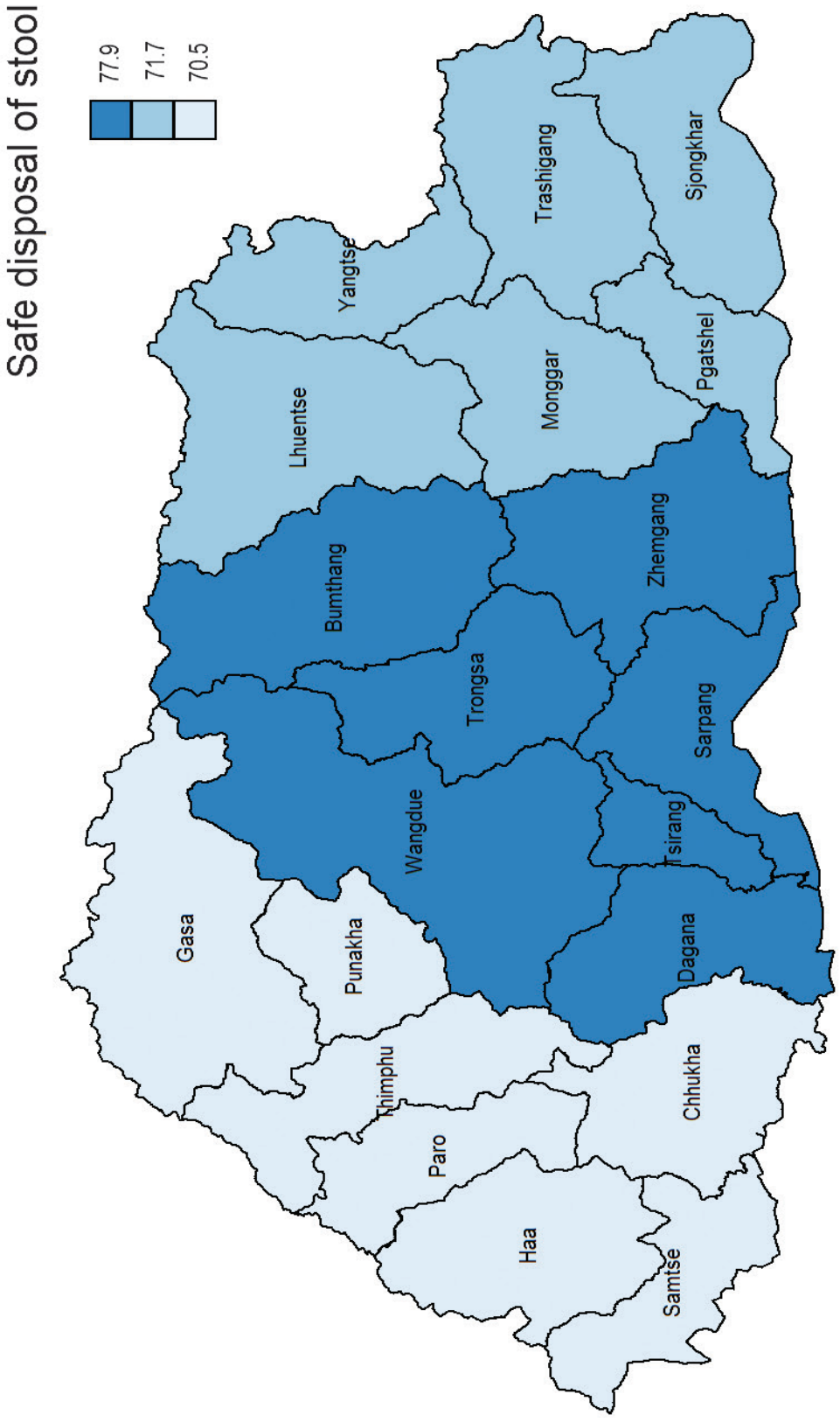


Photo courtesy: UNICEF, Bhutan

9
Hygiene and Sanitation


Access to Improved Sanitation
71.6
70.8
69.6
Trashigang
Sjongkhar
Yangtse
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse


Safe disposal of stool
77.9
71.7
70.5
Trashigang
Sjongkhar
Yangtse
Lhuentse
Monggar
Pgatshel
Bumthang
Zhemgang
Trongsa
Sarpang
Wangdue
Tsirang
Gasa
Punakha
Dagana
Thimphu
Chhukha
Paro
Haa
Samtse

Hygiene and Sanitation

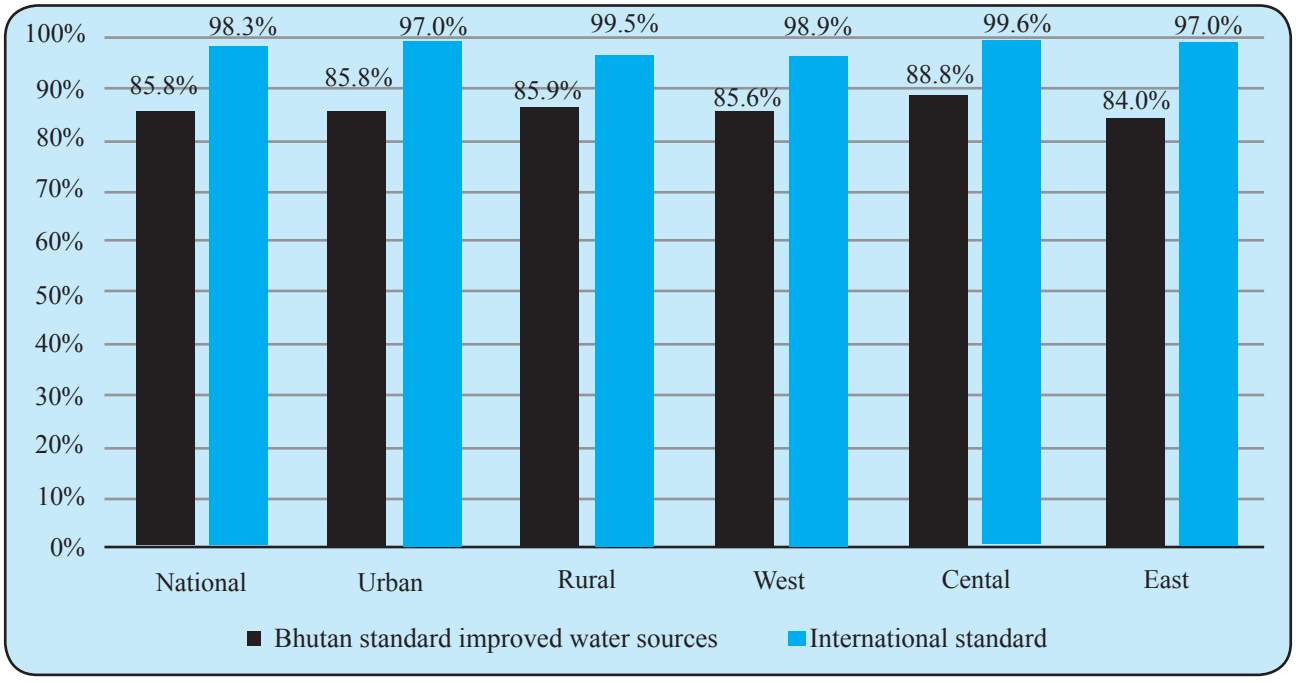
- A majority of households in Bhutan had improved water sources (98%) by the international JMP definition.
- In addition, Bhutan has set a more specific standard for improved water source which was also measured in the survey, and nationally 86% of households met the standard.
- Almost three-quarters of households had access to improved sanitation facilities (71%). A similarly high percentage reported behaviors for disposal of child stools that are sanitary and in line with WASH guidelines.
- Access to hand washing stations, based on observation by enumerators, was also high (87.4% of households).

Access to improved water sources

According to the WHO, improved water sources are essentially ones that are protected from outside contaminants (especially fecal matter); improved water sources include public taps, protected springs, piped water, and rainwater collection (27). The achievement of access to improved water sources for all people is a component of the Millennium Development Goals (MDGs), and improved water reduces the incidence of diarrheal diseases leading to improved nutritional status. Bhutan has near-universal access to improved water sources with 98.3% of households nationally reporting access to improved water sources (Figure 44).

Bhutan has a more rigorous standard for what qualifies as improved water source, requiring that water is piped inside the home or compound. Even using this higher standard for water sources the vast majority of Bhutanese homes meet this standard (85.8% of households).

Figure 44.Percentage of households with access to improved water sources



Improved sanitation facilities

In many countries in South Asia, open defecation and lack of access to basic toilet facilities cause major public health problems, through increasing the acquisition of diarrheal diseases, trachoma, schistosomiasis, and intestinal helminthes. The WHO defines improved toilet facilities as that which guarantees the separation of feces from human contact; these include composting toilets, ventilated improved pit (VIP) latrines, and toilets linked to sewer systems or septic tanks (27).

More than two-thirds (70.6%) of the Bhutan's households report access to improved toilet facilities (Figure 45). There is no significant regional difference in access, but a greater proportion of households in urban areas had access to improved facilities than in rural areas. In line with this proportion about the same proportion of care givers dispose of children's feces in a way that meets the criteria of safe and sanitary practice (Figure 46), with no variation by region or locality.

Figure 45. Access to improved toilet facilities

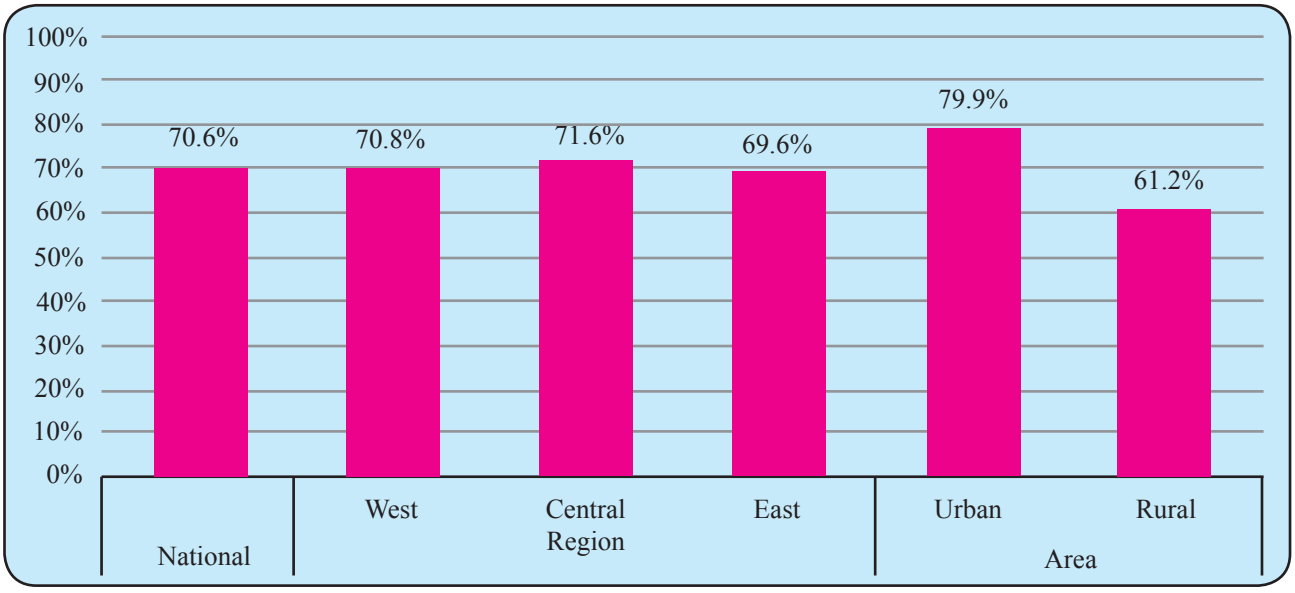
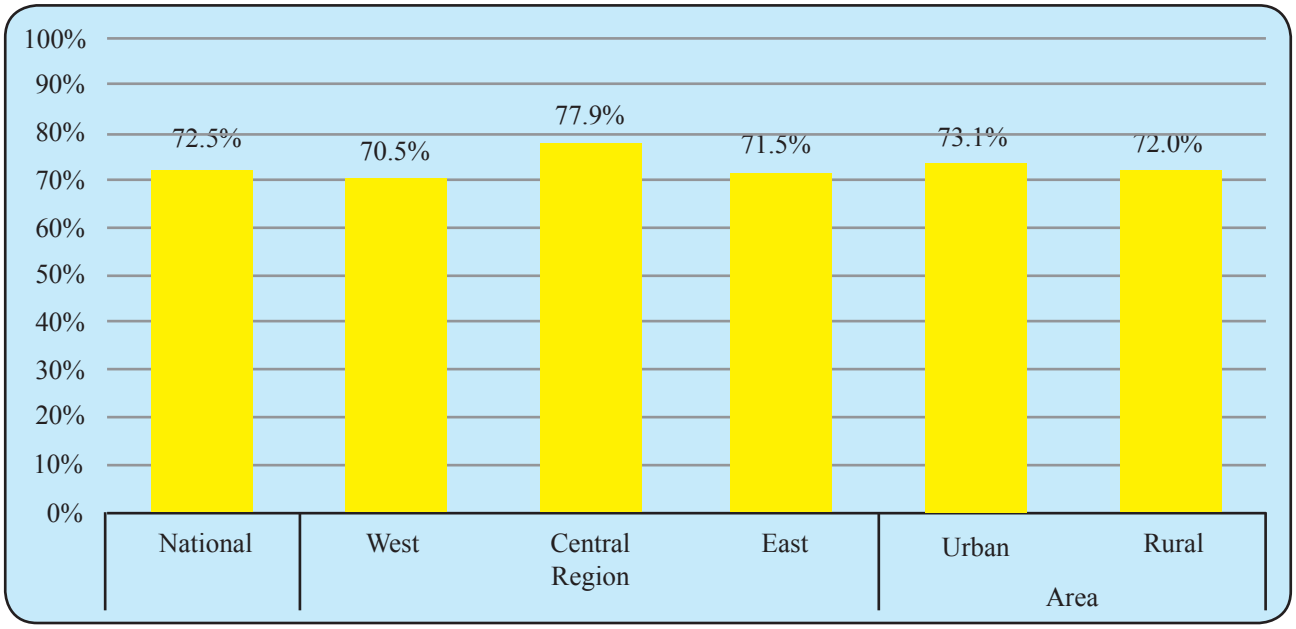


Figure 46. Percentage of households safely disposing of child stools



Hand washing stations

In addition, to drinking water and toilet facilities, hygiene practices are a vital component of illness prevention. While NNS 2015 did not directly measure hygiene practices, it did measure the observable indicator of a hand washing station, as without a set hand washing location, it is unlikely that hand washing will become a routine part of one's daily tasks. NNS 2015 showed that nearly nine in ten households maintained hand washing stations and that access did not differ significantly between rural and urban areas, but were slightly more common in the East (Figure 47).

Figure 47. Households with access to hand washing stations

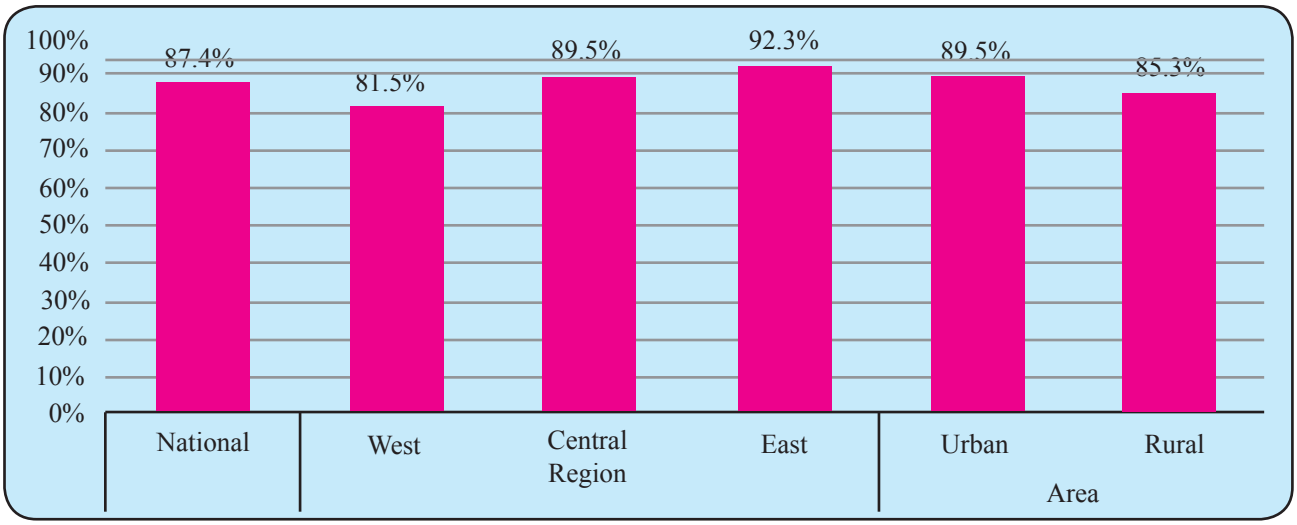


Photo courtesy: HPD, MoH

Table 5: Nutritional status of children

		Weight for age:			Height for age:			Weight for height:				BMI for age	
		% below -2 sd	% below -3 sd	Number of children	% below -2 sd	% below -3 sd	Number of children	% below -2 sd	% above +2 sd	% below -3 sd	Number of children	% below -2 sd	% below -3 sd
Sex	Male	7.7%	3.0%	698	17.6%	4.6%	694	4.7%	2.3%	3.4%	697	4.1%	696
	Female	10.3%	4.6%	751	24.5%	7.5%	745	3.9%	2.0%	1.9%	736	3.6%	743
Area	Urban	5.6%	3.9%	306	16.0%	3.4%	301	3.2%	1.5%	2.6%	299	4.4%	301
	Rural	12.4%	3.8%	1143	26.1%	8.6%	1138	5.4%	2.8%	2.7%	1134	3.4%	1138
Region	Western	11.1%	5.8%	614	16.2%	4.5%	616	4.6%	3.4%	3.4%	609	3.4%	610
	Central	7.7%	2.2%	308	18.5%	6.8%	305	4.0%	1.1%	1.5%	304	2.6%	304
	Eastern	7.6%	2.6%	527	29.1%	7.4%	518	4.2%	1.5%	2.6%	520	5.4%	525
Age	0-5	7.6%	5.3%	118	5.2%	3.6%	116	6.3%	2.4%	7.6%	126	9.1%	128
	6-11	8.2%	4.3%	151	8.3%	3.9%	147	5.2%	1.2%	2.6%	150	2.6%	150
	12-23	8.6%	4.3%	300	20.4%	5.4%	299	5.7%	4.2%	4.4%	297	6.2%	295
	24-35	7.9%	4.9%	295	20.2%	3.0%	294	6.4%	3.2%	1.5%	285	4.1%	288
	36-47	10.7%	4.0%	335	31.2%	8.2%	333	1.6%	0.6%	0.6%	327	1.4%	330
	48-59	9.9%	0.9%	250	23.2%	9.9%	250	1.8%	0.6%	2.0%	248	2.0%	248
Mother's education	None	10.5%	4.4%	806	28.2%	7.8%	801	6.3%	3.0%	2.6%	797	4.7%	800
	Primary	9.9%	3.9%	202	20.8%	4.9%	202	3.6%	2.6%	0.8%	201	2.1%	203
	Secondary	5.0%	2.4%	371	10.5%	3.2%	369	1.9%	0.7%	3.8%	367	3.9%	368
Wealth index quintiles	Poorest	14.9%	5.1%	410	35.1%	11.8%	412	7.0%	4.3%	2.9%	406	3.8%	406
	Second	8.6%	3.0%	467	21.6%	5.0%	462	3.6%	1.8%	2.1%	462	2.6%	464
	Middle	7.2%	2.1%	248	21.2%	3.8%	250	2.9%	1.2%	3.6%	247	5.9%	249
	Fourth	8.2%	4.7%	178	18.5%	6.8%	174	5.9%	2.6%	2.5%	174	3.8%	177
	Richest	5.6%	4.4%	146	5.7%	1.9%	141	1.7%	0.8%	1.7%	144	2.8%	143
Total		9.0%	3.8%	1449	21.2%	6.1%	1439	4.3%	2.2%	2.6%	1433	3.9%	1439

Table 6: Percentage of last-born children in the 2 years preceding the survey who were ever breastfed, percentage who were breastfed within one hour of birth, and percentage who received prelacteal feed

		Percentage ever breastfed [1]	Number of children	Percentage who were first breastfed: Within one hour of birth [2]	Number of children	Percentage who received a prelacteal feed	Number of children
Sex	Male	98.7%	259	78.4%	257	4.9%	281
	Female	99.8%	275	76.8%	274	2.2%	299
Area	Urban	100.0%	97	81.1%	97	1.4%	107
	Rural	98.7%	450	75.0%	447	5.0%	498
Region	Western	99.2%	239	77.8%	238	3.5%	263
	Central	99.5%	102	77.9%	101	2.2%	117
	Eastern	99.2%	206	77.8%	205	4.0%	225
Mother's education	None	99.8%	306	77.2%	305	3.9%	328
	Primary	97.3%	81	75.5%	80	5.4%	87
	Secondary +	99.3%	156	79.5%	155	2.3%	169
Wealth index quintiles	Poorest	100.0%	164	72.9%	164	4.7%	180
	Second	98.7%	189	74.6%	188	6.9%	208
	Middle	99.5%	81	80.1%	80	2.9%	88
	Fourth	98.4%	67	81.2%	66	1.8%	75
	Richest	100.0%	46	81.2%	46	0.3%	54
Total		99.3%	547	77.9%	544	3.4%	605

Table 7: Percentage of living children according to breastfeeding status at selected age groups

Percent exclusively breastfed [1]		Children 0-6 months			
		Percent exclusively breastfed [1]	Number of children	Percent predominantly breastfed [2	Number of children
Area	Urban	51.1%	25	65.9%	25
	Rural	52.0%	99	64.7%	99
Region	Western	33.8%	65	46.9%	65
	Central	48.4%	15	64.4%	15
	Eastern	76.6%	44	92.1%	44
Mother's education	None	51.1%	65	72.0%	65
	Primary	21.9%	16	30.7%	16
	Secondary	57.7%	43	64.3%	43
Total		51.4%	124	65.4%	124

Table 8: Percentage of infants age 6-8 months who received solid, semi-solid or soft foods during the previous day and continued breastfeeding, Bhutan

		Percent receiving solid, semi-solid or soft foods	Number of children age 6-8 months	Continued BF at one year	Number of children age 12-15 months	Continued BF at two years	Number of children age 20-23 months
Sex	Male	85.6%	36	86.8%	43	52.2%	47
	Female	88.2%	32	99.7%	52	67.8%	39
Area	Urban	88.0%	10	95.0%	20	49.8%	14
	Rural	86.2%	59	89.1%	80	69.3%	72
Region	West	92.8%	26	91.7%	37	59.9%	38
	Central	70.3%	17	94.0%	20	70.3%	18
	East	99.5%	26	91.0%	43	55.6%	30
Total		86.9%	69	92.0%	100	60.6%	86

Table 9: Percentage of children age 6-23 months who received minimum dietary diversity and iron rich foods

		Percent receiving 4 or more food groups	Number of children age 6-23 months	Percent receiving iron rich foods	Number of children age 6-23 months
Sex	Male	9.9%	218	12.0%	218
	Female	21.1%	235	21.7%	235
Area	Urban	21.2%	80	20.1%	80
	Rural	11.1%	391	14.0%	391
Region	Western	18.4%	197	18.6%	197
	Central	7.4%	98	12.3%	98
	Eastern	16.8%	176	16.9%	176
Age	6-8 months	2.8%	69	4.5%	69
	9-11 months	18.3%	87	16.3%	87
	12-17 months	13.1%	168	13.2%	168
	18-23 months	20.1%	147	23.8%	147
Mother's education	None	16.0%	260	20.6%	260
	Primary	5.9%	70	4.7%	70
	Secondary	19.3%	125	16.4%	125
Wealth index quintiles	Poorest	4.9%	147	12.5%	147
	Second	12.7%	161	16.4%	161
	Middle	15.6%	65	10.9%	65
	Fourth	16.0%	59	18.0%	59
	Richest	33.9%	39	28.9%	39
Total		15.3%	471	16.6%	471

Table 10: Percentage of children age 6-23 months who received solid, semi-solid, or soft foods (and milk feeds for non-breastfeeding children) the minimum number of times (min. meal frequency) or more the previous day

		Percent receiving solid, semi-solid and soft foods the minimum number of times	Number of children age 6-23 months
Sex	Male	62.2%	189
	Female	71.7%	203
Area	Urban	55.9%	66
	Rural	74.7%	334
Region	Western	70.3%	168
	Central	67.6%	80
	Eastern	61.9%	152
Age	6-8 months	74.9%	60
	9-11 months	66.5%	78
	12-17 months	69.7%	148
	18-23 months	60.8%	114
Mother's education	None	67.3%	229
	Primary	67.5%	61
	Secondary	66.1%	106
Wealth index quintiles	Poorest	77.8%	128
	Second	70.6%	140
	Middle	56.9%	54
	Fourth	52.2%	46
	Richest	77.1%	32
Total		66.9%	400

Table 11: Percentage of children age 0-23 months who were ever fed with a bottle (bottle feeding)

		Percentage of children age 0-23 months ever fed with a bottle	Number of children age 0-23 months:
Sex	Male	35.5%	255
	Female	28.3%	273
Area	Urban	31.6%	95
	Rural	31.1%	446
Region	Western	33.7%	239
	Central	25.0%	102
	Eastern	32.1%	200
Age	0-5 months	15.4%	123
	6-11 months	30.7%	142
	12-23 months	38.1%	276
Mother's education	None	29.4%	303
	Primary	29.0%	79
	Secondary	34.8%	155
Wealth index quintiles	Poorest	22.1%	162
	Second	24.6%	187
	Middle	18.9%	80
	Fourth	50.2%	66
	Richest	41.6%	46
Total		31.4%	541

Table 12: Low birth weight infants

Percentage of last-born children in the 2 years preceding the survey that are estimated to have weighed below 2500 grams at birth and percentage of live births weighed at birth, Bhutan

		Percent of live births:					
		% weighted	% weights obtained	No of children	Below 2500 grams	Mean Weight at birth	No of children
Sex	Male	94.7%	85.2%	281	7.5%	3.11	233
	Female	94.8%	83.8%	299	6.3%	3.24	243
Area	Urban	98.7%	87.3%	107	4.4%	3.24	95
	Rural	91.7%	77.9%	498	9.1%	3.13	393
Region	Western	96.0%	84.1%	263	8.1%	3.12	225
	Central	95.2%	82.0%	117	4.2%	3.19	95
	Eastern	93.3%	79.8%	225	6.6%	3.26	168
Education	None	91.2%	81.3%	328	6.0%	3.19	261
	Primary	93.4%	90.5%	87	12.7%	3.07	73
	Secondary	99.9%	88.6%	169	5.9%	3.21	151
Wealth index quintiles	Poorest	81.8%	69.2%	180	7.8%	3.09	119
	Second	94.2%	80.9%	208	7.2%	3.19	176
	Middle	99.9%	93.4%	88	9.2%	3.12	80
	Fourth	100.0%	84.7%	75	5.3%	3.27	67
	Richest	100.0%	84.7%	54	4.4%	3.23	46
Total		94.9%	82.3%	605	6.8%	3.18	488

Table 13: Anemia of children

		Mild	Moderate	Severe	Total	Mean Altitude corrected HB	No of children
Sex	Male	25.2%	21.9%	0.1%	47.2%	11.0	638
	Female	24.8%	15.3%	0.7%	40.8%	11.2	700
Area	Urban	26.7%	17.0%	0.7%	44.4%	11.1	280
	Rural	23.5%	19.7%	0.1%	43.4%	11.0	1058
Region	Western	25.4%	24.1%	0.1%	49.6%	10.9	566
	Central	25.3%	13.5%	0.1%	38.9%	11.3	291
	Eastern	24.4%	15.2%	1.0%	40.6%	11.2	481
Age	6-11	26.4%	33.1%	0.0%	59.5%	10.6	146
	12-23	33.7%	32.0%	0.1%	65.7%	10.5	310
	24-35	27.7%	18.7%	0.1%	46.6%	11.0	296
	36-47	13.4%	8.5%	1.5%	23.3%	11.5	337
	48-59	24.5%	7.0%	0.0%	31.5%	11.5	249
Mother's education	None	26.3%	19.4%	0.8%	46.5%	11.0	752
	Primary	30.4%	21.0%	0.0%	51.5%	11.0	188
	Secondary	20.4%	17.3%	0.1%	37.8%	11.2	330
Wealth index quintiles	Poorest	25.9%	21.1%	0.0%	47.0%	11.0	383
	Second	29.3%	19.6%	0.2%	49.0%	11.0	429
	Middle	33.5%	11.9%	1.6%	47.0%	11.0	230
	Fourth	18.7%	19.5%	0.0%	38.3%	11.2	167
	Richest	15.1%	21.3%	0.0%	36.3%	11.2	129
Total		25.0%	18.4%	0.4%	43.8%	11.1	1338

10
Recommendations

Recommendations

1. Improve household food diversity including encouraging the intake of iron and protein rich foods through multisectoral approach. Develop appropriate dietary guidelines by relevant programme.
2. Strengthen ANC coverage through early booking to increase ANC visits in the first trimester and improve follow up after first visit to increase the recommended 8 ANC visit for all pregnant women.
3. Review and strengthen dietary/nutrition counselling package at Mother and Child Health clinics including the emphasis on the dangers of alcohol and betel nut intake.
4. Revise anemia prevention and control strategy by incorporating targeted interventions for children, adolescent girls, pregnant women and non-pregnant women.
    a. Strengthen the current IFA supplementation programme for school children and pregnant women
    b. Strategize to improve the iron intake by children through improvements in the complementary feeding and by exploring the use of micronutrient powders.
5. Improve breastfeeding support in public, private and non-formal sectors, and revitalize baby Friendly Hospital Initiatives. Develop an enforceable code for marketing of breast milk substitutes backed by appropriate legislation.
6. Develop innovative approaches to bring about behavior change to improve adequacy and quality of complementary feeding.
7. Strengthen and scale up the programme on Rural Sanitation and Hygiene.
8. Develop comprehensive M&E system to monitor the effective implementation of nutrition programmes and measure the outcomes periodically.
9. Collect district level data in the next National Nutrition Survey.
10. Include nutrition indicators in the Health Information Management System (HMIS) during the next review.

11
References

References:

1. **National Statistics Bureau.** *Population projections Bhutan 2005-2030.* Thimpu, Bhutan : National Statistics Bureau, July 2007.

2. **Bhutan Multiple Indicator Survey.** *Bhutan Multiple Indicator Survey.* Thimphu, Bhutan : National Statistics Bureau, May 2011.

3. **Centre for Research Initiative.** *National Nutrition, Infant & Young Child Feeding Survey.* Thimphu, Bhutan : Food & Nutrition Programme; Ministry of Health, 2009.

4. **The Royal Government of Bhutan, Ministry of Health and Education.** *Anemia Among Men Women And Children In Bhutan: How Big Is the Problem?* Thimphu, Bhutan : The Royal Government of Bhutan, Ministry of Health and Education, August 2003.

5. **Magnani, Robert.** *Food and Nutrition Technical Assistance Project (FANTA).* [Online] December 1997. [Cited: April 2011, 15.] http://www.fantaproject.org/downloads/pdfs/sampling.pdf.

6. **Rutstein, Shea Oscar and Johnson, Kiersten.** *DHS comparative reports no. 6: The DHS wealth index.* Calverton, US : ORC Macro, 2004.

7. *Education Improves Public Health and Promotes Health Equity.* **Hahn and Truman.** s.l. : International Journal of Health Services, 2015.

8. *What works? Interventions for maternal and child undernutrition and survival.* **Bhutta, Zulfiqar A., et al.** 9610, London, UK : Lancet, 2008, Vol. 371, pp. 417–440.

9. **World Health Organization (WHO).** *Nutritional Landscape Informtion System (NLIS): Country profile indicators - Interpretation guide.* Geneva, Switzerland : WHO, 2010.

10. **World Health Organization.** Anemia. *Health Topics.* [Online] 2012. [Cited: September 5, 2015.] http://www.who.int/topics/anemia/en/ .

11. *Iron deficiency anemia in infancy: Long-lasting effects on auditory and visual system functioning.* **Algarín, Cecilia, et al.** s.l. : Nature, 2003, Pediatric Research, Vol. 53, pp. 217-223.

12. **World Health Organization.** *Iron Deficiency: Anemia Assessment, Prevention, and Control.* Geneva, CH : World Health Organization, 2001.

13. —. Vitamin and Minteral Nutrition Information System. [Online] 2008. [Cited: September 7, 2015.] http://www.who.int/vmnis/ anemia /prevalence/summary/anemia_data_status_t2/en/.

14. —. *Vitamin and Minteral Nutrition Information System.* Geneva, CH : World Health Organization, 2008.

15. **World Food Programme.** Construction of the FCS. [Online] 2008. [Cited: September 3, 2015.] http://home.wfp.org/stellent/groups/public/documents/ ena/wfp196627.pdf.

16. **Food and Agriculture Organization of the United Nations (FAO).** *Policy brief: Food security.* s.l. : FAO, 2006.

17. **World Health Organization (WHO).** Antenatal care: Report of a Technical Working Group, Geneva, 31 October - 4 November 1994. [Online] 1999. [Cited: October 19, 2012.] https://apps.who.int/rht/documents/MSM96-8/msm968.htm. WHO/FRH/MSM/96.8.

18. —. *Standards for maternal and neonatal care: Provision of effective antenatal care.* Geneva, Switzerland : WHO, 2006.

19. **Ministry of Health.** *National Midwifery Standards Bhutan.* 2009.

20. *Periconceptional supplementation with folate and/or multivitamins for preventing neural tube defects: RHL Commentary.* **Bhutta, Z. A. and Hasan, B.** Geneva, CH : World Health Organization, 2002, The WHO Reproductive Health Library.

21. *Routine iron/folate supplementation during pregnancy: effect on maternal aneamia and birth outcomes.* **Imdad, Aamer and Zulfiqar, Bhutta. A.** 2010, Pediatric and Perinatal Epidemiology, Vol. 26, pp. 168-177.

22. **World Health Organization.** Daily iron and folic acid supplementation during pregnancy. [Online] [Cited: September 18, 2015.] http://www.who.int/elena/titles/daily_iron_pregnancy/en/.

23. ***Indicators for assessing infant and young child feeding practices. Part 1: Definitions.*** **Geneva : World Health Organization, 2008.**

24. ***Indicators for assessing infant and young child feeding practices. Part 2: Measurement.*** **Geneva, Switzerland : World Health Organization, 2010.**

25. **UNICEF.** ***Programming Guide on Infant and Young Child Feeding.*** **Geneva, Switzerland : WHO, 2011.**

26. ***Impact of hookworm deworming on anemia and nutritional status among children in Thailand.*** **Watthanakulpanich, D., et al. 4, s.l. : Southeast Asian J Trop Med Public Health, 2011, Vol. 42, pp. 782-792.**

27. UNICEF. Access to water and sanitation: a few definitions. [Online] [Cited: September 4, 2015.] http://www.unicef.org/wcaro/ overview_2570.html.

28. World Health Organization. *The Management of Nutrition in Major Emergencies.* Geneva, CH : s.n., 2000.

Appendix 1: Detailed description of sampling weights

To account for a differences in the sample selection procedure caused by the selection of the equity areas and a lack of sufficient urban areas in the eastern region, the weighting procedure was not uniform across areas. The first adjustment made was stratifying the country into five strata consisting of the three regions plus the two equity districts separately (see step 3 below). In addition, for Punakha the probability of selection was set at 1 (see step 4). Steps 5 and 6 were particularly complicated as the East region had a few urban areas selected than other regions (step 5) and that the equity areas selected chiwog without a rural/urban stratification (Step 6). Because of this, the probability for chiwog in Punakha are determined without a rural urban stratification. In addition, the probability for chiwog selection in Lhuntse was the sum of the rural/urban stratified probability and the probability of the increased sample without rural/urban stratification that was done as an equity dzongkhag. This difference led to chiwog substrate within each dzongkhag (step 7). Step 11 is used to outline the entire sampling structure.

Stata code

```
***1) generating a variable that lists the number of dzongkhags in each region

gen dzongkhag_num=7 if region==”central”| region==”west”

replace dzongkhag_num=6 if region==”east”


***2) Coding the regions

gen region_code=1 if region==”west”

replace region_code=2 if region==”central”

replace region_code=3 if region==”east”


***3) Identifying 5 strata which equal the three regions + the two equity districts

gen dzongkhag_strata=region_code

replace dzongkhag_strata=4 if dzongkhag_code==20

replace dzongkhag_strata=5 if dzongkhag_code==16
```

***4) Calculating probability of dzongkhag selection; it is different for Punakha

gen dprob=2*dzongkhag_pop/region_pop

replace dprob=1 if dzongkhag_code==20

***5) Calculating probability of chiwog selection

*when stratified by rural/urban (usual)

gen cprob=dprob*49*chiwog_pop/region_pop if rural==1

replace cprob=dprob*20*chiwog_pop/region_pop if rural==0

*The number of rural and urban sites selected difference for the East region

replace cprob=dprob*53*chiwog_pop/region_pop if rural==1 & region_code==3

replace cprob=dprob*16*chiwog_pop/region_pop if rural==0 & region_code==3

***6) In the equity dzongkhags, sampling was done without stratifying by rural and urban

replace cprob=dprob*60*chiwog_pop/dzongkhag_pop if dzongkhag_code==20

replace cprob=cprob+34*chiwog_pop/dzongkhag_pop if dzongkhag_code==16

**Due to population size, some chiwogs had better than a 100% probability of selection, but this was capped at 100%

replace cprob=1 if cprob>1

***7) Generating the variable for chiwog stratification for the svyset command

gen chiwog_strata=region_code*2+rural

replace chiwog_strata=1 if dzongkhag_code==20

replace chiwog_strata=8 if dzongkhag_code==16

***8) Generating a variable showing the finite population number of chiwogs in each chiwog strata

gen chiwog_fpc=96 if chiwog_strata==1

replace chiwog_fpc=130 if chiwog_strata==2

replace chiwog_fpc=169 if chiwog_strata==3

replace chiwog_fpc=31 if chiwog_strata==4

replace chiwog_fpc=192 if chiwog_strata==5

replace chiwog_fpc=21 if chiwog_strata==6

replace chiwog_fpc=122 if chiwog_strata==7

replace chiwog_fpc=105 if chiwog_strata==8

***9) generating the probability of selection for households using the number of households listed

gen hhprob=cprob*hh_surveyed/listed_hh

***10) Generating sampling weights using the inverse of the probability of selection

gen bnns_hhwt=1/hhprob

***11) Defining the survey structure

*for households

global svyhh svyset dzongkhag_code [pw=bnns_hhwt], strata(dzongkhag_strata) singleunit(certainty) fpc(dzongkhag_num) || area_id, strata(chiwog_strata) fpc(chiwog_fpc) || hhid, fpc(listed_hh)

*for individuals

global svyhhmem svyset dzongkhag_code [pw=bnns_hhwt], strata(dzongkhag_strata) singleunit(certainty) fpc(dzongkhag_num) || area_id, strata(chiwog_strata) fpc(chiwog_fpc) || hhid, fpc(listed_hh) || _n

Appendix 2a: Standard error, Design effect, weight & unweighted count and Confidence limits: National Level

	value(r)	Standard error(se)	Design effect(deft)	Weighted count	Unweighted count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalence	21.2%	0.021	1.95	1418.2	1439	17.0%	25.4%
Underwight prevalence	9.0%	0.009	1.21	1461.5	1475	7.2%	10.8%
Wasting prevalence	4.3%	0.006	1.16	1440.6	1459	3.1%	5.5%
overweight prevalence	3.9%	0.008	1.52	1419.0	1439	2.3%	5.4%
Anemia prevalence	43.8%	0.044	3.23	1331.9	1338	35.1%	52.6%
Exclusive breastfeeding under 6 months	52.3%	0.119	2.64	115.5	124	28.6%	76.1%
Early Initiation of Breastfeeding	77.9%	0.032	1.79	510.3	544	71.5%	84.2%
Dietary diversity*	15.3%	0.035	2.09	454.6	471	8.4%	22.3%
Iron rich food	16.6%	0.027	1.59	454.6	471	11.1%	22.0%
Women							
Anemia prevalence 10-49 years (non pregnant)	34.9%	0.016	2.35	4811.2	4786	31.7%	38.1%
Anemia prevalence 10-19 years	31.3%	0.033	2.75	1498.5	1524	24.8%	37.8%
Anemia prevalence pregnant women	28.1%	0.050	1.37	148.5	152	18.1%	38.1%
ANC +4 visits	84.8%	0.025	1.61	513.9	546	79.8%	89.7%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	79.9%	0.026	2.15	1153.2	1131	74.7%	85.0%
PNC visit	83.1%	0.018	1.64	1170.5	1153	79.5%	86.8%
PNC counselling for child feeding (Of those who received PNC)	87.1%	0.016	1.44	973.1	917	83.9%	90.3%
Household members							
Access to improved water facilities	98.3%	0.009	4.17	3569.0	3570	96.5%	100.1%
Access to improved sanitation facilities	70.6%	0.021	2.73	3569.0	3570	66.4%	74.8%
Food insecurity-worry about food	1.6%	0.003	1.37	3569.0	3571	1.0%	2.1%
Food insecurity-eating only rice	0.7%	0.002	1.49	3569.0	3571	0.3%	1.1%
Food insecurity-skipping meals	0.7%	0.002	1.42	3569.0	3571	0.3%	1.2%
Food insecurity-food ran out	1.2%	0.002	1.28	3569.0	3571	0.7%	1.6%

Appendix 2b Standard error, Design effect, weight & unweight count and Confidence limits: Urban Areas

	value(r)	Standard error(se)	Design effect(deft)	Weighted count	Unweighted count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalence	16.0%	0.024	1.74	1460.7	1490	11.2%	20.8%
Underwight prevalence	5.6%	0.014	1.64	1487.8	1500	2.8%	8.4%
Wasting prevalence	3.2%	0.009	1.40	1470.1	1493	1.3%	5.0%
overweight prevalence	4.4%	0.014	1.81	1464.0	1490	1.6%	7.2%
Anemia prevalence	44.4%	0.082	4.26	1405.6	1469	28.0%	60.8%
Exclusive breastfeeding under 6 months	53.0%	0.186	3.72	821.4	926	15.9%	90.2%
Early Iniatiation of Breastfeeding	81.1%	0.041	1.81	1007.6	1286	73.0%	89.3%
Dietary diversity*	21.2%	0.048	1.87	961.4	1269	11.6%	30.8%
Iron rich food	20.1%	0.043	1.71	961.4	1269	11.5%	28.7%
Women							
Anemia prevalance 10-49 years (non pregnant)	35.9%	0.031	3.27	4980.0	5052	29.7%	42.2%
Anemia prevalance 10-19 years	32.4%	0.057	3.84	3246.8	4283	21.0%	43.8%
Anemia prevalance pregnant women	29.8%	0.082	2.02	2578.4	3969	13.5%	46.1%
ANC +4 visits	87.3%	0.044	2.32	1007.6	1286	78.4%	96.1%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	80.8%	0.036	2.32	1362.7	1449	73.5%	88.0%
PNC visit	88.4%	0.022	1.70	1363.8	1450	84.0%	92.7%
PNC counselling for child feeding (Of those who recived PNC)	87.1%	0.025	1.81	1294.5	1418	82.0%	92.2%
Household members							
Access to improved water facilities	99.6%	0.002	1.62	3569.0	3571	99.2%	100.1%
Access to improved sanitation facilities	79.9%	0.021	2.18	3569.0	3571	75.7%	84.0%
Food insecurity-worry about food	0.7%	0.004	1.93	3569.0	3571	-0.1%	1.4%
Food insecurity-eating only rice	0.1%	0.001	1.32	3569.0	3571	-0.1%	0.3%
Food insecurity-skipping meals	0.2%	0.001	1.33	3569.0	3571	-0.1%	0.5%
Food insecurity-food ran out	0.4%	0.003	1.80	3569.0	3571	-0.1%	0.9%

*Diverse Diet: Receiving 4 or more food groups per day

Appendix 2c Standard error, Design effect, weight & unweight count and Confidence limits: Rural Areas

	value(r)	Standard error(se)	Design effect(deft)	Weighted count	Unweighted count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalance	26.1%	0.020	1.23	1463.6	1455	22.1%	30.1%
Underwight prevalance	12.4%	0.013	1.11	1479.7	1481	9.7%	15.1%
Wasting prevalance	5.4%	0.010	1.15	1476.5	1472	3.5%	7.3%
overweight prevalance	3.4%	0.006	0.83	1461.0	1455	2.3%	4.5%
Anemia prevalance	43.4%	0.042	2.18	1432.2	1375	35.0%	51.7%
Exclusive breastfeeding under 6 months	51.3%	0.053	0.52	783.7	416	40.7%	61.8%
Early Iniatiation of Breastfeeding	75.0%	0.028	0.92	1008.7	764	69.4%	80.5%
Dietary diversity*	11.1%	0.030	1.32	999.2	708	5.0%	17.2%
Iron rich food	14.0%	0.025	0.99	999.2	708	8.9%	19.1%
Women							
Anemia prevalance 10-49 years (non pregnant)	33.8%	0.023	2.37	4981.8	4886	29.1%	38.5%
Anemia prevalance 10-19 years	30.2%	0.021	1.06	3402.4	2393	26.0%	34.5%
Anemia prevalance pregnant women	25.9%	0.056	0.72	2720.7	1335	14.7%	37.0%
ANC +4 visits	82.6%	0.030	1.15	1012.3	766	76.6%	88.6%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	78.9%	0.024	1.31	1296.5	1188	74.2%	83.6%
PNC visit	77.7%	0.020	1.08	1312.7	1209	73.8%	81.7%
PNC counselling for child feeding (Of those who recived PNC)	87.0%	0.016	0.95	1184.6	1005	83.7%	90.3%
Household members							
Access to improved water facilities	97.0%	0.014	3.42	3569.0	3570	94.2%	99.8%
Access to improved sanitation facilities	61.2%	0.031	2.65	3569.0	3570	55.1%	67.3%
Food insecurity-worry about food	2.5%	0.006	1.63	3569.0	3571	1.3%	3.7%
Food insecurity-eating only rice	1.3%	0.003	1.21	3569.0	3571	0.6%	1.9%
Food insecurity-skipping meals	1.3%	0.003	1.24	3569.0	3571	0.6%	2.0%
Food insecurity-food ran out	2.0%	0.005	1.48	3569.0	3571	1.0%	2.9%

Appendix 2d Standard error, Design effect, weight & unweight count and Confidence limits: Western Region

	val-ue(r)	Standard error(se)	Design effect(deft)	Weight-ed count	Unweight-ed count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalence	16.2%	0.032	2.14	590.8	616	9.7%	22.7%
Underwight prevalence	11.1%	0.013	1.02	601.8	630	8.5%	13.7%
Wasting prevalence	4.6%	0.007	0.85	602.4	625	3.1%	6.0%
overweight prevalance	3.4%	0.009	1.14	583.4	610	1.7%	5.1%
Anemia prevalence	49.6%	0.086	4.02	545.5	566	32.4%	66.8%
Exclusive breastfeeding under 6 months	36.0%	0.185	2.95	59.5	65	-0.9%	72.9%
Early Iniatiation of Breastfeeding	77.8%	0.050	1.84	233.0	238	67.8%	87.9%
Dietary diversity*	18.4%	0.056	2.06	206.2	197	7.2%	29.7%
Iron rich food	18.6%	0.039	1.42	206.2	197	10.8%	26.4%
Women							
Anemia prevalance 10-49 years (non pregnant)	39.8%	0.030	2.66	1931.7	2062	33.9%	45.7%
Anemia prevalance 10-19 years	34.9%	0.066	3.29	570.5	659	21.7%	48.2%
Anemia prevalance pregnant women	24.9%	0.047	0.75	48.7	74	15.5%	34.4%
ANC +4 visits	87.7%	0.029	1.33	234.8	239	81.9%	93.4%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	79.4%	0.052	2.80	477.5	494	69.0%	89.7%
PNC visit	89.0%	0.026	1.83	484.8	503	83.8%	94.2%
PNC counselling for child feeding (Of those who recived PNC)	87.0%	0.015	0.90	431.6	434	84.1%	89.9%
Household members							
Access to improved water facilities	97.0%	0.024	5.11	1376.1	1520	92.3%	101.7%
Access to improved sanitation facilities	70.8%	0.034	2.80	1376.1	1520	64.0%	77.7%
Food insecurity-worry about food	1.7%	0.003	0.85	1376.1	1520	1.1%	2.3%
Food insecurity-eating only rice	0.8%	0.004	1.57	1376.1	1520	0.1%	1.6%
Food insecurity-skipping meals	0.9%	0.004	1.68	1376.1	1520	0.0%	1.7%
Food insecurity-food ran out	1.4%	0.003	1.04	1376.1	1520	0.8%	2.1%

Appendix 2e Standard error, Design effect, weight & unweight count and Confidence limits: Central Region

	value(r)	Standard error(se)	Design effect(deft)	Weighted count	Unweighted count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalance	18.5%	0.044	2.12	343.1	305	9.6%	27.4%
Underwight prevalance	7.7%	0.018	1.30	351.1	311	4.0%	11.4%
Wasting prevalance	4.0%	0.007	0.62	346.4	307	2.7%	5.3%
overweight prevalance	2.6%	0.011	1.31	343.3	304	0.3%	4.8%
Anemia prevalance	38.9%	0.083	3.10	328.9	291	22.2%	55.5%
Exclusive breastfeeding under 6 months	48.8%	0.076	0.58	14.0	15	33.6%	63.9%
Early Iniatiation of Breastfeeding	77.9%	0.079	1.98	106.5	101	62.2%	93.6%
Dietary diversity*	7.4%	0.047	1.86	105.8	98	-1.9%	16.7%
Iron rich food	12.3%	0.042	1.33	105.8	98	3.9%	20.7%
Women							
Anemia prevalance 10-49 years (non pregnant)	35.3%	0.013	0.97	1194.2	1106	32.6%	38.0%
Anemia prevalance 10-19 years	33.4%	0.050	2.10	385.5	345	23.4%	43.4%
Anemia prevalance pregnant women	32.2%	0.068	0.83	32.1	31	18.6%	45.7%
ANC +4 visits	87.0%	0.031	0.97	107.0	102	80.7%	93.2%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	83.8%	0.015	0.68	272.1	241	80.7%	86.8%
PNC visit	78.7%	0.032	1.30	273.0	242	72.3%	85.1%
PNC counselling for child feeding (Of those who recived PNC)	90.1%	0.025	1.22	214.9	194	85.2%	95.0%
Household members							
Access to improved water facilities	99.5%	0.002	0.80	916.7	821	99.2%	99.9%
Access to improved sanitation facilities	71.6%	0.043	2.87	916.7	821	63.0%	80.2%
Food insecurity-worry about food	1.5%	0.008	1.94	916.7	821	-0.1%	3.0%
Food insecurity-eating only rice	0.4%	0.003	1.51	916.7	821	-0.2%	1.0%
Food insecurity-skipping meals	0.6%	0.003	0.96	916.7	821	0.1%	1.1%
Food insecurity-food ran out	1.0%	0.005	1.58	916.7	821	0.0%	2.0%

Appendix 2f Standard error, Design effect, weight & unweight count and Confidence limits: Eastern Region

	val-ue(r)	Standard error(se)	Design ef-fect(deft)	Weight-ed count	Unweight-ed count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalance	29.1%	0.034	1.66	484.3	518	22.3%	35.9%
Underwight prevalance	7.6%	0.016	1.39	508.7	534	4.3%	10.8%
Wasting prevalance	4.2%	0.015	1.67	491.8	527	1.2%	7.2%
overweight prevalance	5.4%	0.018	1.82	492.3	525	1.7%	9.1%
Anemia prevalance	40.6%	0.043	1.88	457.4	481	32.0%	49.2%
Exclusive breastfeeding under 6 months	76.6%	0.090	1.36	42.0	44	58.6%	94.6%
Early Iniatiation of Breastfeeding	77.8%	0.044	1.40	170.8	205	69.0%	86.7%
Dietary diversity*	16.8%	0.059	1.89	142.7	176	5.0%	28.5%
Iron rich food	16.9%	0.055	1.77	142.7	176	5.9%	27.9%
Women							
Anemia prevalance 10-49 years (non pregnant)	29.0%	0.024	2.19	1685.3	1618	24.1%	33.8%
Anemia prevalance 10-19 years	26.0%	0.036	1.92	542.6	520	18.8%	33.2%
Anemia prevalance pregnant women	28.4%	0.101	1.86	67.7	47	8.2%	48.6%
ANC +4 visits	79.4%	0.055	1.80	172.1	205	68.3%	90.5%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	77.8%	0.039	1.84	403.6	396	70.1%	85.5%
PNC visit	79.2%	0.034	1.66	412.6	408	72.5%	85.9%
PNC counselling for child feeding (Of those who recived PNC)	85.2%	0.041	2.01	326.6	289	77.1%	93.3%
Household members							
Access to improved water facilities	98.9%	0.004	1.33	1276.1	1229	98.1%	99.7%
Access to improved sanitation facilities	69.6%	0.032	2.52	1276.1	1229	63.1%	76.1%
Food insecurity-worry about food	1.4%	0.005	1.41	1276.2	1230	0.5%	2.4%
Food insecurity-eating only rice	0.8%	0.004	1.46	1276.2	1230	0.1%	1.5%
Food insecurity-skipping meals	0.7%	0.003	1.33	1276.2	1230	0.1%	1.3%
Food insecurity-food ran out	1.0%	0.004	1.41	1276.2	1230	0.2%	1.8%

Appendix 2g Standard error, Design effect, weight & unweight count and Confidence limits: Punakha

	value(r)	Standard error(se)	Design effect(deft)	Weighted count	Unweighted count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalence	15.9%	0.026	0.29	17.4	282	10.7%	21.0%
Underwight prevalence	9.0%	0.020	0.30	17.7	289	4.9%	13.1%
Wasting prevalence	5.1%	0.014	0.26	17.5	285	2.3%	7.8%
overweight prevalence	2.7%	0.010	0.25	17.2	280	0.7%	4.7%
Anemia prevalence	46.8%	0.037	0.29	15.9	255	39.3%	54.2%
Exclusive breastfeeding under 6 months	42.2%	0.086	0.20	1.6	30	25.0%	59.3%
Early Iniatiation of Breastfeeding	74.9%	0.054	0.29	6.0	106	64.0%	85.7%
Dietary diversity*	11.0%	0.033	0.22	5.0	84	4.4%	17.5%
Iron rich food	11.7%	0.032	0.21	5.0	84	5.2%	18.1%
Women							
Anemia prevalance 10-49 years (non pregnant)	34.1%	0.020	0.30	49.4	914	30.1%	38.1%
Anemia prevalance 10-19 years	29.8%	0.034	0.28	17.0	313	23.1%	36.5%
Anemia prevalance pregnant women	22.4%	0.080	0.26	2.3	34	6.4%	38.4%
ANC +4 visits	85.2%	0.037	0.24	6.0	106	77.9%	92.5%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	88.2%	0.025	0.28	13.9	226	83.3%	93.2%
PNC visit	84.3%	0.032	0.32	14.0	229	78.0%	90.7%
PNC counselling for child feeding (Of those who recived PNC)	88.0%	0.029	0.30	11.8	196	82.2%	93.8%
Household members							
Access to improved water facilities	97.0%	0.007	0.28	40.0	713	95.6%	98.5%
Access to improved sanitation facilities	56.8%	0.032	0.41	40.0	713	50.3%	63.3%
Food insecurity-worry about food	1.5%	0.004	0.23	40.0	713	0.6%	2.4%
Food insecurity-eating only rice	1.0%	0.003	0.22	40.0	713	0.3%	1.6%
Food insecurity-skipping meals	0.8%	0.003	0.22	40.0	713	0.2%	1.4%
Food insecurity-food ran out	1.0%	0.003	0.22	40.0	713	0.3%	1.7%

*Diverse Diet: Receiving 4 or more food groups per day

Appendix 2h Standard error, Design effect, weight & unweight count and Confidence limits: Lhuntse

	val-ue(r)	Standard error(se)	Design ef-fect(deft)	Weight-ed count	Unweight-ed count	confidence limits	
						r-2se	r+2se
Children under 5							
Stunting prevalence	23.0%	0.024	0.24	16.9	289	18.1%	27.9%
Underwight prevalance	11.2%	0.019	0.25	17.3	297	7.5%	14.9%
Wasting prevalance	2.7%	0.009	0.23	17.2	294	0.9%	4.4%
overweight prevalance	5.7%	0.014	0.25	17.2	294	2.9%	8.5%
Anemia prevalance	43.2%	0.034	0.27	15.6	268	36.3%	50.0%
Exclusive breastfeeding under 6 months	54.2%	0.091	0.21	1.6	25	36.1%	72.3%
Early Iniatiation of Breastfeeding	85.8%	0.032	0.22	6.6	114	79.4%	92.3%
Dietary diversity*	13.2%	0.035	0.23	5.5	97	6.2%	20.3%
Iron rich food	16.8%	0.039	0.23	5.5	97	9.0%	24.6%
Women							
Anemia prevalance 10-49 years (non pregnant)	26.7%	0.017	0.26	44.0	844	23.3%	30.2%
Anemia prevalance 10-19 years	28.2%	0.029	0.23	13.6	271	22.3%	34.1%
Anemia prevalance pregnant women	36.8%	0.087	0.19	1.3	24	19.4%	54.3%
ANC +4 visits	74.0%	0.040	0.22	6.6	113	65.9%	82.0%
ANC counselling for nutrition in pregnancy (of those who went for ANC)	85.6%	0.024	0.24	12.5	216	80.7%	90.4%
PNC visit	70.4%	0.034	0.26	12.8	221	63.5%	77.3%
PNC counselling for child feeding (Of those who recived PNC)	90.6%	0.026	0.26	9.0	154	85.4%	95.8%
Household members							
Access to improved water facilities	98.8%	0.004	0.23	36.3	657	98.0%	99.6%
Access to improved sanitation facilities	81.1%	0.017	0.27	36.3	657	77.6%	84.6%
Food insecurity-worry about food	2.8%	0.008	0.29	36.4	658	1.2%	4.4%
Food insecurity-eating only rice	0.7%	0.004	0.30	36.4	658	-0.1%	1.5%
Food insecurity-skipping meals	0.8%	0.004	0.26	36.4	658	0.0%	1.5%
Food insecurity-food ran out	1.0%	0.004	0.22	36.4	658	0.3%	1.8%

Appendix 3 Survey Organization

Spot Checkers

1. Dr. Ugyen Dophu, DG, DMS, MoH
2. Dr. Pandup Tshering, Director, DoPH, MoH
3. Mr. Tandin Dorji, CPO, HCDD, MoH
4. Dr. Isabel Vashti Simbeye, Health and Nutrition Specialist, UNICEF

Regional Supervisors

Western Region	Mr. Laigden Dzed	Sr. Nutritionist, Nutrition Programme, DoPH, MoH
	Ms. Pemba Yangchen	Sr. Nutritionist, Nutrition Programme, DoPH, MoH
	Ms. Dechen Zangmo	M&E officer, UNICEF, Bhutan
Central Region	Mr. Rinchen Tshering	Sr. Statistical Investigator, NSB, Bhutan
	Dr. Chandralal Monger	Health and Nutrition Officer, UNICEF Bhutan
	Mr. Tsheten	Laboratory Technologist, PHL, MoH
Eastern Region	Ms. Dorji Pelzom	Sr. Statistician, HMIS, MoH
	Mr. Mongal Singh Gurung	Research Officer, PPD, MoH
	Mrs. Deki Pem	Lecturer, FNPH, KGUMSB

List of Field Enumerators

1. Chakra Pani Bhandari, HA, Laya BHU
2. Karma Jurmey, ADHO
3. Karma Yangzom, Dietecian, Punakha Hospital
4. Choki Wangmo, HA, Nobgang BHU
5. Bhawani Shankar, HA, Kabesa BHU
6. Priyasha Gurung, Dietecian, Bajo Hospital
7. Thinley Wangdi, Staff Nurse,Bajo Hospital
8. Krishna Singh Mongar, Chief Nurse, Bajo Hospital
9. Wangchuk Dukpa, HA
10. Santalal, Gaselo BHU
11. Tshering Phuntsho, HA, Kamichu BHU
12. Mahendra Rai, HA
13. Thrinlay Tobgay, HA, Airport Hospital
14. Karma Tenzin, Sr. HA, Betikha BHU
15. Chimmi Wangmo, Dietician, Mongar Hospital
16. Rinzin Wangdi, HA, Mongar Hospital
17. Chador Tenzin, HA, Mongar Hospital
18. Hari Prasad Pokheral, Dietician, S/Jongkhar Hospital
19. Tshewang Jamtsho, GNM, Jomotshangka BHU I
20. Younten Dorji, GNM, Samdrupcholing BHU I
21. Sangay Jamtsho, Sr. Lab Technician, S/Jongkhar Hospital
22. Neten Dukpa, Lab Technician
23. Sonam Tshering, Lab Technician
24. Dorji Gyelsten, DHO, Chukha Dzongkhag
25. Kinley Beda, Dietician, Phuntsholing Hospital
26. Thinlay Tobgay, Sr. HA

27. Rinzin, Sr. HA, Reserboo Hospital
28. Dawa Pelzang, Sr. HA, T/Gang Hospital
29. Karma Wangchuk, Dietician, T/Gang Hospital
30. Kelzang Tshering, HA, Bumthang Hospital
31. Tenzin, Sr. HA, Jomotshangkha Hospital
32. Jamyang Choden, Dietician, Bumthang Hospital
33. Chophel, Sr. HA, Minjey BHU
34. Loday Zangpo, HA, Lhuentse Hospital
35. Chundu Raj Chhettri, Dietician, Lhuentse Hospital
36. Rinchen, Sr. HA, Gomphu BHU
37. Ugyen Dema, AN, Yebilabtsha Hospital
38. Devi Maya, HA, Buli BHU
39. Thukten Penjor, Dietician, JDW NRH
40. Jamyang Lhamo, Dietecian, JDW NRH
41. Sangay Dorji, ACO, Gidakom Hospital
42. Rinchen Wangdi, Staff Nurse, Gidakom Hospital
43. Sonam Choden, AN, Gidakom Hospital
44. Sonam Phuntsho, Pharmacy Technician, Gidakom Hospital
45. Leki Penjor, Lab Technician, Gidakom Hospital
46. Shacha Gyelsten, HA, Chuzargang BHU
47. NB Mongar, HA, Lhayul BHU
48. Lam Dorji, Dietician, Tsirang Hospital
49. Pema Yangchen, Dietician, Samtse Hospital
50. Thinley Choden, ADHO, Samtse Dzongkhag
51. Kamal Prasad Phuyul, Staff Nurse, Samtse Hospital
52. Gem Dorji, Staff Nurse, Tongsa Hospital
53. Tenzin Wangchuk, Dietician, P/Gatsel Hospital

54. Tshering Choki, Dietician, Gelephu RRH

55. Pema Lhamo, Pharmacy Technician, Samtse Hospital

56. Sangay, Staff Nurse, Tongsa Hospital

57. Naina Singh Gurung, HA, Sombekha BBHU

58. Nado, HA, Bali BHU

59. Dorji Tshering, Sr. Lab Technician, Public Health Laboratory

60. Rinchen Wangdi, Sr. Lab Technician, Public Health Laboratory

61. Phuntsho Namgay, Lab Technician, Public Health Laboratory

62. Ugyen Wangdi, Staff Nurse, Lhamoizinkha Hospital

63. Purna Maya, AN, Lhamoizinkha Hospital

64. Yeshey Choden, HA, Gasa BHU I

NNS 2015 Survey Team

Photo courtesy: Pemba Yangchen, MoH

Appendix 4 Information Sheet and Consent Form

Please read out the consent/assent form in front of the respondent and take his / her consent/assent before starting interview.

Name of Organization: Ministry of Health

Research Title: National Nutrition Survey

Name of Sponsor: UNICEF

PART I: Information Sheet

Introduction

Under-nutrition occurs in a considerable proportion of young children in Bhutan. Several studies conducted in the past, viz., Bhutan Multiple Indicator Survey of 2010, National Nutrition and infant and young child feeding survey conducted in 2008, Survey of anemia among the general population, conducted in 2003, etcetera showed very poor nutritional status among Bhutanese population and especially among the infants and young children. In addition, the information available on the nutrition situation of infants, young children and mothers was found inadequate and out-dated, therefore not very useful for advocacy, policy, planning and programming. It is in this light that a national survey is deemed necessary to document the prevalence and determinants of stunting and anemia in children under-five, anemia in adolescent girls and the reproductive age, so as to avail up-to-date and reliable information necessary for actions to address the problem.

Purpose of the study

1. To estimate the prevalence of malnutrition among children less than five years of age in Bhutan and to better understand its determinants
2. To estimate the prevalence of anemia among women of reproductive age, adolescent girls, and children less than five years of age in Bhutan and to better understand its determinants

Type of Research Intervention

As a part of the survey activity, we will be asking you about your household's socio- economic status, child feeding practice, water and sanitation, food access, morbidity and related information on maternal health and do anthropometry measurement to all the under five children within the household

to assess their nutritional status and hemoglobin test for children older than 6 months and to all female between 10-49 years of age.

Iron is a nutrient that is needed for the body to make blood and low iron in the body makes a person lethargic and fatigue and causes anemia. To know about the anemia status of you and your children, we would like to test a little blood from your finger and from your under-5 year but older than 6 months children's finger. If you agree we will prick the finger tip to obtain a few drops of blood and test for anemia.

Participant selection

You have been randomly selected to be part of this survey and this is why we would like to interview you. The interviewers are from Ministry of Health.

Voluntary Participation and Right to Refuse or Withdraw

Your participation is voluntary and you can withdraw from the survey even after having agreed to participate. You are free to refuse to answer any question that is asked in the questionnaire.

Duration

Tentatively an hour time is required for the interview and measurements. If you agree to take part in the survey, we shall start to collect information with your consent.

Risks

One to two drops of blood will be taken from your finger to test for anemia. This may cause some mild pain. You will be informed about the kind of tests which will be done on your blood sample.

Discomforts

We will measure your height and weight and we might ask you to remove your thick clothes, shoes, etc. so it may cause you some discomfort; but we will take extra care to avoid the discomforts, if any.

Benefits

Reimbursements

You will not be provided any incentive for taking part in this research and you will not be reimbursed for your time lost and travel expense, if any. However, we shall remain ever grateful for your participation.

Confidentiality

The information you provide is totally confidential and will not be disclosed to anyone. It will only be used for research purposes. Your name, address, and other personal information will be removed

from the instrument, and only a code will be used to connect your name and your answers without identifying you. You may be contacted by the survey team again only if it is necessary to complete the information on the survey.

Sharing of the results

The report of the survey will be published and shared among the relevant stakeholders.

Who to Contact

If you have any questions about this survey you may ask me or the Survey Coordinator Ms. Pemba Yangchen at 17535400.

For this survey we have obtained clearance from National Statistics Bureau and ethical clearance from Research Ethics Board of Health (REBH). So, you could contact the Chairperson of REBH Dr. Pakila Drukpa at 17977760 or the Member Secretary of REBH Mr. Mongal Singh Gurung at 17920280.

PART II: Certificate of Consent

1. Informed Consent Form for the Participants ≥18 years

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate in this study.

Name of Participant _____

Signature of Participant _____

Date _____(Day/month/year)

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness _____ *AND* *Thumb print of Participant*

Signature of witness _____

Date _____ (Day/month/year)

2. Informed Assent Form for the Participants <18 years

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I assent voluntarily to participate in this study.

Name of Participant _____

Signature of Participant _____

Date _____(Day/month/year)

If illiterate

I have witnessed the accurate reading of the assent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given assent freely.

Name of witness _____ *AND* *Thumb print of Participant*

Signature of witness _____

Date _____ (Day/month/year)

3. Informed Consent Form for the Parents or Legal Guardians of the Participants < 18 years

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to allow my child to participate in this study.

Name of Parents or Legal Guardians _____

Signature of Parents or Legal Guardians _____

Date _____(Day/month/year)

If illiterate

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Name of witness _____ *AND* *Thumb print of Participant*

Signature of witness _____

Date _____ (Day/month/year)

Statement by the enumerator/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the person understood it. I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of enumerator /person taking the consent_____

Signature of enumerator /person taking the consent_____

Date _____ (Day/month/year)

Appendix 5 Survey Questionnaires

NATIONAL NUTRITION SURVEY – 2015 (NNS)

HOUSEHOLD QUESTIONNAIRE

HOUSEHOLD INFORMATION PANEL	
HH1. Dzongkhag code	
HH2 Gewog/Town code	
HH3. Chiwog/EA code	
HH4. Household Serial number	
HH5. Name of household head	.....

HH6. Team leader's code	
HH7. Enumerator's code	
HH8. Date of enumeration	

Household: A household is defined as a person or group of persons, related or unrelated, who live together in the same dwelling unit, who acknowledge one adult male or female as the head of household, who share the same living arrangements, and are considered as one unit. A usual member is a person who "normally" lives in the household.

Household head: The person who manages the income and expenses of the household and who is the most knowledgeable about its other members. If the head of the household is not present or is unavailable (e.g., the person is living abroad temporarily), then an alternate must be selected in consultation with the senior household members. The selection is based on the following criteria (in descending order of priority): (i) acceptability to other members of the household; (ii) legal responsibility for the dwelling (owner or lease holder); (iii) income earning capacity; (iv) main responsibility for shopping for the household; and (v) seniority.

Household member, usual: A person who has lived with the household for at least 6 of the last 12 months.

The following also count as usual household members although they may have lived less than 6 months out of the past 12 with the household:

(i) in-country school or college students who are staying with the household as boarders;
(ii) all students living outside Bhutan;
(iii) armed forces personnel who live in barracks (dekha);
(iv) monks (gelongs) who live in shedas, gomdeys, or dratshangs in Bhutan or outside Bhutan;
(v) infants who are less than 6 months old;
(vi) newly married couples who have been living together for less than 6 months;

(vii) servants and other paid domestic employees who are living with the household; and

(viii) persons who have recently joined the household and are expected to stay permanently.

No	Variables	Code	Skip
2.1 HMLN	Household member Line number		Write the Chronological order of household members starting with the head of the household followed by oldest member of the household. Tap on "add group" button for any new member.
2.2b HHMR	Household member name		Type the names of the member in the box and tap on the add group
2.2b HHMR	Relation to Household Head	Self (head)……..….1 Spouse ……..……..2 Son /Daughter…….....…...3 Son-in-law/Daughter-in-law…..…….....…..4 Grandchild……....……...……..5 Parent ……..……...6 Parent-In-Law ……....…7 Sister/Brother…….....….8 Brother-in-law/Sister-in law……..…….....…..9 Uncle / Aunt ……..……....…10 Niece/nephew…….....….11 Other relative ……..…….....….12 Adopted/Foster/Stepchild…….....….....13 Not related ……...……14 Don't know……..…….99	Select options from checklist corresponding to how the person listed is related to the head of the household. Be particularly careful in doing this if the respondent is not the head of the household. Make sure that you record the relationship of each person to the household head, not the relationship to the respondent. If the head of the household is married to a woman who has a child from a previous marriage, that child's relationship to the head of the household should be selected as '13' ('Adopted/ foster/stepchild'). If a household member is not related to the head of household, such as a friend who lives with the household, select '14' ('Not related'). Select '99' if the respondent doesn't know the relationship of a household member to the head of household.
2.3 HHMS	Sex	Male……..…. 1 Female……..… 2	Select the sex of the HH members from the list.

2.4 **HHAG**	Age in completed years		Ask the respondent for her/ his age and other household members' age in completed years and type the age for each of the household member. Completed age is also defined as 'the number of completed years since birth'. With this definition, since a 6-month-11 months old baby has not completed a full year, his/her age will be entered as '00'. Note that you will be obtaining more accurate estimates of children's ages later. If she/he does not know their exact ages refer to some memorable events in order to estimate the exact age using "Lopta Conversion Table" enclosed in the manual. Annexure I
2.5 **HMST**	Marital status	Never married ……...…...1 Living together…..... 2 Married……..... 3 Divorced…….4 Separated……..……..5 Widow/widower……....……..6 N/A……..……7	Ask the respondent about the marital status of the household members. Select the marital status corresponding to the responses given. For a woman who is not currently married and not currently living with someone but who was formerly in a union, record her current marital status at the time of the interview. Since she was in a union at one time, but is not on the day you are interviewing her, she will be widowed, divorced or separated. ***You should use 'widowed' (a) for women who were married and their husband died, and (b) for women who were in an informal union and their partner died. 'Divorced' should be used for women who were formally married and whose marriage formally ended. 'Separated' should be used (a) for women who were married, but are no longer continuing the marriage with their husband, and (b) for women who were in an informal union and are no longer continuing the union with their partner.***

2.6 HMED	Highest education attended	No Education……..…..…1 Early Learning Center……...…2 Primary (pre-primary to grade 6)…….....3 High school (Grade7-12)….....4 University……..……..5 Diploma/Certificate……...6 Monastic school……..…7 Non-formal education.....8 N/A……..……..10	Select the highest education level that a person has attended. Someone who has never gone to school, whether formal or informal, will be coded as "NO EDUCATION". Formal education should take precedence over non-formal education. Hence, a person who attended just a few years of formal primary education and subsequently attended non-formal should be coded as "PRIMARY EDUCATION" "rather than "NON-FORMAL EDUCATION" Early Learning Center (ELC): Include ECCD under ELC Note: No education includes illiterate and those children 0-5 years who do not attend any Early Learning Center (ELC):
2.7 HMMO	What is your main occupation? (Describe precise-ly)	…… …… …..	
2.8 HMWA	Is this a woman between the ages of 10-49 years?	No……..…0 Yes……..1	If the person in the line is a woman of between 10 to 49 years of age select "Yes" other-wise select "No". If "No" skip to 2.11
2.9	If yes, is the women a mother to a living child 0-59 months old	No……../……0 Yes……..1 N/A……9	If the answer to number 2.8 is yes then ask if the women has living child under 5 years of age and code accordingly.

2.10 HMPR	Is the woman pregnant?	No……0 Yes……1 Don't know……8 N/A……9	If the person is a woman aged between 10 to 49 years of age, ask if she is currently pregnant and select accordingly. Select "N/A" if the woman is not sure regarding her pregnancy.
2.11 HMPR	Is this a child under the age of 5	No……0 Yes……1 N/A……9	If the child is under 5 years of age select "Yes" and if not "No" and select "N/A" if not applicable
2.12a HMRT	Did anyone not in the above household list send remittances back to the household during the past 12 months?	No……0 Yes……1 Don't know……8	Ask the respondent if any person, who is not listed in the household demography sheet, sent money to the household in the last 12 months.
2.12b HMNR	If yes, how many person(s) sent remittances back to the household during the past 12 months?		If any person(s) sent remittances to the household during the last 12 months then ask how many persons sent remittance back and type the number of person in the box provided.
2.12c HMIB HMAC		Bhutan Another country	If the household received money in the last six months from person(s) who are not member of the household please ask how much money they received from inside the country and how much from outside the country and type the amount in Ngultrum. If the respondent doesn't know the amount type 888888. If the respondent did not receive remittances keep it blank.

2.13 HMME	Who is (are) main house hold earner? Multiple answers allowed	Self……A Spouse…….....B Children……...…….C Son/Daughter in-law……D Grandchild…….…….....E Parent……...…….F Parent-In-Law…...…….....G Siblings ……H Relatives……I Not in the HH……...…….J	Ask who the main earner of the household is, and write his/her relation to the respondent and select all the applies. Main earner is the person who contributes to MAJORITY of the household income. He/ she may or may not be a household member. If s/he has any other relationships with the respondent not mentioned in list, select "Relatives". If s/he is not a household member (even if related to the respondent) please select "Not in the HH".

No.	Questions	Code		Skip
3.1a HHL	Does your household own any land?	No……..0 Yes……...…….....1		If "No" skip to 3.2
3.1b HHL	How much land does your household own in decimal?	Wet land Dry land Orchard		Ask the respondent that how much land does the household own in decimal. Type 0000 if the household does not own Annexure II
3.2 HHIT	Does your household own the following items? (Consider only items which are in working condition and if the household owns)	No	Yes	
	Sofa set	0	1	
	Heater	0	1	
	Fan	0	1	
	Computer laptop	0	1	
	Fixed Telephone(other than mobiles)	0	1	
	Choesham	0	1	
	Camera	0	1	
	Foreign Bow	0	1	
	Radio	0	1	
	Electric iron	0	1	
	Power chain	0	1	
	Bukhari	0	1	
	Rice cooker	0	1	
	Curry cooker	0	1	
	Refrigerator	0	1	
	Modern stove	0	1	
	Water boiler	0	1	
	Micro-wave oven	0	1	
	Bicycle	0	1	
	Tractor	0	1	

	Power tiller	0	1	
	Jewelry	0	1	
	Motor bike, scooter	0	1	
	Seshu Gho/kira	0	1	
	Family car	0	1	
	Other vehicle	0	1	
	Washing machine	0	1	
	Sewing machine	0	1	
	Television	0	1	
	VCR/ VCD/ DVD	0	1	
	Grinding machine	0	1	
	Wrist watch	0	1	
	Weaving tool			
3.3 HHWM	What main material is used to build the wall of your main living house?	Mud-bonded bricks/stones……...……...1 Cement-bonded bricks/stones……..…2 Concrete…….....…3 Mud……...…….....…4 Wood/Branches/Bamboo…….....…….....5 Other(specify)…….....6 Metal sheet……..1 Concrete/Cement……2 Tiles/slate……3 Thatch……4 Plank/Shingles……5 Others(specify)……6		Ask and observe carefully the type of materials that were used to make the wall of the main living house and select. If there are different types of materials were used then consider the material of maximum portion.
3.5 HHFM	What materials are used to build the floor of your main living house?	Tiles……1 Concrete/Cement……2 Clay/Earthen floor……..3 Plank/Shingles……...4 Bamboo……..…5 Other (specify)…….……..6		Ask and observe carefully the type of materials that were used to make the floor the main living house and select. In case of more than one materials used consider the material that was used or maximum portion of the floor.

3.6 HHRO	How many rooms does your household occupy, including bedrooms, living rooms and rooms used for family enterprise, but NOT counting toilets, kitchens and balconies?		Please ask the respondent and also observe the number of rooms the household uses for living purpose and type the number.
3.7 HHCF	What type of cooking fuel your HH mainly use?	Gas……..……1 Electricity……2 Wood……..…..……3 Coal……4 Kerosene…… 5 Dung cake……6 Bio-gas…… ...7 Other (specify)……...…..8	Please ask the respondent that what type of fuel the household uses for cooking and select accordingly. If the household use more than one type of fuel considers the type they use the most.

3.8b HHLP	If yes, how many? (If the number is greater than 95 type 95)	Cattle Pigs Buffalo Horses Goats Sheep Poultry Yaks Others (specify)…….	Ask about each of the listed livestock, poultry, if the household currently has, if yes, number of livestock and poultry of the household currently has. For example: Does your household currently have cow. If yes, How many cows does your household have including calf. Does your household currently have Buffalo. If yes, How many Buffalos does your household have? Type the number of cows and buffalos the household has in the boxes provided. If the household does not have type "00" If the number is greater than 95 code 95. If not specified skip to 3.9
3.9 HHFF	Do you farm fish?	No……0 Yes……..……...1	Ask if the household farm fish and select accordingly. If the answer is "no" skip to 3.11a
3.10 HHFT	What type of fish do you farm? Multiple answer allowed	Ones to be eaten whole with bones…… A Bigger fish……..…..B Others(specify)…….....C	If the household farm fish, ask about the type of fish that the household farm. Select on the types that apply.
3.11a HHVF	Do you grow fruits/ vegetables?	No……...……0 Yes……..1	If "No" skip to 3.13

3.11b HHVF	During the last 12 months what types of vegetables and fruits did your household grow? (Multiple answer allowed)	Orange fleshed sweet potato……..…A Ordinary sweet potato……..B Legumes and nuts……..…….....C Dark green leafy vegetable……..…D Red/orange/yellow fruits……...…..E Any other type of fruits……...…F Red/orange/yellow vegetables…...….G Any other vegetables……...…H	Ask the respondent about each of the listed vegetables, legumes and nuts, fruits separately that if the household produced this during the last 12 months. Help the respondent to recall asking question about their production in different seasons and select from the list that apply.
3.12 HHGV	During the last 4 months did your household grow vegetables in your kitchen garden?	No…….0 Yes…….....1 Not applicable ……..…..8	Ask if the household grew vegetables in a homestead garden in the last 4 months starting from yesterday. At first ask about the days past of the current month then ask about the next preceding month and continue. Select "Not applicable" if the household doesn't have a homestead garden.
3.13a HHGP	Do your household receive benefits from any of the govern-ment programmes	No……..…0 Yes……1	If "No" skip to 3.14
3.13b HHGP	Please tell me if your household receives benefits from any of the following government programs currently? (Multiple answer allowed)	Pension ..……A Kidu from HM Office…….....……..B Agriculture subsidies…….....C Others (specify)……...…..D Don't know ……....…..X	Ask about each of the listed program that if any member of the household member is currently receiving. Select all that apply.

3.14 HHAI	Household income in the past 12 months in Ngultrum: (From all sources)	Own Business income Wages, salaries incl religious fees Cereal Vegetables, fruits Poultry, livestock Remittance Pensions Rental /real estate Inheritance Kidu Scholarship Sellling of assets Others (specify)	The aim of the questions are to collect total amount of cash income in the household during the last 12 months . Type the amount in Ngultrum against the critera that applies to the respondent. If the respondent has not received any kind of cash income within the 12 months, type "0"

4. Household Water Supply, Sanitation and Hygiene

4.1 WSDW	What is the main source of drinking water for members of this household? (Select ONE)	Improved water sources Piped water into dwelling/compound ……. 1 Neighbor's pipe…….....…..2 Public outdoor tap…….....……3 Protected well…….....….4 Protected spring…….....5 Bottled water…….....6 Rainwater collection.....7 Unimproved water sources Unprotected well...8 Unprotected spring…….....….....….9 Tanker truck ...…….....….....10 Cart with small tank/drum...……..…..11 Surface water…….....12 Other sources ……..….....13	

Ask the respondent where the household currently gets water for drinking. If the household gets water for drinking from more than one source select the source from where the household collects drinking water most of the time.

Piped into dwelling/compound : water service connected by pipe with in-house/compound plumbing to one or more taps, for example, in the kitchen and/or bathroom.

Piped to neighbour: water obtained from a neighbour's house or yard connection.

A public tap is a water point from which the public may collect their water. (stand pipe, public fountain or public tap).

A protected dug well: well that is protected from run-off water through a well lining or casing that is raised above ground level and a platform that diverts spilled water away from the well.

An unprotected dug well; is either (1) the well is not protected from run-off water; (2) the well is not protected from bird droppings and animals.

A protected spring: free from run-off and from bird droppings and animals pollution.

An unprotected spring is subjected to run-off or bird droppings or animals.

Rainwater collection is collected or harvested from surfaces by roof or ground catchment and stored in a container, tank or cistern until used.

A tanker-truck: water source transports and sells water by means of a tanker truck.

Cart with small tank/drum: water provider who transports water into a community and then sells the water.

Surface water located above ground and includes rivers, dams, lakes, ponds, streams, canals and irrigation channels from which water is taken directly.

Bottled water : is purchased water sold in bottles.

4.2a WSDW	Do you store drinking water	No……0 Yes……1	If "No" skip to 4.4
4.2b WSDW	How do you store drinking water?	In containers (buck-et, jerry can, jerkin, bottle, drum, etc……1 Roof tank or cistern.....2	Please ask and observe the water stored at home for dinking and select accordingly
4.3 WSCC	Are the containers covered? (observation)	No……0 Yes……1 Not observed……2	Please observe the water stored at home for dinking and select accordingly
4.4 WSSD	Do you do anything to the water to make it safer to drink?	No……0 Yes……1 Don't know……9	if "No" or "Don't know" Skip to 4.6
4.5 WSWM	What do you usually do to make the water safer to drink? Multiple answer allowed	Boil .....A Add bleach / chlorine .....B Strain it through a cloth.....C Use water filter.).....D Solar disinfection .....E Let it stand and settle .....F Other (specify)……G Don't know.....X	Select all that apply. The household may be using a method that you know do not make water safer to drink. Do not use your own judgment.
4.6 WSSH	Do you have soap in your household?	No……0 Yes……1	if "No" Skip to question 4.9
4.7 WSSU	Has your household used soap between yesterday to today	No……0 Yes……1	if "No" Skip to question 4.9. Can ask the members if they have used
4.8 WSSF	When you used soap today or yesterday, what did you use it for? (If for washing my or my children's hands is mentioned, probe what was the occasion, but do not read the answers.) (Do not read the answers, ask to be specific, encourage "what else" until nothing further is mentioned and check all that apply) Multiple answer	Washing clothes ……A Washing my body.....B Washing my children.....C Washing child's bottoms .....D Washing my children's hand……E Washing hands after defecating……F Washing hands after cleaning child……G Washing hands before feeding child……H Washing hands before preparing food……I Washing hands before eating ……J Washing utensils……K Others (specify) ……L	Ask the mother to recall on what purposes she used soap today. Then ask about yesterday whole day and night and select on all the purposes she mentioned. Do not read the answer. Ask "what else" until nothing further is mentioned

4.9 WSTF	What kind of toilet facility does this household use? (Select ONE)	Flush to piped sewer system ……1 Flush to septic tank (without soak pit).....2 Flush to septic tank (with soak pit) …...….3 Flush to pit (latrine) ……4 Flush to somewhere else ……5 Flush to unknown place/Not sure/ ….....6 Ventilated Improved Pit ……..7 Pit latrine with slab……..…8 Pit latrine without slab/open pit …..…...…9 Long drop latrine ……...…10 Composting toilet …….....11 Bucket …….……...12 No facility/Bush/Field ……..……..13 Others……14	Ask the respondent where the household members usually defecate. If possible observe the toilet facility that the members usually use to determine the type of latrine and select accordingly If "Bucket","No facility/ Bush/Field" and "Others" skip to 4.14
4.10 WSTL	Where is this toilet facility located? Do you share this facility with others who are not members of your household?	Inside or attached to dwelling……..…1 Elsewhere inside compound ……2 Outside compound……....3 Not shared……....…0 Shared……....1	Ask about the location of the toilet facility that the household use and select accordingly. A shared toilet is a joint asset between a set numbers of household. If "Not shared" Skip to 4.13
4.12 WSSF	Do you share this facility only with members of other households that you know, or is the facility open to the use for the general public?	Other households only (not public)..0 Public facility 1	The intention of this question is to understand whether the shared facility is only shared with other households (such as a neighboring household) or whether the facility is open to the public.
4.13 WSST	Do you wear Shoes/ slippers in toilet?	No ……0 Yes……1	Ask the mother whether she wears shoes in toilet.
Observation	Do you wear Shoes/ slippers in toilet?	No ……0 Yes……1	Ask the mother whether she wears shoes in toilet.
4.14 WSWH	Can you show me where you usually wash your hands? (Ask to see and observe)	Modern piped facilities in dwelling.....0 Inside/near toilet facility……....1 Inside/near kitchen/cooking place….....2 Elsewhere in yard……..…....3 Outside yard……....…..4 No specific place……....5 No permission to see……..……...6	

4.15 WSDC	OBSERVATION ONLY: is there soap or detergent or locally used cleansing agent?	Soap……..1 Detergent…….....2 Ash…….....3 Mud/sand…….....4 None……..…….5 Other (specify) ……..…….....6	Observe and select accordingly. This item should be either in place or brought by the interviewee within one minute. If the item is not present within one minute select none, even if brought out later.
4.16 WSOW	OBSERVATION ONLY: is there water?	No ……0 Yes……1	Observe and select accordingly. Interviewer: turn on tap and/or a check container and note if water is present.
4.16 WSOW	OBSERVATION ONLY: is there water?	No ……0 Yes……1	Observe and select accordingly. Interviewer: turn on tap and/or a check container and note if water is present.

5. Household Food Security

No	Questions	Code	Descriptions and Guidelines
5.1a FSNM	Number of meals normally taken by the household in a day.	Once a day……..0 Twice a day……1 Thrice a day……2 >Three a day……..…..3	Ask the respondent on the number of meals they take in a day and select accordingly. If "thrice a day" or "> thrice a day" skip to 5.2
5.1b FSNM	Reasons for having meals lesser than 3 times a day	Health…….....1 Religion…….....2 Weight loss ……..…3 Habit……4 Food shortage……...…..5	
5.2 FSSO	What are the sources of food for the household?	Own farm production…….A Purchased food……...B Government rations…….....C Supplies from relatives/friends.....D Other (Specify)…….....E	Ask the respondent which one of all the food sources is the most important to them and select from the list
5.3 FSSI	Of the ones indicated above, which do you regard as the most important	Own farm production…….....1 Purchased food…….....2 Government rations…..…….....3 Supplies from relatives/friends……4 Other (Specify)…….....5	Ask the respondent which one of all the food sources is the most important to them and select from the list
5.4a FSHC	Did the household change its food consumption over the past 12 months compared to the previous year	No…….....0 If Yes, go to next question…1	Ask the respondent if their food consumption pattern has increased or decreased in the past 12 months compared to the last year. If "no" skip to 5.5a
5.4b FSCP	What changes have taken place? (choose up to three) Changes 1- Changes 2- Changes 3-	Increased number of meals taken per day…….…… .....A Increased consumption of staple foods (such as rice, flour, potatoes, maize and wheat)……..B Increased consumption of legumes and vegetables …….C Increased consumption of animal and milk products (such as meat, poultry, fish, eggs and dairy products)…….D Decreased number of meals taken per day……E Decreased consumption of staple foods…….……F Decreased consumption of legumes and vegetables …….G Decreased consumption of animal and milk products……H Other (specify)…….I	Select the three most important changes that have happened to their food consumption pattern and select accordingly.

5.5a FSFM	In the last 12 months has a situation been faced when there was not enough food to feed all members of the household	No……0 Yes……..…...1	If "No" skip to 5.14
5.5 b	In what month(s) did you experience this situation (Multiple answers allowed)	January……..…A February……....B March…..……....C April……...D May……....E June……..……..F July……..…..……..G August……..…….H September……...……I October……..…….…J November…..……K December……..……L	
5.6 FSFR	Main reasons for food shortages by Household (choose up to three) Reason 1- Reason 2- Reason 3-	Decline in own farm production because of Draught…...A Lack of funds to purchase food……...…..B Decline in government food supplies……..C Decline in food supplies from friends and relatives…….D Decline in remittances received from relatives and friends..E Increase of food price……..F Unemployment of household member(s)……..G Increase of household expenditures due to Illness/death of household member (s)……..……H Other (specify)…… ……I	If the respondent has had food shortage over the past 12 months, ask what the main 3 reasons for the food shortages were and select from the list.
Explain "last 1 month" following the guideline below: If interview date is 22 June, then 22 May to 22 June is one month. Ask if the household was worried that they would not have enough food and how food will be managed and from where food will come during the period of June 1 to 21 (21 days) then ask about May 22 to 31 (last day of the last month) Last one month: Please tell the respondent that I will be asking the question for the period of last one month and the last one month is: Suppose interview date is 22 June, then 22 May to 22 June is one month. Ask about 1 to 21 June first then about 22 – 31 May.			
5.7 FSNEF	During the last month, how many times did you worry that your household would not have enough food or worry about where food will come from?	Never……..…….....0 If yes, how often Rarely – (once or two times)……1 Sometimes –(three to ten times) .....2 Often – (more than ten times)….....3	

Explain "last 1 month" following the guideline below: If interview date is 22 June, then 22 May to 22 June is one month. Ask if the respondent or any other household member ate rice only or rice with salt, onion, chili or any other spices during the period of June 1 to 21 (21 days) then ask about May 22 to 31 (last day of the last month) Use local term of only rice/ rice with salt, onion, chili, etc. If "Never" skip to question 5.14		
5.8 FSME	During the last month, how many times did you or any members of your household have to eat only rice/Kharang/flour? (with salt, onion, chili, etc)	Never…….....0 If yes, how often Rarely – (once or twice)…….……1 Sometimes –(three to ten times)…….....…..2 Often – (more than ten times)…….....…..3
Explain "last 1 month" following the guideline below: If interview date is 22 June, then 22 May to 22 June is one month. Ask if the respondent or any other household member ate rice only or rice with salt, onion, chili or any other spices during the period of June 1 to 21 (21 days) then ask about May 22 to 31 (last day of the last month) Use local term of only rice/ rice with salt, onion, chili, etc. If "Never" skip to question 5.14		
5.8 FSME	During the last month, how many times did you or any members of your household have to eat only rice/Kharang/flour? (with salt, onion, chili, etc)	Never…….....0 If yes, how often Rarely – (once or twice)…….……1 Sometimes –(three to ten times)…….....2 Often – (more than ten times)…….....3
If someone in the household did eat only rice and or rice with spices in the last one month (question number 5.3.a) then ask which member (s) in the household ate only rice on the last day. If "Never" skip to question 5.10		
5.9 FSFT	In the last day when someone in the household ate only rice/kharang/ flour, who/ whose household member was/were it? (with salt, onions, chili etc.) (State the most recent occurrence)	Member line number

5.10 FSSF	During the last month, how many times did you or any of your household members had to eat a smaller amount/skip meals at any meal time (e.g. breakfast, lunch or dinner) in a day than you felt needed because there was not enough food or money to buy food?	Never…….....……..0 If yes, how often Rarely – (once or twice)…….……1 Sometimes –(three to ten times)…….....2 Often – (more than ten times)…….....3	
Explain last 1 month following the guideline below: If interview date is 22 June, then 22 May to 22 June is one month. Ask if the respondent or any other member of the household ate smaller meal then they felt they needed during the period of June 1 to 21 (21 days) then ask about May 22 to 31 (last day of the last month) If "never" skip to 5.12 One example of smaller meal: A household needs 3 kg rice for lunch however, the household cooked 2.5 kg rice because they could not manage rest of the rice needed or saved for future as they are not able to manage enough food for the household.			
5.11 FSFM	In the last day when someone in the household had to eat fewer meals in a day because there was not enough food or money to buy food, which household member (s) was it? (Choose all that apply)	Member line number	If someone in the household ate fewer meals in the last one month then ask which household member (s) ate fewer meals in the last day then select their member line number.
5.12 FSFS	During the last month, how many times did the food stored in your home run out and there was no money to buy more that day?	Never……..0 If yes, how often Rarely – (once or twice)……1 Sometimes –(three to ten times)…….....2 Often – (more than ten times)…….....….3 (Follow the instruction below	

5.13 FSCS	Did you (household) have to do the following to cope with food shortage during the last month? (Multiple answer allowed)	Sale / mortgage of assets……A Eat low quality food…….....B Eat less items of foods……C Stop schooling of HH members…D Borrow food……E Take loan……..F N/A……X	Ask the respondent if the household had to do the listed act to manage foods or cope with the food shortage and select all that apply.

CFDN	Could you please tell me how many days in the last 7 days your household member (s) have eaten the following foods?			
SL no.	**Food category Multiple answer**	**Examples**	**No. of days**	
6.1 CFSS	All Starchy Staples	Rice, wheat, muri (zaw/puffed rice), potatoes, sweet potatoes, maize, khichuri		
6.2 CFLN	All Legumes and Nuts	Dal, cooked dry beans, peas, peanuts, other seeds/ beans, dal khichuri		
6.3 CFGL	Dark green leafy vegetables	All kind of leafy vegetables		
6.4 CFRO	Red/orange/ yellow fruits	Ripe mangoes, papaya, jackfruits other red/ yellow or orange fruit		
6.5 CFYV	Red/ orange/ yellow vegetables	Orange sweet potato, pumpkin, carrot or other yellow or orange vegetables		
6.6 CFVF	Vitamin C rich fruits	Guava, Strawberry, lemon, orange, lychees, pineapple, mango, grapes		
6.7 CFVC	Vitamin C rich vegetable	Gourd, broccoli, cauliflower, tomatoes, green cabbage		
6.8 CFOFG	Other vegetables or fruits	Cabbage, turnips, bananas, apples		
6.9 CFEG	Eggs	Hen/duck, other birds, or fish eggs		
6.10 CFOM	Organ meat	Liver, kidney, gizzards		
6.11a CFSF	Small Fish	Small Fish Eaten Whole with Bones (small prawn/dry fish)		
6.11b CFLF	Large fish/ Sea foods	Large whole fish/ Shell fish/dry fish		

6.12 CFAP	Flesh Foods and Small Animal Protein	Beef, Pork, Veal, Lamb, Goat, Chicken, Duck		
6.13 CFDR	Dairy	Milk, cheese, yogurt or other milk products		
6.14 CFEO	Edible Oil	Foods containing oil, fat, butter		
6.15 CFSH	Sugar, honey, molasses			
6.16 CFCS	Condiment/ spices	Spices, coriander leaf, mint leaf, betel nut, betel leaf		
6.17a CFMD	Miscellaneous (Drinks)	Tea		
6.17 b	Carbonated drink	Coke, pepsi, Coca cola and etc		
6.18 CFOS	Others	SpeciFY.....…		
6.19 CFT	Do you drink tea with or within half an hour of your meal?	No……0 Yes…….1		

NATIONAL NUTRITION SURVEY – 2015 (NNS)

WOMEN AND CHILD QUESTIONNAIRE

WOMAN AND CHILD INFORMATION PANEL	
HH1 Dzongkhag code:	
HH2 Gewog/Town code	
HH3 Chiwog/EA code	
HH4 Household Serial Number	
HH5 Woman Serial No.	
HH6 Name of the woman	
HH7 Child Serial No.	
HH8 Child Name	
H**H9** Team leader's code	
HH10 Enumerator's code	
HH**11** Date of enumeration	

7. Ante-Natal Care and Post Natal care

7.1 FPTP	During your target pregnancy (child name), did you take any iron tablets/ capsules or syrups? (If yes, how often?)	Not taken……...……0 Rarely (1-2 times a month)……...…1 Sometimes (1-2 times a week).....2 Often (3-4 times a week)……...….3 Mostly (More than 5 or more days/ week)…4 Don't know/ can't remember…….....9	
7.2a FPANC	Did you receive ANC check up during the target pregnancy	No…….0 Yes……1	If "No" skip to 7.5
7.2b FPANC	How many times did you receive antenatal checkups during this pregnancy?	Number of times Don't know……99	Ask the mother if she received any pregnancy related check-ups during the pregnancy. Ask her how many times in total she saw someone for antenatal care during her pregnancy. This refers to care related to her pregnancy and should not include seeing a doctor or nurse for other reasons. Select "Don't know" if she do not remember
7.3 FPPM	How many months pregnant were you when you first went for antenatal care (ANC)?	Months Enter "99" if she does not remember at all.	Ask the respondent how many months into her pregnancy she was when she received her first antenatal care. If she does not remember, ask her how many menstrual periods she had missed at the time. Assume each missed period corresponds to a month and enter the number in the space provided. For example, if the respondent doesn't recall how many months pregnant she was when she first received antenatal care, but knows that she had missed two periods enter as 02 months.
7.4 FPHE	Did the health care worker talk to you about your eating habits during the ANC checkup?	No ……...……...….0 Yes…….....1	Ask the mother if the doctor/ health care worker gave her any advises during ANC. If the answer is "yes" then ask what it was about. If the woman mentioned that it was about her eating habit then select "Yes" otherwise "No".

7.5 FPPE	During this pregnancy did you eat more, the same, or less than you did before you were pregnant?	Less……...……...1 About the same…….....2 More ……..…3	Ask the mother if she ate more, the same or less during the pregnancy comparing to before pregnancy, when she was not pregnant.
7.6 FPPR	During this pregnancy did you rest more, the same, or less than you did before you were pregnant?	Less…….....1 About the same…….....2 More ……....…….3	Ask the mother if she took rest more, the same, or less during the pregnancy comparing to before pregnancy, when she was not pregnant.
7.7 FPVAC	Did you (mother) receive a vitamin A capsule within 6 weeks of the delivery?	No……..……0 Yes…….....1 Don't know…….....….9 N/A (Not completed 6 weeks). ……..…….....…...8	Showing the flash card make sure that the mother understands VAC then ask if she received a VAC (vitamin "A" capsule) within 6 weeks of the delivery. Code "N/A" if duration of delivery has not yet completed six weeks.
7.8b FPPNCT	Did the health care worker talk to you about your eating habits during the PNC checkup?	Within 3 days…….A 4-7 days..……..…..B 8-21 days..……....…C 22-42 days……..D	Ask the mother how many days after her delivery did she receive the PNC care.
7.9 FPEHM	Did the health care worker talk to you about your eating habits during	No…….……0 Yes……....….1	Ask the mother if the doctor/ health care worker gave her any advice during PNC. If the answer is "yes" then ask what it was about. If the woman reply that it was about her eating habit then select "Yes" otherwise "No":
7.10 FPEHC	Did the health care worker talk to you about how to feed your child during the PNC checkup?	No……..……0 Yes……..….....1	Ask the mother if the doctor/ health care worker gave her any advice during PNC. If the answer is "Yes" then ask, what advice the doctor/ heath worker provided to her. If the mother replied that the doctor/ health worker talked about feeding of the child (how to feed the child) then select "Yes" otherwise "No".
7.11 FPLC	Did the health care worker provide information about proper positioning and attachment during PNC checkups?	No…….0 Yes……....…1	

Ask the mother if the doctor/ health care worker provided information about (proper positing and attachment) proper breastfeeding. If the answer is "yes" then select "Yes" otherwise "No". Proper breastfeeding information: • Mother initiates breastfeeding within 1 hour of birth. • Tell the mother about proper position • Tell the mother about proper attachment • Mother Breastfeeds frequently, day and night. • Mother offers second breast after infant releases the first. • Breastfeed often, on demand, day and night. • Exclusively breastfeed during the first six months. • Continue to breastfeed even if the child or the mother is ill. • Steps on positioning and attachment. • Offer second breast after infant releases the first and still seems to be hungry.			
7.12 FPNB	During this pregnancy did you suffer from night blindness?	No……0 Yes……1	Ask the mother if she knows about "night blindness". Please use the local name of night-blindness and ask the question. If the answer is "Yes' then request her to tell you the symptoms. If her answer indicates that she really understands night blindness, knows local terms along with more than one symptoms of night blindness then ask if she suffered from night blindness during the pregnancy. If she does not know night blindness/ cannot tell the correct symptoms then explain the symptoms of NBL to her so that she can understand night blindness. Then ask if she suffered from NBL during the pregnancy and select accordingly. Before asking the question makes sure that the mother understands NBL. If the answer to this question is "No" then skip to 8.1
7.13 FPSD	Did you also have trouble seeing during the day?	No……0 Yes……...1	If the respondent suffered from night blindness during the pregnancy, ask if she had also trouble seeing during day time and select accordingly.

NATIONAL NUTRITION SURVEY – 2015 (NNS)

WOMEN AND CHILD QUESTIONNAIRE

WOMAN AND CHILD INFORMATION PANEL	
HH1 Dzongkhag code:	
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HH3 Chiwog/EA code	
HH4 Household Serial Number	
HH5 Woman Serial No.	
HH6 Name of the woman	
HH7 Child Serial No.	
HH8 Child Name	
H**H9** Team leader's code	
HH10 Enumerator's code	
HH**11** Date of enumeration	

7. Ante-Natal Care and Post Natal care

7.1 FPTP	During your target pregnancy (child name), did you take any iron tablets/ capsules or syrups? (If yes, how often?)	Not taken……...……0 Rarely (1-2 times a month)……...…1 Sometimes (1-2 times a week).....2 Often (3-4 times a week)……...….3 Mostly (More than 5 or more days/ week)…4 Don't know/ can't remember…….....9	
7.2a FPANC	Did you receive ANC check up during the target pregnancy	No…….0 Yes……1	If "No" skip to 7.5
7.2b FPANC	How many times did you receive antenatal checkups during this pregnancy?	Number of times Don't know……99	Ask the mother if she received any pregnancy related check-ups during the pregnancy. Ask her how many times in total she saw someone for antenatal care during her pregnancy. This refers to care related to her pregnancy and should not include seeing a doctor or nurse for other reasons. Select "Don't know" if she do not remember
7.3 FPPM	How many months pregnant were you when you first went for antenatal care (ANC)?	Months Enter "99" if she does not remember at all.	Ask the respondent how many months into her pregnancy she was when she received her first antenatal care. If she does not remember, ask her how many menstrual periods she had missed at the time. Assume each missed period corresponds to a month and enter the number in the space provided. For example, if the respondent doesn't recall how many months pregnant she was when she first received antenatal care, but knows that she had missed two periods enter as 02 months.
7.4 FPHE	Did the health care worker talk to you about your eating habits during the ANC checkup?	No ……...……...….0 Yes…….....1	Ask the mother if the doctor/ health care worker gave her any advises during ANC. If the answer is "yes" then ask what it was about. If the woman mentioned that it was about her eating habit then select "Yes" otherwise "No".

7.5 FPPE	During this pregnancy did you eat more, the same, or less than you did before you were pregnant?	Less……...……...1 About the same…….....2 More ……..…3	Ask the mother if she ate more, the same or less during the pregnancy comparing to before pregnancy, when she was not pregnant.
7.6 FPPR	During this pregnancy did you rest more, the same, or less than you did before you were pregnant?	Less…….....1 About the same…….....2 More ……....…….3	Ask the mother if she took rest more, the same, or less during the pregnancy comparing to before pregnancy, when she was not pregnant.
7.7 FPVAC	Did you (mother) receive a vitamin A capsule within 6 weeks of the delivery?	No……..……0 Yes…….....1 Don't know…….....….9 N/A (Not completed 6 weeks). ……..…….....…...8	Showing the flash card make sure that the mother understands VAC then ask if she received a VAC (vitamin "A" capsule) within 6 weeks of the delivery. Code "N/A" if duration of delivery has not yet completed six weeks.
7.8b FPPNCT	Did the health care worker talk to you about your eating habits during the PNC checkup?	Within 3 days…….A 4-7 days..……..…..B 8-21 days..……...…C 22-42 days……..D	Ask the mother how many days after her delivery did she receive the PNC care.
7.9 FPEHM	Did the health care worker talk to you about your eating habits during	No…….……0 Yes……....….1	Ask the mother if the doctor/ health care worker gave her any advice during PNC. If the answer is "yes" then ask what it was about. If the woman reply that it was about her eating habit then select "Yes" otherwise "No":
7.10 FPEHC	Did the health care worker talk to you about how to feed your child during the PNC checkup?	No……..……0 Yes……..….....1	Ask the mother if the doctor/ health care worker gave her any advice during PNC. If the answer is "Yes" then ask, what advice the doctor/ heath worker provided to her. If the mother replied that the doctor/ health worker talked about feeding of the child (how to feed the child) then select "Yes" otherwise "No".
7.11 FPLC	Did the health care worker provide information about proper positioning and attachment during PNC checkups?	No…….0 Yes……....…1	

Ask the mother if the doctor/ health care worker provided information about (proper positing and attachment) proper breastfeeding. If the answer is "yes" then select "Yes" otherwise "No". Proper breastfeeding information: • Mother initiates breastfeeding within 1 hour of birth. • Tell the mother about proper position • Tell the mother about proper attachment • Mother Breastfeeds frequently, day and night. • Mother offers second breast after infant releases the first. • Breastfeed often, on demand, day and night. • Exclusively breastfeed during the first six months. • Continue to breastfeed even if the child or the mother is ill. • Steps on positioning and attachment. • Offer second breast after infant releases the first and still seems to be hungry.			
7.12 FPNB	During this pregnancy did you suffer from night blindness?	No……0 Yes……1	Ask the mother if she knows about "night blindness". Please use the local name of night-blindness and ask the question. If the answer is "Yes' then request her to tell you the symptoms. If her answer indicates that she really understands night blindness, knows local terms along with more than one symptoms of night blindness then ask if she suffered from night blindness during the pregnancy. If she does not know night blindness/ cannot tell the correct symptoms then explain the symptoms of NBL to her so that she can understand night blindness. Then ask if she suffered from NBL during the pregnancy and select accordingly. Before asking the question makes sure that the mother understands NBL. If the answer to this question is "No" then skip to 8.1
7.13 FPSD	Did you also have trouble seeing during the day?	No……0 Yes……...1	If the respondent suffered from night blindness during the pregnancy, ask if she had also trouble seeing during day time and select accordingly.

8. Feeding Practice

We are now going to ask you some questions about how you feed your child. (PRACTICE)			
8.10 FPBF	Has (name) ever been breastfed?	No……...0 Yes……..1	Ask the mother whether the child has ever been breastfed. This question does not matter how long the mother breastfed the child, only whether or not she ever gave the child breast. It does not matter whether or not the mother's milk had arrived at the time of giving the breast to the child.
8.11 FPBD	How long after birth did you first put (name) to the breast? If respondent reports she put the infant to the breast immediately after birth, circle "0" For 'Immediately'. And put "00" in the boxes . If less than 1 hour, circle "1" for hours AND RECORD "00"hours in the boxes. If less than 24 hours, circle "1" and record number of completed hours, from 01 to 23 in the boxes. Otherwise, circle "2" and record number of completed days.	Immediately ..... 0 OR Hours..... 1 OR Days.....2 Not applicable = 88	Ask the mother when the child was first put to the breast .How "long after birth" that means time between birth and first putting the breast to the child For this question it does not matter whether or not the mother's milk had arrived at the time of first putting the breast to the child. If the respondent reports that she put the breast to the infant immediately after birth, select "immediately" and type "00" in the boxes, if less than one hour of birth, then select circle "hours" and type "00", If respondent reports that one or more hours, but less than 24 hours, then select "hours" and type the exact completed hours. If respondent reports that 24 or more hours, then select "days" and record number of completed days. Please fill in the boxes with "88" when not applicable.
8.12 FPCO	Did you give colostrums to (name)?	No……..0 Yes……1 Don't know……9	Ask the mother if she gave colostrums to the child. It has different local names in different areas. (Colostrums is known as first milk. It is creamy yellow or golden substance that is present in the breast before the mother milk is made). Please ask the mother if first few drops were taken out before first breastfeeding the child.
8.13 FPEBF	Did you put any food or drink in (name's) mouth within 6 months after birth? (Excluding breastfeeding)	No……0 Yes……...1 Don't know……..9	Please ask the mother of the child if any drink/ liquid/ foods, excluding medicine and breast milk, was given to child's mouth within 6 months after birth of the child and select accordingly. If" No" skip to 8.16

8.14 FPPL	Did you put any food or drink (name) in mouth before first breast milk?	No……0 Yes……...1 Don't know……...9	Asks the mother whether the child was given anything to the child's mouth like liquid/ drinks/food after the birth and before initiation of breast milk. Please select "Yes" if anything was given and "No" if anything was not given and "Don't know" for the answer don't know. (Usually children are given honey, sugar water, butter etc.)
8.15 FPLQ	Did (name) have had any of the following liquids/drinks yesterday during the day or night? (To be asked only for mothers with < 2 years old child) A. Plain water B. Infant formula C. Tinted powder or fresh animal milk D. Juice or Juice drink/Suja water E. Yogurt F. Others (specify) G. N/A		Read each item from the list and ask if the child have had the items from yesterday wake up to whole day if not, then ask about yesterday sunset to whole night -wait for the response and select accordingly. Please ask about each of the listed item one by one. If the child was fed infant formula please try to see the packet. If the child was fed "Dextrose" consider it as sugar water. Infant formula: exclusively prepared for infants. Example: Lactogen, Cerealac. Tinted, powder or fresh animal milk: All form of animal milk that include powder, liquid in packet or tin, fresh (liquid) milk excluding breast milk. If the child was fed infant formula/ tinted powder or fresh milk/ yogurt then ask how many times the child was fed, each category of food item , during yesterday day and night and type the number of times in the boxes provided. If did not feed yesterday please put "0" in the box.
8.16 FPBT	Did (Name) drink anything from the bottle when he was below 2 years of age?	No……0 Yes……1 Don't know……9	Ask the respondent whether the child drank anything from a bottle with a nipple when he was below 2 years of age

8.17 FPEA	Yesterday during the day or night, did (name) eat anything at home or outside home? (To be asked only for mothers with < 2 years old child)	Rice, bread or other foods made from grains including thick grain based porridge.....A Pumpkin, carrots, sweet potatoes that are yellow or orange inside…….....B hite potatoes, white yams or any other foods made from roots…….....C Any dark green leafy vegetables?.....D Ripe mangos, ripe papayes, ripe jack fruits ……..E Any other fruits or vegetables?.....F Liver, kidney, Heart……..G Any meat (beef, chicken, goat, duck etc.)……H Eggs……..……I Large fish /dried fish /sea food……K Small fish/ dried fish…….....L Any foods made with beans/ nuts/lentils?.....M Cheese or milk product…….....….N Any oil, fats, /butter or foods made with any of these?.....P Any sugary foods such as chocolates, candies, pastries, cakes or biscuits?.....Q Condiments for flavor (chilies, spices, herbs or fish powder)…….....R Salty snacks such as chanachur, biscuits, chips, etc…….....S Others…….....X	Please follow the procedure below to get information for the question: Request the respondent to describe everything that the child ate yesterday from the time he/she woke up to Sunset. Think about when (name) first woke up yesterday. Did (name) eat anything at that time? If yes, please tell me everything (name) ate that time. Probe; anything else? What did (name) do after that? Did (name) eat anything at that time? If yes, please tell me everything (name) ate that time. Probe; anything else? Repeat the question above until respondent says nothing else. List all the times eaten in your note book. Then ask about yesterday Sunset to whole night following the same procedure until mother says the child went to sleep. List all the times eaten in your note book. If respondent mentions mixed dishes, probe; What ingredients were in that (mixed dish), anything else? If the food is not listed in any of the food groups. Write the food under others . If food are used in small amounts for seasoning or as a condiment. Include them under the condiment group. Select all that apply from the list.

9. Morbidity:

No	Questions	Select	Skip
9.1 MRSC	Was (name) sick in the last 15 days?	No……0 Yes……..……1	Ask the mother if the child (name of the child) was sick in the last 7 days from the day of interview. For example: The interview is taking place on Sunday then ask if the child was sick in last 7 days (from last Sunday to till date). If answer is "no" then ask about previous 7 days (last Sunday to previous Sunday) .Select "No" If answer for both weeks is still no . If the child was sick anytime during the last 15 days then select "Yes" If "no" skip to question number 9.9
9.2 MRSD	Which of the following illness did s/he suffer from? Multiple answers allowed	Fever……..……...A Cough/ Runny Nose..……B Difficulty breathing……...C Diarrhea…….……D Others (Specify)……E	If the child was sick in the last 15 days then ask from what illnesses the child suffered or suffering and select accordingly.
9.3 MRAT	Did you seek advice/treatment for these illnesses?	No……..……0 Yes……1	If the child suffered from one or more illnesses ask, if any treatment or advise was sought for the illnesses . If "no" skip to question number 9.6
9.4 MRPT	Where did you seek treatment/ advice for any of these illnesses? Multiple answer allowed	Govt. Health Facilities.....A Pvt Health facilities (diagnostic or pvt hospitals) …….....B Lama/Pandit/Rimdro/Puja/ paw/pam……....C Drungtsho/Menpa…….....D Local healers…..…….....E VHW……..…F Others(specify)……....G Don't know……X	If answer to question number 9.3 is "Yes", ask from where the treatment/ advises were received. Select all the places/ sources of treatment/ advices received.

9.5 MRHP	Did the doctor/ health worker talk to you about how/ what to feed the child? (if applicable including breast milk)	No……0 Yes……1 Don't know……...9	Ask the mother if the doctor/ health worker gave her any advises besides medical treatment. If the answer is "Yes" then ask, what advises the doctor/ heath worker provided to her. If the mother replied that the doctor/ health worker talked about feeding/ breast feeding of the child (how/ what to feed the child) then select "Yes" otherwise"- No" .
9.6 MRCD	During the illness how much was child (name) given to drink?	Less……1 About the same…….....2 More……...……3 Nothing to drink…….....4 Don't know……....…..9	Ask the mother when the child was sick then how much liquid was given to drink compared to normal (when the child was not sick). Was it less than usual to drink, about the same amount or more than usual to drink and select accordingly. Consider how much was given to the child not how much the child drank.
9.7 MRCE	During the illness how much was the child (name) given to eat?	Less……1 About the same…….....……2 More……...……3 Nothing to eat..…….....….4 Not yet began feeding.....5 Don't know……....…..9	Ask the mother when the child was sick then how much food was given to eat compared to normal (when child was not sick). Was it less than usual, about the same amount or more than usual to eat and select accordingly. Consider how much was given the child not how much the child eat.
9.8 MRLQ	Did you give the following liquids/ drinks during illness in the last 15 days? Multiple answer allowed	Fluid from ORS Pkt……..…A Any recommended homemade fluid…….....….B Rice water/rice porridge …..C Whey (Dachu) ……..….....D Suja/Weak tea (Phekha) with salt……...……..…E No……G N/A……..……..…H	If the child age is 15 months or more, ask the mother when was the last the child received deworming medicine. Take her answer and check if it is within last six months and select accordingly

9.9 MFCA	If the child age is 15 to 59 months, Did (name) receive deworming medicine in the last 6 months?	No……0 Yes……..1 N/A…… 8 Don't Know…….....…9	Read each item from the list and ask if the child was given the items during the period of illness and select accordingly.
9.10 MRVAC	If the child age is 6 to 59 months, Did (name) receive VAC in the last 6 months?	No……0 Yes……...1 Don't know…….....…9	Make sure first that the mother knows vitamin Take her answer and check MCH handbook and select accordingly.
9.11 MRNBL	If the child age is 12 to 59 months, Is the (name) suffering from night blindness? (if the mother does not know NBL, Enumerator will explain)	No……0 Yes……..1 Don't Know…….....9	
Ask the mother if she knows about "night blindness". Please use the local name of night-blindness and ask the question. If the answer is "Yes' then request her to tell you the symptoms. If her answer indicates that she really understands night blindness; knows local terms along with more than one symptoms of night blindness then ask if the child is suffering from night blindness. If answer is "no" or cannot tell the correct symptoms then explain the symptoms of NBL to her so that she can understands night blindness. When you are sure that mother understands night blindness, ask if the child has the night blindness and select accordingly. Night blindness: Persons who are night blind are likely to bump into things when there is insufficient light especially during Sunset. Night blind children are less likely to play/ move in such situations, cannot locate foods from the plate during taking food after Sunset and tries to cling on mother at night.			
We are now going to ask you some questions about hygienic condition of your household			
9.12 MRSTL	The last time (Name) passed stool, where did he/she defecate?	Used toilet facility…….....…0 Used potty…….....1 Used washable diapers……...2 Used disposable diapers……..3 Defecated in his cloths……...4 Defecated on the premises/yard….. .....5 Went outside the house…….....6 Other(specify)…….....……7 Don't know……...……9	Ask the mother where the child (name) defecated last time and select accordingly.

9.13 MRSDI	The last time (Name) passed stools, where were the feces disposed of?	Child used toilet facility……0 Thrown/dropped in toilet facility…....1 Disposed into waste/thrush bin..…....…2 Discarded in the yard/Premise…….....…3 Discarded outside the yard/Premise……...4 Buried…….....5 Left where child defecated….....6 Rinsed/ Washed way Water discarded into toilet facility……..…7 Water discarded into sink or tub connected to drainage system…….....8 Water discarded outside……..……....9 Washed directly in pond/ river……..…....10 Other…….....11 Don't Know…….....99	
Ask the mother where the feces that the child (name) passed last time were disposed of and select accordingly. Please select " Child used toilet facility " if the child used toilet and did not have to discard the stools. Disposed into waste/ thrush bin: Please check whether the stool was disposed into the waste thrush bin or outside dustbin and select if stool was disposed into the waste bin. Discarded in the yard/Premise: The stool was thrown away anywhere inside the premise. Discarded outside premise: The stool was thrown away anywhere outside the premise. Put into fixed place: The stool was put into a place that was fixed for disposal of stool. Left where child defecated: The child defecated at any place other than toilet facility and they kept the stool as it was. Other: The child defecated at a place that does not match any of the listed select. Please specify the place. Rinse/ washed away: Clean or washed away the stool with water. Select "Water discarded into toilet Facility" to " Water discarded outside " are the places where the water was discarded after washing the stool and the select " Washed directly in pond/ river " is used when the stool is washed directly in a water body like pond/ river.			
9.14 MRPSC	The last time (Name) passed stools, did you (mother) clean him/her?.	No……..0 Yes……..……1	Ask the mother of the child, when last time the child had defecated whether she cleaned bottom of the child and select accordingly. If the answer is "No" go to next section
9.15 MRHW	Did you wash your hand after cleaning?	No……0 Yes……..……1	If she cleaned bottom of the child then ask whether she washed her hands after cleaning bottom of the child. If "No" go to next section.
9.16 MRHWM	If you (mother) washed your hand, how did you wash?	Only water……1 Water and soap……..……..2 Water and ash…….....3 Water and other detergent…...4 Water and mud……....5 Others (specify)……..…..6	If the mother washed her hands after cleaning the bottom of the child then ask how did she washed her hands and select accordingly.

STATUS OF THE QUESTIONNAIRE

SOQ	Status of the questionnaire	Completed……1 Refusal/incomplete……2	

NATIONAL NUTRITION SURVEY – 2015 (NNS)
PREGNANT WOMEN QUESTIONNAIRE

PREGNANT WOMEN INFORMATION PANEL	
HH1 **Dzongkhag code**	
HH2 **Gewog/Town code**	
HH3 **Chiwog/EA code**	
HH4 **Household Serial Number**	
HH5 **Name of household head**	
HH6 **Team leader's code**	
HH7 **Enumerator's code**	
HH8 **Date of enumeration**	

10. Pregnant women module

10.1 PWHM	Woman line number? (From HH Demography section)		No pregnant ……..00	Select the line number of the pregnant woman to whom the questions will be asked
10.2 PWWN	Woman name		.....	
10. 3 PWSS	In the last 7 days did you consume the following food items?			
SL no.	Food category	Examples of food	No. of days	
10.3.1	All Starchy Staples	Rice, wheat, muri, potatoes, sweet potatoes, maize, khichuri		
10.3.2	All Legumes and Nuts	Dal, cooked dry beans, peas, peanuts, other seeds/ beans, khichuri		
10.3.3	Dark green leafy vegetables	All kind of leafy vegetables		
10.3.4	Red/orange/ yellow fruits	Ripe mangoes, papaya, jackfruits other red/ yellow or orange fruit		
10.3.5	Red/ orange/ yellow vegetables	Orange sweet potato, pumpkin, carrot or other yellow or orange vegetables		
10.3.6	Vitamin C rich fruits	Guava, Strawberry, lemon, orange, lychees, pineapple, mango, grapes		
10.3.7	Vitamin C rich vegetable	Gourd, broccoli, cauliflower, tomatoes, green cabbage		
10.3.8	Other vegetables or fruits	Turnips, bananas, apples		
10.3.9	Eggs	Hen/duck, other birds, or fish eggs		

10.3.10	Organ meat	Liver, kidney, gizzards		
10.3.11a	Small Fish	Small Fish Eaten Whole with Bones		
10.3.11b	Large fish/ sea food	Large whole fish and shell fish and dried fish		
10.3.12	Flesh Foods and Small Animal Protein	Beef, Pork, Veal, Lamb, Goat, Chicken, Duck		
10.3.13	Dairy	Milk, cheese, yogurt or other milk products		
10.3.14	Edible Oil	Foods containing oil, fat, butter		
10.3.15	Sugar, honey, molasses			
10.3.16	Condiments/			
Spices	Spices, coriander leaf, mint leaf, betel nut, betel leaf			
10.3.17a	Miscellaneous (Drinks)	Tea		
10.3.17b	Carbonated drink	Pepsi, Coke, Coca cola and etc		
10.3.17c	Alcohols	Ara, Bangchang, Sinchang, Changkoe, beer and etc		
10.4 PWMA	At what age were you married?			Type the age in completed years

10.5 PWPM	How many months pregnant are you now?	Months Don't know……99	Ask the woman that how many months pregnant she is at the time of interview. Type the completed months in the boxes provided. Select "Don't know" if the woman does not know duration of her pregnancy.
10.6 PWNP	Including this pregnancy, how many times have you been pregnant? (Total number whether or not the pregnancy resulted in a child)	Times	Ask the woman that how many times she became pregnant including stillbirth, miscarriage and live birth. Type the total number of her pregnancy including current one in the boxes provided.
10.7 PWANC	How many times did you receive antenatal checkups during this pregnancy?	Never ……..0 Yes, ……..1 Number of times Don't know……..…..9	Ask the woman if she received any pregnancy related check-ups during this pregnancy. If the answer is "yes" then how many times did she receive and select accordingly. If "Never" or "Don't know " skip to 10.11
10.8 PWPANC	How many months pregnant were you when you first went for antenatal care during this pregnancy?	Months Don't know……..…….99	Ask the woman how many months pregnant she was when she first went to receive pregnancy related check up (ANC).
10.9 PWEH	Did the health worker talk to you about your eating habits during this pregnancy at the ANC checkup?	No ……..…0 Yes……...……1 Don't know……..…..9	Ask the woman if the health worker gave her any advises during ANC. If the answer is "yes" then ask what was it about. If the woman mentioned that it was about her eating habit then select "Yes" otherwise "No"
10.10 PWFE	How many iron folic acid tablet did you take in the last 7 days?	Exact number Don't know……..…99	Type the number of IFA taken during the last 7 days

10.11 PWPE	During this pregnancy do you eat more, the same, or less than you did before you were pregnant?	Less……..……..…1 About the same…….....……2 More …….....…..3	Ask the woman if she eats more, the same or less during the pregnancy comparing to when she was not pregnant and select accordingly.
10.12 PWPR	During this pregnancy do you rest more, the same, or less than you did before you were pregnant?	Less…….....……1 About the same…….....…….2 More…….....…….3	Ask the woman if she takes rest more, the same, or less during this pregnancy comparing to before pregnancy, when she was not pregnant and select accordingly.
10.13 PWAP	Is there another pregnant woman at home at the time of interview?	No……0 Yes……1	If "Yes" tap on "add group" button

NATIONAL NUTRITION SURVEY – 2015 (NNS)

ANTHROPOMETRY QUESTIONNAIRE

HH1 Dzongkhag code	
HH2 Gewog/Town code	
HH3 Chiwog/EA code	
HH4 Household Serial number	
HH5 Name of household head	
HH6 Team leader's code	
HH7 Enumerator's code	
HH8 Date of enumeration	

11. Anthropometry

Sl #	Variables	Select	Skip
11 ANWCL	Target woman /child line # from demography section.	Child ……1 Women…….....2	If the selected respondent is "Women" skip to 11.2
11.1	Child line number	Line #	Select the respondent line number from the list.
11.2 ANWCN	Women (mother of child) line number	Line # Mother not in demo Section…00	Type the line number of the selected women. Select "Mother not in demo Section" if mother is not listed in the household.
11.3a ANCW	Is the child measured or not	No……0 Yes…….……....1	
1.3b ANCW	Date of birth of child		Day/Month/Year
11.3c ANCW	Weight in (kg) for the child	Exact measurement in (kg).	Follow the procedure given for the weight measurement in Annexure III and type the weight(kg) in the boxes Measure carefully –a small mistake can cause incorrect and biased calculation. If measured skip to 11.4a
11.3d	Reasons for not measuring weight	Absent……1 Sick/disable…….,,,,,…..2 Refused…….....,,,...3 Non-cooperative……,,…..4	Select the weight measurement status accordingly.
11.4a ANCH	Is this child's height/ length measured or not?	No……..0 Yes…….,….1	If "No" skip to 11.4c

11.4b ANCH	Height/ length in (cm) for child	Exact measurement in (cm).	Follow the procedure given for the height/length measurement in cms Annexure IV. Measure carefully –a small mistake can cause incorrect and biased calculation. If measured skip to 11.5 a
11.4c	Reasons for not measuring Height/length	Absent……..…… 1 Sick/disable……. 2 Refused……...…,….3 Non-cooperative……,,,…4	Select the weight measurement status accordingly.
11.5a ANCE	Has the status of edema been checked?	No……..0 Yes……,,,,…...1	If "No" skip to 11. 5c
11.5b ANCE	Edema	No……..0 Yes……,…….1	Select the edema measurement status accordingly. Annexure V
11.6 ANWCB	Birth order	Exact birth order Don't know…….99	The birth order is the chronological order of life births (children that were born alive, even if now dead). Starting with the eldest child. Miscarriages and stillbirth are excluded. Multiple births (twin etc.) are recorded as individual case. Ask the mother about birth order position for each eligible child and type in the boxes
11.7a ANWCHg	Is the hemoglobin of the child/women measured	No……..0 Yes……..,,,,.....1	If "No" skip to 11.7c

11.7b ANWCHg	Hemoglobin	Exact Hb in (g/dL)	Take the hemoglobin measurement from the finger for both children 6-59 months and of 10-49 years old women. Follow the procedure given for the hemoglobin testing in Annexure VI. If measured skip to 11.8
11.7c	Reasons for not measuring Hb	Absent……..……..1 Sick/disable……2 Refused……...……..3 Non-cooperative……4	Select the Hb measurement status accordingly.