

# Child malnutrition in northern Ghana: evidence, factors and recommendations from a new study

Mahama Saaka, Asamoah Larbi, Irmgard Hoeschle-Zeledon and Bernard Appiah



# Child malnutrition in northern Ghana: evidence, factors and recommendations from a new study

Mahama Saaka, Asamoah Larbi, Irmgard Hoeschle-Zeledon  
and Bernard Appiah

The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three regional projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads the program's monitoring, evaluation and impact assessment. <http://africa-rising.net/>



### Citation

M. Saaka, A. Larbi, I. Hoeschle-Zeledon and B. Appiah. 2015. Child malnutrition in northern Ghana: evidence, factors and recommendations from a new study. IITA report. IITA, Ibadan, Nigeria. 22 pp.

ISBN: 978-978-8444-65-7

### Author Institutions

Mahama Saaka, University for Development Studies Ghana  
Asamoah Larbi, IITA, Tamale, Ghana  
Irmgard Hoeschle-Zeledon, IITA, Ibadan, Nigeria  
Bernard Appiah, Centre for Science and Health Communication

International Institute of Tropical Agriculture, (IITA)  
PMB 5320, Ibadan, Oyo State, Nigeria  
Tel: +234 2 7517472, (0)8039784000, (0)8055055954,  
(0)8034035281, (0)8034035282, (0)8034035283  
VOIP via USA: 1-201-6336094  
Fax: INMARSAT: 873761798636  
E-mail: [iita@cgiar.org](mailto:iita@cgiar.org)

International mailing address  
IITA  
Carolyn House, 26 Dingwall Road  
Croydon CR9 3EE, UK

This document was made possible with support from the American people delivered through the United States Agency for International Development (USAID) as part of the US Government's Feed the Future Initiative. The contents are the responsibility of the producing organization and do not necessarily reflect the opinion of USAID or the U.S. Government.

Cover photograph

Mothers line up to weigh their babies in northern Ghana. Photo credit: UNICEF



This document is licensed for use under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 Unported License

# Acknowledgements

This booklet highlights the findings of a study conducted in November 2013 in Northern, Upper West, and Upper East Regions of Ghana to assess child malnutrition. The study involved discussions with community members and local leaders. We would like to acknowledge the input of the 1,200 women who provided their valuable time and knowledge in sharing their experiences and ideas on child nutrition. We also thank the Ghana Health Service for playing a role in conducting the study.

The present booklet is based on the study's technical report by Saaka and Maturu (2013); this can be downloaded from <https://cgspace.cgiar.org/handle/10568/42255>



# Contents

Acknowledgements .....	iii
Summary .....	vi
1. Why is this booklet needed?.....	1
2. How the study was carried out .....	2
How participants were selected.....	2
How basic measurements were taken .....	2
How the results were analyzed .....	4
3. Key findings and explanations.....	5
Socio-economic and demographic characteristics of the sample .....	5
Nutritional status of children aged 6–36 months .....	6
Prevalence of malnutrition by gender .....	7
Prevalence of malnutrition by age groups .....	7
Factors that influence better or poor nutritional status .....	8
Household food production and access.....	13
Food consumption or use .....	15
Predictors of minimum dietary diversity .....	16
Household decision-making and care of the child .....	17
4. Conclusions and recommendations .....	19
Conclusions .....	19
Recommendations for policymakers.....	19
Recommendations for health and nutrition experts.....	19
Recommendations for agricultural extension workers .....	20
Recommendations for media professionals.....	20
5. References.....	21
6. Glossary.....	22

## Tables

1. Some malnutrition indicators and how they were measured in northern Ghana.....	3
2. Some sample characteristics of study participants in northern Ghana.....	5
3. Nutritional status of children aged 6–36 months in northern Ghana (gender and age combined)...	6
4. Weighted analysis of wasting, stunting, and underweight by intervention and comparison households in northern Ghana.....	8
5. Two-variable analysis of predictors of better nutritional status among children aged 6–36 months in northern Ghana.....	9
6. Multivariable predictors of better nutritional status among children aged 6-36 months in northern Ghana.....	11
7. Multivariable predictors of achieving minimal dietary diversity in children aged 6–23 months in northern Ghana.....	16
8. Household decision-making and care of the child in northern Ghana.....	18

## Figures

1. Geographical distribution of malnutrition types among children aged 6-36 months in northern Ghana.....	6
2. Prevalence of malnutrition types among children aged 6-36 months by gender in northern Ghana...	7
3. Prevalence of malnutrition types among children aged 6-36 months in northern Ghana by age groups.....	7
4. Core infant, child feeding indicators for intervention and comparison households in northern Ghana.....	10
5. Percentage of households growing different types of crops in northern Ghana.....	13
6. Type of animals and percentage of households that reared them in northern Ghana.....	14
7. Food types and percentages of children fed with them in the previous 24 hours in northern Ghana.....	15

## Photo

1. Breastfeeding. Photo credit: UNICEF.....	12
---	----

# Summary

This booklet summarizes the results of a new baseline study that was carried out in northern Ghana in November 2013. The findings of the study indicate that children in northern Ghana suffer from poor nutrition.

The new study was conducted among 600 households in communities where a project to link agriculture and health was about to be implemented and 600 other households that would not benefit from the project (Saaka and Maturu, 2013). All the households were selected from a total of five districts in northern Ghana: Northern, Upper East, and Upper West Regions.

The aim was to collect information on knowledge and practices related to the feeding of infants and young children which would serve as a baseline for comparison in future after the completion of the project.

The study revealed some important findings that could help to determine the potential impact of the project which is being implemented by the International Institute of Tropical Agriculture (IITA) in collaboration with the Ghana Health Service (GHS) and the University for Development Studies (UDS) in Ghana. For example, the prevalence of being too short for one's age (also called chronic malnutrition or stunting) among children aged 6-36 months was 23.2% and the prevalence increased with age. The cases of the different types of malnutrition — wasting (thinness), stunting (being too short for one's age), and underweight (having less than the ideal body weight for one's height and age — were significantly more among boys than among girls. The proportion of people found to be suffering from wasting in two districts was above the normal 15.0% level recommended by the World Health Organization (WHO) and can be described as being very high or critical.

The children did not eat protein-rich food often enough for good health as most (90.8%) were fed on cereal-based foods. Also the intake of foods known to have a good content of micronutrients and protein was less than satisfactory. For example, only 14.3% of children were fed on vitamin A-rich fruits and vegetables.

Generally, the practices for feeding infants and young children were not the best and need to be improved. The most consistent determinants of a minimum acceptable diet across all the districts were the age of the child, whether the child was being breastfed, and the age of the mother. Children aged 6-36 months in northern Ghana are at greater risk of failing to meet the infant feeding standards recommended by WHO given that less than 50.0% of them were on a minimum acceptable diet.

The new study identified a number of factors, including health and socio-economic status and food production factors that might have played a role.

This booklet makes recommendations for audiences such as healthcare workers, nutritionists, agricultural extension workers, and media professionals to help to address malnutrition in northern Ghana.





# Why is this booklet needed?

Having ideal nutrition is critical for human development and economic growth. However, childhood undernutrition — children having less than the normal body weight for their ages, being too short (stunted) for their ages and/or too thin (wasted) — remains a public health problem in low- and middle-income countries, including Ghana. The problem is often influenced by differences in where people live and socio-economic factors such as poverty and education.

Although there is potential for agricultural change to improve nutrition in low- and middle- income countries, little scientific evidence exists on how agriculture-nutrition linkages work. More evidence is needed on how to design, implement, evaluate, and scale up successful integrated agriculture-nutrition-health project strategies for improved nutritional outcomes (von Braun et al., 2011).

Thus IITA, in collaboration with GHS and the UDS in Ghana, has initiated an integrated approach to address food insecurity and poor nutrition in areas of northern Ghana — comprising the Upper East, Upper West, and Northern Regions.

The focus of the project is to combine agriculture with health strategies to address undernutrition through action research. The project seeks to identify and promote the eating of different types of locally available foods, including vegetables and fruits which are rich in essential nutrients, and animal-sourced foods, to improve the health and nutritional outcomes of children and pregnant women.

To help to assess the impact of the project in future, researchers in November 2013, before it began, conducted a baseline survey in five project districts in northern Ghana. This booklet describes how the study was conducted and the key factors that influence feeding practices for infants and young children.

A comparison of the findings highlighted in this booklet and those to be carried out later will help to determine the impact of the project.

A key aim here is to help readers understand the study, its methods, and findings in non-technical language. This booklet makes recommendations for promoting nutrition and health in northern Ghana.

The target audience comprises mainly policymakers, mothers or caregivers, healthcare workers or nutritionists, agricultural extension workers, media professionals, members of the general public, and those interested in understanding and using evidence-based nutritional data in low- and middle-income countries.

Academic institutions with an interest in undertaking human-impact studies, such as in food security and nutrition, may also find this booklet useful.

# How the study was carried out

Malnutrition, a term used for poor nutrition, can be described in many ways: undernutrition (resulting from eating a diet that has less than the required amount of nutrients), overnutrition (resulting from eating a diet that has more nutrients than are required) and diseases associated with a lack of essential nutrients, including iron-deficiency anemia and vitamin A deficiency. Malnutrition can also be acute (short-term) or chronic (long-term). Table 1 includes how different types of malnutrition are defined and measured.

## How participants were selected

Researchers used a statistical approach to randomly select 600 mothers or caregivers from households of five project districts in the three Northern regions of Ghana who are 15 to 60 years, with each having a child aged 6-36 months. Only one eligible mother or caregiver was randomly selected for interview in any particular sampled household. If more than one eligible woman was available within one household, the mother of the youngest child was interviewed.

The 600 mother-child pair sample size was deemed to be adequate because it took into account the fact that the United Nations Children's Fund (UNICEF) had determined the proportion of the population in the project districts having malnutrition to be 25.0% (UNICEF, 2011). Researchers estimated that they would be 95.0% confident to find the prevalence to be the same if they took a sample from the population.

The same approach was used to select 600 mother-child pairs in comparison communities not benefitting from the intervention in the five project districts. Thus, a total of 1,200 mothers and 1,200 children were selected for this study, which was conducted in November 2013.

## How basic measurements were taken

In this study, researchers measured indicators of malnutrition and factors that could have an impact on them. These indicators included the nutritional status of children and were assessed through different strategies as summarized in Table 1.

Factors that could influence poor nutrition included the following:

- household decision-making on child care,
- use of maternal care services,
- number of children with malaria, fever, and diarrhea, and how mothers or caregivers managed the sick children,
- feeding practices for infants and young children as reflected in how mothers provided breastfeeding and other relevant care for children, and
- socio-economic factors, such as the types of crops grown or livestock raised by the households.

**Table 1. Some malnutrition indicators and how they were measured in northern Ghana.**

What was measured	How it was measured and/or its importance
Age	The exact age of the child was recorded in months based on information found in child health records/booklets, birth certificates, and baptismal cards.
Weight	The weight of the child was determined to the nearest 0.1 kilogram (kg) using an electronic weighing scale.
Height	For children aged up to 23 months who could not yet walk, their length was determined in a lying position through a specialized wooden instrument called infantometer. The length or height was measured to the nearest 0.1 centimeter (cm). For children aged 24-59 months and adults, their height (called stature) was measured in a standing position.
Body Mass Index (BMI)	This was determined by weight in kilograms divided by the square of the height in meters ( $\text{kg}/\text{m}^2$ ). This indicator is commonly used to group adults as being underweight, overweight, or obese.
Stunting	Stunting is the proportion or percentage of children with height-for-age below -2 standard deviations (SD).
Wasting	Wasting is the proportion or percentage of children with weight-for-height below -2 standard deviations (SD).
Underweight	Underweight is the proportion or percentage of children with weight-for-age below -2 standard deviations (SD).
Mid/Upper Arm Circumference (MUAC)	MUAC was measured in cm, to the nearest 0.1 cm, using standard measuring tapes. MUAC can be used to determine whether children aged 1-5 years are suffering from severe malnutrition or satisfactory nutrition.
Weight-for-height (WFH)	WFH is used to indicate wasting, which occurs due to rapid weight loss. Wasting reflects acute malnutrition.
Height-for-age (HFA)	This indicator reflects skeletal growth (stature), and is used to indicate stunting, which occurs when children fail to grow to an appropriate height. Stunting reflects chronic malnutrition.
Weight-for-age (WFA)	WFA takes into account wasting or stunting or a combination of the two. Children with low weight-for-age indices are said to be underweight.
Prevalence	Prevalence is the number of cases of a disease or an outcome being studied. Prevalence is used in this study to describe, for example, the proportion or percentage of children found to be suffering from stunting, wasting, or underweight.
Z-score	This is a statistical measurement — similar to a standard deviation — that shows how a score is related to the average of scores. Thus, a Z-score of zero means the score is the same as the average. A negative Z-score shows it is below the mean and a positive Z-score shows it is above the mean. Scientists have shown that, in 95.0% of a reference population, normal growth occurs from -2.0 to +2.0 Z-scores.
Infants and young children feeding/health practices	Mothers or caregivers were asked to respond to a survey with items such as <ul style="list-style-type: none"><li>• food and liquid consumption during the day before the survey,</li><li>• breastfeeding and management of diarrhea in children, and</li><li>• types of food that were fed to children in the 24 hours before the study.</li></ul>

## How the results were analyzed

The results were analyzed by determining the outcomes in both the intervention and the comparison communities. However, to help to determine the impact of the project being implemented by IITA and partners, for some of the outcomes researchers determined the differences between project and comparison communities.

Infant and young child feeding indicators, including minimum meal frequency, minimum dietary diversity, and minimum acceptable diet, were estimated by the recall of food and liquid consumption during the previous day using a survey questionnaire developed and validated by the Food and Agriculture Organization (FAO, 2011).

Minimum dietary diversity is the proportion of children who ate at least four or more varieties of foods from the seven food groups in a 24-hour time period. A dietary diversity score was created by adding the 16 different types of food reported to have been eaten. The dietary diversity score ranges from 0 to 16. If a child is reported to have eaten four or more food types, it means the child has met the WHO minimum dietary indicator.

Minimum meal frequency is the proportion of children who received complementary foods the minimum number of times recommended by the WHO in the previous 24 hours. For breastfed children, the frequency should be at least twice for those aged 6-8 months, and at least three times for those aged 9-23 months. For non-breastfed children, it should be at least four times in 24 hours (WHO, 2007; WHO et al., 2010).

Minimum acceptable diet is derived from two indicators: minimum dietary diversity and minimum meal frequency. When a currently breastfed child meets both indicators, the child is considered to have met the WHO recommended minimum acceptable diet.

Researchers also analyzed how some contexts such as the attitudes of mothers contributed to the main outcomes, including the nutritional status of children or meeting recommended targets.

A measure of the strength of evidence — called a p-value — was used to determine whether outcomes were largely due to chance or not. A p-value of 0.05 means the result would be expected to occur by chance only 5 times out of 100 repeated tests on different numbers of people selected from the population. Thus, when a p-value is less than 0.05, this suggests that the evidence appears to be strong as the likelihood of it occurring by chance is very small. Such a p-value is said to be statistically significant. However, a p-value that is equal to or greater than 0.05 indicates that the evidence is more likely to occur by chance or is statistically not significant.

# Key findings and explanations

## Socio-economic and demographic characteristics of the sample

The average age of the mothers or caregivers was 28.9 years. The youngest was 15 years old and the oldest person to be interviewed was aged 60, with most of them (81.9%) being in the age group of 18-35 years (Table 2).

The children had an average age of 18.9 months. Nearly 71.0% of the mothers or caregivers had no formal education and most (62.9%) mainly earned an income through agriculture. There was no statistical significance between the intervention and comparison communities in terms of the age and educational level of mothers and the age and gender of their youngest child.

**Table 2. Some sample characteristics of study participants in northern Ghana.**

Characteristics	Number of women interviewed	Percentage
<b>Child's characteristics</b>		
Gender (n=1195)	585	48.8
Male	590	51.2
Female		
Age distribution in months (n=1195)		
6-8	131	11.4
9-11	148	12.2
12-23	495	43.3
24- 36	401	33.2
<b>Mother's characteristics</b>		
Age (n=1197)		
Under 18	13	1.1
18-35	979	81.8
35 +	205	17.1
Educational level (n=1195)		
No schooling	831	70.9
Low (at least junior high/middle school)	314	26.5
High (at least senior high school)	30	2.7
Main source of income (n=1198)		
Nothing	44	3.7
Service worker (e.g., seamstress)	60	5.0
Trader/vendor	294	25.5
Agricultural worker	754	62.9
Other	46	3.8

## Nutritional status of children aged 6–36 months

Nutritional indicators are based on body measurements such as height-for-age (HAZ), weight-for-age (WAZ), weight-for-height (WHZ), and Mid/Upper Arm Circumference (MUACZ); z-scores were determined according to WHO guidelines (WHO, 2006)

It was found that the proportion of children considered to be too thin for their age was 12.5% (Table 3); the proportion of children considered to be suffering from the severe form of thinness (wasting) was 2.2%, which slightly exceeds the 2.0% WHO cut-off point.

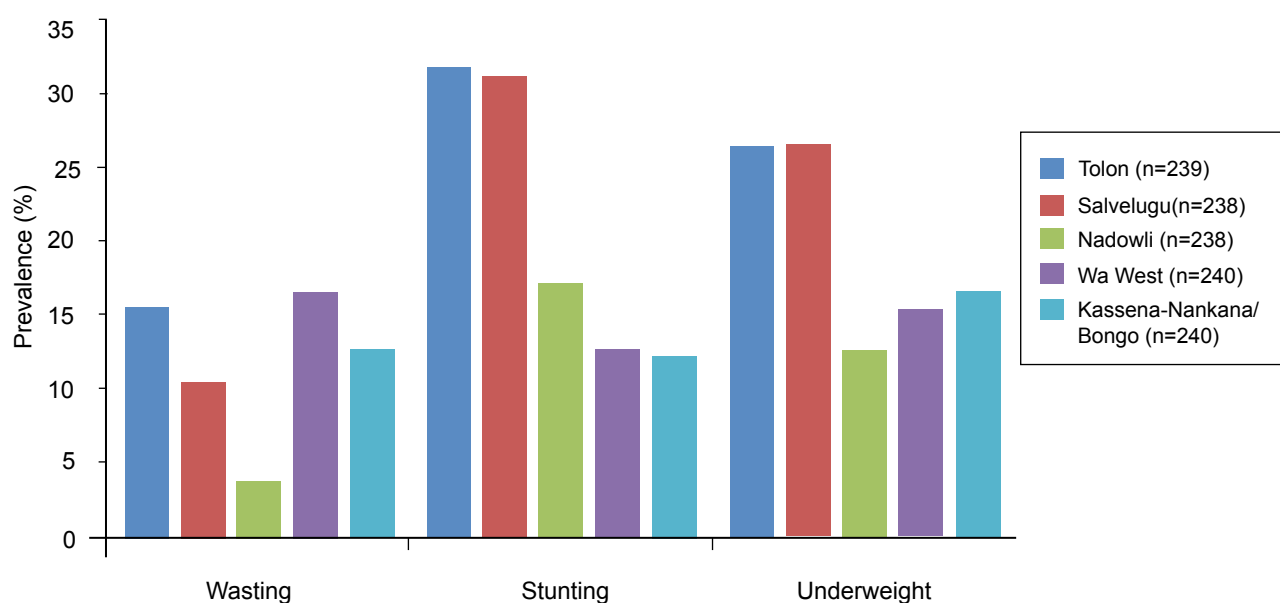
The percentage of children considered to be too short for their ages and heights, also called stunting, was 23.2%. The proportion of children considered to weigh less than the ideal body weight for their height and age was 21.1%.

The proportions of children considered to be too thin for their age and height (wasting) in Wa West and Tolon Districts were above the normal 15.0% level recommended by the WHO and can be described as very high or critical (Fig. 1). The highest proportion of children considered to be too short for their ages and weight (stunting) was in the Tolon and Savelugu Districts in the Northern Region and the malnutrition situation is serious, according to the WHO cut-off for public health relevance. The lowest proportion of children considered to be too short for their ages and weights was in Kassena-Nankana/Bongo District of the Upper East Region.

**Table 3. Nutritional status of children aged 6–36 months in northern Ghana (gender and age combined).**

Variable	Number of women interviewed	Prevalence of chronic malnutrition	Prevalence of acute malnutrition	Prevalence of severe acute malnutrition
Weight for age or underweight *	1195	21.1	17.6	3.4
Height for age or chronic malnutrition*	1188	23.2	16.4	6.8
Weight for height or global acute malnutrition*	1188	12.5	10.3	2.2

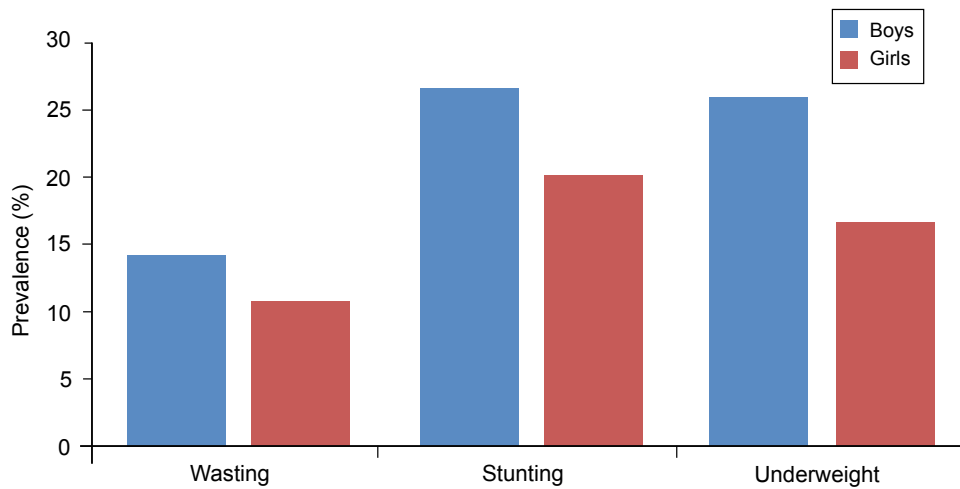
\*The p-value for each indicator was less than 0.05, meaning statistical significance.



**Figure 1. Geographical distribution of malnutrition types among children aged 6-36 months in northern Ghana.**

## Prevalence of malnutrition by gender

The prevalence of wasting, stunting, or underweight was significantly higher among boys than among girls (Fig. 2).



**Figure 2. Prevalence of malnutrition types among children aged 6-36 months by gender in northern Ghana.**

Note: 95% Confidence Interval. The three indicators had p-values less than 0.05, meaning statistical significance.

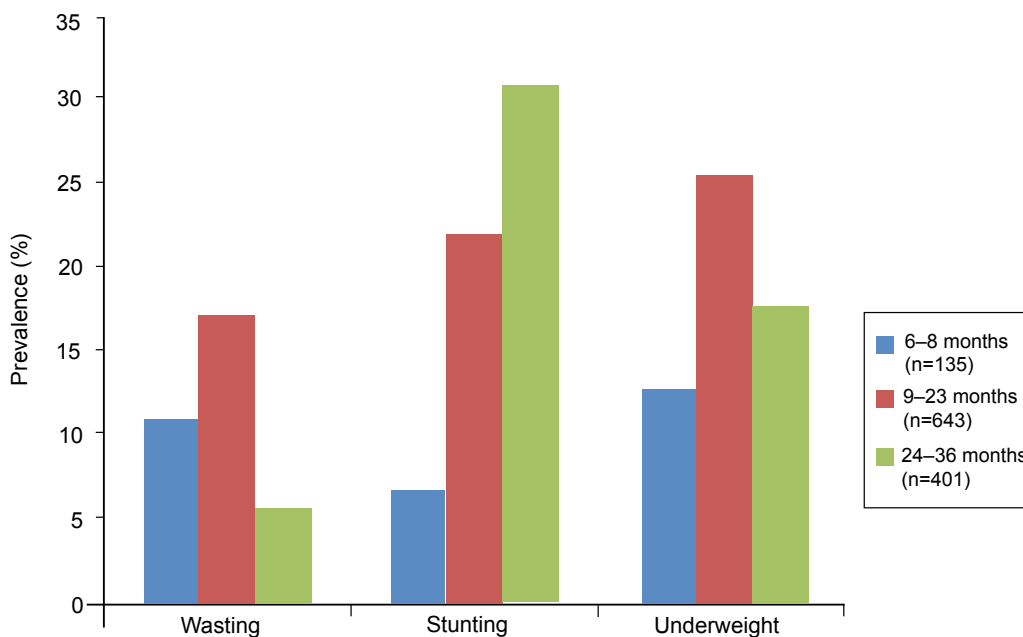


The prevalence of wasting, stunting or underweight was significantly higher among boys than among girls.

## Prevalence of malnutrition by age groups

Children aged 9-23 months had the highest prevalence rates of wasting and underweight whereas those aged 24-36 months had the highest prevalence of stunting (Fig. 3).

The proportions of children considered to be too short and too thin for their age were higher for intervention households but the relationships were not statistically significant (Table 4).



**Figure 3. Prevalence of malnutrition types among children aged 6-36 months in northern Ghana by age groups.**

Note: The p-value for each indicator was less than 0.05, meaning statistical significance.



**Table 4. Weighted analysis of wasting, stunting, and underweight by intervention and comparison households in northern Ghana.**

Indicator	Number of respondents	Comparison households (Prevalence/%)	Intervention households (Prevalence/%)
Weight for age or underweight	1188	13.6	11.4
Height for age or chronic malnutrition	1188	20.6	25.8
Weight for height or global acute malnutrition	1195	21.6	20.5

### Factors that influence better or poor nutritional status

Factors such as region of residence, age of child and mother, mother’s education, and whether the child was breastfed influenced whether a child had a worse or better nutritional status (Table 5).

The proportion of children who had better nutrition had the following characteristics: they



The finding that a higher percentage of children who were born in health facilities had a better nutritional status than their counterparts born at home suggests that healthcare workers might have provided nutritional education to the mothers.

- lived in the Upper East Region,
- were 6-8 months old,
- were female,
- had mothers older than 35 years,
- had mothers with a higher educational level,
- had not had diarrhea within two weeks before the survey, and
- had been born at a health facility rather than at home.

Chronic hunger resulting from issues with food availability and/or access to food has long been identified as the major cause of stunting. However, more evidence now suggests that stunting continues to exist even in food-secure households or with supplementary feeding programs (Das Gupta et al., 2005).

Such evidence suggests that food use and other child care factors may play a significant role in children’s nutritional status. The high prevalence of stunting in the study sample therefore suggests that non-food aspects of food security need to be addressed alongside food-based interventions.

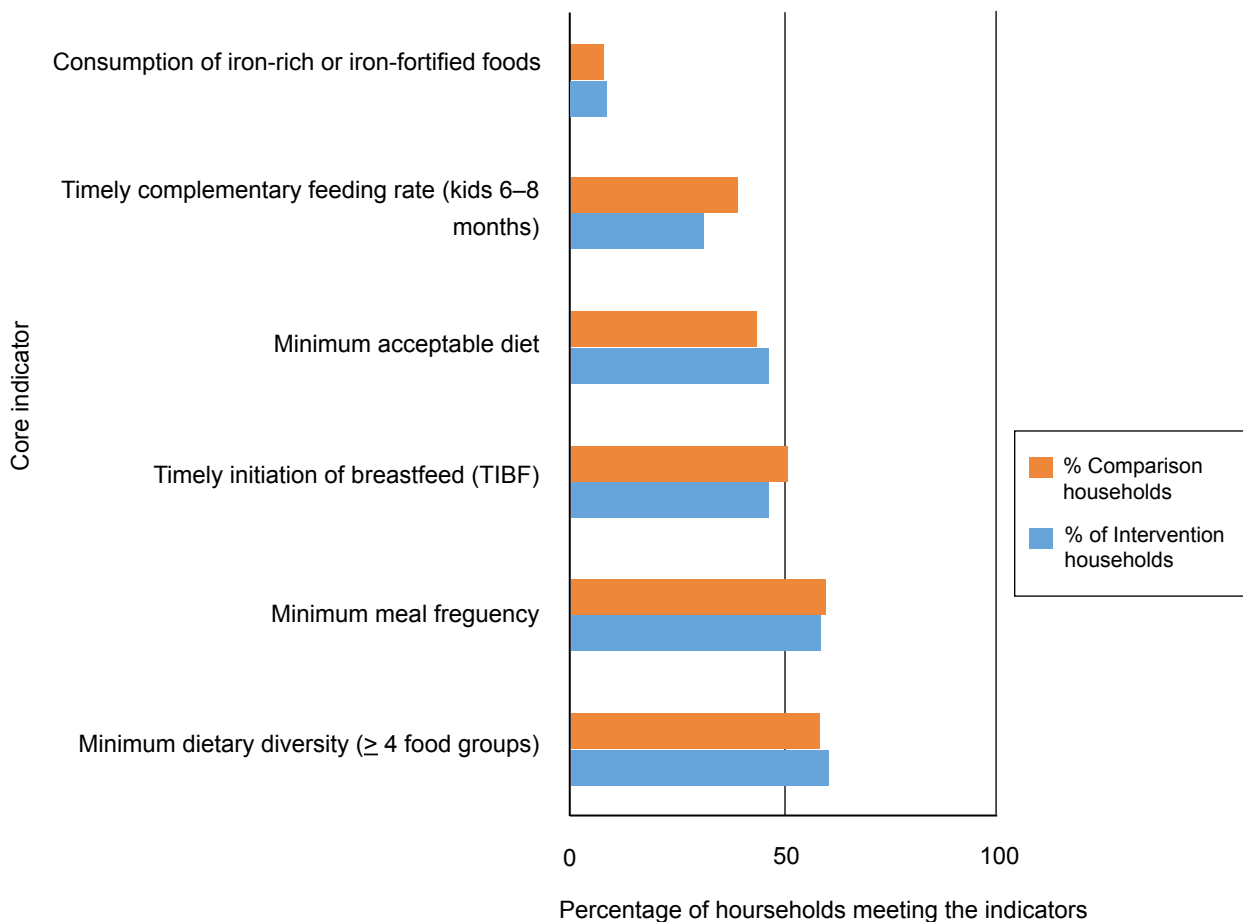
The finding that a higher percentage of children who were born in health facilities had better nutritional status than their counterparts born at home suggests that healthcare workers might have provided nutritional education to the mothers.

**Table 5. Two-variable analysis of predictors of better nutritional status among children aged 6–36 months in northern Ghana.**

Characteristics	Number of women interviewed	Children with worse nutritional status (%)	Children with better nutritional status (%)
<b>Region of residence</b>			
Northern	465	41.1	58.9
Upper East	239	22.3	77.7
Upper West	464	22.4	77.6
<b>Age of child (months)</b>			
6-8	131	16.9	83.1
9-11	148	24.6	75.4
12-23	491	37.1	62.9
24-36	398	33.5	66.5
<b>Gender of child</b>			
Male	580	35.4	64.6
Female	588	29.0	71.0
<b>Mother's educational level</b>			
None	827	34.5	65.5
Low	312	26.8	73.2
High	29	20.6	79.4
<b>Mother's age (years)</b>			
Under 18	13	53.3	46.7
18-35	970	32.9	67.1
35+	204	25.8	74.2
<b>Child currently breastfeeding?</b>			
Yes	894	34.0	66.0
No	268	26.1	73.9
<b>Child had diarrhea in the past two weeks?</b>			
Yes	392	38.0	64.3
No	776	28.6	71.4
<b>Place of delivery</b>			
Home	520	35.7	64.3
Health facility	621	28.2	71.8

Note: 95% confidence level (CI); P-values for all the relationships were found to be less than 0.05, meaning statistical significance.

Complementary feeding indicators were also assessed as predictors of nutritional adequacy. None of the complementary feeding indicators recommended by the WHO (minimum meal frequency, minimum dietary diversity, and minimum acceptable diet) were associated with any of the child growth indicators among children aged 6-23 months (Fig. 4).



**Figure 4. Core infant, child feeding indicators for intervention and comparison households in northern Ghana.**

Note: The p-value for each indicator was greater than 0.05, meaning none of the indicators were statistically significant.

Other factors such as current breastfeeding, eating roots and tubers, not having had diarrhea in the previous two weeks, and place of birth were significantly associated with having better nutritional status.

However, in real life, relationships exist among more than two factors. Thus, instead of examining only two-way relationships such as that between maternal age and better nutritional status or between current breastfeeding and better nutritional status — as shown in Table 3—researchers also examined the multiple factors that influence having better nutritional status. One way of performing this task is called multivariable logistic regression.

Multivariable logistic regression analyses showed that factors contributing significantly to better nutritional status included being a female child, a resident in the Upper West Region, a younger child, and a non-breastfeeding child (Table 6).

**Table 6. Multivariable predictors of better nutritional status among children aged 6-36 months in northern Ghana.**

Characteristics	Odds of a child having better nutritional status	Explanation
<b>Region of residence</b> <b>(Reference: Northern Region)</b>		
Upper West	2.50	Compared with the Northern Region, children in the Upper West Region were 2.5 times more likely to have a better nutritional status.
Upper East	2.60	Compared with the Northern Region, children in the Upper East Region were 2.6 times more likely to have a better nutritional status.
<b>Age of child in months</b> <b>(Reference: 24-36 months)</b>		
6-8	13.66	Younger children aged 6-8 months were 13.7 times more likely to have a better nutritional status than children aged 24-36 months.
9-11	3.90	Children aged 9-11 months were 3.9 times more likely to have a better nutritional status than children aged 24-36 months.
12-23	2.20	Children aged 12-23 months were 13.7 times more likely to have a better nutritional status than children aged 24-36 months.
<b>Gender of child</b> <b>(Reference: Male)</b>		
Female	1.88	Female children were significantly 1.9 times more likely to have better nutrition status than males.
<b>Breastfeeding</b> <b>(reference: Child breastfeeding)</b>		
Not breastfeeding	2.80	Children who were not breastfeeding were almost 3 times more likely to have a better nutritional status than breastfeeding children.
<b>Diarrhea (Reference: Child had diarrhea two weeks before survey)</b>		
Child had no diarrhea	1.93	Children who had had no diarrhea were 1.9 times more likely to have a better nutritional status than children who had had diarrhea in the last two weeks before the study.

Note: This table is based on the 688 children (57.7%) who were classified as those from households with a low socio-economic status.



It is likely that breastfeeding during early life is protective and that stunting becomes more likely as the child becomes more dependent on foods that are of poor quality.

Undernutrition and childhood illnesses are related. The two conditions act in such a way that illness can suppress appetite leading to child undernutrition while, on the other hand, nutritional deficiencies increase the likelihood of the child getting infectious diseases (Yadav, 2007). Generally, improving dietary intake to recommended levels together with the elimination of diarrhea and fever-related illnesses at the same time would be necessary to achieve ideal child growth.

Of all the predictors of better nutritional status, the age of the child contributed most to the variation of better nutritional status. This finding is consistent with other studies (Sah, 2004; Apkota and Gurung, 2009). A possible explanation is that children in the



Photo 1. Breastfeeding. Photo credit: UNICEF.

youngest age group, 6-8 months, have a significantly lower risk of stunting than children in the older age groups. It is likely that breastfeeding during early life is protective and that stunting becomes more likely as the child becomes more dependent on foods that are of poor quality. Exposure to non-food factors, including infections, could also play a role.



Children aged 6-8 months were almost 14 times more likely to have a better nutritional status than children aged 24-36 months. Breastfeeding in younger children and poor diets in older children might have played a role in this finding.

As shown (Table 6), a child’s age did influence better nutritional status. Children aged 6-8 months were almost 14 times more likely to have a better nutritional status than those aged 24-36 months. Breastfeeding in younger children and poor diets in older children might have played a role in this finding.

### Household food production and access

The primary source for obtaining food for 92.5% of households was their own production (e.g., farming). Only 0.3% of the households did not grow any kind of crops, meaning that the households were agriculture-based. Most households (98.0%) reported cultivating grains and roots and tubers but less than 5.0% in both intervention and comparison communities reported growing orange or yellow fruits and vegetables. The cultivation of leafy green vegetables was reported in 30.0% of households (Fig. 5).

Although over 80.0% of both the intervention and comparison households indicated that they kept chickens, ducks, or other

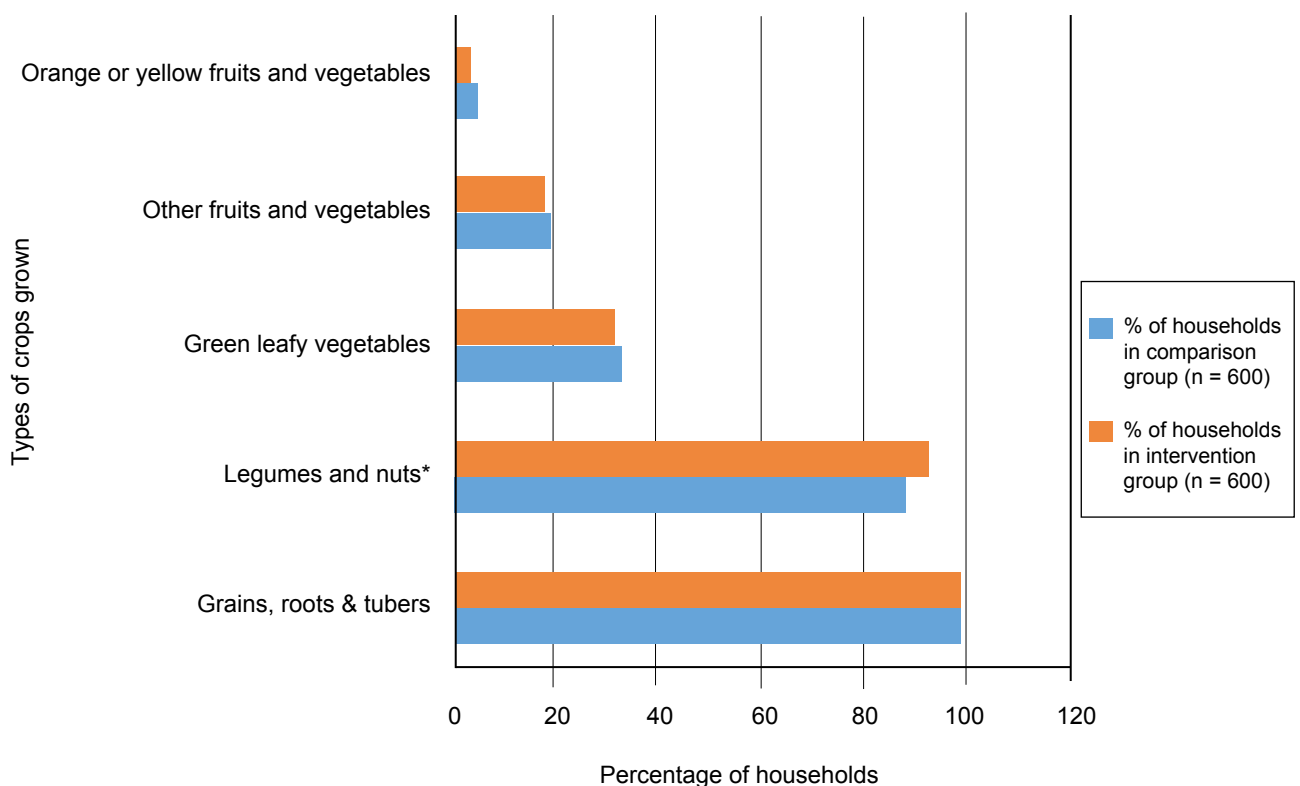


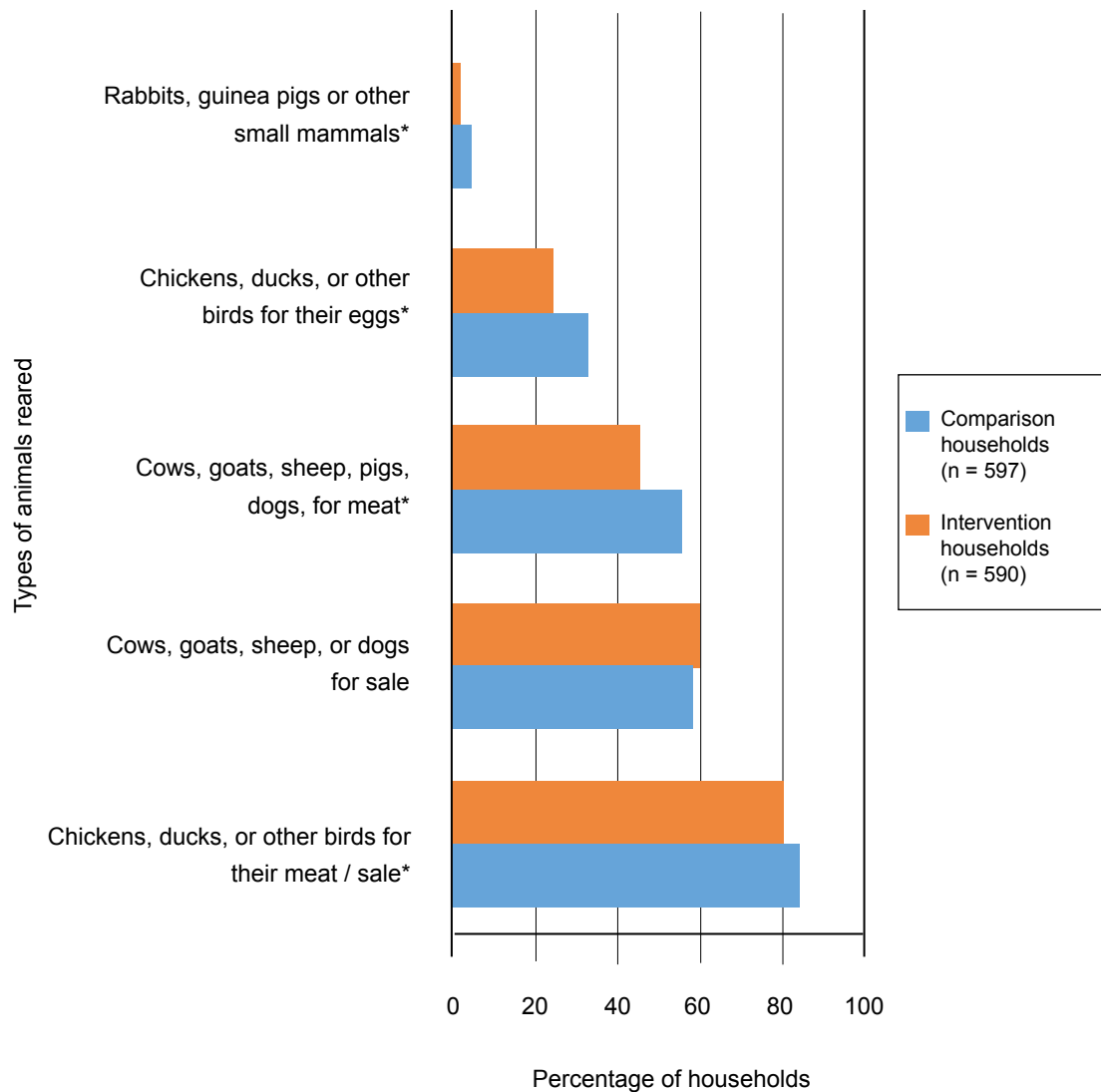
Figure 5. Percentage of households growing different types of crops in northern Ghana.

\*P-value less than 0.05, meaning statistical significance.

birds for meat or for sale, only 23.0% in the comparison communities and 33.0% in the intervention communities said they kept these birds for their eggs (Fig. 6).

In both the intervention and comparison communities, nearly the same proportion of households kept cows, goats, sheep, or dogs for sale. However, 56.4% in the intervention households and 45.8% in the comparison households reported they kept these animals for the sake of meat.

Keeping rabbits, guinea pigs, or other small mammals was practiced by less than 5.0% of households. Fish farming was rarely practiced in the study population.



**Figure 6. Type of animals and percentage of households that reared them in northern Ghana.**

\* P-value less than 0.05, meaning statistical significance.

### Food consumption or use

As shown in Figure 7, respondents indicated that most children were fed with cereal-based foods in the 24 hours before the study. Only 14.3% of children were fed with vitamin A-rich fruits and vegetables; this suggests they were not getting the required essential nutrients.

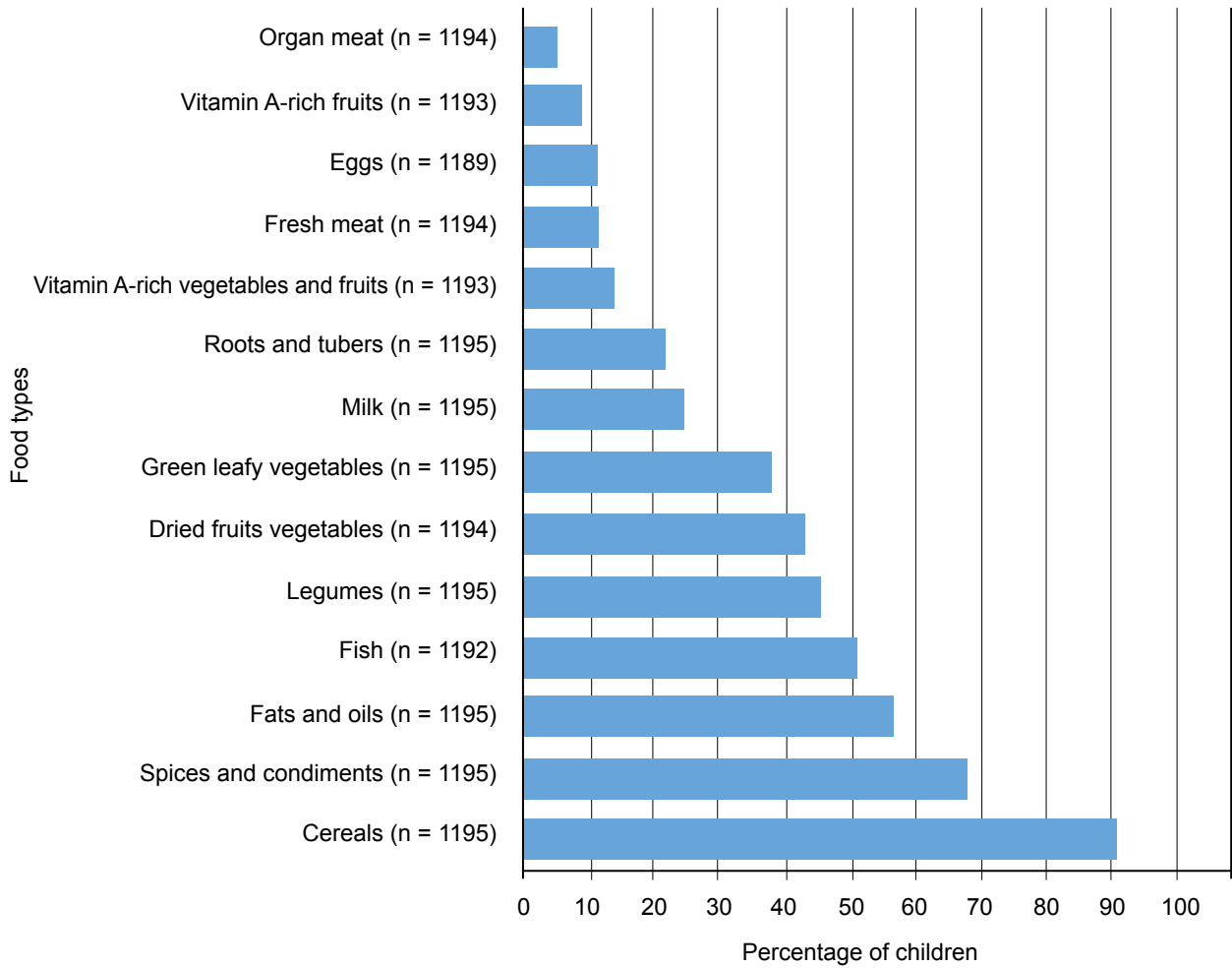


Figure 7. Food types and percentages of children fed with them in the previous 24 hours in northern Ghana.



## Predictors of minimum dietary diversity

When all the variables were analyzed through a statistical method called multivariable logistic regression, researchers found strong evidence for all the relationships between meeting minimal dietary diversity and variables such as age of the child and the mother, socio-economic status of households, region where a child lived, and households that kept chicken, ducks, or other birds (Table 7).

**Table 7. Multivariable predictors of achieving minimal dietary diversity in children aged 6–23 months in northern Ghana.**

Characteristics	Odds ratio of meeting minimal dietary diversity	Explanation
Region of residence (Reference: Northern Region)		
Upper West	1.72	Children resident in the Upper West Region were 1.7 times more likely to be fed a more diversified diet than children in the Northern Region.
Upper East	2.64	Children resident in the Upper East Region were 2.6 times more likely to be fed a diversified diet than children in the Northern Region.
Mother's age in years (Reference: Under 18 years)		
18-35	3.26	Children of mothers 18-35 years old were about 3 times more likely to be fed a diversified diet compared with children whose mothers were younger (under 18 years).
+35	5.07	Children of older mothers (>35 years) were 5.1 times more likely to be fed a diversified diet compared with children whose mothers were younger (under 18 years).
Age of child in months (Reference: 6-8 months)		
9-11	4.88	Younger children aged 9-11 months were 4.9 times more likely to be fed a diversified diet compared with children aged 6-8 months.
12-23	13.93	Children aged 12-23 months were 13.9 times more likely to be fed a diversified diet compared with children aged 6-8 months.
Household keep chickens, ducks, or other birds for the meat/sale (Reference: Household does not keep these birds)	2.09	Children from households that kept chickens, ducks, or other birds for the meat or sale were 2.1 times more likely to be fed a diversified diet compared with children from households that did not keep such birds.

Note: A child that met minimal dietary diversity was one who ate at least four or more varieties of foods from the seven food groups in the past 24 hours.



Children from households of higher socio-economic status were 1.07 times more likely to have been provided with the recommended dietary diversity compared with children from households with a lower socio-economic status. This suggests that the socio-economic status may not be an important factor in meeting minimal dietary diversity.

The results of the multivariable regression analyses (Tables 6 and 7) show that although children aged 6-8 months were less likely to meet the minimum dietary diversity they were more likely to have a better nutritional status. The more diversified the children's diet, the wider the variety of nutrients they receive which enhance their health and nutrition. The number of different food groups eaten, therefore, better reflects a quality diet. Children who eat, for example, an average of four different food groups are said to have a diet that offers some diversity in both macronutrients (proteins and carbohydrates) and essential nutrients such as vitamins.

Children from households of higher socio-economic status were 1.07 times more likely to have been provided with the recommended dietary diversity than children from households with lower socio-economic status (not shown in the table); the finding suggests this factor may not be important for meeting minimal dietary diversity.

However, all these variables helped to explain only 29.0% of the difference in meeting minimum dietary diversity. Therefore, it is possible that other variables or factors may help to explain the reason behind some households meeting or not meeting the targets of minimal dietary diversity.

### **Household decision-making and care of the child**

Making decisions about what food to buy could prove useful in eventually determining what to eat. In addition, in the absence of the mother, other people in the households may be responsible for the child's upkeep.

The current study did not find strong evidence in the difference between the intervention and comparison households in terms of who makes decisions about what food to buy or when to take a child to a health facility and who cares for the child in the absence of the mother (Table 8). However, it was found that the husband, partner, or another man in the house plays a key role in making decisions about buying food and taking a sick child to a health facility.

In addition, when a mother is not at home, aunts or siblings take care of the child. Thus, interventions for mothers or caregivers could target these key audiences too.

**Table 8. Household decision-making and care of the child in northern Ghana**

Characteristic*	Number of respondents	Study Arm	
		Comparison households number (%)*	Intervention Households number (%)*
Who usually makes decisions about buying food or taking child for health services?			
Mother/caregiver	256	138 (53.9)	118 (46.1)
Husband/partner or another man in the household	595	276 (46.4)	319 (53.6)
Mother/caregiver and father together	253	129 (51.0)	124 (49.0)
Elder person in household/ family	80	47 (58.8)	33 (41.3)
Mother/caregiver together with an elder person	8	5 (62.5)	3 (37.5)
Other person	5	3 (60.0)	2 (40.0)
Does not know	1	0 (0.0)	1 (100.0)
Total	1198	598 (49.9)	600 (50.1)
Care of a child when mother is not at home			
Sibling	215	100 (46.5)	115 (53.5)
Auntie	76	33 (43.4)	43 (56.6)
Uncle	7	2 (28.6)	5 (71.4)
Grandmother	601	295 (49.1)	306 (50.9)
Grandfather	171	91 (53.2)	80 (46.8)
Not applicable	69	31 (44.9)	38 (55.1)
Other	58	47 (81.0)	11 (19.0)
Total	1197	599 (50.0)	598 (50.0)

\*All the variables have p-values greater than 0.05, meaning no statistical significance.

# Conclusions and recommendations

## Conclusions

Young children aged below 2 years in northern Ghana are at risk of not meeting the WHO recommended infant feeding standards, given that less than 50.0% of them were on a minimum acceptable diet.

The findings showed that feeding practices for children aged 6-23 months were unlikely to meet the recommended standards and those aged 6-8 months were the most vulnerable.

None of the complementary feeding indicators recommended by the WHO were associated with child growth indicators among children aged 6-23 months, perhaps because there was little variation in the indicators in the study population.

The findings of the study described in this booklet have implications for promoting nutrition-health linkages for key stakeholders such as policymakers, health and nutrition experts, agricultural extension officers, and media professionals.

## Recommendations for policymakers

Policymakers should do as follows:

- Target children at risk of having inadequate complementary feeding with nutrition policies and interventions.
- Increase efforts at encouraging the girl child to reach a higher level of education as the mother's education could help provide better nutrition for her children.
- Provide a sufficiently nutrient-rich diet (through enriched complementary foods and community-based food fortification) for children aged 6-23 months to reduce cases of chronic malnutrition.
- Improve the economic status of households, such as giving support to households in keeping chickens, ducks, or other birds for the meat or sale to help them to have a minimum diversified diet.
- Provide a sustainable and focused intervention strategy to improve maternal nutrition.

## Recommendations for health and nutrition experts

Health and nutrition experts should do as follows:

- Strengthen focused health and nutrition education and behavioral change communication at all health facilities and outreach points within communities with an emphasis on hygienic practices for caregivers.
- Educate mothers and caregivers on the appropriate timing for complementary feeding, dietary diversity, and the management of common childhood illnesses, particularly diarrhea.
- Promote the use of a nutrient-rich diet for children aged 6-23 months to help reduce rates of chronic malnutrition.
- Use the findings of this baseline survey to improve infant and child feeding practices through household trials and communication strategies for behavioral change, including trials of improved practices and focused educational campaigns at interpersonal and community levels.
- Use sustainable intervention strategies to improve maternal nutrition.
- Encourage pregnant women to deliver their babies in health facilities where they are likely to receive better nutritional advice.
- Target children born at home and deliver culturally-appropriate information to their mothers and caregivers.
- Encourage mothers to pass on knowledge on nutrition and health to those who look after their children — such as aunts and siblings — when the mothers are not available.

## **Recommendations for agricultural extension workers**

Agricultural extension workers must educate farmers to do as follows:

- Rear cows, goats, sheep, and pigs for their meat.
- Keep chickens, ducks, or other birds for meat and sale.
- Grow biofortified crops such as maize and cassava to help provide essential nutrients, including vitamin A.
- Grow vegetables and fruits rich in vitamin A and other essential nutrients.

## **Recommendations for media professionals**

Media professionals should do the following:

- Use the findings of this study to reach out to key stakeholders such as policymakers, health and nutrition experts, farmers, mothers, and caregivers.
- Provide opportunities for nutrition and health experts to educate members of the public on malnutrition in northern Ghana.
- Read this booklet to understand key aspects of surveys on nutrition to enable them to report stories that accurately capture the key messages here.

# References

Apkota, V.P. and C K. Gurung. 2009. Prevalence and predictors of underweight, stunting and wasting in under-five children. *Journal of Nepal Health Research Council* 7(15): 120-126.

Das Gupta, M., M. Lokshin, M. Gragnolati, and O. Ivaschenko. 2005. Improving child nutrition outcomes in India: Can the integrated child development services program be more effective? Policy Research Working Paper 3647, World Bank, Washington DC, USA.

FAO. 2011. Guidelines for measuring household and individual dietary diversity. Food and Agriculture Organization of the United Nations, Rome, Italy.

UNICEF. 2011. Multiple Indicator Cluster Survey (MICS). UNICEF, Accra, Ghana.

Saaka, M. and S. Maturo. 2013. Integrating agricultural and nutritional Interventions for improved nutritional status of rural families in northern Ghana: Baseline survey report. International Institute of Tropical Agriculture, Ibadan. Nigeria.

Sah, N. 2004. Determinants of child malnutrition in Nepal: A case analysis from Dhanusha, Central Terai of Nepal. *Journal of Nepal Health Research Council* 2(2): 50-55.

WHO, UNICEF, USAID, FANTA, AED, UC DAVIS, and IFPRI. 2010. Indicators for assessing infant and young child feeding practices Part 2: Measurement. WHO, Geneva, Switzerland.

WHO. 2006. Neonatal and perinatal mortality: Country, regional and global estimates. WHO, Geneva, Switzerland.

WHO. 2007. Indicators for assessing infant and young child feeding practices. Part 1 Definitions. WHO, Department of Child and Adolescent Health and Development, Washington DC, USA.

von Braun, J., M.T. Ruel, and S. Gillespie. 2011. Bridging the gap between the agriculture and health sectors. In 2020 Conference Brief 14 on leveraging agriculture for improving nutrition and health, edited by, International Food Policy Research Institute, Washington DC, USA. pp.

# Glossary

**Biofortified crop:** This is a crop that has been produced through science and has higher levels of essential nutrients. For example, if maize is produced to have higher levels of vitamin A, it is called vitamin-A biofortified maize.

**Chronic malnutrition:** This is inadequate nutrition that occurs over a long time. It is often a slow process and may result in inability to reach a desired height (stunting).

**Food fortification:** This is the practice of adding essential nutrients such as iron and vitamins to food crops to make them provide good nutrition.

**Food security:** The state of having a reliable and sufficient quantity of cheap and nutritious food.

**Global acute malnutrition:** This occurs as a result of recent rapid weight loss, poor nutrition, or inability to gain weight within a short time. It is also called wasting.

**Macronutrients:** These are nutrients that the body requires in larger amounts. Examples include protein, carbohydrates, and fats.

**Malnutrition:** This describes the lack of proper nutrition and usually resulting from not having enough to eat, not eating enough of the right kinds of food, or the body being unable to use the food that is eaten because of diseases.

**Micronutrients:** These are nutrients that the body requires in smaller amounts. Examples include vitamins and minerals.

**Obese:** A condition that results in the body having excess fat, making the person considered excessively overweight.

**Overnutrition:** Overnutrition occurs when more than the necessary amounts are eaten of food substances such as proteins or vitamins that a person needs to remain healthy.

**Overweight:** Children are said to be overweight if they weigh more than the normal amount considering their age and height.

**Stunting:** When children fail to grow to reach a desired height despite their age, this is called stunting.

**Undernutrition:** This results from an inadequate food intake or poor use of nutrients by the body because of repeated infectious diseases.

**Underweight:** Children are said to be underweight if they weigh less than the normal amount considering their age and height.

**Wasting:** Wasting occurs when children become thin. It is usually because of a lack of important nutrients such as fat, carbohydrate, protein, vitamins, and minerals in a diet.



**FEED THE FUTURE**  
The U.S. Government's Global Hunger & Food Security Initiative



**USAID**  
FROM THE AMERICAN PEOPLE