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## LASER PULSE

Long-term Assistance and Services for Research (LASER)  
Partners for University-Led Solutions Engine (PULSE)

# POVERTY AND MALNUTRITION IN THE DEMOCRATIC REPUBLIC OF THE CONGO: SECONDARY DATA ANALYSIS FINDINGS FROM THE PROVINCES OF TANGANYIKA, KASAI, AND KASAI CENTRAL

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## **ABOUT LASER PULSE**

LASER (Long-term Assistance and Services for Research) PULSE (Partners for University-Led Solutions Engine) is a \$70M program funded through USAID’s Innovation, Technology, and Research Hub, that delivers research-driven solutions to field-sourced development challenges in USAID partner countries.

A consortium led by Purdue University, with core partners Catholic Relief Services, Indiana University, Makerere University, and the University of Notre Dame, implements the LASER PULSE program through a growing network of 3,000+ researchers and development practitioners in 74 countries.

LASER PULSE collaborates with USAID missions, bureaus, and independent offices, and other local stakeholders to identify research needs for critical development challenges, and funds and strengthens the capacity of researcher-practitioner teams to co-design solutions that translate into policy and practice.

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## Executive Summary

### Context and Purpose

The Democratic Republic of the Congo (DRC) is one of the poorest countries in the world. It ranks 179 out of 191 according to the 2022 United Nations (UN) Human Development Index (HDI). Poverty and malnutrition remain important development concerns within the country. The DRC's poverty and food security status vary across the country's provinces, with some provinces being more vulnerable than others. In order to tackle poverty and food security in a fragile country like the DRC, policymakers and development partners need to understand the extent of the problems as well as the factors that explain them. This assessment uses the United Nations International Children's Emergency Fund's (UNICEF) Multiple Indicator Cluster Survey, Round 6 (MICS6) dataset collected in 2017-18 by UNICEF and the DRC National Statistics Institute (Institut National de la Statistique in French) to analyze the profile of poor households and malnourished children in three provinces of the DRC - Tanganyika, Kasai, and Kasai Central. The assessment addresses the following questions:

- i. What are the characteristics of households and children with high levels of poverty and acute and chronic malnutrition in the targeted provinces?
- ii. How do the characteristics of households and children with high levels of poverty and acute and chronic malnutrition vary across each targeted province?
- iii. How do the characteristics of households with high levels of poverty and children with high levels of acute & chronic malnutrition for each of the targeted provinces compare to households which do not experience poverty and child malnutrition?
- vi. What characteristics are significantly associated with high levels of poverty and acute and chronic malnutrition in each province?

### Methodology

To address these questions, the study used the most recent MICS6 survey dataset for the DRC, which consists of data collected in 2017-18. The dataset is representative of the population at the national level and at the provincial level. A sufficiently large sample size of households (20,792) and children (21,456) nationally permitted statistical analyses in the three targeted provinces.<sup>1</sup> An in-depth literature review informed the selection of potential variables correlated with poverty and malnutrition in the targeted provinces. The analyses defined a household as poor if it fell in the bottom 20 percent of the national household wealth index distribution. Since this definition mostly reflects extreme poverty, affecting only the most vulnerable population, the analyses were repeated using a second, less restrictive definition of poverty. In this alternate framework, a household was defined as poor if it fell in the bottom 40 percent of the national household wealth index distribution. The analyses began with a series of descriptive statistics comparing the distribution of potential correlates of poverty and malnutrition in the subpopulation of (a) poor households and non-poor households and (b) malnourished and non-malnourished children. This was followed by an econometric analysis to assess the economic and statistical significance of the potential correlates in explaining the likelihood of being a poor household or a malnourished child.

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<sup>1</sup> Table 1 reports the sample size for each targeted province.

## Main Findings

### Poverty

Relative to national estimates, the prevalence of poverty (defined as being in the bottom 20 percent of wealth distribution<sup>2</sup>) in the three targeted provinces is high: 29 percent in Tanganyika, 54 percent in Kasai, and 50 percent in Kasai Central, compared to 23 percent nationally. The descriptive and econometric analyses showed that observable characteristics significantly distinguish poor from non-poor households.

In Tanganyika, having completed at least primary school, having access to electricity, and owning cattle, goats and sheep, some chickens, some house furniture, a bicycle, and a mobile phone, are associated with a low probability of being poor. Living in a house built with precarious roof and wall materials (e.g., weed roofs, mud walls, sandy floors), cooking indoors in one's house, drinking water from unsafe sources (e.g., uncovered wells, rainwater, river water), and practicing open defecation are indications of a high probability of being poor.

Compared to non-poor households, the typical poor household in Kasai is more likely to be headed by a female, live in a house with precarious roofing materials (e.g., weed roofs), use wood products as cooking fuel, and practice open defecation without access to a hand-washing system. Poor households in Kasai are also less likely than non-poor households to use petroleum to light their dwelling place despite the lack of access to electricity. They are also less likely than non-poor households to own livestock and most primary non-agricultural assets, including bicycles, radios, or mobile phones.

Similar to the other two provinces, poor households in Kasai Central are more likely than non-poor households to live in a house with precarious roof materials. They are also more likely to use petroleum for lighting compared to non-poor households and are less likely to own small ruminants (goats and sheep), poultry, and non-agricultural assets compared to non-poor households. However, a unique feature of Kasai Central is that, contrary to expectations, cattle ownership is associated with a higher probability of being poor, while having a bed net is associated with a lower probability of being poor.

The analyses indicated that some characteristics are common among poor households in all three targeted provinces (e.g., living in rural areas, use of precarious roof materials, the head of household having no education level), while other characteristics are unique to poor households in specific provinces (e.g. cattle ownership in Kasai Central).

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<sup>2</sup> This definition of poverty comes from the scope of work of this project.



## **Malnutrition**

### ***Wasting***

Wasting, defined as low weight for height, reflects acute malnutrition. A child is considered wasted if the weight-for-height, standardized with a reference distribution (z-score), is beyond two.

In Tanganyika, compared to non-wasted children, the typical wasted children are boys under five, who are not the sons of the household head, but who live with their fathers within the household (e.g., nephew or grandson of the head of household). Compared to non-wasted children, these wasted children are also more likely to suffer from respiratory illnesses, still be breastfed, and have been born to young mothers (less than 20 years old at the time of birth) with no education.

In Kasai, compared to non-wasted children, wasted children are more likely to be girls, who are not the first-born children, and who live in households with the fathers present. Compared to non-wasted children, these wasted children also have a lower Body Mass Index (BMI)<sup>3</sup> and are more likely to be born to young mothers with a low education level.

In Kasai Central, compared to non-wasted children, wasted children are more likely to be girls, that are daughters of the household head, whose fathers do not live in the same household, and who have had recent episodes of cough. Compared to non-wasted children, these wasted children also have a lower BMI. When the mothers of the girls are not the household head themselves, but are daughters of the household head, the risk of wasting is lower compared to when the mother of the girl is also the household head.

### ***Stunting***

Stunting, defined as low height-for-age, reflects chronic malnutrition. A child is considered stunted if the height-for-age, standardized with a reference distribution (z-score), is beyond two.

In Tanganyika, compared to non-stunted children, stunted children are more likely to be boys, who are not the sons of the household head, and who do not live in the same households with their fathers. Compared to non-stunted children, the typical stunted children in Tanganyika have also had a recent episode of cough or respiratory illnesses and are born to mothers with a low education level. However, when these children live in female-headed households, their risk of stunting is significantly lower than when they live in male-headed households.

In Kasai, compared to non-stunted children the typical stunted children are boys who are first-borns, are still breastfeeding, have a high BMI, and have had a recent episode of cough. Compared to non-stunted children in Kasai, these stunted children are also less likely to sleep under bed nets and more likely to live in poor households.

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<sup>3</sup> The discussion here is not to equate wasting with low BMI but to see whether BMI is an observable characteristic of wasted children.

In Kasai Central, the sex of children does not significantly determine stunting. In this province, stunted children are more likely than non-stunted children to have functional disabilities and to have had recent episodes of diarrhea.

***Role of infant and young children's feeding practices***

Minimum dietary diversity indicators require children to consume a minimum of five food groups out of ten. Across all three targeted provinces, less than 20 percent of the children consumed more than the minimum required number of food groups. In most cases the average number of food groups consumed by malnourished children was higher compared to the average number of food groups consumed by non-malnourished children.

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## Acronyms

<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>BMI</b>	Body Mass Index
<b>DHS</b>	Demographic and Health Survey
<b>DRC</b>	Democratic Republic of the Congo
<b>FAO</b>	Food and Agriculture Organization
<b>HDI</b>	Human Development Index
<b>HH</b>	Household
<b>HHH</b>	Head of Household
<b>HIV</b>	Human Immunodeficiency Virus
<b>LASER-PULSE</b>	Long-term Assistance and Services for Research - Partners for University-Led Solutions Engine
<b>MICS</b>	Multiple Indicator Cluster Survey
<b>SSA</b>	Sub-Saharan Africa
<b>USAID</b>	United States Agency for International Development
<b>UN</b>	United Nations
<b>UNDP</b>	United Nations Development Program
<b>UNICEF</b>	United Nations International Children's Emergency Fund

# 1. Background, Research Questions, and Objectives

## 1.1. Background

The Democratic Republic of the Congo (DRC) is one of the poorest countries in the world. It ranks 179 out of 191 countries on the 2022 United Nations Human Development Index (HDI) with a gross national income per capita of \$1,076 purchasing power parity. A Congolese child has a life expectancy of only 59 years at birth (UNDP, 2022). Food insecurity continues to be a major development issue for the DRC. Congolese households struggle to ensure sufficient year-round access to affordable and quality diets, despite the country's enormous agricultural potential and its large endowment of natural and mineral resources. While the DRC is making some notable progress, with its ranking on the HDI improving slowly (up from being the lowest ranked out of 187 countries in 2011, to a rank of 179 out of 191 countries at present), poverty and hunger remain (UNDP, 2022). Conflict and instability continue to slow down the inclusion of many DRC provinces in national development programs and threaten the economic resilience of millions of households. Consequently, the DRC consistently appears on the list of the world's most fragile and conflict-affected states.<sup>4</sup>

To tackle poverty and food insecurity in a fragile country like the DRC, policymakers and development partners need to understand the extent of the problems and the factors that drive them. Understanding the profile of poor households and drivers of food insecurity and child malnutrition are essential to inform policies and development efforts aimed at improving household resilience and, consequently, their poverty and food security situation. This report analyzes the profile of poor households and malnourished children in three provinces in the DRC. To do so, the assessment uses the Multiple Indicator Cluster Survey, Round 6 (MICS6) survey dataset collected by the United Nations International Children's Emergency Fund (UNICEF) and Institut National de la Statistique (INS) of the DRC (UNICEF, 20218; INS, 2018). This is a large-scale survey conducted in 2017-18 in the DRC that is representative of the population at the national and provincial levels as well as at the urban-rural level within each province.

Similar to most low and middle-income countries, the DRC's economic development and food security situations display significant differences across provinces. First, there is a sizable urban-rural gap, with income per capita in urban households being three times larger than the income per capita of rural households (World Bank, 2018). There are also substantial differences across provinces. While some provinces with large urban centers are more developed with better access to essential infrastructure and services, many rural provinces have enormous development challenges and are more fragile. Hence, localized development approaches need to target the most vulnerable provinces. This assessment focuses on three provinces, Kasai, Kasai Central and Tanganyika, (hereafter referred to as the targeted provinces) that are among the poorest and most food-insecure provinces of the DRC and belong to the USAID Resilience Focus Zone .

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<sup>4</sup> <https://thedocs.worldbank.org/en/doc/9b8fbd62f7183cef819729cc9073671-0090082022/original/FCSList-FY06toFY22.pdf>

## 1.2. Research Questions and Objectives

Poverty and food security, key development objectives shared by the DRC's national government and development partners, are complex problems with a myriad of direct and underlying factors that span many sectors. Using the MICS6 dataset, the analyses conducted for this report estimate the prevalence of poverty and malnutrition in the targeted provinces and examine the characteristics of households and children vulnerable to poverty and food insecurity. The key research questions are:

- i. What are the characteristics of households and children with high levels of poverty and acute and chronic malnutrition in the targeted provinces?
- ii. How do the characteristics of households and individuals with high levels of poverty and acute and chronic malnutrition vary geographically across each of the targeted provinces?
- iii. How do the characteristics of households and individuals with high levels of poverty, food insecurity, poor diet or access to food, and high levels of acute and chronic malnutrition compare to households and individuals that are not poor or malnourished?
- iv. Using statistical inference modeling, what characteristics are significantly associated with high levels of poverty, poor diet or food insecurity, and acute and chronic malnutrition in each targeted province?

The analyses and discussions of the findings are grounded in the literature, including previous reports of poverty and food security commissioned by the USAID Bureau of Humanitarian Actions.

## 1.3. Structure of the Report

The report is structured as follows. Section 2 summarizes relevant literature on poverty and food security, with more extensive annotated reviews available in the annexes. Section 3 presents the methodology, starting with a description of the dataset and key variables, followed by a discussion of the econometric models used. The findings are presented and discussed in Section 4. Section 5 concludes the report.

## 2. Literature Review

This section discusses relevant literature on poverty, malnutrition, and food security. The search for relevant literature was conducted in Google Scholar using the following keywords: "food insecurity," "malnutrition," "poor," "poverty," "stunting," "the Democratic Republic of the Congo," and "wasting." Given the paucity of literature on the DRC and the targeted provinces, the search was broadened to include the entire Sub-Saharan Africa (SSA) region as well as other low-income and fragile countries. Priority was given to studies published in the last five years and those that focused on Tanganyika, Kasai, and Kasai Central. Older seminal studies are also cited. Where relevant, studies on the DRC or other developing countries that discuss potential correlates of poverty and malnutrition are cited. The exposition here is intentionally brief, and Tables A13 and A21 in the Annexes provide a complete annotated list of relevant studies consulted.



## 2.1. Review of the Literature on Poverty

There is growing literature on the dynamics of poverty that explores reasons and mechanisms through which households exit or fall back into poverty in low and middle-income countries. The pioneering works by Angus Deaton (1992; 1997) have enabled the economic development field to better understand poverty by providing a quantitative method of counting impoverished individuals and analyzing household poverty. After those pioneering works, the sub-field of poverty measurement and analysis developed in three ways. First, household consumption has emerged as the main proxy when defining poverty in developing countries (Beegle et al., 2012). Second, with growing data availability, the literature has shifted towards analyzing the dynamics of poverty and identifying characteristics and interventions that enable some households to durably escape poverty while others remain persistently trapped or fall back into poverty (Farrow et al., 2005). Third, during the last two decades, there has been a shift toward a multidimensional approach to measuring poverty in recognition of poverty involving not only economic deprivation but also lack of access to social services and security (Shaukat et al., 2020; Benson et al., 2005).

Though the world has made enormous progress in reducing global poverty since the 1990s, some countries, such as the DRC, continue to record significant poverty rates. The successes and failures of poverty reduction provide rich insights into variables that define poor individuals and households. These variables include:

- households' resource endowment and capital (both financial and non-financial assets such as land, livestock, and machineries);
- socio-demographic characteristics of households and their members (including intra-household power dynamics);
- households' economic choice and opportunities including employment and migration; and,
- characteristics of the physical, social, and economic environment in which the households live (including climatic factors, cultural norms, and national and global policies and shocks).

The significance and relative importance of each of these correlates in explaining the likelihood of poverty vary over time and across geographical areas, consequently limiting the ability of researchers to generalize their findings or to make claims about their validity outside of the scope of study. Hence, assessing poverty and the profile of households that are poor is a context-specific exercise that needs to be updated when new and more comprehensive data become available.

Multiple studies have analyzed poverty in the DRC using a wide variety of data and methods. One of the earliest reference documents on poverty in the DRC is the National Strategy for Growth and Poverty Reduction produced by the DRC's government in 2006 with the support of the World Bank. The Strategy conducted a thorough assessment of poverty using household survey data on employment, income, and consumption (INS, 2005)<sup>5</sup>. The document highlights the deteriorating macroeconomic and political situation during the country's development. It also

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<sup>5</sup> See <https://catalog.ihsn.org/index.php/catalog/4076>

finds that physical impairments or death of the household's breadwinner is a key determinant of poverty (defined as consumption below the national poverty line).<sup>6</sup> Loss of livelihood due to physical impairment or death of the head of household has become a widespread phenomenon due to the compounded effect of conflict and health crises. Other factors contributing to poverty include the lack of economic opportunities in rural areas of the DRC, as well as the household head's involvement in -low productivity socio-economic activities which result in low monetary compensation. Using the same dataset and definition of poverty as the above study, but with a focus on the variation of poverty across the DRC's provinces, Moumimi (2010) finds that lack of education is another key factor characterizing poor households.

However, most studies on the DRC either use national data or focus on urban areas. Very few studies provide an in-depth assessment of poverty at the provincial level. In particular, literature on the three targeted provinces of this report is scarce. Therefore, this literature review draws from empirical studies from other provinces of the DRC as well as relevant studies from other developing countries. For example, Mbuyi (2011) analyzed the evolution of poverty in the DRC using time series data on the HDI and its components, and applied the HDI framework to household survey data collected in Kinshasa. He found that the DRC has performed worse than most of its neighbors on all components of the HDI, although local households in the Kinshasa area have recorded progress on education and health indicators. Using a national household survey and logistic regression, Konde (2016) found that the main correlates of non-monetary poverty<sup>7</sup> in urban areas were the household heads' level of education, the household's dwelling characteristics, and demographic variables such as household size. By constructing a wealth index to analyze multidimensional poverty and inequality in the DRC, Bungudi (2022) found that the prevalence of poverty was higher in rural areas and among uneducated individuals.

Outside of the DRC, the literature on the correlates of poverty in SSA and other developing countries is extensive and guides the choice of variables included in the poverty analyses for this report. For example, Achia et al. (2010) used the household wealth index from the Demographic and Health Survey (DHS) and logistic regression to analyze the correlates of poverty in Kenya. The authors found that low human capital, in the form of heads of households' lack of education, was a significant marker of poor households. In addition, the study corroborated findings from other studies (see Farrow et al. 2005 for details). In another study, Adeyemi et al. (2009) pooled data from 48 SSA countries and used income per capita and cross-country regressions<sup>8</sup> to show that poverty was correlated with larger household sizes, higher employment in low productivity sectors, female-headed households, lack of access to safe water and sanitary services, and health issues (most notably HIV/AIDS). Furthermore, they found that the macroeconomic environment, characterized by high inflation and population growth, affected household poverty.

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<sup>6</sup> The poverty line is the minimum level of income deemed adequate in a particular country.

<sup>7</sup> Non-monetary poverty is defined based on non-monetary variables reflecting household well-being beyond money. It uses ownership of assets and access to basic services (health, education, energy, etc.) instead of income or expenditure.

<sup>8</sup> Cross-country regressions are analyses that pool together a dataset on several countries for a single year or across multiple years.

Based on this literature review (see Table A13 in the Annex), potential correlates of household poverty were identified and utilized in the analyses for this report. These correlates can be grouped into six broad categories:

- i. socio-demographic and economic characteristics of households and individuals (including those of the head of households)
- ii. characteristics of household dwelling place
- iii. characteristics of household cooking place and toilet
- iv. household non-agricultural asset holdings
- v. household agricultural asset holdings
- vi. changes in household environmental and climatic conditions, and exposure to policy changes and economic, social and political shocks (such as conflict and migration)

One limitation of the MICS6 dataset is it does not capture household identifiers beyond the province level. Thus, it is not possible to merge the given data with existing data on climate, conflict, and policies. As a result, the analysis in this report focuses on the first five groups of correlates above. Variables belonging to the first five groups are readily available in most household survey datasets and are observable characteristics that lend themselves more easily to designing interventions.

## 2.2. Review of the Literature on Food Insecurity and Child Malnutrition

According to the UN Food and Agriculture Organization (FAO) “*Food security, at the individual, household, national, regional and global levels 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*” (1996). Food insecurity continues to be a global public health problem that manifests itself with more acuity in low and middle-income countries. The situation is exacerbated by climate change and recurring social, political, economic, and health crises that disrupt production systems and trade flows. Eliminating hunger and food insecurity globally is now incorporated in the UN Sustainable Development Goals, and concerted efforts are made at local, national, and international levels to achieve this goal. Food insecurity continues to be the subject of extensive research.

The FAO (1996) developed a framework to analyze the temporal and spatial determinants of food insecurity. The framework identifies four pillars of food security: accessibility, availability, utilization, and stability. This framework has been used to identify the determinants of food insecurity and child malnutrition through factors that influence each of the pillars (Drammeh et al. 2019). Household food insecurity has the most consequential impact on children, particularly those under five. Child malnutrition has been established as a leading cause of child mortality and poor adulthood development outcomes related to education, wage, productivity, and health (Hoddinott et al. 2013; Fink et al. 2016; Nugent et al 2020). UNICEF (1991) has also developed a framework more specifically adapted to the analysis of child malnutrition and ways in which it relates to household, community, national, and global factors.

These two frameworks have generated two strands of literature on child malnutrition and household food insecurity. The first strand focuses on issues related to definitions and indicator measurements for food security and nutrition. Several indicators have been proposed and

successively tested. For child malnutrition, the two most used indicators are wasting and stunting. Wasting is a form of malnutrition that causes a person's body to become progressively weaker and more emaciated. Though wasting can affect older children and adults, especially women of reproductive age, it is most prevalent among children under five. Stunting reflects a situation of chronic malnutrition and/or repeated infections that also occurs primarily among children. Both wasting and stunting are a sign of poor health caused by inadequate nutrient intake. The second strand of literature applies the FAO and UNICEF frameworks, along with theoretical models, to identify potential determinants of malnutrition and food insecurity (see Bain et al., 2013 for a systematic review of the literature). Factors identified as correlates of malnutrition range from the socio-demographic characteristics of children to the characteristics of their parents and the environment in which they live. The following paragraph summarizes studies on the correlates of malnutrition in children from the DRC.

Kandala et al. (2011) used the 2007 DHS dataset and spatial econometric modeling to show that children's stunting was correlated with age, gender, living in a female-headed household, having a mother with little education and ill health, and living in a poor household. Another study conducted by Kismul et al. (2018) used more recent DHS data for the DRC, collected in 2013-14, and logistic regressions to arrive at similar results. More specifically, the authors found that boys were more likely to be stunted than girls. In addition, residence in rural areas, poverty, low education, and poor health of the mother (as proxied by low body mass index [BMI]) were found to be correlated with stunting. In contrast, early breastfeeding and longer birth intervals reduced the risk of stunting in young children. Using primary data from the North and South Kivu provinces of the DRC, Bapolisi et al. (2021) noted that empowering mothers within the household enabled them to allocate scarce household resources more efficiently towards improving children's nutritional status. In turn, this resulted in lower rates of stunting and being underweight. This result was corroborated by Imai et al. (2014) in India, Essilfie et al. (2020) in Ghana, and Melesse (2021) in Ethiopia, indicating that maternal characteristics are important determinants of child malnutrition and overall household food security.

From this literature review (see Table A21 in the Annex B2), a list of potential correlates of child malnutrition were identified. These correlates were grouped into five broad categories:

- i. children's socio-demographic characteristics
- ii. children's health and nutrition behaviors (including feeding practices and diet)
- iii. mothers and fathers' characteristics (including health status and behavior)
- iv. household characteristics (including household socio-economic status)
- v. changes in household environmental and climatic conditions and exposure to policy changes and other shocks (including social and political shocks such as conflict and migration)

As in the case of the poverty analysis discussed in the previous section, due to limitations of the MICS6 dataset, the fifth category of correlates also cannot be captured in the child malnutrition analysis. Instead, the focus in this analysis remains on variables available in the datasets that are observable characteristics and that lend themselves more easily to designing interventions.

### 3. Methodology

#### 3.1. Data Source and Data Processing Strategy

##### 3.1.1. Data Source and Sampling Strategy

The primary source of data used for this analysis is UNICEF’s MICS6 survey dataset for the DRC. The survey was conducted by the INS of the DRC and UNICEF between 2017 and 2018 using structured questionnaires administered to households, women aged 15-49, men aged 15-49, and children aged 0-59 months along with their mothers.

The survey was designed by UNICEF to be representative of provinces and types of residence (rural/urban) in the DRC. Details of the sampling strategy can be found in the survey report available on UNICEF’s website (UNICEF, 2018). The sampling strategy used was a three-stage stratification process producing 76 strata. Within each stratum, enumeration areas - the lowest geographic units corresponding to a village in rural areas and to a neighborhood in cities - were randomly selected and within each enumeration area 30 households were randomly selected. Information was then collected on women, men, and children from selected households based on the relevant inclusion criteria (age ranges listed in the preceding paragraph). Although the initial sample size was 21,630 households, almost a thousand households had to be excluded from the survey. This was due to either security concerns in selected enumeration areas or the need to disregard enumeration areas with less than 30 households. In the end, the total sample consisted of 20,792 surveyed households. The table below summarizes the sample size of households and children in the three targeted provinces as well as the total sample size.

**Table 1: Sample size**

Geography	Number of surveyed households	Number of surveyed children
Tanganyika	656	723
Kasai	840	933
Kasai Central	839	886
DRC National	20,792	21,456

##### 3.1.2. Data Processing, Cleaning, and Transformation

Data available from UNICEF’s website has already undergone a certain degree of cleaning and quality control. Additionally, files were processed and further data cleaning was performed as necessary for the purposes of this analysis<sup>9</sup>. The occasional missing data and outliers in quantitative variables were dealt with. A distinction was made between missing data from ‘skipped questions,’ where entries were legitimately missing, and missing data from some information not being recorded. For missing data not due to skipped questions, the following rule-of-thumb, which reflects common practices for handling missing entries in survey data, was adopted: i) observations with missing data were discarded if they represented less than 5 percent of the sample in each of the targeted provinces; and ii) missing values were imputed with median

<sup>9</sup> UNICEF MICS survey datasets are publicly available and can be downloaded free of charge at <https://mics.unicef.org/surveys>. The Stata dofiles developed are also published and may be used to replicate the analyses in this report.



observations at the lowest geographic unit, starting from the enumeration area to the stratum to the type of residence, and the province, for which there existed at least ten valid observations. Extreme values in continuous variables were dealt with by replacing them with the top and bottom one percentile of the distribution of the variable within each targeted province (a process known technically as winsorization).

## **3.2. Definitions of Key Variables**

Two types of variables were used in the analysis: (i) outcome variables measuring poverty, malnutrition, and other aspects of household and child nutrition, and (ii) potential correlates used in the assessment of the profile of poor households and malnourished children. This section provides details on the definitions of these variables.

### **3.2.1. Defining and Measuring Poverty**

The MICS6 dataset does not capture income or consumption information. Instead, the survey includes a wealth index that was constructed using household ownership of productive assets (e.g., livestock, agricultural tools) and non-productive assets (e.g., house, cash). This report uses the available wealth index to categorize households as poor or non-poor. This choice is consistent with the recent development literature that emphasizes the multidimensional nature of poverty and with previous poverty and food insecurity assessments commissioned by USAID in other geographies using similar datasets.

A household is defined as poor if it falls in the bottom 20 percent of the national household wealth index distribution. Since this definition mostly reflects extreme poverty, affecting only the most vulnerable population, the analyses are repeated using a second, and less restrictive definition of poverty. In this definition, a household is defined as poor if it falls in the bottom 40 percent of the national household wealth index distribution. The 40 percent threshold adheres to practices by the World Bank in their measurement of shared prosperity. In addition, it is statistically convenient to ensure a larger sample size within the sub-population of poor households in each targeted province.

### **3.2.2. Defining and Measuring Child Malnutrition**

Malnutrition may take the form of acute or chronic malnutrition. The two most common measures of malnutrition are wasting, for acute malnutrition, and stunting, for chronic malnutrition. Wasting is assessed by measuring children's weight given their height. A child is considered wasted if their weight-for-height, standardized with a reference distribution (z-score), is beyond two. Stunting manifests as low height-for-age, and a child suffers from stunting if the height-for-age is below two standard deviations of the reference distribution. The literature also considers being underweight, or having low weight given age (measured as weight-for-age) falling below two standard deviations of the reference distribution, as an important measure of chronic malnutrition. Being underweight can reflect wasting or stunting, or both. A child that suffers from any of these three forms of malnutrition is considered to be undernourished. Child

malnutrition can also take the form of deficiencies in specific micronutrients - minerals and vitamins - that can cause diseases such as measles, diarrhea, pneumonia, and physical and mental impairments. However, the MICS6 dataset already captures such deficiencies, and given that these deficiencies also result in wasting and stunting, they have been excluded from the analysis. This report focuses primarily on wasting and stunting.

### 3.2.3. Definition of Potential Correlates

Table 2 below summarizes all variables considered as potential correlates of household poverty and child malnutrition in the various analyses. The table provides a brief description of the variable and indicates the analysis in which it was used.

**Table 2: Definition of variables used in the analysis**

Potential correlate	Description	Used for poverty	Used for wasting and stunting
HH is rural	Takes the value 1 if the household resides in a rural area	Yes	Yes
HHH is female	Takes the value 1 if the household head is a female	Yes	Yes
HH size	Number of individuals in the household	Yes	Yes
Number children under 5	Number of children under five years old in the household	Yes	Yes
Number children aged 5-17	Number of children between 5 and 17 years old in the household	Yes	No
Head of HH age	Age of the head of the household	Yes	Yes
Head of HH education	Level of education completed by the head of HH: no school, primary, secondary, tertiary	Yes	Yes
Has electricity	Takes the value 1 if the household has access to electricity	Yes	No
Has internet	Takes the value 1 if the household has access to internet	Yes	No
House ownership	Takes the value 1 if the household owns the house	Yes	No
Number of rooms	Number of rooms in the house	Yes	No
Floor material: Sand	Type of floor materials: sand, cement, others	Yes	No
Roof material: Metal	Type of roof materials: metal, leaves, weeds, others	Yes	No
Wall material: Brick	Type of wall materials: cement bricks, mud, others	Yes	No
Use petroleum lamp	Takes the value 1 if the household uses a petroleum lamp for lighting	Yes	No
Cooking place	Household kitchen or cooking place: in-house, separate house, outdoor	Yes	No
Cooking fuel	Type of fuel used for cooking: charcoal, woods, others	Yes	No
Drinking water source	Type of source of drinking water: safe, unsafe	Yes	Yes
Type of toilet: Modern	Type of toilet: modern traditional, open defecation	Yes	Yes
Water to wash hand	Takes the value 1 if the household has a hand-washing system	Yes	Yes
Has bed net	Takes the value 1 if the household has a bed net for sleeping	Yes	Yes
Owens an agricultural land	Takes the value 1 if the household owns an agricultural land	Yes	No
Farm size	Number of hectares of land owned; 0 if non-agricultural HH	Yes	No
Livestock ownership cattle	Owens (number of animal): cattle, sheep and goats, pigs, poultry rabbit	Yes	No
Non-agricultural assets	For each asset, takes the value 1 if the household owns it: table or chairs, couch, bed frame or mattress, dresser, bicycle, motorbike or car, boat or canoe, radio, TV, DVD/CD player, mobile phone	Yes	No

Wealth quintile	Household wealth quintile: 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup>	No	Yes
Child gender	Gender of the child: girl, boy	No	Yes
Child's birth rank	Child's birth rank among children born to the same mother	No	Yes
Child's birth interval: 0 year	Child's birth interval: among children born to the same mother	No	Yes
Child age in months	Child age in months	No	Yes
Child is HHH son/daughter	Child is related to the head of household as child	No	Yes
Child lives with parent	Child lives with mother; child lives with father	No	Yes
Child BMI Z-score	Child BMI score	No	Yes
Child has disability	Takes the value 1 if child has a disability	No	Yes
Child is still breastfed	Takes the value 1 if child is still breastfed	No	Yes
Child had diarrhea	Takes the value 1 if child has diarrhea during the preceding 24 hours	No	Yes
Child had fever	Takes the value 1 if child has fever during the preceding 24 hours	No	Yes
Child had cough	Takes the value 1 if child has coughed the preceding 24 hours	No	Yes
Child had resp. illness	Takes the value 1 if child has respiratory illness the preceding 24 hours	No	Yes
Mother is HHH	Takes the value 1 if mother is head of household	No	Yes
Mother is spouse of HHH	Takes the value 1 if mother is the spouse of the head of household	No	Yes
Mother is daughter of HHH	Takes the value 1 if mother is the daughter of the head of households	No	Yes
Mother is daughter-in-law (DiL) of HHH	Takes the value 1 if mother is the daughter in-law of the head HH	No	Yes
Mother current age	Mother's current age	No	Yes
Mother' age at childbirth	Mother' age at childbirth: <20, 20-34, >35	No	Yes
Child (under 2) food intake	Child food intake during the preceding 24 hours: grains, roots, or tubers, pulses, dairy, meat, poultry, or fish, eggs, leafy green vegetables, others vitamin A rich fruits and vegetable, other vegetables, other fruits	No	Yes
Number of food groups eaten	Number of food groups, out of 10, eaten by the child during the preceding 24 hours	No	Yes
Minimum Diet Diversity	Takes the value 1 if the number of food groups (out of 10) eaten by the child during the preceding 24 hours is 5 or greater	No	Yes
Intake of sodium	Drank liquid with sodium during the preceding 24 hours	No	Yes
Intake of water	Drank liquid with water during the preceding 24 hours	No	Yes
Intake of formula	Drank liquid with infant formula during the preceding 24 hours	No	Yes

### 3.3. Descriptive and Econometric Analyses

#### 3.3.1. Descriptive Analysis

The analyses begin with a descriptive analysis to compare the characteristics of households and children with high levels of poverty and malnutrition to the characteristics of households and children with low levels of poverty and malnutrition. The descriptive analysis also compares the incidence of poverty (malnutrition) across households (children) with and without particular characteristics. Differences between poor and non-poor households, as well as malnourished and non-malnourished children, are evaluated using a statistical test (t-test) of the difference in means between the respective groups.

The statistics reported are means/percentages of potential correlates in the sub-population of poor households and the sub-population of non-poor households (or the sub-population of malnourished children and the sub-population of non-malnourished children). As such, the sum of percentages are not expected to add up to 100 percent. For example, the analysis compares the percentage of female-headed households within the sub-population of poor households to the percentage of female-headed households within the sub-population of non-poor households<sup>10</sup>. This assessment provides insights into whether or not female headship of households is a significant correlate to poverty.

#### 3.3.2. Econometric Analysis

The descriptive analysis is followed by an econometric (regression) analysis of the correlates of poverty and child malnutrition. The regression analysis allows estimations of the correlation between each of the variables and household poverty, holding all other factors constant. More formally, the following general model is estimated:

$$Y_{ip} = \alpha + \beta X_{ip} + \varepsilon_{ip}$$

where  $Y_{ip}$  is the outcome variable of choice for individual or household  $i$ , in province  $p$ ;  $X_{ip}$  includes all potential correlates in the model. The term  $\varepsilon_{ip}$ , formally called the error term, captures the combined effect of all variables that could potentially affect poverty or malnutrition but that have been omitted from the analysis. This omission could either be because these variables have not been identified in the relevant literature or because they were unavailable in the data (examples include rainfall shocks, policy shocks, cognitive skills, etc.). The terms  $\alpha$  and  $\beta$  are parameters to be estimated by the model.  $\alpha$  is a constant term and  $\beta$  represents partial correlations between the outcome variables and all other variables included in the model.

In the poverty estimation, the unit of analysis is the household and  $Y_{ip}$  is a binary variable that takes the value of one if the household lies in the bottom 20 percent of the wealth distribution (or in the bottom 40 percent for the less restrictive poverty definition), and zero otherwise.  $X$  refers to all the potential correlates of poverty included in the model. In the

<sup>10</sup> This comparison is different from a comparison of the percentage of poor households among female headed households to the percentage of non-poor households in the same sub-population. For such comparison, the sum of the two percentages should add up to 100 percent.

malnutrition estimation, the unit of analysis is the mother-child combination, and the outcome variable is either child wasting or child stunting.  $X$  includes the potential correlates of child malnutrition. Both models are estimated using an econometric method called the Linear Probability Model. This method has the advantage of producing coefficient estimates that can be directly interpreted as the effect of the variable of interest on the likelihood of being poor (or wasted or stunted), while holding all other variables constant. In some analyses and illustrations, the variables included in the descriptive analysis are grouped together to provide more meaningful insights.



## 4. Results

### 4.1. Household Poverty

#### 4.1.1. Distribution of Wealth Index and Prevalence of Household Poverty

Figure 1 shows the distribution of household wealth index in the three targeted provinces as well as at the national level. In all cases, the distribution is skewed with a long right tail indicating high wealth inequality. Recent evidence has shown that income inequality is a strong barrier to inclusive development (see for example, Stiglitz, Sen & Fitoussi, 2009; Solt, 2019).

Figure 1: Distribution of household wealth index by province

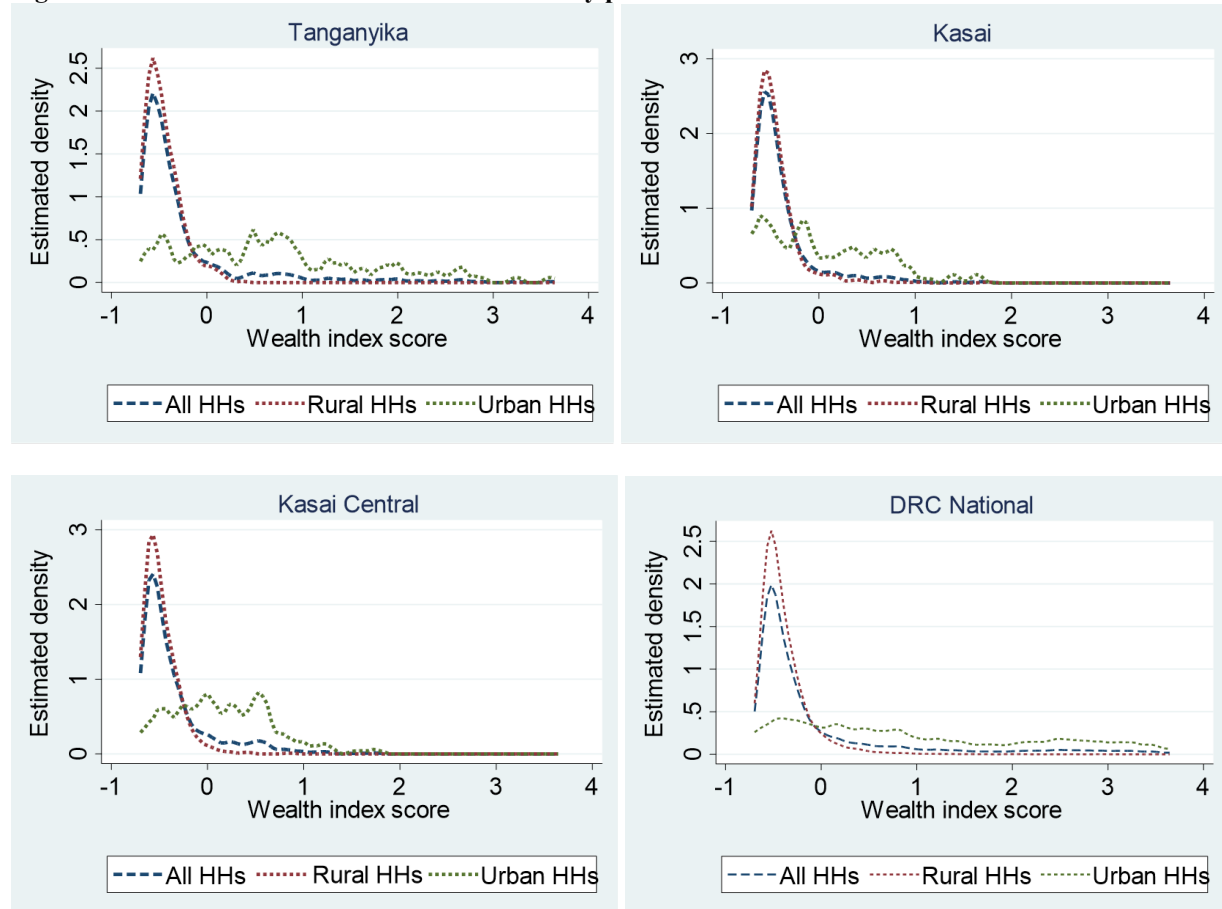


Figure 2 shows the prevalence of poverty for all households as well as the differences in poverty rates between rural and urban households both by province and at the national level. The Figure shows that while 23 percent of households in the DRC are extremely poor, the three targeted provinces are even poorer. The Kasai and Kasai Central provinces are among the poorest provinces in the country, with respective poverty rates estimated at 54 and 50 percent of households respectively.

Figure 2: Prevalence of poverty by province

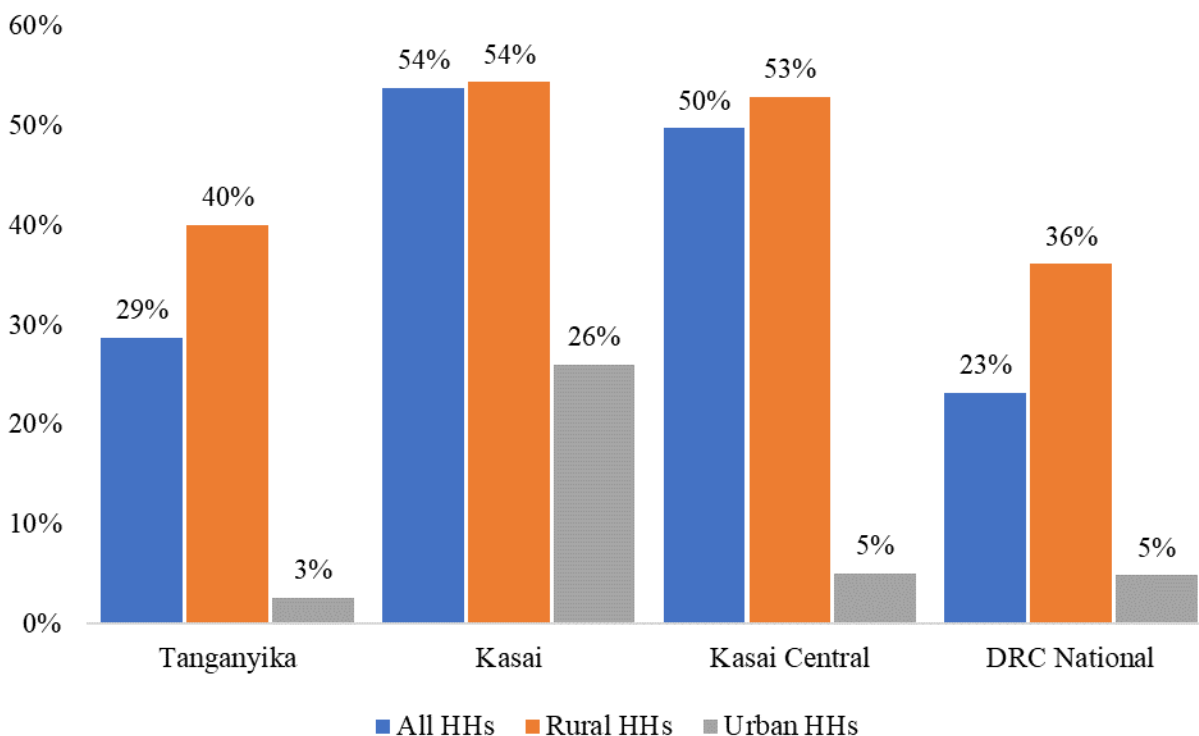


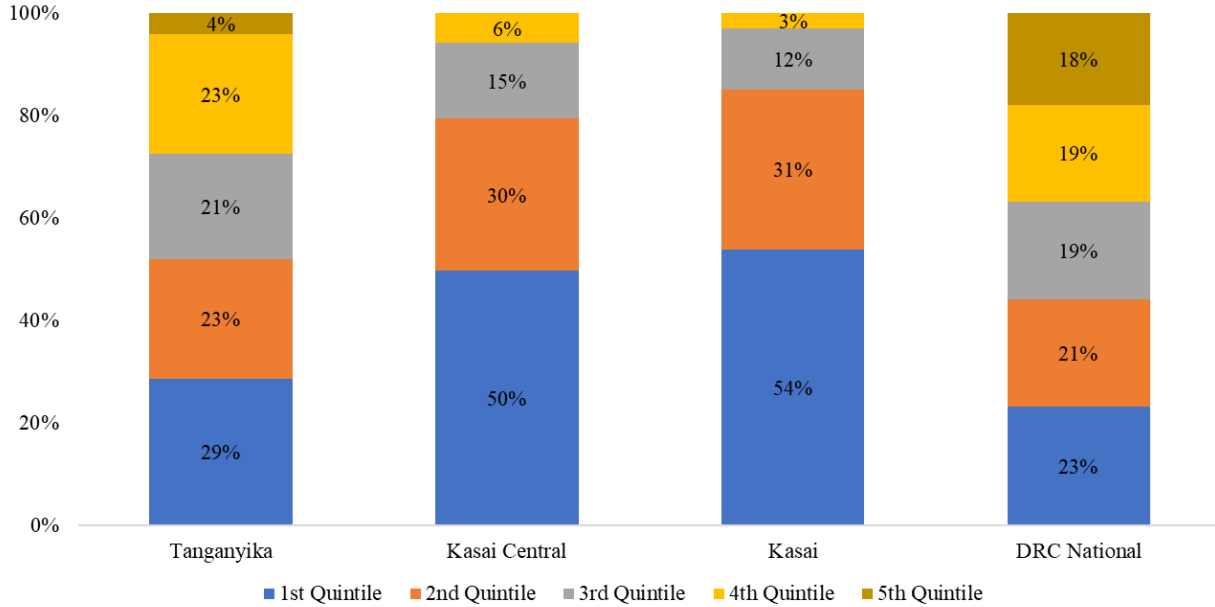
Figure 3 shows the percentage of households by wealth quintile and province and compares them with national averages. No household in the two Kasai provinces falls in the top quintile of the wealth distribution. In contrast, about 29 percent of households in Tanganyika fall in the bottom 20 percent of the national wealth distribution, while 4 percent of households are in the top quintile of the national wealth distribution.

Similar to all developing countries, there are significant rural/urban disparities in poverty levels within the DRC. Figure A1 in Annex A3 shows the difference in the distribution of household wealth quintiles between rural and urban households, by province. The Figure shows that in all three targeted provinces, rural households constitute the majority of households that are poor. For instance, the percentage of households living in extreme poverty in rural areas varies between 40 and 55 percent while that in urban areas varies between 3 and 26 percent. Of the three targeted provinces, Kasai has the largest percentage of urban poor households at 26 percent compared to 3 percent in Tanganyika, 5 percent in Kasai Central, and 5 percent nationally.

As expected, using a less restrictive definition of poverty, based on the bottom 40 percent of the wealth distribution, results in higher poverty rates. In the case of Tanganyika and DRC National, the difference between the percentage of households in the bottom 20 percent of the wealth distribution and the percentage of households in the bottom 40 percent of the distribution is around 20 percent. This difference is represented by the orange portion of each bar in Figure 3. As the Figure shows, this difference is much larger for the two Kasai provinces where the

difference between the percentage of households in the bottom 20 percent of the wealth distribution and the percentage of households in the bottom 40 percent of the distribution is around 30 percent.

**Figure 3: Percentage of households by wealth quintile and province**



### 4.1.2. Comparing Poor and Non-poor Households

The analysis in this section is a primarily descriptive comparison of the distribution of potential correlates of poverty across poor and non-poor households. As noted earlier in the methodology section, the same analyses have been conducted using two definitions of poverty. Results are first discussed using the more restrictive definition that entails falling in the bottom 20 percent of the wealth distribution (results in Tables A1 - A5 in Annex A1). These are followed by a discussion of results when using the less restrictive definition of poverty which entails falling in the bottom 40 percent of the wealth distribution. Results from these analyses can be found in Tables A7 - A11 in Annex A2. All tables report the following three sets of information:

- i. Summary statistics of relevant variables for all households, used to depict the general profile of a typical household in each targeted province.
- ii. Summary statistics of the relevant variables disaggregated by poor and non-poor households in each of the targeted provinces. These statistics are useful to compare the profile of a typical poor household to that of a typical non-poor household. The significance of any difference in the mean value of each variable between poor and non-

poor households is assessed using statistical tests (t-test of the equality of means between the two groups)<sup>11</sup>.

- iii. Summary statistics for the DRC National which enable a comparison of the profiles of poor households in each of the targeted provinces with the profile of poor households nationally.

As discussed in Section 2.1, the narrative below is structured around the following five categories of potential correlates of poverty identified in the literature:

- i. Socio-demographic and economic characteristics of households and individuals (including those of the head of households)
- ii. Characteristics of household dwelling place
- iii. Characteristics of household cooking place and toilet
- iv. Household non-agricultural asset holdings
- v. Household agricultural asset holdings

#### *4.1.2.1 Household Socio-demographic Characteristics and Poverty*

The main correlates of poverty as documented in the literature are socio-demographics and economic characteristics. The DRC is still a predominantly rural country with rural households representing 59 percent of households nationally (Table A1). The three targeted provinces have an even higher share of the rural population than the national average with the percentage of rural households estimated at 98 percent in Kasai, 93 percent in Kasai Central, and 70 percent in Tanganyika. Table A1 also indicates that more than 90 percent of poor households reside in rural areas. Less than 1 percent of poor households in the Kasai provinces reside in urban areas. In all three provinces, the share of households headed by individuals who have no schooling or have only completed primary schooling is higher for poor households. With the exception of Kasai Central, a significantly larger percentage of male-headed households are poorer than female-headed households (according to the statistical test of difference in proportions). Non-poor households appear to have slightly larger household size than poor households, and the difference is statistically significant. While access to electricity is low in the DRC overall, the Kasai provinces are particularly affected by the lack of access to electricity. For example, less than 1.5 percent of households, essentially non-poor households, in Kasai and Kasai Central are connected to the electrical grid compared to 15 percent of households in Tanganyika and 27 percent of households nationally.

The general pattern in the relationship between a household's socio-demographic characteristics and poverty discussed above remains the same when poverty is defined as being in the bottom 40 percent of the wealth distribution. As Table A7 shows, even with the less restrictive definition of poverty, a significantly larger percentage of households living in rural

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<sup>11</sup> As noted in section 3.3.1, the sum of the percentages across the columns for poor households and non-poor households is not expected to add up to 100 percent as each estimate represents the relative importance of the variable in rows in the sub-population defined in the corresponding column.

areas, headed by individuals with no education, and without access to electricity and internet connection are likely to be poor.

#### *4.1.2.2 Characteristics of Household Dwelling and Poverty*

Characteristics of household dwelling places have been extensively used in interventions targeting poverty. The descriptive results in Table A2 indicate that house ownership is common in all three targeted provinces. In Tanganyika, 80 percent of poor households and 68 percent of non-poor households live in their own houses. Though the rate of house ownership is high in Kasai (82 percent for poor households and 78 percent for non-poor households), there is no statistical difference among the rates of house ownership between poor and non-poor households. In Kasai Central, non-poor households are more likely than poor households to own a house (80 percent of non-poor households and 67 percent of poor households own a house). Compared to non-poor households, most poor households in the targeted provinces tend to live in smaller dwelling places (with an average of 1.6-1.8 rooms for poor households and between 2-2.5 rooms for non-poor households) with precarious materials consisting of sandy floors, weed roofs, and mud walls.

Using the less restrictive definition of poverty, the differences in most of the characteristics of dwelling places between poor and non-poor households are less pronounced but remain significant (Table A8). Hence, irrespective of the definition of poverty used, the characteristics of household dwelling places distinguish poor households from non-poor households.

#### *4.1.2.3 Characteristics of the Household Cooking Place, Toilet, and Poverty*

The characteristics of households' cooking place can be used to distinguish between poor and non-poor households. Statistics in Table A3 indicate that compared to non-poor households, poor households are at a greater risk of respiratory illnesses. This is caused by exposure to smoke from cooking with wood and charcoal inside the dwelling. In Tanganyika, the share of households cooking in a separate house that is detached from the dwelling place is larger for non-poor households (18 percent) compared to poor households (13 percent), but the difference between the two groups is not statistically significant. In Kasai and Kasai Central, cooking in a separate house is a significant distinguishing factor of poverty, with households that are poor being less likely to adopt this practice. Nearly all households that are poor in the three targeted provinces and nationally use wood for cooking, but it is only in Tanganyika that the gap between poor and non-poor households using wood as fuel is significant (94 percent vs. 46 percent).

Poor households are also identifiable by the quality of their source of drinking water and by the type of toilet they use. Across all households, drinking water from unsafe sources (such as uncovered wells, collected rainwater, collected river water) is more common than drinking from safe sources (such as tap water, covered wells, community-covered wells, bottled water, or treated water). However, in all three targeted provinces drinking from unsafe sources is more prevalent among poor households. Access to safe drinking water by poor households is worse than the national averages in Kasai and Kasai Central but better than national averages in Tanganyika. Poor households display other unsafe water and sanitation practices. While very few



households have a modern toilet, open defecation is more prevalent among poor households in all three provinces, with the most pronounced gap between poor and non-poor households in Kasai province. Having a hand-washing station near the toilet or using one after defecating is not widespread in the Kasai and Kasai Central provinces. However, ownership of bed nets in the Kasai province, both among poor and non-poor households, is higher than the national average.

Table A9 in Annex A2 indicates that using the less restrictive definition of poverty does not change the findings above regarding the relationship between characteristics of household cooking places, toilets and household poverty. In most cases, the gap between poor households and non-poor households remains large and statistically significant. This confirms that lack of access to safe water and sanitation, and uses of unsafe cooking fuel, are key characteristics of poor households in Tanganyika, Kasai, and Kasai Central.

#### *4.1.2.4 Household Agricultural Asset Holdings and Poverty*

The poverty literature shows that in rural areas, where agriculture is the main source of livelihood, ownership of key agricultural assets is a predictor of the potential to escape poverty. Agricultural assets such as land and livestock are not only used as factors of production but also serve as collateral for credit and fund household microenterprises. In addition, they can be sold for cash during emergencies. Thus, agricultural assets are important determinants of a household's adaptive capacity and consequently, shock resilience.

Over 50 percent of households in each of the three targeted provinces own agricultural land, with farm sizes ranging between 1.2 and 2.3 hectares (Table A4). Hence, farming households in the provinces of Tanganyika, Kasai, and Kasai Central, are small-scale producers. On average, poor households are more likely to own a farm. This reflects the dependence of poor households on agriculture as a source of livelihood. However, across all three provinces, the average farm size is higher for households that are non-poor; yet this difference is statistically significant only in Kasai Central. Ownership of livestock is also prevalent and is an indication of the popularity of mixed crop-livestock farming systems. Very few households (less than 0.4 percent in Tanganyika and Kasai Central, and 1.3 percent in Kasai) own cattle. Livestock production consists of rearing small ruminants and poultry. Like land holding, the number of animals owned by poor households is significantly lower than the number of animals owned by non-poor households. This pattern holds in all three provinces, and nationally, irrespective of the definition of poverty used (as shown in Table A10 which reports results with the less restrictive definition of poverty).

#### *4.1.2.5 Household Non-Agricultural Asset Holdings and Poverty*

Similar to agricultural assets, ownership of non-agricultural assets increases household shock resilience, and is an identifying feature of alleviating poverty. Non-agricultural assets, including mobile phone ownership and use, allow household integration into the rural non-farm economy. In Kasai and Kasai Central provinces, 26 percent of households own a mobile phone. Mobile phone ownership is more common in Tanganyika (39 percent), though slightly lower than the national average of 47 percent (Table A5). However, these numbers mask large disparities between poor and non-poor households. In all three provinces, less than 10 percent of

poor households own a mobile phone while more than 43-58 percent of non-poor households own a mobile phone. A similar disparity between poor and non-poor households is observed in the ownership of most other types of non-farm assets, with the exception of assets whose ownership is not common among the general population (such as boats, canoes, DVD players, and televisions). These findings remain valid with the use of a less restrictive definition of poverty (Table A11).

### 4.1.3. Econometric Analysis of the Correlates of Poverty

This section discusses the results of the econometric analysis of household poverty correlates. The results are summarized in a series of coefficient plots in Figures 4-6, presented as separate figures for ease of readability. Each figure displays the following information:

- In the graphs, each dot represents the point estimates of the coefficient of the variable indicated (on the y-axis).
- The farther away a dot is from the vertical red line, the higher the coefficient estimate. Dots to the left of the vertical line indicate a negative relationship between the variable and poverty while dots to the right of the vertical line indicate a positive relationship between the variable and poverty.
- The horizontal bar traversing each dot represents a 90 percent confidence interval. If the bar crosses the vertical red line, the relationship between the variable and poverty is not statistically significant at a 10 percent level.

The full regression table with coefficient estimates and standard errors is presented in Table A10 in Annex A1.

The regression analysis confirms the importance of several variables related to household demographics, dwelling place, cooking place, toilet, and asset holdings in characterizing poor households in Tanganyika, Kasai, and Kasai Central. As expected, some of the variables are no longer statistically significant in a multiple regression framework when other factors are held constant. For example, household size is no longer a significant correlate of poverty when controlling for all other characteristics. The regression findings can be used to establish the profile of the typical poor household with a description of observable characteristics. Such a profile can inform the targeting of poverty-reducing interventions.

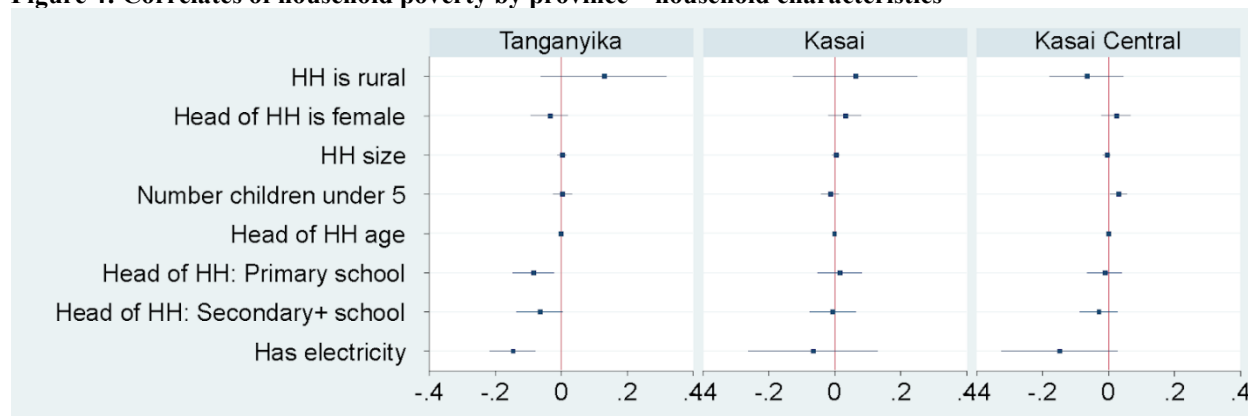
The analysis indicates that in Tanganyika, having completed primary school or a higher level of education, having access to electricity, and owning cattle, goats and sheep, some chickens, some house furniture, a bicycle, and a mobile phone, are associated with a low probability of being poor. However, living in a house built with precarious roof and wall materials, cooking inside one's house, drinking water from unsafe sources, and practicing open defecation are indications of a high probability of being poor.

The typical poor household in Kasai is more likely to be headed by a female, live in a house with precarious roofing materials, use wood products as cooking fuel, and practice open defecation without access to a hand-washing system. Poor households in Kasai are also less likely to use petroleum to light their dwelling place despite a lack of electricity. These

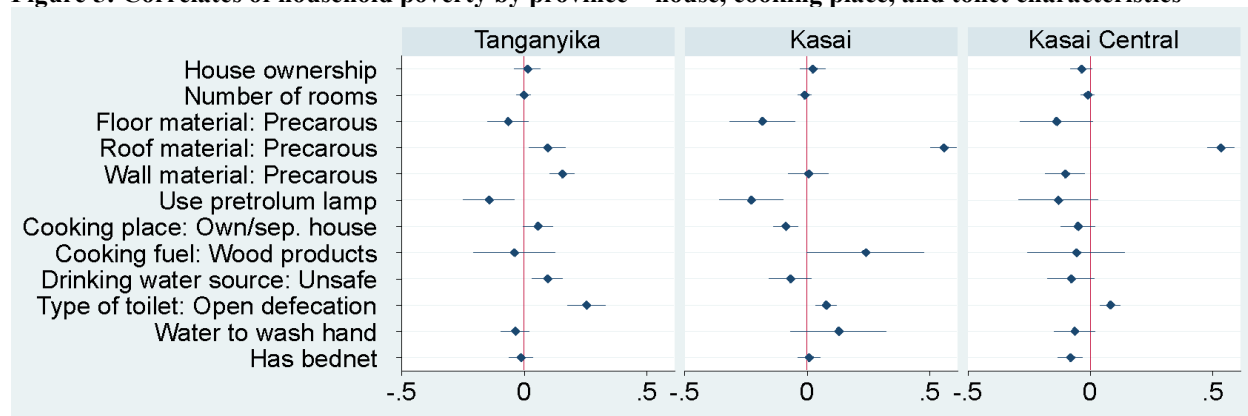
households are also less likely to own livestock and most primary non-agricultural assets, including a bicycle, radio, or mobile phone.

Similar to the other two provinces, poor households in Kasai Central are more likely to live in a house with precarious roof materials, use petroleum for lighting, and are less likely to own small ruminants, poultry, and non-agricultural assets. However, a unique feature of Kasai Central is that ownership of cattle is associated with a higher probability of being poor, while having a bed net is an indicator of not being poor.

**Figure 4: Correlates of household poverty by province – household characteristics**

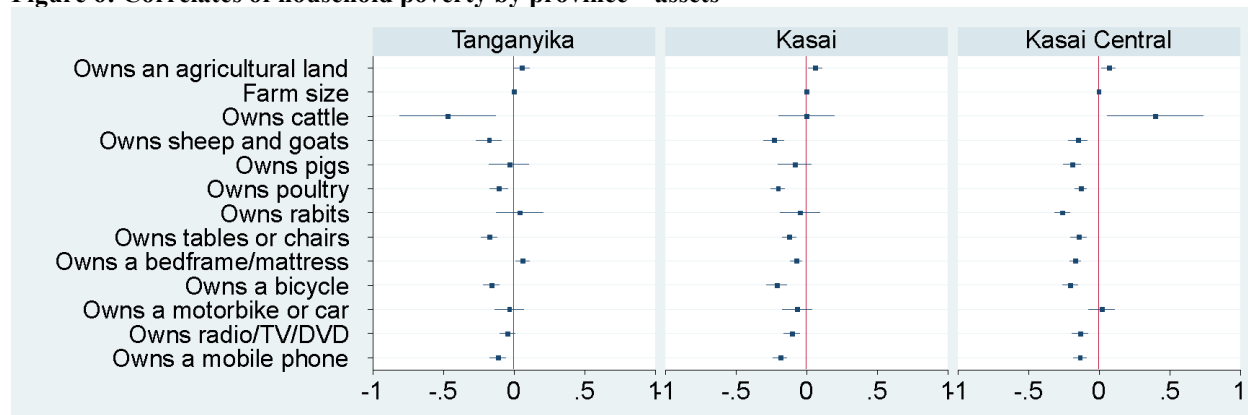


**Figure 5: Correlates of household poverty by province – house, cooking place, and toilet characteristics**



Notes: The coefficients plotted in Figures 4 and 5 are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child stunting (an increase in the variables is associated with a decrease in child stunting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child stunting (an increase in the variables is associated with an increase in child stunting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child stunting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

**Figure 6: Correlates of household poverty by province – assets**



Notes: The coefficients plotted are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with household poverty (an increase in the variables is associated with a decrease in household poverty) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with household poverty (an increase in the variables is associated with an increase in household poverty) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and household poverty is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

The econometric analyses were replicated using the definition of poverty based on the bottom 40 percent threshold. The findings remain largely valid (Table A12). The statistical significance of the coefficient of most variables improves largely due to the increase in sample size of poor households with the less restrictive definition.

## 4.2. Child Malnutrition

### 4.2.1. Distribution of Child Anthropometric Scores and Prevalence of Acute and Chronic Malnutrition

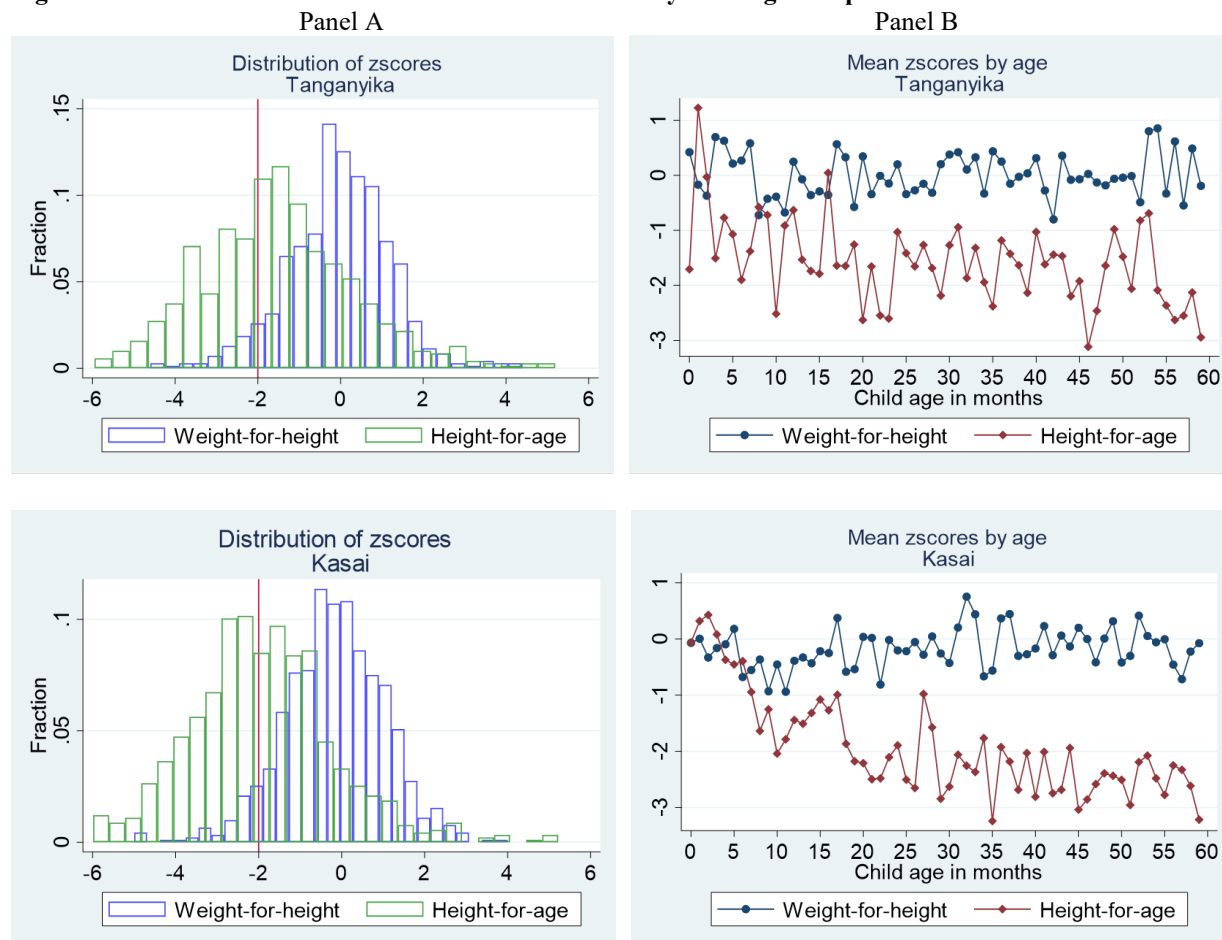
In Figure 7, Panel A below shows the distribution of child malnutrition indicators, namely wasting and stunting, across all three targeted provinces. Wasting is measured using children’s weight-for-height (indicated by blue) while stunting is measured using children’s height-for-age (indicated by green). The vertical red line indicates the reference value of -2. Children with observations to the left of the line are assessed as wasted (in case of weight-for-height) or stunted (in case of height-for-age). The distribution of weight-for-height is close to normal, with most observations falling between -4 and +4, but slightly skewed to the right. This implies that most observations fall to the right of the red line, indicating the low prevalence of wasting in the population.

In contrast, stunting constitutes a far more common malnutrition problem in the DRC and globally in most developing countries. This phenomenon is reflected in Figure 7 whereby the

distribution of height-for-age z-scores is skewed to the left. This implies that more observations fall to the left of the red line, indicating the higher prevalence of stunting compared to wasting in all three targeted provinces.

Panel B of Figure 7 shows that there is no age effect in the experience of wasting, which occurs at the same rate at all ages for children under five. However, unlike wasting, there is a downward correlation between stunting and children's age, whereby children under two are the most likely age group to show signs of stunting, with potentially detrimental consequences for their survival beyond five years.

**Figure 7: Distribution of z-scores of nutrition indicators by child age and province**



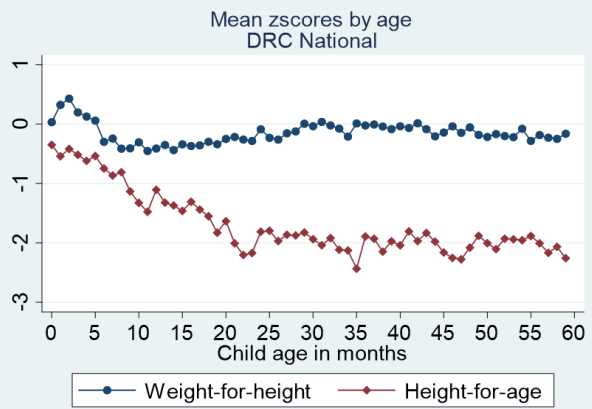
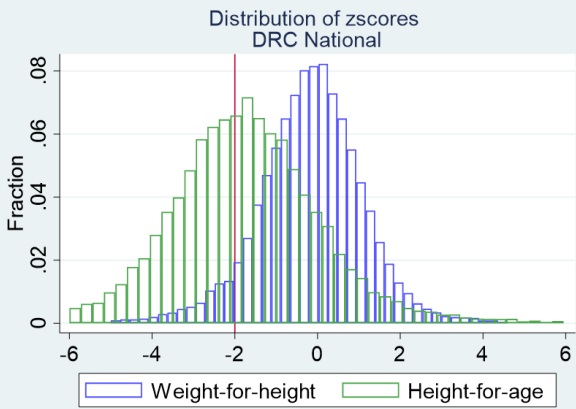
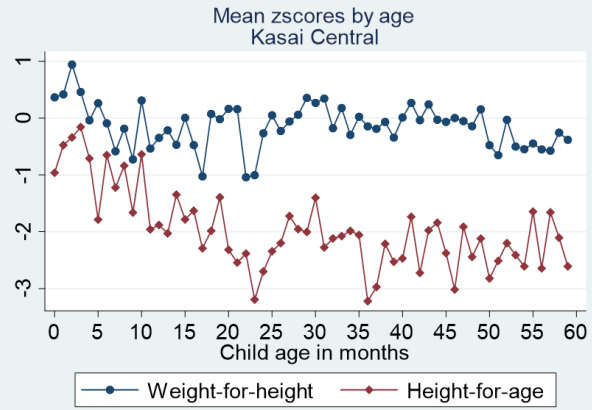
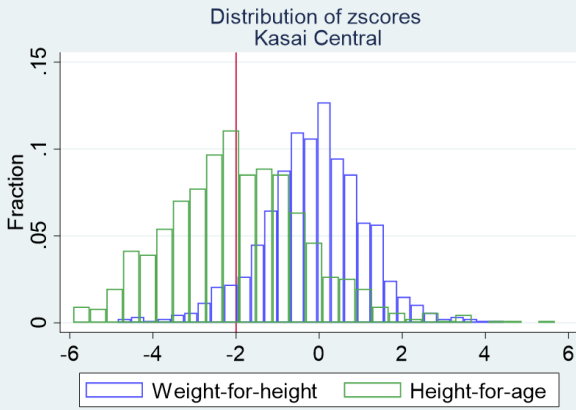




Figure 8 compares the prevalence of wasting among children under five, by rural and urban households, for the three targeted provinces and the national averages. The Figure shows that the prevalence of wasting is four percent in Tanganyika, seven percent in Kasai, six percent in Kasai Central, and six percent nationally. There are significant rural-urban differences in the prevalence of wasting in all cases except for in Kasai, with children in rural areas suffering the most from acute malnutrition.

**Figure 8: Prevalence of wasting among children under five**

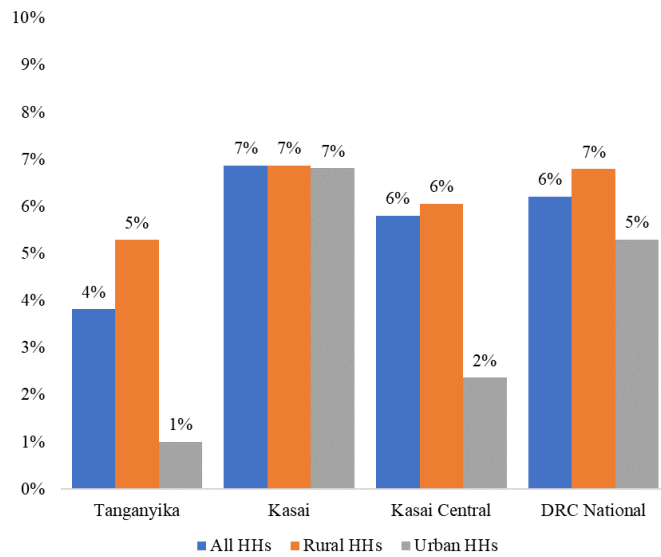
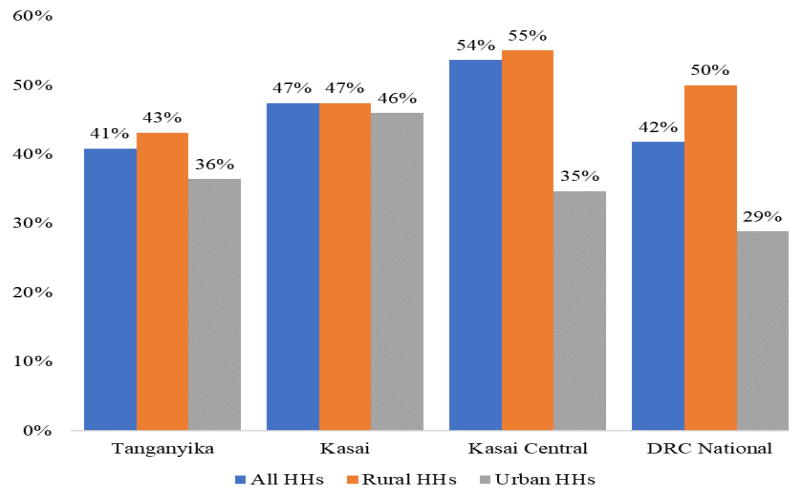


Figure 9 compares the prevalence of stunting among children under five, by rural and urban households, for the three targeted provinces and the national averages. As seen in the Figure, more than 40 percent of children under age five are significantly shorter than they should be at their age across all provinces and at the national level. The stunting rate is the highest in Kasai Central, which is also the poorest of the three targeted provinces. While stunting affects children in both rural and urban areas significantly, as with wasting, the rates are more pronounced in rural areas. For example, 42 percent of the children in rural households in the DRC are stunted compared to 29 percent of children in urban households of the DRC. Given these results, the analysis was extended to further examine ways in which the feeding practices of infants and young children under 24 months, including breastfeeding children, influence their nutritional status.

**Figure 9: Prevalence of stunting among children under five**



## 4.2.2. Comparing Malnourished and Non-malnourished Children

This primarily descriptive section reports findings on the comparison of potential correlates of malnutritions across malnourished and non-malnourished children under five. The results discussion follows a structure similar to the discussion in Section 4.1.2. The discussion in this section refers to Tables A14-A18 in Annex B1. All tables report the following information:

- i. Summary statistics of the selected variables for all children under five. These statistics depict the general profile of a typical child in the targeted provinces.
- ii. Summary statistics of the selected variables, disaggregated by malnourished and non-malnourished children in each targeted province. These statistics are useful to compare the profile of the typical malnourished child to the profile of the typical non-malnourished child. The estimates for wasting and stunting are reported separately. The significance of any difference in means is assessed using statistical tests (t-test of the equality of means between the two groups)<sup>12</sup>.
- iii. The tables also include statistics for the DRC National which enables a comparison of the profile of malnourished households in the targeted provinces with the profile of malnourished households nationally.

As discussed in Section 2.2, the narrative below is structured around the following five categories of potential correlates of malnutrition identified in the literature:

- i. Characteristics of Children
- ii. Children's Health
- iii. Characteristics of Mothers
- iv. Characteristics of Households
- v. Infant and Young Children Feeding Practice of children under two

### 4.2.2.1 Characteristics of Children Under Five and Malnutrition

Physiological differences between children under five due to differences in gender, age, and other characteristics influence their capacity to absorb and process key nutrients. These characteristics constitute potential correlates of malnutrition. Table A14 presents the relationship between children's characteristics and their nutritional status.

The population of children under five in the three targeted provinces and nationally is balanced in terms of the sex of the child. The percentage of girls among children under five is 52 percent in Tanganyika, 51 percent in Kasai, 49 percent in Kasai Central, and 51 percent nationally. Yet, compared to boys, girls represent a smaller percentage of malnourished children in Tanganyika (about 18 percent of wasted children and 44 percent of stunted children are girls). A similar pattern is observed nationally (roughly 45 percent of wasted children and 46 percent of stunted children are girls). In the two Kasai provinces, the difference in the prevalence of

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<sup>12</sup> As noted in section 3.3.1, the sum of the percentages across the columns for wasted (or stunted) children and non-wasted (or non-stunted) children is not expected to add up to 100 percent as each estimate represents the relative importance of the variable in rows in the sub-population defined in the corresponding column.

wasting between girls and boys is not statistically large. However, a higher percentage of boys (54 percent) are stunted compared to girls (46 percent) in Kasai.

Birth order is associated with malnutrition in Tanganyika and nationally, where wasted children (in both cases) and stunted children (only in DRC National) are not the first-born children. A child's birth interval, or the number of years that elapsed between the child's birth and the previous birth given by the mother, also characterizes the likelihood of malnourishment in some cases. However, the relationship is not strong (statistically significant at the national level for wasting and stunting, but non-significant for wasting in Kasai and Kasai Central). The nature of the relationship varies from province to province and by the specific intervals under consideration.

In Tanganyika, the number of children that are wasted and stunted is higher in households where the father is present compared to households where the father is not present. In contrast, in the DRC National, the number of wasted children is higher while the number of stunted children is lower in households where the father is present compared to households where the father is not present.

#### *4.2.2.2 Children's Health and Wasting and Stunting*

Children's health is a key driver of their malnutrition status. As shown in Table A15, a low BMI indicates a higher likelihood of wasting in Kasai, Kasai Central, and DRC National, and a lower likelihood of stunting in Kasai and DRC National. In Tanganyika, the relationship between BMI and malnutrition is not statistically significant. Recent episodes of diarrhea, fever, cough, and respiratory illnesses generally affect a higher percentage of malnourished children under five compared to non-malnourished children. However, the strength of this relationship varies across the provinces. In Tanganyika, 29 percent of stunted children had coughs compared to 19 percent of non-stunted children who experienced any cough in the week preceding the survey. Fourteen percent of wasted children and eight percent of stunted children in Tanganyika had respiratory illnesses compared to only five percent of non-wasted and four percent of non-stunted children with similar illnesses. In Kasai, the prevalence of cough and respiratory illness was much higher among wasted children (61 percent for cough and 25 percent for respiratory illnesses) compared to non-wasted children (40 percent for cough and 12 percent for respiratory illnesses). Compared to non-stunted children in Kasai, fever and cough were higher among stunted children in the province. However, non-wasted children in Kasai Central were more likely than wasted children to report a cough.

Two other characteristics of children's health that are significant characteristics of malnourished children include functional disability and being breastfed. In both Kasai and Kasai Central, the percentage of stunted children with disability is more than double the percentage of non-stunted children with disability (seven percent stunted children compared to three percent stunted children in Kasai; and 15 percent stunted children compared to seven percent stunted children in Kasai Central). No significant association was found between a child's disability and wasting or stunting in Tanganyika. Findings also indicate that compared to non-wasted children under five, a higher percentage of wasted children are still breastfeeding. This does not mean that

breastfeeding leads to wasting. It is rather an indication that young children, still in the breastfeeding age, are more vulnerable to wasting than older children.

#### *4.2.2.3 Characteristics of Mothers and Malnutrition*

As discussed in the literature review, several studies have shown that empowered mothers better allocate resources towards improving their children's nutrition. Hence, mothers' characteristics are potential correlates of wasting and stunting. Table A16 presents the relationship between mothers' characteristics and wasting and stunting.

Female headship of the household is common in the DRC. At the national level, 20 percent of children under five live in households headed by a woman. A similar percentage of children under five live in female-headed households in Tanganyika (18 percent), Kasai (19 percent), and Kasai Central (19 percent). Female headship is strongly associated with having fewer malnourished children within the household in Tanganyika. For example, in households where the mother herself is the household head, only three percent of children are wasted compared to 18 percent of non-wasted children, and only 11 percent of children are stunted compared to 22 percent of non-stunted children. There is no significant difference between the percentage of malnourished and non-malnourished children in Tanganyika when the child's father, or maternal or paternal grandfather is the household head instead of the mother. In the two Kasai provinces, there is no significant association between female headship of household and child malnutrition.

Other significant mothers' characteristics that explain wasting and stunting include the age of the mother at childbirth and her education level. In Tanganyika, and to some extent in Kasai and Kasai Central, children with older mothers are more likely to get better nutrition. In all three provinces, children whose mothers have attained a lower level of education have a greater likelihood of being wasted and stunted compared to children whose mothers have a higher level of education. This result is only weakly reflected in the analysis in Kasai and Kasai Central.

#### *4.2.2.4 Characteristics of Household and Malnutrition*

The next set of factors that affect child nutrition is household characteristics. These characteristics are relevant since children under five, being members of a household, are naturally affected by the socio-economic status of the household. In particular, given the strong poverty-nutrition nexus documented in the literature, most variables correlated with household poverty are potentially also correlated with child malnutrition. Table A17 compares the distribution of relevant household characteristics to a child's nutritional status. At the national level, most household characteristics are significantly correlated with wasting and stunting. At the provincial level, some associations are statistically significant, but many are not.

There are more rural households than urban households in the DRC and in the three targeted provinces. Malnutrition is more common among children living in rural areas of the DRC. Of the children experiencing wasting in the DRC, 67 percent live in rural households; this compares to 61 percent of the country's children not experiencing wasting who also reside in rural areas. Similarly, 73 percent of the stunted children are in rural households in the DRC compared to 53 percent of stunted children who reside in rural areas.. At the provincial level, the

association between living in rural households and child malnutrition is only significant in Tanganyika for wasting and Kasai Central for stunting. Household size and household composition (the number of members of different sex and age groups within the household) are also correlated with child malnutrition. The number of children aged 5-17 that are wasted and stunted is less than the number of children aged 5-17 that are non-wasted and non-stunted in households in Tanganyika. Furthermore, the number of children below five that are stunted is also less than the number of children below five that are non-stunted in households in Tanganyika. On average, households that have non-stunted children are larger in size than households that have stunted children. In the two Kasai provinces, the distributions of household demographics among malnourished and non-malnourished children are statistically similar.

Other household characteristics correlated with wasting and stunting include the quality of drinking water sources, the type of toilets used, and the wealth quintile of the household. In Tanganyika and Kasai non-wasted children are more likely than wasted children to live in households that use traditional safe toilets and that do not use open defecation. At the DRC national level, non-malnourished children are more likely than malnourished children to live in households with modern toilets and in households that do not practice open defecation. In Kasai Central and DRC National, non-stunted children are more likely than stunted children to have a hand washing station accessible after using the toilet. Furthermore, non-wasted children in the DRC are also more likely than wasted children to have a hand washing station accessible after using the toilet. In the Kasai province and the DRC National, households where children sleep under bed nets have a lower prevalence of stunting compared to households where children do not sleep under bed nets. Furthermore, households in the DRC National where children sleep under bed nets also have a lower prevalence of wasting compared to households where children do not sleep under bed nets. In all provinces, belonging to a wealthy household reduces the risk of wasting and stunting for children compared to children in less wealthy households.

#### *4.2.2.5 Feeding Practices of Infants and Young Children and Malnutrition*

Young children, particularly those still breastfeeding, are in a critical stage of early childhood development. As a result, it is essential for them to be provided with a diverse diet to ensure adequate nutrient intake. Table A18 restricts the analysis to children under 23 months and compares their dietary intake, aside from breast milk, with their malnutrition status. Minimum dietary diversity indicators require children to consume at least five food groups out of ten. However, across all three targeted provinces, less than 20 percent of children consume a diversified diet (defined as consuming at least five food groups out of the ten food groups in the indicator<sup>13</sup>).

Given this low prevalence of a diverse diet, eating out of more than five food groups does not distinguish malnourished children from non-malnourished children. Paradoxically, the average number of food groups eaten by stunted children is higher than the average number of food groups eaten by non-stunted children in all three provinces and the DRC National. Furthermore, the number of food groups eaten by wasted children is higher than the number of

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<sup>13</sup> The 10 food groups in the dietary diversity indicator are: 1. Grains, roots, and tubers; 2. Pulses, 3. Nuts and seeds; 4. Dairy; 5. Meat, poultry, and fish; 6. Eggs; 7. Dark leafy greens and vegetables; 8. Other Vitamin A-rich fruits and vegetables; 9. Other vegetables - might also include fruits; 10. Other fruits.



food groups eaten by non-wasted children in the provinces of Tanganyika and Kasai. However, this pattern is reversed in the Kasai Central province where the number of food groups eaten by wasted children is lower than the number of food groups eaten by non-wasted children. The diet of malnourished children in Tanganyika and Kasai Central appears to be heavy on grains, roots, and tubers.

### 4.2.3. Econometric Analysis of the Correlates of Child Malnutrition

This section discusses the results of the econometric analysis of child malnutrition correlates. Figures 10-13 plot the coefficient estimates presented in separate figures for ease of readability. Similar to Section 4.1.3, each figure displays the following information:

- In the graphs, each dot represents the point estimates of the coefficient of the variables indicated (on the y-axis).
- The farther away a dot is from the vertical red line, the higher the coefficient estimate. Dots to the left of the vertical line indicate a negative relationship between the variable and child malnutrition while dots to the right of the vertical line indicate a positive relationship between the variable and child malnutrition.
- The horizontal bar traversing each dot represents a 90 percent confidence interval. If the bar crosses the vertical red line, the relationship between the variable and poverty is not statistically significant at a 10 percent level.

The full regressions with coefficient estimates and standard errors are presented in Table A20 in the annexes. The regression analysis confirmed the importance of some variables related to children's characteristics, children's health, mothers' characteristics, and household characteristics. Several other variables show that significant differences in means between malnourished and non-malnourished children are no longer statistically significant in a multiple regression framework when other factors are held constant. Nevertheless, the regression analyses provided further insights into the profile of malnourished children in the three targeted provinces.

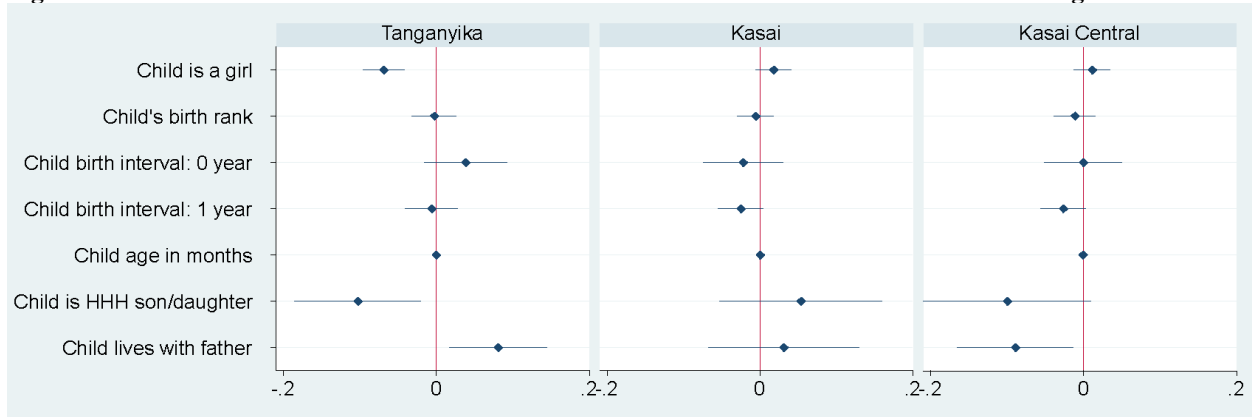
#### 4.2.3.1 Correlates of Child Malnutrition – Wasting and All Children Under Five

Several factors are significantly correlated with wasting, but the direction of the association varies across provinces. In Tanganyika, typical wasted children under five are boys who are not the sons of the household head, but who live with their fathers in the household (e.g., nephew or grandson of the head of household). These children are also more likely to suffer from respiratory illnesses, still be breastfeeding, and have been born to young mothers (less than 20 years old at the time of birth) with no education.

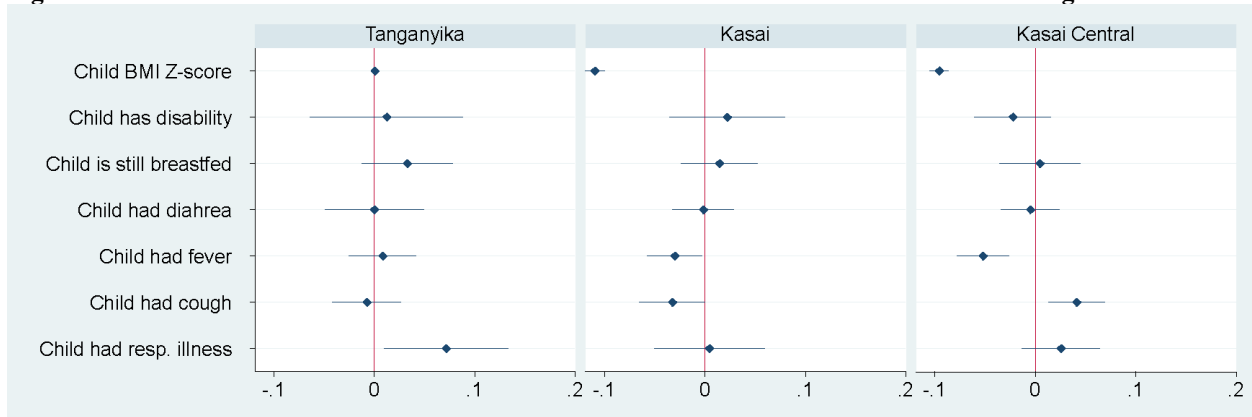
In the Kasai province, wasted children are more likely to be girls, who are not the first-born children, and who live in households with the fathers present. These children also have a low BMI and are born to young mothers with no education.

In Kasai Central, wasting more likely affects girls that are daughters of the household head, whose fathers do not live in the same household, and who have had recent episodes of cough. These children also have a low BMI. When the mothers of the girls are not the household head themselves, but are daughters of the household head, the risk of wasting is lower.

**Figure 10: Correlates of child malnutrition – characteristics of children under five and wasting**

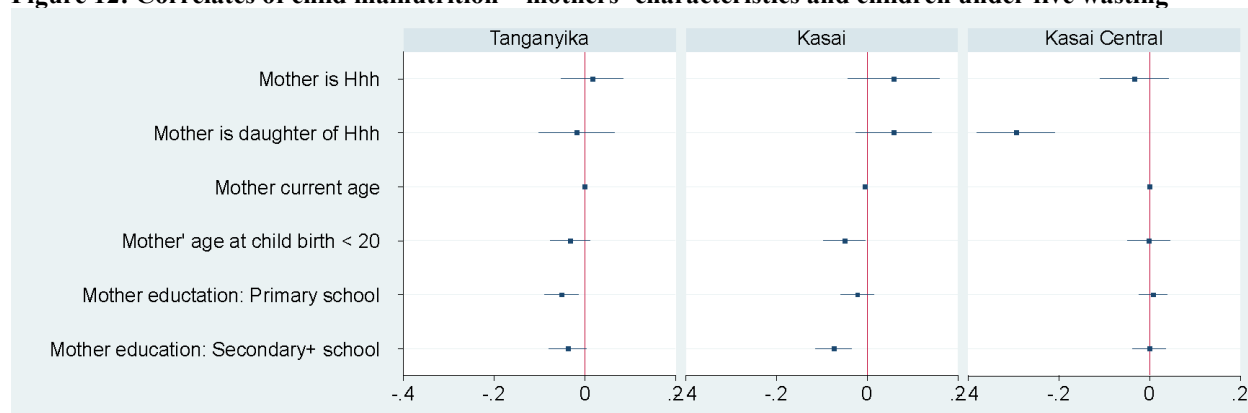


**Figure 11: Correlates of child malnutrition –children’s health and children under five wasting**



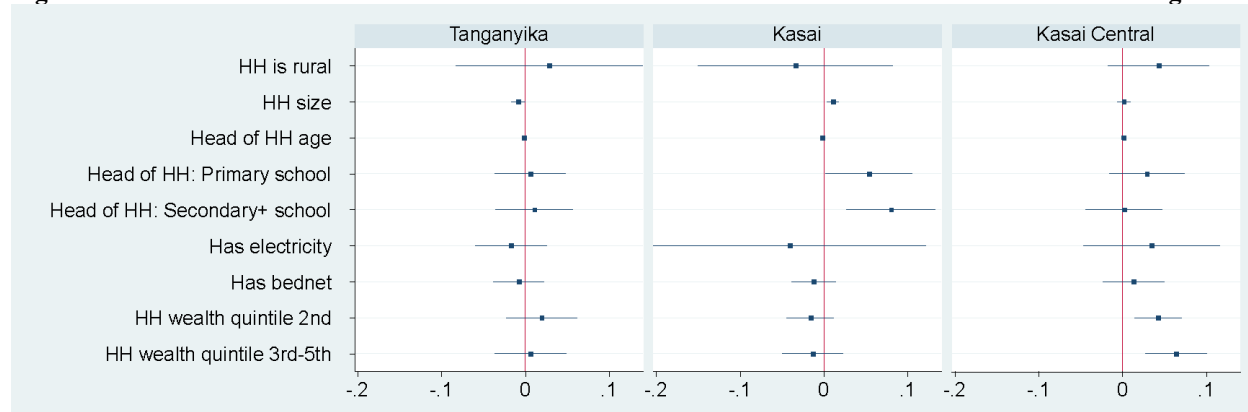
Notes: The coefficients plotted in Figures 10 and 11 are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child stunting (an increase in the variables is associated with a decrease in child stunting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child stunting (an increase in the variables is associated with an increase in child stunting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child stunting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

**Figure 12: Correlates of child malnutrition – mothers’ characteristics and children under five wasting**



Notes: The coefficients plotted are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child stunting (an increase in the variables is associated with a decrease in child stunting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child stunting (an increase in the variables is associated with an increase in child stunting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child stunting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

**Figure 13: Correlates of child malnutrition – household characteristics and children under five wasting**

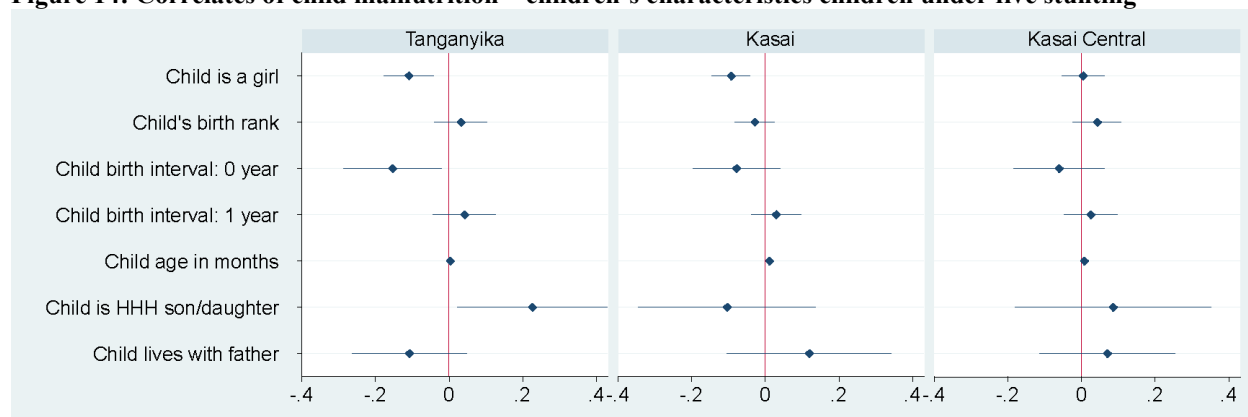


Notes: The coefficients plotted are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child wasting (an increase in the variables is associated with a decrease in child wasting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child wasting (an increase in the variables is associated with an increase in child wasting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child wasting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

4.2.3.2 Correlates of Child Malnutrition – Stunting and All Children Under Five

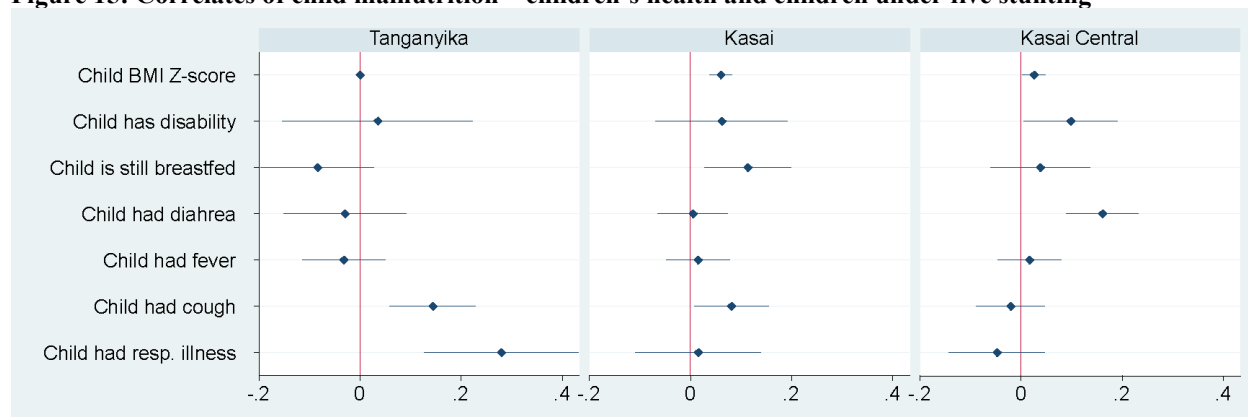
In all three provinces, there are some commonalities between the factors that are correlated with wasting and the factors that are correlated with stunting (Figures 14 - 17). However, there are also some notable differences. In Tanganyika, stunted children are more likely to be boys, who are first-born but are not directly related to the head of household as their sons and do not have their fathers present in the household. These children are more likely to have had a recent episode of cough or respiratory illnesses and to have been born to mothers with no education. However, when these children are in female-headed households, their risk of stunting is significantly lower. In Kasai, the typical stunted children are boys who are first-borns, still breastfeeding, have a high BMI, and have had recent episodes of coughing. These children do not sleep under bed nets and live in poor households. In Kasai Central, the sex of children does not significantly determine stunting. In this province, stunted children are more likely to have functional disabilities and recent episodes of diarrhea.

**Figure 14: Correlates of child malnutrition – children’s characteristics children under five stunting**

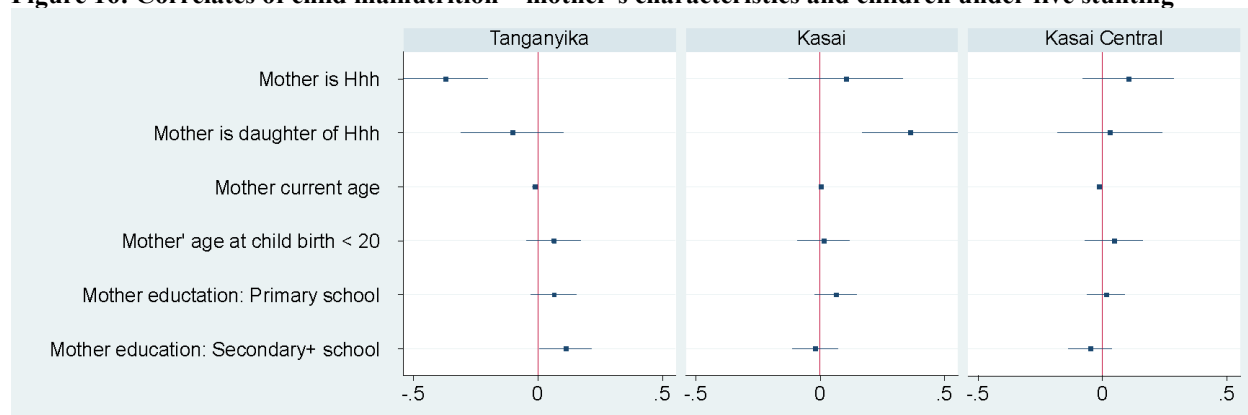


Notes: The coefficients plotted are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child stunting (an increase in the variables is associated with a decrease in child stunting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child stunting (an increase in the variables is associated with an increase in child stunting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child stunting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

**Figure 15: Correlates of child malnutrition – children’s health and children under five stunting**

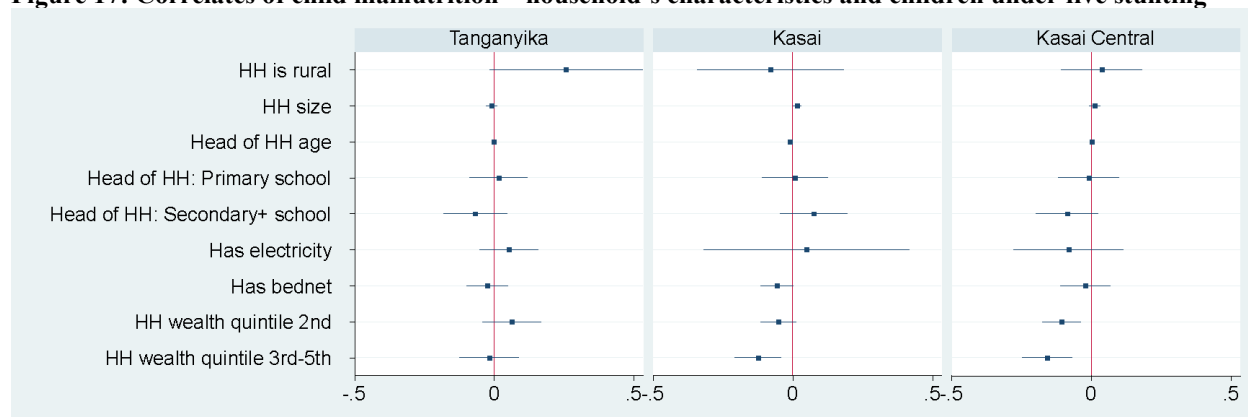


**Figure 16: Correlates of child malnutrition – mother’s characteristics and children under five stunting**



Notes: The coefficients plotted in Figures 15 and 16 are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child stunting (an increase in the variables is associated with a decrease in child stunting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child stunting (an increase in the variables is associated with an increase in child stunting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child stunting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

**Figure 17: Correlates of child malnutrition – household’s characteristics and children under five stunting**



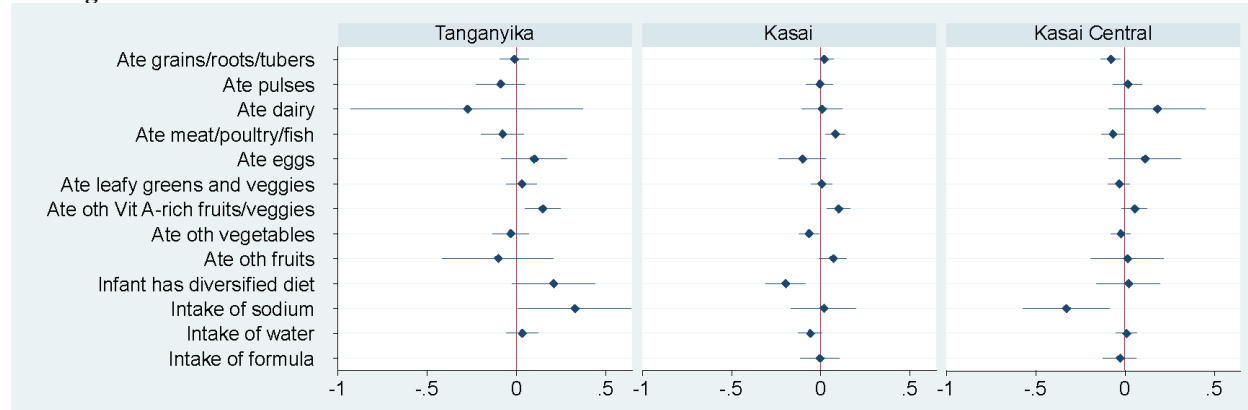
Notes: The coefficients plotted are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child stunting (an increase in the variables is associated with a decrease in child stunting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child stunting (an increase in the variables is associated with an increase in child stunting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child stunting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

#### 4.2.3.3 Correlates of Child Malnutrition – Role of Feeding Practices of Infants and Young Children

For infants and young children who are still breastfeeding, a separate regression was run to explore the role of feeding practices in the risk of wasting and stunting. The sample size for the regression was small, and the coefficients were imprecisely estimated. Yet, it provided additional insights into the profile of wasted and stunted children in the three targeted provinces. Findings showed that dietary intake is associated with wasting and stunting. However, most coefficient estimates were not statistically significant, likely due to the small sample size used in the analysis.

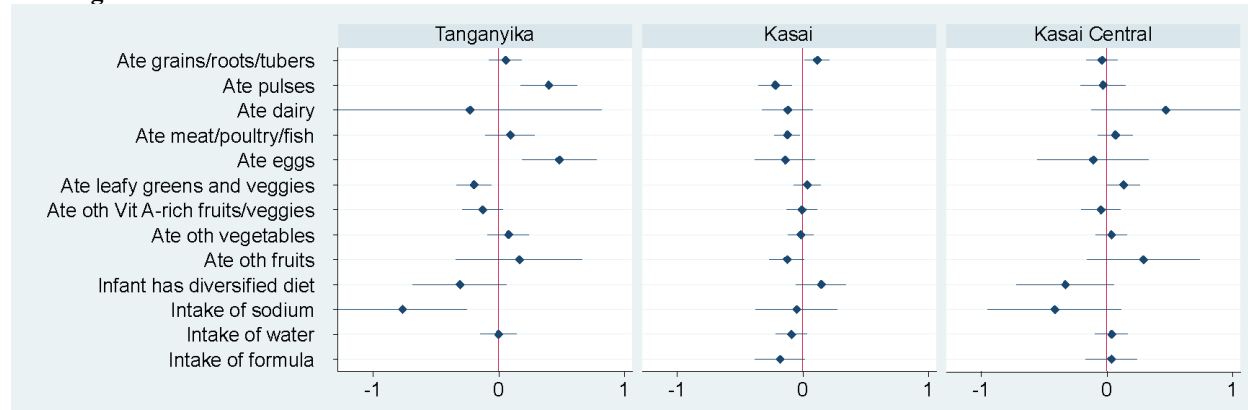


**Figure 18: Correlates of child malnutrition – infant and young children feeding practices and under two wasting**



Notes: The coefficients plotted are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child wasting (an increase in the variables is associated with a decrease in child wasting) and the correlation is statistically significant at a 10 percent significance level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child wasting (an increase in the variables is associated with an increase in child wasting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child wasting is not statistically significant. Accordingly, a correlation of -1 indicates a perfect negative correlation; a correlation of 1 indicates a perfect positive correlation; and a correlation of 0 indicates no correlation. Please see page 22 for additional detail on how to interpret the figure.

**Figure 19: Correlates of child malnutrition – infant and young children feeding practices and under two stunting**



Notes: The coefficients plotted are obtained via OLS regression with sampling weights and strata fixed effect. Separate regressions are run for each of three targeted provinces. Robust standard errors are computed and the horizontal lines represent 90 percent confidence intervals. On these graphs, when the dot and confidence intervals are to the left of the red vertical line, the corresponding variable is negatively correlated with child stunting (an increase in the variables is associated with a decrease in child stunting) and the correlation is statistically significant at 10 percent level. When the dot and confidence intervals are to the right of the red line, the corresponding variable is positively correlated with child stunting (an increase in the variables is associated with an increase in child stunting) and the correlation is statistically significant at a 10 percent significance level. When either the dot or the confidence overlap the red line, the association between the corresponding variable and child stunting is not statistically significant.

## 5. Concluding Remarks

This report used the most recent survey data representative of the population at the national and provincial levels in the DRC to assess the extent of poverty and malnutrition in the provinces of Tanganyika, Kasai, and Kasai Central. The assessment also helped establish the profile of poor households and wasted and stunted children in these provinces by identifying key characteristics that are distinguishable features of poor households and malnourished children.

Descriptive and econometric analyses were used to test the significance of relevant potential variables selected from the literature in explaining the likelihood of poverty and malnutrition. Estimates show that poverty rates in Tanganyika (29 percent), Kasai (54 percent), and Kasai Central (50 percent) are much higher than the national rate (23 percent). The findings indicated that observable household characteristics related to the dwelling place and socio-demographics can be used to uniquely characterize people who are poor. Across all three provinces, poor households are identifiable by the characteristics of their dwelling places (precarious roof, wall, and floor materials such as weed roofs, mud walls, and sandy floors). Poor households also have no access to safe sanitation and practice open defecation. They have no ownership of certain agricultural and non-agricultural assets (goats and sheep, mobile phones, radios), and are more likely to be headed by individuals with no education. In Tanganyika, poor households are more likely to practice open defecation. In Kasai, using wood products as cook fuel is a distinctive characteristic of poor households. In Kasai Central, ownership of cattle is more prevalent among poor households. These households are also less likely to sleep in bed nets. These findings can be used to design and implement interventions that target poor households. In a resource-constrained world, these observable household characteristics can be used to develop criteria to only reach poor households in need of assistance.

Malnutrition remains an important development problem in the DRC, with 6 percent of children under five affected by wasting and 42 percent of children under five affected by stunting. The prevalence of malnutrition in Tanganyika is slightly lower than the national average (in this province, 4 percent of children are wasted, and 41 percent of children are stunted). In Kasai, the prevalence of wasting is 7 percent, and the prevalence of stunting is 47 percent. In Kasai Central, wasting affects 6 percent of children, and stunting affects 54 percent of children. Hence, food and nutrition issues are more acute in Kasai and Kasai Central than in Tanganyika. These two provinces are also substantially poorer than Tanganyika. The findings also indicate that demographic and health characteristics of children and the characteristics of their mothers and those of their households are significant correlates of child malnutrition. Wasted and stunted children are more likely in households headed by young mothers with no education who show signs of bad health with a low BMI. These children are also more likely to experience health issues and present symptoms such as cough and diarrhea. In Tanganyika, wasted and stunted children are more likely to be boys. In Kasai, girls are more likely to experience wasting while boys are more likely to experience stunting. In Kasai Central girls are more likely to be wasted but both boys and girls are equally likely to be stunted. These observable characteristics are useful to effectively identify and target malnourished children in the three target provinces.

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## Annexes

### Annex A: Tables and figures from poverty analyses

#### Annex A1: Descriptive tables and figures from poverty (bottom 20 percent of wealth distribution) analyses

**Table A1: Household socio-demographic characteristics and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
HH is rural (%)	69.6	(1.8)	97.2	(1.0)	58.5	(2.6)	***
Head of HH is female (%)	23.4	(1.7)	25.9	(2.6)	22.5	(2.2)	
HH size (#)	4.9	(0.1)	4.5	(0.1)	5.0	(0.1)	***
Number of children under 5 (#)	1.1	(0.0)	1.1	(0.1)	1.1	(0.1)	***
Number of children aged 5-17 (#)	1.6	(0.1)	1.6	(0.1)	1.7	(0.1)	***
Head of HH age (#)	41.4	(0.5)	41.7	(0.9)	41.2	(0.7)	***
Head of HH: No schooling (%)	25.2	(1.7)	49.8	(2.9)	15.3	(1.9)	***
Head of HH: Primary school (%)	28.0	(1.8)	29.8	(2.7)	27.2	(2.3)	
Head of HH: Secondary school (%)	44.1	(1.9)	20.3	(2.4)	53.7	(2.6)	***
Head of HH: Tertiary school (%)	2.7	(0.6)	0.0	(0.0)	3.7	(1.0)	***
Has electricity (%)	14.7	(1.4)	0.3	(0.3)	20.5	(2.1)	***
Has internet (%)	1.5	(0.5)	1.0	(0.6)	1.7	(0.7)	
<b>b. Kasai</b>							
HH is rural (%)	98.0	(0.5)	99.0	(0.5)	96.8	(0.9)	***
Head of HH is female (%)	32.6	(1.6)	38.6	(2.4)	25.7	(2.1)	***
HH size (#)	5.2	(0.1)	5.0	(0.1)	5.5	(0.1)	***
Number of children under 5 (#)	1.1	(0.0)	1.1	(0.1)	1.2	(0.1)	
Number of children aged 5-17 (#)	1.9	(0.1)	1.8	(0.1)	2.1	(0.1)	
Head of HH age (#)	42.9	(0.5)	42.7	(0.7)	43.2	(0.6)	
Head of HH: No schooling (%)	12.9	(1.2)	17.9	(1.9)	6.9	(1.2)	***
Head of HH: Primary school (%)	30.3	(1.6)	31.9	(2.3)	28.6	(2.2)	
Head of HH: Secondary school (%)	53.5	(1.7)	48.8	(2.5)	58.9	(2.4)	***
Head of HH: Tertiary school (%)	3.3	(0.6)	1.4	(0.6)	5.6	(1.1)	***
Has electricity (%)	1.1	(0.4)	0.0	(0.0)	2.4	(0.7)	***
Has internet (%)	0.5	(0.2)	0.2	(0.2)	0.9	(0.4)	
<b>c. Kasai Central</b>							
HH is rural (%)	93.4	(0.9)	99.3	(0.4)	87.5	(1.6)	***
Head of HH is female (%)	31.5	(1.6)	40.6	(2.5)	22.5	(2.0)	***
HH size (#)	5.1	(0.1)	4.5	(0.1)	5.7	(0.1)	***
Number of children under 5 (#)	1.0	(0.0)	1.0	(0.0)	1.1	(0.0)	***
Number of children aged 5-17 (#)	1.9	(0.1)	1.5	(0.1)	2.2	(0.1)	***
Head of HH age (#)	44.7	(0.5)	43.4	(0.8)	45.9	(0.7)	***
Head of HH: No schooling (%)	16.9	(1.3)	22.3	(2.1)	11.6	(1.5)	***
Head of HH: Primary school (%)	31.5	(1.6)	36.6	(2.4)	26.4	(2.1)	***
Head of HH: Secondary school (%)	47.8	(1.7)	41.0	(2.5)	54.4	(2.4)	***
Head of HH: Tertiary school (%)	3.8	(0.7)	0.1	(0.1)	7.6	(1.3)	***
Has electricity (%)	1.4	(0.4)	0.0	(0.0)	2.8	(0.8)	***
Has internet (%)	0.8	(0.3)	0.0	(0.0)	1.5	(0.6)	***
<b>d. DRC National</b>							

HH is rural (%)	58.7	(0.3)	91.4	(0.3)	48.9	(0.4)	***
Head of HH is female (%)	28.5	(0.3)	40.1	(0.6)	25.0	(0.4)	***
HH size (#)	5.2	(0.02)	4.4	(0.03)	5.4	(0.03)	***
Number of children under 5 (#)	1.0	(0.02)	1.0	(0.01)	1.0	(0.01)	
Number of children aged 5-17 (#)	1.8	(0.01)	1.5	(0.02)	1.9	(0.02)	***
Head of HH age (#)	43.8	(0.1)	42.9	(0.2)	44.1	(0.1)	***
Head of HH: No schooling (%)	13.9	(0.2)	25.2	(0.5)	10.5	(0.3)	***
Head of HH: Primary school (%)	25.0	(0.3)	35.5	(0.6)	21.8	(0.4)	***
Head of HH: Secondary school (%)	51.5	(0.3)	38.7	(0.6)	55.4	(0.4)	***
Head of HH: Tertiary school (%)	9.5	(0.2)	0.7	(0.1)	12.2	(0.3)	***
Has electricity (%)	26.6	(0.3)	0.3	(0.1)	34.5	(0.4)	***
Has internet (%)	1.3	(0.1)	0.2	(0.1)	1.6	(0.1)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table A2: Characteristics of household dwelling and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
House ownership (%)	71.3	(1.8)	79.5	(2.4)	68.0	(2.4)	***
Number of rooms (#)	1.9	(3.8)	1.6	(4.7)	2.0	(0.1)	***
Floor material: Sand (%)	87.6	(1.3)	97.8	(0.9)	83.5	(1.9)	***
Floor material: Cement (%)	11.7	(1.3)	0.0	(0.0)	16.5	(1.9)	***
Roof material: Metal (%)	28.4	(1.8)	0.0	(0.0)	39.9	(2.6)	***
Roof material: Leaf (%)	67.8	(1.8)	97.5	(0.9)	55.9	(2.6)	***
Roof material: Weeds (%)	2.5	(0.6)	2.2	(0.9)	2.7	(0.8)	
Wall material: Brick (%)	58.9	(1.9)	31.9	(2.7)	69.7	(2.4)	***
Wall material: Mud (%)	38.6	(1.9)	62.5	(2.9)	29.0	(2.4)	***
Wall material: Wood (%)	2.0	(0.5)	4.3	(1.2)	1.0	(0.5)	***
<b>b. Kasai</b>							
House ownership (%)	80.5	(1.4)	81.7	(1.9)	77.7	(2.0)	
Number of rooms (#)	2.0	(3.2)	1.8	(3.6)	2.5	(0.1)	***
Floor material: Sand (%)	96.5	(0.6)	100	(0)	95.1	(1.0)	***
Floor material: Cement (%)	3.2	(0.6)	0.0	(0.0)	4.9	(1.0)	***
Roof material: Metal (%)	25.1	(1.5)	3.5	(0.9)	40.9	(2.4)	***
Roof material: Leaf (%)	73.8	(1.5)	96.0	(1.0)	56.9	(2.4)	***
Roof material: Weeds (%)	1.1	(0.4)	0.5	(0.4)	1.9	(0.7)	
Wall material: Brick (%)	4.5	(0.7)	0.7	(0.4)	12.8	(1.6)	***
Wall material: Mud (%)	95	(0.8)	98.7	(0.6)	87.2	(1.6)	***
Wall material: Wood (%)	0.5	(0.2)	0.6	(0.4)	0.0	(0.0)	
<b>c. Kasai Central</b>							
House ownership (%)	72.4	(1.5)	67	(2.3)	79.1	(2.0)	***
Number of rooms (#)	2.2	(3.2)	1.8	(3.9)	2.2	(0.1)	***
Floor material: Sand (%)	97.5	(0.5)	100	(0.0)	92.5	(1.3)	***
Floor material: Cement (%)	2.5	(0.5)	0.0	(0.0)	7.0	(1.2)	***
Roof material: Metal (%)	20.7	(1.4)	0.3	(0.3)	50.2	(2.4)	***
Roof material: Leaf (%)	77.9	(1.4)	99.2	(0.5)	48.0	(2.4)	***
Roof material: Weeds (%)	1.1	(0.4)	0.3	(0.3)	1.8	(0.6)	***
Wall material: Brick (%)	6.6	(0.9)	0.3	(0.3)	8.9	(1.4)	***
Wall material: Mud (%)	93.1	(0.9)	99.1	(0.5)	90.7	(1.4)	***
Wall material: Wood (%)	0.3	(0.2)	0.5	(0.4)	0.4	(0.3)	
<b>c. DRC National</b>							
House ownership (%)	66.7	(0.3)	79.1	(0.5)	63.0	(0.4)	***
Number of rooms (#)	2.1	(0.0)	1.8	(0.0)	2.2	(0.0)	***
Floor material: Sand (%)	71.5	(0.3)	99.8	(0.1)	62.9	(0.4)	***
Floor material: Cement (%)	27.6	(0.3)	0.1	(0.0)	35.9	(0.4)	***
Roof material: Metal (%)	46.6	(0.3)	1.8	(0.2)	60.2	(0.4)	***
Roof material: Leaf (%)	48.1	(0.3)	93.4	(0.3)	34.4	(0.4)	***
Roof material: Weeds (%)	3.8	(0.1)	4.5	(0.2)	3.5	(0.2)	***
Wall material: Brick (%)	31.4	(0.3)	6.2	(0.3)	39.0	(0.4)	***
Wall material: Mud (%)	61.5	(0.3)	89.2	(0.4)	53.2	(0.4)	***
Wall material: Wood (%)	5.6	(0.2)	3.9	(0.2)	6.1	(0.2)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A3: Characteristics of household cooking place and toilet and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-Poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
Use petroleum lamp (%)	4.9	(0.8)	1.2	(0.6)	6.4	(1.3)	***
Cooking place: In house (%)	65.2	(1.9)	72.2	(2.6)	62.4	(2.5)	***
Cooking place: Separate house (%)	16.8	(1.5)	13.3	(2.0)	18.2	(2.0)	
Cooking place: Outdoor (%)	17.0	(1.5)	13.5	(2.0)	18.3	(2.0)	
Cooking fuel: Charcoal (%)	38.9	(1.9)	3.8	(1.1)	53.0	(2.6)	***
Cooking fuel: Woods (%)	59.3	(1.9)	93.5	(1.5)	45.6	(2.6)	***
Drinking water source: Safe (%)	69.8	(1.8)	50.4	(2.9)	77.6	(2.2)	***
Drinking water source: Unsafe (%)	18.2	(1.5)	23.5	(2.5)	16.1	(1.9)	***
Type of toilet: Modern (%)	5.4	(0.9)	1.0	(0.6)	7.2	(1.4)	***
Type of toilet: Traditional safe (%)	84.1	(1.4)	68.8	(2.7)	90.2	(1.6)	***
Type of toilet: Open defecation (%)	9.9	(1.2)	28	(2.6)	2.6	(0.8)	***
Handwashing station (%)	27.0	(1.7)	17.0	(2.2)	31.0	(2.4)	***
Has bed net (%)	52.3	(2.0)	26.8	(2.6)	62.6	(2.5)	***
<b>b. Kasai</b>							
Use petroleum lamp (%)	2.5	(0.5)	0.4	(0.3)	2.5	(0.8)	***
Cooking place: In house (%)	60.7	(1.7)	69	(2.3)	52.0	(2.4)	***
Cooking place: Separate house (%)	17.6	(1.3)	9.4	(1.4)	38.0	(2.3)	***
Cooking place: Outdoor (%)	21.2	(1.4)	21.5	(2.0)	9.9	(1.4)	
Cooking fuel: Charcoal (%)	11.6	(1.1)	1.1	(0.5)	9.7	(1.4)	***
Cooking fuel: Woods (%)	87.6	(1.1)	98.8	(0.5)	88.5	(1.5)	***
Drinking water source: Safe (%)	15.4	(1.2)	9.3	(1.4)	28.0	(2.1)	***
Drinking water source: Unsafe (%)	5.7	(0.8)	4.8	(1.0)	4.7	(1.0)	
Type of toilet: Modern (%)	0.0	(0.1)	0.0	(0.0)	0.6	(0.4)	
Type of toilet: Traditional safe (%)	56.9	(1.7)	44.9	(2.4)	81.3	(1.9)	***
Type of toilet: Open defecation (%)	43	(1.7)	55.1	(2.4)	18.0	(1.8)	***
Handwashing station (%)	1.1	(0.4)	0.0	(0.0)	7.2	(1.2)	***
Has bed net (%)	28.4	(1.6)	21.7	(2)	92.0	(1.3)	***
<b>c. Kasai Central</b>							
Use petroleum lamp (%)	1.3	(0.4)	0.0	(0.1)	4.9	(1.1)	***
Cooking place: In house (%)	70.2	(1.6)	88.6	(1.6)	51.0	(2.4)	***
Cooking place: Separate house (%)	21.5	(1.4)	4.8	(1.1)	27.0	(2.2)	***
Cooking place: Outdoor (%)	8.3	(1)	6.6	(1.2)	20.7	(2.0)	
Cooking fuel: Charcoal (%)	5.0	(0.8)	0.2	(0.2)	23.9	(2.1)	***
Cooking fuel: Woods (%)	94.1	(0.8)	99.7	(0.3)	74.6	(2.1)	***
Drinking water source: Safe (%)	19	(1.4)	10.0	(1.5)	22.4	(2.0)	***
Drinking water source: Unsafe (%)	3.6	(0.6)	2.6	(0.8)	6.7	(1.2)	
Type of toilet: Modern (%)	0.3	(0.2)	0.0	(0.0)	0.1	(0.1)	
Type of toilet: Traditional safe (%)	67	(1.6)	52.6	(2.5)	70.9	(2.2)	***
Type of toilet: Open defecation (%)	32.6	(1.6)	47.4	(2.5)	29.0	(2.2)	***
Handwashing station (%)	5.1	(0.8)	2.9	(0.8)	2.3	(0.7)	***
Has bed net (%)	86.5	(1.2)	81.0	(2.0)	36.2	(2.3)	***
<b>d. DRC National</b>							
Use petroleum lamp (%)	9.4	(0.2)	2.1	(0.2)	11.6	(0.3)	***
Cooking place: In house (%)	40.2	(0.3)	50.8	(0.6)	37.0	(0.4)	***
Cooking place: Separate house (%)	21.9	(0.3)	14.7	(0.4)	24.1	(0.4)	***
Cooking place: Outdoor (%)	37.2	(0.3)	33.6	(0.6)	38.3	(0.4)	***
Cooking fuel: Charcoal (%)	32.6	(0.3)	1.1	(0.1)	42.1	(0.4)	***
Cooking fuel: Woods (%)	61.2	(0.3)	97.8	(0.2)	50.2	(0.4)	***

Drinking water source: Safe (%)	56.8	(0.3)	24.0	(0.5)	66.8	(0.4)	***
Drinking water source: Unsafe (%)	15.7	(0.3)	25.3	(0.5)	12.9	(0.3)	***
Type of toilet: Modern (%)	10.9	(0.2)	0.2	(0.1)	14.1	(0.3)	***
Type of toilet: Traditional safe (%)	75.3	(0.3)	67.9	(0.6)	77.5	(0.4)	***
Type of toilet: Open defecation (%)	13.8	(0.2)	31.8	(0.6)	8.4	(0.2)	***
Handwashing station (%)	24.4	(0.3)	11.0	(0.4)	28.4	(0.4)	***
Has bed net (%)	67.6	(0.3)	47.2	(0.6)	73.8	(0.4)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A4: Household agricultural asset holdings and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
Owens agricultural land (%)	54.9	(1.9)	68.5	(2.7)	49.4	(2.6)	***
Farm size (#)	1.2	(0.3)	1.6	(0.4)	1.1	(0.4)	
Owens cattle (%)	0.4	(0.2)	0.0	(0.0)	0.5	(0.4)	
Number of cattle (#)	0.05	(3.0)	0.0	(0.0)	0.1	(0.0)	
Owens sheep and goats (%)	8.4	(1.1)	1.0	(0.6)	11.3	(1.7)	***
Number of sheep and goats	0.9	(0.2)	0.5	(0.03)	1.1	(0.3)	***
Owens pigs (%)	2.6	(0.6)	0.0	(0.0)	3.7	(1.0)	***
Number of pigs (#)	0.1	(0.03)	0.0	(0.0)	0.1	(0.0)	
Owens poultry (%)	23.1	(1.6)	9.8	(1.8)	28.5	(2.4)	***
Number of poultry	2	(0.2)	0.7	(0.2)	2.5	(0.3)	***
Owens rabbits (%)	1.8	(0.5)	0.0	(0.0)	2.6	(0.8)	***
Owens a plow (%)	0.3	(0.0)	0.0	(0.0)	0.5	(0.4)	
<b>b. Kasai</b>							
Owens agricultural land (%)	70.6	(1.6)	72.7	(2.2)	76.9	(2.0)	
Farm size (#)	0.8	(0.2)	0.7	(0.2)	3.4	(0.6)	
Owens cattle (%)	1.3	(0.4)	0.01	(0.0)	0.4	(0.3)	***
Number of cattle (#)	1.0	(0.1)	0.1	(0.01)	0.1	(0.2)	***
Owens sheep and goats (%)	0.0	(1.0)	0.02	(0.7)	18.5	(1.9)	***
Number of sheep and goats	1.0	(3.0)	0.1	(0.1)	0.8	(0.3)	***
Owens pigs (%)	2.9	(0.6)	0.1	(0.1)	21.5	(2.0)	***
Number of pigs (#)	0.1	(0.03)	0.01	(0.0)	0.7	(0.1)	***
Owens poultry (%)	27.4	(1.5)	17	(1.8)	48.1	(2.4)	***
Number of poultry	1.2	(0.2)	0.9	(0.2)	2.7	(0.2)	***
Owens rabbits (%)	2.2	(0.5)	0.7	(0.4)	21.7	(2.0)	***
Owens a plow (%)	0.4	(0.0)	0.3	(0.0)	0.1	(0.1)	
<b>c. Kasai Central</b>							
Owens agricultural land (%)	78.9	(1.4)	80.8	(2.0)	76.9	(2.0)	
Farm size (#)	2.3	(0.3)	1.2	(0.2)	1.0	(0.3)	***
Owens cattle (%)	0.3	(0.2)	0.2	(0.2)	2.7	(0.8)	
Number of cattle (#)	0.1	(0.1)	0.01	(0.03)	0.2	(0.1)	
Owens sheep and goats (%)	9.7	(1.0)	0.7	(0.4)	18.7	(1.9)	***
Number of sheep and goats	0.4	(0.1)	0.02	(0.01)	2.0	(0.5)	***
Owens pigs (%)	11.1	(1.1)	0.7	(0.4)	6.3	(1.2)	***
Number of pigs (#)	0.4	(0.1)	0.1	(0.04)	0.3	(0.1)	***
Owens poultry (%)	32.3	(1.6)	16.3	(1.8)	39.5	(2.4)	***

Number of poultry	1.6	(0.1)	0.5	(0.1)	2.6	(0.3)	***
Owens rabbits (%)	12.1	(1.1)	2.4	(0.8)	4.0	(1.0)	***
Owens a plow (%)	0.2	(0.0)	0.4	(0.0)	0.6	(0.4)	
<b>d. DRC National</b>							
Owens agricultural land (%)	52.6	(0.3)	71.2	(0.5)	47.0	(0.4)	***
Farm size (#)	2.9	(0.1)	2.9	(0.2)	2.9	(0.1)	
Owens cattle (%)	1.6	(0.1)	0.4	(0.1)	2.0	(0.1)	***
Number of cattle (#)	0.1	(0.02)	0.0	(0.01)	0.2	(0.02)	***
Owens sheep and goats (%)	13.1	(0.2)	3.5	(0.2)	16.0	(0.3)	***
Number of sheep and goats	1.0	(0.1)	0.2	(0.04)	1.2	(0.1)	***
Owens pigs (%)	5.4	(0.2)	1.6	(0.2)	6.6	(0.2)	***
Number of pigs (#)	0.3	(0.02)	0.1	(0.02)	0.4	(0.03)	***
Owens poultry (%)	24.8	(0.3)	16.9	(0.4)	27.2	(0.4)	***
Number of poultry	1.8	(0.04)	0.9	(0.04)	2.1	(0.05)	***
Owens rabbits (%)	3.2	(0.1)	1.4	(0.1)	3.8	(0.2)	***
Owens a plow (%)	0.5	(0.01)	0.2	(0.1)	0.5	(0.1)	***

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**Table A5: Household non-agricultural asset holdings and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
Owens tables or chairs (%)	63.2	(1.9)	24.1	(2.5)	78.8	(2.1)	***
Owens a couch (%)	5.7	(0.9)	0.6	(0.4)	7.7	(1.4)	***
Owens a bedframe/mattress (%)	40.3	(1.9)	24.1	(2.5)	46.8	(2.6)	***
Owens a dresser (%)	4.9	(0.8)	1.2	(0.6)	6.3	(1.3)	***
Owens a bicycle (%)	32	(1.8)	11.9	(1.9)	40.1	(2.6)	***
Owens a motorbike or car (%)	4.8	(0.8)	0.0	(0.0)	6.8	(1.3)	***
Owens a boat or canoe (%)	2.7	(0.6)	4.3	(1.2)	2.1	(0.7)	
Owens a radio receptor (%)	31.5	(1.8)	7.6	(1.6)	41.1	(2.6)	***
Owens a TV (%)	8.4	(1.1)	0.0	(0.0)	11.8	(1.7)	***
Owens a DVD/CD player (%)	0.0	(0.1)	0.0	(0.0)	0.0	(0.1)	
Owens a mobile phone (%)	39	(1.9)	2.2	(0.9)	53.8	(2.6)	***
<b>b. Kasai</b>							
Owens tables or chairs (%)	72.0	(1.5)	58.2	(2.4)	97.9	(0.7)	***
Owens a couch (%)	1.6	(0.4)	0.5	(0.4)	2.3	(0.7)	***
Owens a bedframe/mattress (%)	41.9	(1.7)	30.3	(2.3)	79.5	(1.9)	***
Owens a dresser (%)	3.7	(0.6)	0.5	(0.3)	9.6	(1.4)	***
Owens a bicycle (%)	8.1	(0.9)	2.9	(0.8)	30.1	(2.2)	***
Owens a motorbike or car (%)	4.3	(0.7)	0.8	(0.4)	6.5	(1.2)	***
Owens a boat or canoe (%)	4.8	(0.7)	3.6	(0.9)	1.7	(0.6)	
Owens a radio receptor (%)	16.8	(1.3)	7	(1.2)	27.7	(2.1)	***
Owens a TV (%)	0.2	(0.1)	0.0	(0.0)	0.2	(0.2)	
Owens a DVD/CD player (%)	0.1	(0.1)	0.0	(0.0)	0.4	(0.3)	
Owens a mobile phone (%)	26.5	(1.5)	9.4	(1.4)	43.1	(2.4)	***
<b>c. Kasai Central</b>							
Owens tables or chairs (%)	86.9	(1.2)	75.9	(2.1)	88.0	(1.6)	***
Owens a couch (%)	1.3	(0.4)	0.2	(0.2)	2.9	(0.8)	***
Owens a bedframe/mattress (%)	56.6	(1.7)	33.4	(2.4)	55.4	(2.4)	***
Owens a dresser (%)	5.2	(0.8)	0.8	(0.4)	7.4	(1.3)	***
Owens a bicycle (%)	16.2	(1.3)	2.2	(0.7)	14.2	(1.7)	***
Owens a motorbike or car (%)	3.9	(0.7)	1.2	(0.5)	8.4	(1.3)	***
Owens a boat or canoe (%)	1.2	(0.4)	0.8	(0.4)	6.1	(1.2)	
Owens a radio receptor (%)	15.5	(1.2)	3.1	(0.9)	28.2	(2.2)	***
Owens a TV (%)	0.1	(0.1)	0.0	(0.0)	0.4	(0.3)	
Owens a DVD/CD player (%)	0.2	(0.2)	0.0	(0.0)	0.3	(0.3)	
Owens a mobile phone (%)	25.9	(1.5)	8.6	(1.4)	46.5	(2.4)	***
<b>c. DRC National</b>							
Owens tables or chairs (%)	85.2	(0.2)	64.1	(0.6)	91.6	(0.2)	***
Owens a couch (%)	17.9	(0.3)	1.0	(0.1)	23.0	(0.4)	***
Owens a bedframe/mattress (%)	77.7	(0.3)	53.9	(0.6)	84.9	(0.3)	***
Owens a dresser (%)	17.7	(0.3)	1.7	(0.2)	22.5	(0.4)	***
Owens a bicycle (%)	18.6	(0.3)	8.7	(0.3)	21.6	(0.4)	***
Owens a motorbike or car (%)	9.4	(0.2)	0.9	(0.1)	12.0	(0.3)	***
Owens a boat or canoe (%)	4.4	(0.1)	5.4	(0.3)	4.1	(0.2)	***
Owens a radio receptor (%)	37.6	(0.3)	7.1	(0.3)	46.8	(0.4)	***
Owens a TV (%)	19.4	(0.3)	0.0	(0.0)	25.3	(0.4)	***
Owens a DVD/CD player (%)	5.3	(0.2)	0.0	(0.0)	6.9	(0.2)	***
Owens a mobile phone (%)	46.5	(0.3)	7.3	(0.3)	58.4	(0.4)	***

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sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A6: Full regression coefficients and standard errors of the correlates of household poverty by provinces**

	(1) Tanganyika	(2) Kasai	(3) Kasai Central	(4) DRC National
HH is rural	0.13 (0.12)	0.06 (0.12)	-0.07 (0.07)	-0.03 (0.08)
Head of HH is female	-0.03 (0.03)	0.03 (0.03)	0.02 (0.03)	0.03*** (0.01)
HH size	0.00 (0.01)	0.00 (0.01)	-0.00 (0.01)	-0.00 (0.00)
Number of children under 5	0.00 (0.02)	-0.01 (0.02)	0.03** (0.02)	0.01* (0.00)
Head of HH age	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00*** (0.00)
Head of HH: Primary school	-0.08** (0.04)	0.02 (0.04)	-0.01 (0.03)	-0.02*** (0.01)
Head of HH: Secondary+ school	-0.06 (0.04)	-0.01 (0.04)	-0.03 (0.04)	-0.04*** (0.01)
Has electricity	-0.15*** (0.04)	-0.07 (0.12)	-0.15 (0.11)	-0.02** (0.01)
House ownership	0.01 (0.03)	0.02 (0.03)	-0.03 (0.03)	0.01 (0.01)
Number of rooms	-0.00 (0.02)	-0.01 (0.02)	-0.01 (0.02)	-0.01** (0.00)
Floor material: Precarious	-0.06 (0.05)	-0.18** (0.08)	-0.14 (0.09)	-0.10*** (0.01)
Roof material: Precarious	0.10** (0.05)	0.56*** (0.03)	0.53*** (0.03)	0.28*** (0.01)
Wall material: Precarious	0.16*** (0.03)	0.01 (0.05)	-0.10** (0.05)	0.03*** (0.01)
Use petroleum lamp	-0.14** (0.07)	-0.23*** (0.08)	-0.13 (0.10)	-0.05*** (0.01)
Cooking place: own or separate house	0.06 (0.04)	-0.09*** (0.03)	-0.05 (0.04)	-0.01** (0.01)
Cooking fuel: Woods and related	-0.04 (0.10)	0.24 (0.15)	-0.06 (0.12)	-0.01 (0.01)
Drinking water source: Unsafe	0.10** (0.04)	-0.07 (0.05)	-0.08 (0.06)	0.02*** (0.01)
Type of toilet: Open defecation	0.26*** (0.05)	0.08*** (0.03)	0.08*** (0.03)	0.12*** (0.01)
Water to wash hand	-0.03 (0.04)	0.13 (0.12)	-0.06 (0.05)	-0.04*** (0.01)
Has bed net	-0.01 (0.03)	0.01 (0.03)	-0.08** (0.03)	-0.04*** (0.01)
Owns an agricultural land	0.06* (0.03)	0.06** (0.03)	0.07** (0.03)	0.04*** (0.01)
Farm size	0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00*** (0.00)
Owns cattle	-0.47** (0.21)	0.00 (0.12)	0.40* (0.21)	0.06*** (0.02)



Owns sheep and goats	-0.17*** (0.06)	-0.23*** (0.05)	-0.15*** (0.04)	-0.13*** (0.01)
Owns pigs	-0.03 (0.09)	-0.08 (0.07)	-0.19*** (0.04)	-0.09*** (0.01)
Owns poultry	-0.10*** (0.04)	-0.20*** (0.03)	-0.13*** (0.03)	-0.10*** (0.01)
Owns rabbits	0.04 (0.10)	-0.04 (0.09)	-0.26*** (0.03)	-0.07*** (0.01)
Owns tables/chairs/couch or dresser	-0.17*** (0.04)	-0.12*** (0.03)	-0.14*** (0.03)	-0.14*** (0.01)
Owns a bedframe/mattress	0.06** (0.03)	-0.07*** (0.03)	-0.16*** (0.02)	-0.08*** (0.01)
Owns a bicycle	-0.16*** (0.03)	-0.21*** (0.05)	-0.20*** (0.03)	-0.09*** (0.01)
Owns a motorbike or car	-0.03 (0.06)	-0.06 (0.06)	0.02 (0.06)	0.00 (0.01)
Owns radio or TV or DVD player	-0.04 (0.03)	-0.10*** (0.04)	-0.13*** (0.03)	-0.07*** (0.01)
Owns a mobile phone	-0.11*** (0.04)	-0.18*** (0.03)	-0.13*** (0.03)	-0.10*** (0.01)
Observations	649	840	837	20,483
R-squared	0.52	0.56	0.65	0.47
Adjusted R-squared	0.50	0.56	0.64	0.47

Notes: Linear probability model estimated using OLS regressions. For each variable, the first row is coefficient estimates and the second row is the standard error. All regressions include survey weights and dummies for strata within provinces. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Annex A2: Descriptive tables and figures from poverty (bottom 40 percent of wealth distribution) analyses**
**Table A7: Household socio-demographic characteristics and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
HH is rural (%)	69.6	(1.8)	97.5	(0.7)	39.3	(3.5)	***
Head of HH is female (%)	23.4	(1.7)	22.0	(1.9)	25.0	(3.1)	
HH size (#)	4.9	(0.1)	4.4	(0.1)	5.4	(0.2)	***
Number of children under 5 (#)	1.1	(0.0)	1.0	(0.0)	1.2	(0.1)	***
Number of children aged 5-17 (#)	1.6	(0.1)	1.4	(0.1)	1.9	(0.1)	***
Head of HH age (#)	41.4	(0.5)	42.4	(0.7)	40.2	(0.9)	***
Head of HH: No schooling (%)	25.2	(1.7)	39.2	(2.3)	10.1	(2.1)	***
Head of HH: Primary school (%)	28.0	(1.8)	33.9	(2.2)	21.5	(2.9)	***
Head of HH: Secondary school (%)	44.1	(1.9)	26.9	(2.1)	62.8	(3.4)	***
Head of HH: Tertiary school (%)	2.7	(0.6)	0.0	(0.0)	5.6	(1.6)	***
Has electricity (%)	14.7	(1.4)	2.5	(0.7)	27.9	(3.2)	***
Has internet (%)	1.5	(0.5)	0.5	(0.3)	2.5	(1.1)	***
<b>b. Kasai</b>							
HH is rural (%)	98.0	(0.5)	99.2	(0.3)	91.5	(2.1)	***
Head of HH is female (%)	32.6	(1.6)	33.9	(1.8)	25.4	(3.3)	
HH size (#)	5.2	(0.1)	5.1	(0.1)	5.8	(0.3)	***
Number of children under 5 (#)	1.1	(0.0)	1.1	(0.0)	1.3	(0.1)	***
Number of children aged 5-17 (#)	1.9	(0.1)	1.9	(0.1)	2.1	(0.2)	
Head of HH age (#)	42.9	(0.5)	43.1	(0.5)	41.9	(0.9)	
Head of HH: No schooling (%)	12.9	(1.2)	14.9	(1.4)	1.2	(0.8)	***
Head of HH: Primary school (%)	30.3	(1.6)	31.3	(1.8)	25.2	(3.3)	
Head of HH: Secondary school (%)	53.5	(1.7)	51.1	(1.9)	66.6	(3.5)	***
Head of HH: Tertiary school (%)	3.3	(0.6)	2.7	(0.6)	6.9	(1.9)	***
Has electricity (%)	1.1	(0.4)	0.4	(0.2)	5.3	(1.7)	***
Has internet (%)	0.5	(0.2)	0.6	(0.3)	0.0	(0.0)	
<b>c. Kasai Central</b>							
HH is rural (%)	93.4	(0.9)	99.2	(0.4)	71.1	(3)	***
Head of HH is female (%)	31.5	(1.6)	33.2	(1.9)	25.0	(2.8)	***
HH size (#)	5.1	(0.1)	4.8	(0.1)	6.3	(0.2)	***
Number of children under 5 (#)	1.0	(0.0)	1.0	(0.0)	1.1	(0.1)	
Number of children aged 5-17 (#)	1.9	(0.1)	1.7	(0.1)	2.5	(0.1)	***
Head of HH age (#)	44.7	(0.5)	44.1	(0.6)	47.0	(0.9)	***
Head of HH: No schooling (%)	16.9	(1.3)	19.4	(1.6)	7.4	(1.7)	***
Head of HH: Primary school (%)	31.5	(1.6)	33.9	(1.9)	22.4	(2.7)	***
Head of HH: Secondary school (%)	47.8	(1.7)	45.1	(2)	58.1	(3.2)	***
Head of HH: Tertiary school (%)	3.8	(0.7)	1.7	(0.5)	12.1	(2.1)	***
Has electricity (%)	1.4	(0.4)	0.2	(0.2)	5.8	(1.5)	***
Has internet (%)	0.8	(0.3)	1.0	(0.4)	0.0	(0.0)	
<b>d. DRC National</b>							
HH is rural (%)	58.7	(0.3)	91.5	(0.3)	32.9	(0.5)	***
Head of HH is female (%)	28.5	(0.3)	33.2	(0.4)	24.7	(0.5)	***
HH size (#)	5.2	(0.0)	4.7	(0.0)	5.6	(0.0)	***
Number of children under 5 (#)	1.0	(0.0)	1.0	(0.0)	1.0	(0.0)	***
Number of children aged 5-17 (#)	1.8	(0.0)	1.6	(0.0)	2.0	(0.0)	***
Head of HH age (#)	43.8	(0.1)	42.7	(0.1)	44.7	(0.2)	***

Head of HH: No schooling (%)	13.9	(0.2)	21.0	(0.4)	8.2	(0.3)	***
Head of HH: Primary school (%)	25.0	(0.3)	33.5	(0.4)	18.2	(0.4)	***
Head of HH: Secondary school (%)	51.5	(0.3)	44.4	(0.4)	57.1	(0.5)	***
Head of HH: Tertiary school (%)	9.5	(0.2)	1.0	(0.1)	16.3	(0.4)	***
Has electricity (%)	26.6	(0.3)	1.2	(0.1)	46.6	(0.5)	***
Has internet (%)	1.3	(0.1)	0.3	(0.1)	2.0	(0.2)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A8: Characteristics of household dwelling and poverty by province**

	All		Distribution among				Sig.
	Est.	SD	Poor		Non-poor		
			Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
House ownership (%)	71.3	(1.8)	80.3	(1.9)	61.5	(3.5)	***
Number of rooms (#)	1.9	(0.0)	1.7	(0.0)	2.2	(0.1)	***
Floor material: Sand (%)	87.6	(1.3)	98.7	(0.5)	75.6	(3.1)	***
Floor material: Cement (%)	11.7	(1.3)	0.0	(0.0)	24.4	(3.1)	***
Roof material: Metal (%)	28.4	(1.8)	0.9	(0.4)	58.2	(3.5)	***
Roof material: Leaf (%)	67.8	(1.8)	97.1	(0.8)	36.1	(3.4)	***
Roof material: Weeds (%)	2.5	(0.6)	1.6	(0.6)	3.5	(1.3)	
Wall material: Brick (%)	58.9	(1.9)	46.6	(2.3)	72.2	(3.2)	***
Wall material: Mud (%)	38.6	(1.9)	49.1	(2.3)	27.3	(3.2)	***
Wall material: Wood (%)	2.0	(0.5)	3.7	(0.9)	0.1	(0.2)	***
<b>b. Kasai</b>							
House ownership (%)	80.5	(1.4)	81.7	(1.9)	79.1	(2.0)	
Number of rooms (#)	196.4	(3.2)	176.7	(3.6)	219.4	(5.0)	***
Floor material: Sand (%)	96.5	(0.6)	100.0	(0.0)	92.5	(1.3)	***
Floor material: Cement (%)	3.2	(0.6)	0.0	(0.0)	7.0	(1.2)	***
Roof material: Metal (%)	25.1	(1.5)	3.5	(0.9)	50.2	(2.4)	***
Roof material: Leaf (%)	73.8	(1.5)	96.0	(1)	48.0	(2.4)	***
Roof material: Weeds (%)	1.1	(0.4)	0.5	(0.4)	1.8	(0.6)	
Wall material: Brick (%)	4.5	(0.7)	0.7	(0.4)	8.9	(1.4)	***
Wall material: Mud (%)	95.0	(0.8)	98.7	(0.6)	90.7	(1.4)	***
Wall material: Wood (%)	0.5	(0.2)	0.6	(0.4)	0.4	(0.3)	
<b>c. Kasai Central</b>							
House ownership (%)	72.4	(1.5)	71.3	(1.8)	76.3	(2.8)	
Number of rooms (#)	2.2	(0)	2.0	(0.0)	2.8	(0.1)	***
Floor material: Sand (%)	97.5	(0.5)	100.0	(0.0)	88.1	(2.1)	***
Floor material: Cement (%)	2.5	(0.5)	0.0	(0.0)	11.9	(2.1)	***
Roof material: Metal (%)	20.7	(1.4)	10.9	(1.3)	58.3	(3.2)	***
Roof material: Leaf (%)	77.9	(1.4)	87.9	(1.3)	39.4	(3.2)	***
Roof material: Weeds (%)	1.1	(0.4)	0.9	(0.4)	1.8	(0.9)	
Wall material: Brick (%)	6.6	(0.9)	1.4	(0.5)	26.6	(2.9)	***
Wall material: Mud (%)	93.1	(0.9)	98.2	(0.5)	73.4	(2.9)	***
Wall material: Wood (%)	0.3	(0.2)	0.3	(0.2)	0.0	(0)	
<b>c. DRC National</b>							
House ownership (%)	66.7	(0.3)	80.7	(0.4)	55.7	(0.5)	***
Number of rooms (#)	2.1	(0)	1.9	(0)	2.3	(0)	***
Floor material: Sand (%)	71.5	(0.3)	99.6	(0.1)	49.3	(0.5)	***

Floor material: Cement (%)	27.6	(0.3)	0.0	(0)	49.3	(0.5)	***
Roof material: Metal (%)	46.6	(0.3)	8.4	(0.3)	76.8	(0.5)	***
Roof material: Leaf (%)	48.1	(0.3)	84.7	(0.3)	19.2	(0.4)	***
Roof material: Weeds (%)	3.8	(0.1)	6.3	(0.2)	1.8	(0.1)	***
Wall material: Brick (%)	31.4	(0.3)	8.0	(0.2)	49.9	(0.5)	***
Wall material: Mud (%)	61.5	(0.3)	87.4	(0.3)	41.0	(0.5)	***
Wall material: Wood (%)	5.6	(0.2)	3.8	(0.2)	7.0	(0.3)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A9: Characteristics of household cooking place and toilet and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-Poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
Use petroleum lamp (%)	4.9	(0.8)	1.2	(0.6)	6.4	(1.3)	***
Cooking place: In house (%)	65.2	(1.9)	72.2	(2.6)	62.4	(2.5)	***
Cooking place: Separate house (%)	16.8	(1.5)	13.3	(2.0)	18.2	(2.0)	
Cooking place: Outdoor (%)	17.0	(1.5)	13.5	(2.0)	18.3	(2.0)	
Cooking fuel: Charcoal (%)	38.9	(1.9)	3.8	(1.1)	53.0	(2.6)	***
Cooking fuel: Woods (%)	59.3	(1.9)	93.5	(1.5)	45.6	(2.6)	***
Drinking water source: Safe (%)	69.8	(1.8)	50.4	(2.9)	77.6	(2.2)	***
Drinking water source: Unsafe (%)	18.2	(1.5)	23.5	(2.5)	16.1	(1.9)	***
Type of toilet: Modern (%)	5.4	(0.9)	1.0	(0.6)	7.2	(1.4)	***
Type of toilet: Traditional safe (%)	84.1	(1.4)	68.8	(2.7)	90.2	(1.6)	***
Type of toilet: Open defecation (%)	9.9	(1.2)	28.0	(2.6)	2.6	(0.8)	***
Handwashing station (%)	27.0	(1.7)	17.0	(2.2)	31.0	(2.4)	***
Has bed net (%)	52.3	(2.0)	26.8	(2.6)	62.6	(2.5)	***
<b>b. Kasai</b>							
Use petroleum lamp (%)	2.5	(0.5)	0.4	(0.3)	4.9	(1.1)	***
Cooking place: In house (%)	60.7	(1.7)	69.0	(2.3)	51.0	(2.4)	***
Cooking place: Separate house (%)	17.6	(1.3)	9.4	(1.4)	27.0	(2.2)	***
Cooking place: Outdoor (%)	21.2	(1.4)	21.5	(2.0)	20.7	(2.0)	
Cooking fuel: Charcoal (%)	11.6	(1.1)	1.1	(0.5)	23.9	(2.1)	***
Cooking fuel: Woods (%)	87.6	(1.1)	98.8	(0.5)	74.6	(2.1)	***
Drinking water source: Safe (%)	15.4	(1.2)	9.3	(1.4)	22.4	(2.0)	***
Drinking water source: Unsafe (%)	5.7	(0.8)	4.8	(1.0)	6.7	(1.2)	
Type of toilet: Modern (%)	0.0	(0.1)	0.0	(0.0)	0.1	(0.1)	
Type of toilet: Traditional safe (%)	56.9	(1.7)	44.9	(2.4)	70.9	(2.2)	***
Type of toilet: Open defecation (%)	43.0	(1.7)	55.1	(2.4)	29.0	(2.2)	***
Handwashing station (%)	1.1	(0.4)	0.0	(0.0)	2.3	(0.7)	***
Has bed net (%)	28.4	(1.6)	21.7	(2.0)	36.2	(2.3)	***
<b>c. Kasai Central</b>							
Use petroleum lamp (%)	1.3	(0.4)	0.0	(0.1)	2.5	(0.8)	***
Cooking place: In house (%)	70.2	(1.6)	88.6	(1.6)	52.0	(2.4)	***
Cooking place: Separate house (%)	21.5	(1.4)	4.8	(1.1)	38.0	(2.3)	***
Cooking place: Outdoor (%)	8.3	(1)	6.6	(1.2)	9.9	(1.4)	
Cooking fuel: Charcoal (%)	5.0	(0.8)	0.2	(0.2)	9.7	(1.4)	***
Cooking fuel: Woods (%)	94.1	(0.8)	99.7	(0.3)	88.5	(1.5)	***
Drinking water source: Safe (%)	19.0	(1.4)	10.0	(1.5)	28.0	(2.1)	***

Drinking water source: Unsafe (%)	3.6	(0.6)	2.6	(0.8)	4.7	(1.0)	
Type of toilet: Modern (%)	0.3	(0.2)	0.0	(0.0)	0.6	(0.4)	
Type of toilet: Traditional safe (%)	67.0	(1.6)	52.6	(2.5)	81.3	(1.9)	***
Type of toilet: Open defecation (%)	32.6	(1.6)	47.4	(2.5)	18.0	(1.8)	***
Handwashing station (%)	5.1	(0.8)	2.9	(0.8)	7.2	(1.2)	***
Has bed net (%)	86.5	(1.2)	81.0	(2.0)	92.0	(1.3)	***
<b>d. DRC National</b>							
Use petroleum lamp (%)	9.4	(0.2)	2.1	(0.2)	11.6	(0.3)	***
Cooking place: In house (%)	40.2	(0.3)	50.8	(0.6)	37.0	(0.4)	***
Cooking place: Separate house (%)	21.9	(0.3)	14.7	(0.4)	24.1	(0.4)	***
Cooking place: Outdoor (%)	37.2	(0.3)	33.6	(0.6)	38.3	(0.4)	***
Cooking fuel: Charcoal (%)	32.6	(0.3)	1.1	(0.1)	42.1	(0.4)	***
Cooking fuel: Woods (%)	61.2	(0.3)	97.8	(0.2)	50.2	(0.4)	***
Drinking water source: Safe (%)	56.8	(0.3)	24.0	(0.5)	66.8	(0.4)	***
Drinking water source: Unsafe (%)	15.7	(0.3)	25.3	(0.5)	12.9	(0.3)	***
Type of toilet: Modern (%)	10.9	(0.2)	0.2	(0.1)	14.1	(0.3)	***
Type of toilet: Traditional safe (%)	75.3	(0.3)	67.9	(0.6)	77.5	(0.4)	***
Type of toilet: Open defecation (%)	13.8	(0.2)	31.8	(0.6)	8.4	(0.2)	***
Handwashing station (%)	24.4	(0.3)	11.0	(0.4)	28.4	(0.4)	***
Has bed net (%)	67.6	(0.3)	47.2	(0.6)	73.8	(0.4)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A10: Household agricultural asset holdings and poverty by province**

	All		Distribution among				Sig.
	Est.	SD	Poor		Non-poor		
			Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
Owens agricultural land (%)	54.9	(1.9)	68.5	(2.7)	49.4	(2.6)	***
Farm size (#)	1.2	(0.3)	1.6	(0.4)	1.1	(0.4)	
Owens cattle (%)	0.4	(0.2)	0.0	(0.0)	0.5	(0.4)	
Number of cattle (#)	0.0	(0.03)	0.0	(0.0)	0.1	(0.05)	
Owens sheep and goats (%)	8.4	(1.1)	1.0	(0.6)	11.3	(1.7)	***
Number of sheep and goats	0.8	(0.2)	0.1	(0.03)	1.1	(0.336)	***
Owens pigs (%)	2.6	(0.6)	0.0	(0.0)	3.7	(1.0)	***
Number of pigs (#)	0.1	(0.02)	0.0	(0.0)	0.1	(0.1)	
Owens poultry (%)	23.1	(1.6)	9.8	(1.8)	28.5	(2.4)	***
Number of poultry	2.0	(0.2)	0.7	(0.2)	2.5	(0.3)	***
Owens rabbits (%)	1.8	(0.5)	0.0	(0)	2.6	(0.8)	***
Owens a plow (%)	0.3	(0.2)	0.0	(0)	0.5	(0.4)	
<b>b. Kasai</b>							
Owens agricultural land (%)	70.6	(1.6)	72.7	(2.2)	68.1	(2.3)	
Farm size (#)	0.8	(0.2)	0.7	(0.2)	1.0	(0.3)	
Owens cattle (%)	1.3	(0.4)	0.0	(0.0)	2.7	(0.8)	***
Number of cattle (#)	0.1	(0.04)	0.0	(0.0)	0.2	(0.1)	***
Owens sheep and goats (%)	9.9	(1.0)	2.3	(0.7)	18.7	(1.9)	***
Number of sheep and goats	1.0	(0.3)	0.1	(0.2)	2.0	(0.5)	***
Owens pigs (%)	2.9	(0.6)	0.1	(0.1)	6.3	(1.2)	***
Number of pigs (#)	0.1	(0.03)	0.0	(0.001)	0.3	(0.06)	***
Owens poultry (%)	27.4	(1.5)	17.0	(1.8)	39.5	(2.4)	***

Number of poultry	1.6	(0.2)	0.9	(0.1)	2.6	(0.3)	***
Owns rabbits (%)	2.2	(0.5)	0.7	(0.4)	4.0	(1)	***
Owns a plow (%)	0.4	(0.2)	0.3	(0.3)	0.6	(0.4)	
<b>c. Kasai Central</b>							
Owns agricultural land (%)	78.9	(1.4)	80.8	(2.0)	76.9	(2.0)	
Farm size (#)	2.3	(0.3)	1.2	(0.2)	3.4	(0.6)	***
Owns cattle (%)	0.3	(0.2)	0.2	(0.2)	0.4	(0.3)	
Number of cattle (#)	0.1	(0.1)	0.0	(0.03)	0.1	(0.2)	
Owns sheep and goats (%)	9.7	(1.0)	0.7	(0.4)	18.5	(1.9)	***
Number of sheep and goats	0.4	(0.2)	0.0	(0.01)	0.8	(0.3)	***
Owns pigs (%)	11.1	(1.1)	0.7	(0.4)	21.5	(2.0)	***
Number of pigs (#)	0.4	(0.1)	0.0	(0.04)	0.7	(0.1)	***
Owns poultry (%)	32.3	(1.6)	16.3	(1.8)	48.1	(2.4)	***
Number of poultry	1.6	(0.1)	0.5	(0.1)	2.7	(0.2)	***
Owns rabbits (%)	12.1	(1.1)	2.4	(0.8)	21.7	(2.0)	***
Owns a plow (%)	0.2	(0.2)	0.4	(0.3)	0.1	(0.1)	
<b>d. DRC National</b>							
Owns agricultural land (%)	52.6	(0.3)	71.2	(0.5)	47.0	(0.4)	***
Farm size (#)	2.9	(0.1)	2.9	(0.2)	2.9	(0.1)	
Owns cattle (%)	1.6	(0.1)	0.4	(0.1)	2.0	(0.1)	***
Number of cattle (#)	0.1	(0.02)	0.0	(0.01)	0.2	(0.02)	***
Owns sheep and goats (%)	13.1	(0.2)	3.5	(0.2)	16.0	(0.3)	***
Number of sheep and goats	1.0	(0.1)	0.2	(0.0)	1.2	(0.1)	***
Owns pigs (%)	5.4	(0.2)	1.6	(0.2)	6.6	(0.2)	***
Number of pigs (#)	0.3	(0.02)	0.1	(0.02)	0.4	(0.03)	***
Owns poultry (%)	24.8	(0.3)	16.9	(0.4)	27.2	(0.4)	***
Number of poultry	1.8	(0.04)	0.9	(0.04)	2.1	(0.05)	***
Owns rabbits (%)	3.2	(0.1)	1.4	(0.1)	3.8	(0.2)	***
Owns a plow (%)	0.5	(0.0)	0.2	(0.1)	0.5	(0.1)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table A11: Household non-agricultural asset holdings and poverty by province**

	All		Distribution among				Sig.
			Poor		Non-poor		
	Est.	SD	Est.	SD	Est.	SD	
<b>a. Tanganyika</b>							
Owens tables or chairs (%)	63.2	(1.9)	24.1	(2.5)	78.8	(2.1)	***
Owens a couch (%)	5.7	(0.9)	0.6	(0.4)	7.7	(1.4)	***
Owens a bedframe/mattress (%)	40.3	(1.9)	24.1	(2.5)	46.8	(2.6)	***
Owens a dresser (%)	4.9	(0.8)	1.2	(0.6)	6.3	(1.3)	***
Owens a bicycle (%)	32.0	(1.8)	11.9	(1.9)	40.1	(2.6)	***
Owens a motorbike or car (%)	4.8	(0.8)	0.0	(0)	6.8	(1.3)	***
Owens a boat or canoe (%)	2.7	(0.6)	4.3	(1.2)	2.1	(0.7)	
Owens a radio receptor (%)	31.5	(1.8)	7.6	(1.6)	41.1	(2.6)	***
Owens a TV (%)	8.4	(1.1)	0.0	(0)	11.8	(1.7)	***
Owens a DVD/CD player (%)	0.0	(0.1)	0.0	(0)	0.0	(0.1)	
Owens a mobile phone (%)	39.0	(1.9)	2.2	(0.9)	53.8	(2.6)	***
<b>b. Kasai</b>							
Owens tables or chairs (%)	72.0	(1.5)	58.2	(2.4)	88.0	(1.6)	***
Owens a couch (%)	1.6	(0.4)	0.5	(0.4)	2.9	(0.8)	***
Owens a bedframe/mattress (%)	41.9	(1.7)	30.3	(2.3)	55.4	(2.4)	***
Owens a dresser (%)	3.7	(0.6)	0.5	(0.3)	7.4	(1.3)	***
Owens a bicycle (%)	8.1	(0.9)	2.9	(0.8)	14.2	(1.7)	***
Owens a motorbike or car (%)	4.3	(0.7)	0.8	(0.4)	8.4	(1.3)	***
Owens a boat or canoe (%)	4.8	(0.7)	3.6	(0.9)	6.1	(1.2)	
Owens a radio receptor (%)	16.8	(1.3)	7.0	(1.2)	28.2	(2.2)	***
Owens a TV (%)	0.2	(0.1)	0.0	(0.0)	0.4	(0.3)	
Owens a DVD/CD player (%)	0.1	(0.1)	0.0	(0.0)	0.3	(0.3)	
Owens a mobile phone (%)	26.5	(1.5)	9.4	(1.4)	46.5	(2.4)	***
<b>c. Kasai Central</b>							
Owens tables or chairs (%)	86.9	(1.2)	75.9	(2.1)	97.9	(0.7)	***
Owens a couch (%)	1.3	(0.4)	0.2	(0.2)	2.3	(0.7)	***
Owens a bedframe/mattress (%)	56.6	(1.7)	33.4	(2.4)	79.5	(1.9)	***
Owens a dresser (%)	5.2	(0.8)	0.8	(0.4)	9.6	(1.4)	***
Owens a bicycle (%)	16.2	(1.3)	2.2	(0.7)	30.1	(2.2)	***
Owens a motorbike or car (%)	3.9	(0.7)	1.2	(0.5)	6.5	(1.2)	***
Owens a boat or canoe (%)	1.2	(0.4)	0.8	(0.4)	1.7	(0.6)	
Owens a radio receptor (%)	15.5	(1.2)	3.1	(0.9)	27.7	(2.1)	***
Owens a TV (%)	0.1	(0.1)	0.0	(0.0)	0.2	(0.2)	
Owens a DVD/CD player (%)	0.2	(0.2)	0.0	(0.0)	0.4	(0.3)	
Owens a mobile phone (%)	25.9	(1.5)	8.6	(1.4)	43.1	(2.4)	***
<b>c. DRC National</b>							
Owens tables or chairs (%)	85.2	(0.2)	64.1	(0.6)	91.6	(0.2)	***
Owens a couch (%)	17.9	(0.3)	1.0	(0.1)	23.0	(0.4)	***
Owens a bedframe/mattress (%)	77.7	(0.3)	53.9	(0.6)	84.9	(0.3)	***
Owens a dresser (%)	17.7	(0.3)	1.7	(0.2)	22.5	(0.4)	***
Owens a bicycle (%)	18.6	(0.3)	8.7	(0.3)	21.6	(0.4)	***
Owens a motorbike or car (%)	9.4	(0.2)	0.9	(0.1)	12.0	(0.3)	***
Owens a boat or canoe (%)	4.4	(0.1)	5.4	(0.3)	4.1	(0.2)	***
Owens a radio receptor (%)	37.6	(0.3)	7.1	(0.3)	46.8	(0.4)	***
Owens a TV (%)	19.4	(0.3)	0.0	(0)	25.3	(0.4)	***
Owens a DVD/CD player (%)	5.3	(0.2)	0.0	(0)	6.9	(0.2)	***
Owens a mobile phone (%)	46.5	(0.3)	7.3	(0.3)	58.4	(0.4)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the

sample's representativeness at the province level. The column All reports the summary statistics for all households. The columns 'distribution among' report the statistics in the subpopulations of poor and non-poor households. The column sig. presents the results of the t-test mean comparison of the variables in rows between poor and non-poor households. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A12: Full regression coefficients of the correlates of household poverty by provinces**

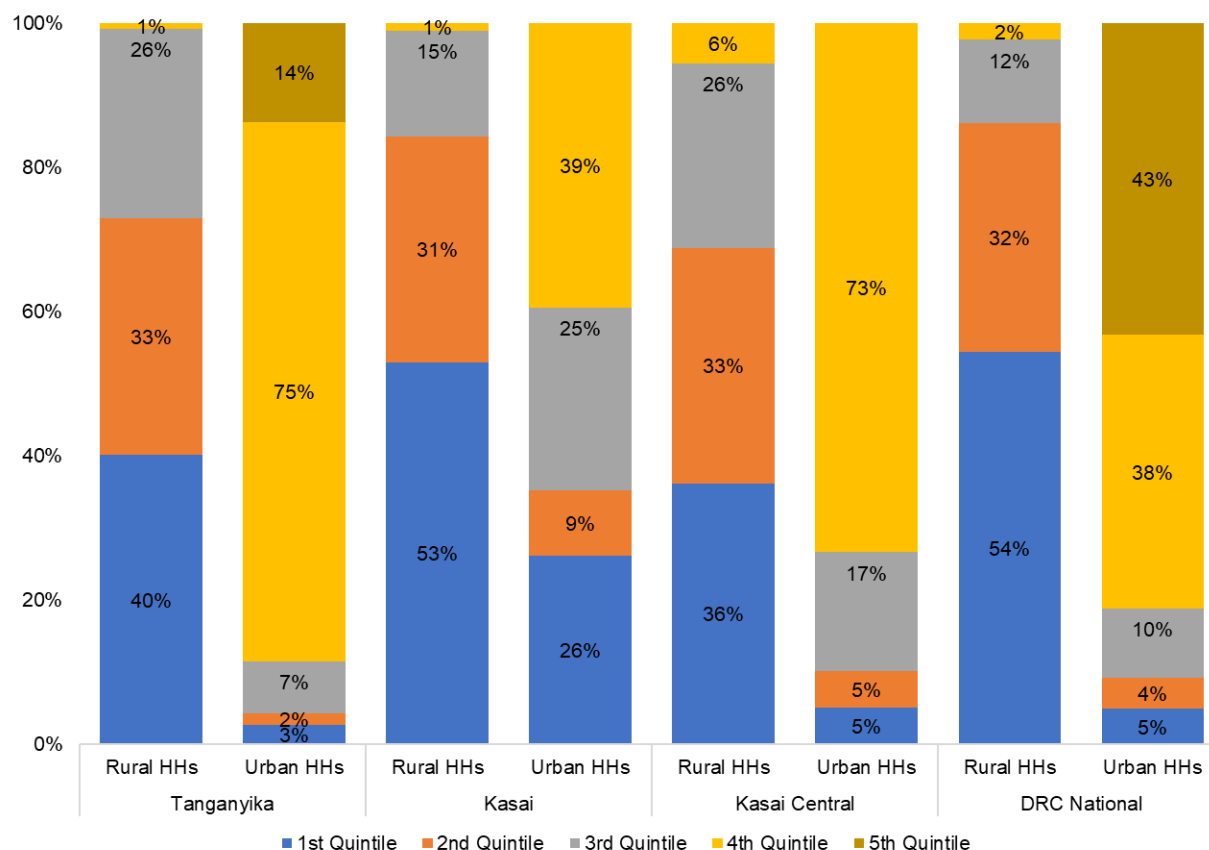
	(1) Tanganyika	(2) Kasai	(3) Kasai Central	(4) DRC National
HH is rural	0.29*** (0.11)	0.43*** (0.08)	0.32*** (0.05)	0.14* (0.07)
Head of HH is female	-0.08*** (0.03)	-0.01 (0.02)	-0.07*** (0.02)	-0.00 (0.00)
HH size	-0.01 (0.01)	0.00 (0.00)	-0.00 (0.01)	0.00 (0.00)
Number of children under 5	0.00 (0.02)	-0.02** (0.01)	0.02 (0.01)	-0.00 (0.00)
Head of HH age	0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Head of HH: Primary school	0.04 (0.03)	-0.01 (0.03)	0.01 (0.03)	-0.01 (0.01)
Head of HH: Secondary+ school	0.02 (0.04)	-0.04 (0.03)	-0.03 (0.03)	-0.03*** (0.01)
Has electricity	-0.09** (0.04)	-0.09 (0.08)	-0.20** (0.08)	-0.07*** (0.01)
House ownership	0.05 (0.03)	0.05** (0.02)	0.02 (0.02)	0.03*** (0.01)
Number of rooms	-0.04** (0.02)	0.00 (0.01)	-0.04*** (0.01)	-0.00 (0.00)
Floor material: Precarious	-0.02 (0.05)	0.35*** (0.06)	-0.00 (0.07)	-0.03*** (0.01)
Roof material: Precarious	0.28*** (0.04)	0.19*** (0.02)	0.29*** (0.03)	0.35*** (0.01)
Wall material: Precarious	0.10*** (0.03)	0.10*** (0.04)	0.06 (0.04)	0.06*** (0.01)
Use petroleum lamp	-0.06 (0.06)	-0.10* (0.06)	0.03 (0.08)	-0.09*** (0.01)
Cooking place: own or separate house	0.01 (0.03)	0.02 (0.02)	0.05 (0.03)	-0.01*** (0.00)
Cooking fuel: Woods and related	-0.10 (0.09)	0.04 (0.10)	0.16 (0.10)	-0.02** (0.01)
Drinking water source: Unsafe	0.12*** (0.03)	-0.02 (0.04)	-0.05 (0.05)	0.04*** (0.01)
Type of toilet: Open defecation	0.05 (0.04)	0.04** (0.02)	0.03 (0.02)	0.06*** (0.01)
Water to wash hand	-0.01 (0.03)	-0.20** (0.08)	-0.08** (0.04)	-0.02*** (0.01)
Has bed net	-0.07** (0.03)	-0.00 (0.02)	0.02 (0.02)	-0.01 (0.00)
Owns an agricultural land	0.08** (0.03)	0.04* (0.02)	-0.01 (0.02)	0.06*** (0.01)
Farm size	-0.00 (0.00)	-0.01*** (0.00)	-0.00 (0.00)	-0.00*** (0.00)
Owns cattle	-0.22	-0.24***	0.10	-0.14***

	(0.19)	(0.08)	(0.16)	(0.02)
Owens sheep and goats	-0.26***	-0.19***	-0.16***	-0.22***
	(0.05)	(0.03)	(0.03)	(0.01)
Owens pigs	-0.26***	-0.37***	-0.35***	-0.14***
	(0.08)	(0.05)	(0.03)	(0.01)
Owens poultry	-0.05	-0.07***	-0.06***	-0.05***
	(0.04)	(0.02)	(0.02)	(0.01)
Owens rabbits	-0.10	-0.11*	-0.31***	-0.09***
	(0.09)	(0.06)	(0.03)	(0.01)
Owens tables/chairs/couch or dresser	0.01	0.02	0.02	-0.07***
	(0.03)	(0.02)	(0.03)	(0.01)
Owens a bedframe/mattress	-0.03	-0.05***	0.03	-0.06***
	(0.03)	(0.02)	(0.02)	(0.01)
Owens a bicycle	-0.09***	-0.10***	-0.03	-0.08***
	(0.03)	(0.03)	(0.03)	(0.01)
Owens a motorbike or car	-0.10*	-0.30***	-0.07	-0.06***
	(0.06)	(0.04)	(0.05)	(0.01)
Owens radio or TV or DVD player	-0.13***	-0.08***	-0.15***	-0.08***
	(0.03)	(0.02)	(0.03)	(0.01)
Owens a mobile phone	-0.13***	-0.06***	-0.08***	-0.11***
	(0.03)	(0.02)	(0.02)	(0.01)
Observations	649	840	837	20,483
R-squared	0.68	0.58	0.68	0.68
Adjusted R-squared	0.66	0.55	0.64	0.65

Notes: Linear probability model estimated using OLS regressions. For each variable, the first row is coefficient estimates and the second row is the standard error. All regressions include survey weights and dummies for strata within provinces. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Annex A3: Additional tables and figures from poverty analyses

**Figure A1: Difference in the distribution of household wealth quintile between rural and urban households by province.**



**Table A13: Key relevant literature on the correlates of household poverty**

Authors and title	Geographies	Data and Methods	Correlates associated with an increase of poverty
Achia, T. N., Wangombe, A., & Khadioli, N. (2010). A Logistic Regression Model to Identify Key Determinants of Poverty Using Demographic and Health Survey Data. <i>European Journal of Social Sciences</i> , 13(1).	Kenya	Asset index as a measure of poverty Logistic regression	Residence in rural Low education of the HH
Adeyemi, S. L., Ijaiya, G. T., & Raheem, U. A. (2009). Determinants of poverty in sub-Saharan Africa. <i>African Research Review</i> , 3(2).	48 SSA countries	Income per-capita as measure of poverty Cross-country OLS regression	High growth rate of population High inflation and external debt servicing Lack of safe water Low economic activities, Gender discrimination, Ethnic and religious conflicts HIV/AIDS
Angélique, N. C., Stany, V., Lebailly, P., & Azadi, H. (2022). Agricultural Development in the	DRC, South Kivu	Household living conditions Descriptive statistics	Low landholding Low family size as a proxy for farm labor No modern husbandry practice (cows)

Fight against Poverty: The Case of South Kivu, DR Congo. <i>Land</i> , 11(4), 472.		Qualitative data from farmers' interview	
Mukherjee, S., & Benson, T. (2003). The determinants of poverty in Malawi, 1998. <i>World Development</i> , 31(2), 339-358.	Malawi	Consumption per-capita as a measure of poverty Household survey OLS regression of income per-capita and counterfactual simulation	Region of residence Older household head Female head of household Household size (quadratic effect) Low education Reliance on subsistence farming (low farm size in a rural zone with agriculture as a primary source of livelihood)
Oyekale, T. O., & Oyekale, A. S. (2013). Assessment of multidimensional poverty in rural and urban Nigeria: evidence from demographic and health survey (DHS). <i>Journal of Human Ecology</i> , 42(2), 141-154.	Nigeria	Asset index as a measure of poverty Descriptive statistics	Characteristic of household house Lack of access to basic services such as electricity and telephone Place of residence (rural and living in the north)
Alia, D. Y., Alia, K. A. J. J., & Fiamohe, E. R. (2016). On poverty and the persistence of poverty in Benin. <i>Journal of Economic Studies</i> .	Benin	Household expenditure below the poverty line as a measure of poverty Household panel survey Descriptive statistics	Demographic and socio-economic characteristics Low education Lack of labor skills
Shah, S., & Debnath, N. (2022). Determinants of Multidimensional Poverty in Rural Tripura, India. <i>Journal of Quantitative Economics</i> , 20(1), 69-95.	Tripura, India	Multi-stage random sampling method Multidimensional poverty index	High dependency ratio Low years of schooling Agriculture as main occupation Female head of household Lack of access to credit
Mberu, B. U., Ciera, J. M., Elungata, P., & Ezech, A. C. (2014). Patterns and determinants of poverty transitions among poor urban households in Nairobi, Kenya. <i>African Development Review</i> , 26(1), 172-185.	Nairobi, Kenya	Asset index as a measure of poverty High-frequency panel data	Gender and marital status of household head Attainment of at least secondary education by household head consistent engagement in formal employment household size incidence of births
Benson, T., Chamberlin, J., & Rhinehart, I. (2005). An investigation of the spatial determinants of the local prevalence of poverty in rural Malawi. <i>Food Policy</i> , 30(5-6), 532-550.	Malawi	Spatial modeling Geographically weighted regression	Geographic locations Geographic variables related to climate, socio-economics characteristics Access to market
Okunola, A. M., & Ojo, O. S. (2019). Household poverty measurement and its determinants among rural farmers in Ondo State, Nigeria. <i>Poverty &amp; Public Policy</i> , 11(4), 277-290.	Ondo state, Nigeria	Household survey Consumption per-capita Logistic regression	Age and marital status head of households household size Number of working household members Farming experience Years of education

## Annex B: Tables and figures from malnutrition analyses

## Annex B1: Descriptive tables and figures from malnutrition analyses

**Table A14: Children's characteristics and wasting and stunting by province**

	All		Distribution among (Panel A)				Distribution among (Panel B)					
			Wasted		Non-Wasted		Sig	Stunted		Non-Stunted		Sig
	Est.	SD	Est.	SD	Est.	SD		Est.	SD	Est.	SD	
<b>a. Tanganyika</b>												
Child is a girl (%)	51.8	(1.9)	17.6	(6.0)	53.2	(2.0)	***	43.9	(3.0)	57.3	(2.4)	***
Child's birth rank (#)	2.4	(0.04)	1.9	(0.1)	2.4	(0.04)	***	2.4	(0.04)	2.3	(0.5)	
Child's birth interval: 0 year (%)	17.4	(1.4)	39.0	(7.7)	16.6	(1.5)	***	16.3	(2.3)	18.2	(1.9)	
Child's birth interval: 1 year (%)	17.3	(1.4)	20.8	(6.4)	17.2	(1.5)		19.6	(2.4)	15.7	(1.8)	
Child's birth interval: 2 years (%)	27.8	(1.7)	17.6	(6.0)	28.2	(1.8)		32.0	(2.9)	24.8	(2.1)	**
Child's birth interval: 3 years (%)	14.4	(1.3)	17.5	(6.0)	14.2	(1.4)		14.9	(2.2)	14.0	(1.7)	
Child's birth interval: 4+ years (%)	16.2	(1.4)	1.7	(2.0)	16.7	(1.5)	***	14.3	(2.1)	17.5	(1.8)	
Child age in months (#)	0.3	(0.0)	23.7	(2.5)	30.1	(0.6)		0.3	(0.0)	0.3	(0.0)	***
Child is HHH son/daughter (%)	83.1	(1.4)	82.0	(6.1)	83.2	(1.5)		89.7	(1.9)	78.6	(2)	***
Child lives with father (%)	67.0	(1.8)	86.3	(5.4)	66.3	(1.9)	***	75.6	(2.6)	61.1	(2.4)	***
Child lives with mother (%)	100.0	(0.0)	100.0	(0.0)	100.0	(0.0)		100.0	(0.0)	100.0	(0.0)	
<b>b. Kasai</b>												
Child is a girl (%)	50.5	(1.7)	52.9	(6.6)	50.3	(1.7)		46.2	(2.4)	54.4	(2.3)	**
Child's birth rank (#)	2.6	(0.03)	2.5	(0.1)	2.6	(0.03)		0.0	(0)	0.0	(0)	*
Child's birth interval: 0 year (%)	12.5	(1.1)	14.1	(4.6)	12.3	(1.1)		12.5	(1.6)	12.5	(1.5)	
Child's birth interval: 1 year (%)	20.4	(1.3)	6.5	(3.3)	21.5	(1.4)	***	21.1	(1.9)	19.9	(1.9)	
Child's birth interval: 2 years (%)	30.2	(1.5)	37.1	(6.4)	29.7	(1.6)		32.8	(2.2)	28.0	(2.1)	
Child's birth interval: 3 years (%)	16.6	(1.2)	23.2	(5.6)	16.1	(1.3)		11.5	(1.5)	21.3	(1.9)	***
Child's birth interval: 4+ years (%)	11.5	(1.1)	4.8	(2.8)	12.0	(1.1)		12.4	(1.6)	10.8	(1.4)	
Child age in months (#)	0.3	(0)	29.0	(2.5)	30.0	(0.6)		0.4	(0)	0.2	(0)	***
Child is HHH son/daughter (%)	84.2	(1.2)	88.7	(4.2)	83.9	(1.3)		82.2	(1.8)	86.0	(1.6)	
Child lives with father (%)	65.1	(1.6)	69.2	(6.1)	64.8	(1.6)		63.4	(2.3)	66.6	(2.2)	
Child lives with mother (%)	100.0	(0.0)	100.0	(0.0)	100.0	(0.0)		100.0	(0.0)	100.0	(0.0)	
<b>c. Kasai Central</b>												
Child is a girl (%)	48.6	(1.7)	41.8	(6.3)	49.0	(1.8)		48.9	(2.4)	48.4	(2.4)	
Child's birth rank (#)	2.6	(0.03)	2.6	(0.1)	2.6	(0.03)		2.6	(0.0)	2.5	(0.1)	
Child's birth interval: 0 year (%)	14.4	(1.2)	16.5	(4.8)	14.2	(1.2)		11.8	(1.5)	17.4	(1.8)	**
Child's birth interval: 1 year (%)	19.5	(1.3)	15.7	(4.7)	19.7	(1.4)		20.3	(1.9)	18.4	(1.9)	
Child's birth interval: 2 years (%)	30.8	(1.6)	34.4	(6.1)	30.6	(1.6)		33.1	(2.3)	28.2	(2.2)	
Child's birth interval: 3 years (%)	15.2	(1.2)	5.9	(3)	15.8	(1.3)		15.4	(1.7)	15.1	(1.7)	
Child's birth interval: 4+ years (%)	12.2	(1.1)	16.9	(4.8)	11.9	(1.1)		12.7	(1.6)	11.5	(1.5)	
Child age in months (#)	29.8	(0.6)	27.8	(2.3)	29.9	(0.6)		32.9	(0.7)	26.1	(0.9)	***
Child is HHH son/daughter (%)	85.5	(1.2)	76.0	(5.5)	86.1	(1.2)	***	88.6	(1.5)	82.0	(1.8)	***
Child lives with father (%)	72.8	(1.5)	62.6	(6.2)	73.4	(1.6)		74.0	(2.1)	71.4	(2.2)	
Child lives with mother (%)	100.0	(0.0)	100.0	(0.0)	100.0	(0.0)		100.0	(0.0)	100.0	(0.0)	
<b>d. DRC National</b>												
Child is a girl (%)	50.8	(0.3)	44.8	(1.3)	51.1	(0.4)	***	46.3	(0.5)	54.0	(0.5)	***
Child's birth rank (#)	2.4	(0.0)	2.5	(0.02)	2.4	(0.01)		2.5	(0.0)	2.4	(0.0)	***
Child's birth interval: 0 year (%)	17.0	(0.3)	15.2	(1.0)	17.1	(0.3)		16.5	(0.4)	17.4	(0.4)	*
Child's birth interval: 1 year (%)	19.6	(0.3)	17.3	(1.0)	19.7	(0.3)	***	21.9	(0.4)	17.9	(0.4)	***
Child's birth interval: 2 years (%)	26.4	(0.3)	27.3	(1.2)	26.3	(0.3)		26.9	(0.5)	26.0	(0.4)	
Child's birth interval: 3 years (%)	14.4	(0.2)	16.6	(1.0)	14.3	(0.3)	***	14.4	(0.4)	14.5	(0.3)	
Child's birth interval: 4+ years (%)	14.2	(0.2)	16.6	(1.0)	14.1	(0.2)	***	11.4	(0.3)	16.3	(0.3)	***
Child age in months (#)	29.4	(0.1)	26.3	(0.5)	29.7	(0.1)	***	32.7	(0.2)	27.1	(0.2)	***
Child is HHH son/daughter (%)	80.1	(0.3)	82.5	(1.0)	79.9	(0.3)	***	80.2	(0.4)	80.0	(0.4)	
Child lives with father (%)	65.7	(0.3)	68.6	(1.2)	65.5	(0.3)	***	65.0	(0.5)	66.1	(0.4)	*
Child lives with mother (%)	100.0	(0.0)	100.0	(0.0)	100.0	(0.0)		100.0	(0.0)	100.0	(0.0)	



Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the representativeness of the sample at the province level. The column All reports the summary statistics for all children. Panel A reports the statistics in the subpopulations of wasted and non-wasted children under five, and the results of t-test mean comparison between the two groups. Panel B reports the statistics in the subpopulations of stunted and non-stunted children under five, and the results of t-test mean comparison between the two groups. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A15: Children’s health and wasting and stunting by province**

	All		Distribution among (Panel A)				Distribution among (Panel B)					
			Wasted		Non-Wasted		Sig	Stunted		Non-Stunted		Sig
	Est.	SD	Est.	SD	Est.	SD		Est.	SD	Est.	SD	
<b>a. Tanganyika</b>												
Child BMI Z-score (#)	0.3	(0.1)	0.2	(2.8)	0.3	(0.0)		0.4	(0.1)	0.3	(0.02)	
Child has disability (%)	3.6	(0.7)	5.2	(3.5)	3.6	(0.7)		3.1	(1.1)	4.0	(1.0)	
Child is still breastfed (%)	34.0	(1.8)	61.0	(7.7)	32.9	(1.8)	***	26.3	(2.7)	39.3	(2.4)	***
Child had diarrhea (%)	0.0	(0.0)	8.9	(4.5)	7.3	(1.0)		0.0	(0.0)	0.0	(0)	
Child had fever (%)	28.2	(1.7)	37.8	(7.7)	27.9	(1.8)		31.0	(2.8)	26.4	(2.1)	
Child had cough (%)	23.5	(1.6)	28.7	(7.2)	23.2	(1.7)		29.4	(2.8)	19.4	(1.9)	***
Child had resp. illness (%)	5.5	(0.9)	14.3	(5.5)	5.1	(0.9)	***	7.5	(1.6)	4.1	(1.0)	*
<b>b. Kasai</b>												
Child BMI Z-score (#)	-0.03	(0.04)	-0.02	(0.01)	00.2	(0.0)	***	0.2	(0.1)	-0.12	(0.1)	***
Child has disability (%)	4.7	(0.7)	5.5	(2.9)	11.5	(1.1)		6.7	(1.2)	3.0	(0.8)	***
Child is still breastfed (%)	37.5	(1.6)	47.2	(6.4)	40.1	(1.7)		27.5	(2.1)	46.4	(2.3)	***
Child had diarrhea (%)	0.0	(0)	28.4	(5.8)	27.4	(1.6)		0.0	(0)	0.0	(0)	
Child had fever (%)	34.7	(1.6)	41.3	(6.3)	48.9	(1.8)		37.4	(2.3)	32.2	(2.2)	*
Child had cough (%)	24.4	(1.4)	61.3	(6.2)	40.2	(1.7)	***	28.8	(2.1)	20.4	(1.9)	***
Child had resp. illness (%)	5.6	(0.8)	24.7	(5.5)	11.9	(1.1)	***	5.4	(1.1)	5.8	(1.1)	
<b>c. Kasai Central</b>												
Child BMI Z-score (#)	0.04	(0.04)	-0.03	(0.01)	0.01	(0.01)	***	0.1	(0.01)	-0.03	(0.01)	
Child has disability (%)	11.1	(1.1)	3.9	(2.6)	4.8	(0.7)		15.1	(1.7)	6.5	(1.2)	***
Child is still breastfed (%)	40.6	(1.7)	45.0	(6.6)	36.9	(1.7)		34.4	(2.3)	47.7	(2.4)	***
Child had diarrhea (%)	0.3	(0)	25.0	(5.7)	17.5	(1.3)		0.3	(0.0)	0.2	(0.0)	***
Child had fever (%)	48.5	(1.7)	28.5	(6.0)	35.1	(1.6)		50.1	(2.4)	46.6	(2.4)	
Child had cough (%)	41.4	(1.7)	10.9	(4.1)	25.4	(1.5)	***	41.4	(2.4)	41.4	(2.4)	
Child had resp. illness (%)	12.7	(1.1)	5.5	(3.0)	5.6	(0.8)		12.2	(1.6)	13.2	(1.6)	
<b>d. DRC National</b>												
Child BMI Z-score (#)	0.2	(0.01)	-1.2	(0.3)	0.2	(0.02)	***	0.4	(0.04)	0.02	(0.04)	***
Child has disability (%)	4.3	(0.1)	2.3	(0.4)	4.5	(0.1)	***	5.8	(0.2)	3.2	(0.2)	***
Child is still breastfed (%)	35.3	(0.3)	46.2	(1.3)	34.6	(0.3)	***	29.0	(0.5)	39.9	(0.5)	***
Child had diarrhea (%)	0.1	(0.0)	18.3	(1.0)	13.7	(0.2)	***	0.1	(0.0)	0.1	(0.0)	***
Child had fever (%)	28.1	(0.3)	34.5	(1.3)	27.7	(0.3)	***	29.7	(0.5)	27.0	(0.4)	***
Child had cough (%)	26.4	(0.3)	30.1	(1.2)	26.2	(0.3)	***	25.8	(0.5)	26.8	(0.4)	
Child had resp. illness (%)	8.6	(0.2)	8.9	(0.8)	8.6	(0.2)		8.8	(0.3)	8.4	(0.3)	

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the representativeness of the sample at the province level. The column All reports the summary statistics for all children. Panel A reports the statistics in the subpopulations of wasted and non-wasted children under five, and the results of t-test mean comparison between the two groups. Panel B reports the statistics in the subpopulations of stunted and non-stunted children under five, and the results of t-test mean comparison between the two groups. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A16: Mother's characteristics and wasting and stunting by province**

	All		Distribution among				Distribution among					
			Wasted		Non-Wasted		Sig	Stunted		Non-Stunted		Sig
	Est.	SD	Est.	SD	Est.	SD		Est.	SD	Est.	SD	
<b>a. Tanganyika</b>												
Mother is HHH (%)	17.6	(1.4)	3.1	(2.7)	18.2	(1.5)	***	10.8	(1.9)	22.3	(2)	***
Mother is spouse of HHH (%)	70.2	(1.7)	80.4	(6.3)	69.8	(1.8)		81.1	(2.4)	62.7	(2.4)	***
Mother is daughter of HHH (%)	7.1	(1)	4.0	(3.1)	7.2	(1)		4.4	(1.3)	8.9	(1.4)	***
Mother is DiL of HHH (%)	0.8	(0.3)	0.0	(0)	0.8	(0.4)		0.5	(0.4)	1.0	(0.5)	
Mother current age (#)	30.3	(0.3)	26.9	(1.2)	30.4	(0.4)		28.7	(0.5)	31.4	(0.5)	***
Mother' age at childbirth < 20 (%)	18.8	(1.5)	24.7	(6.8)	18.6	(1.5)		24.4	(2.6)	14.9	(1.7)	***
Mother' age at childbirth 20-34 (%)	58.0	(1.9)	66.0	(7.5)	57.7	(1.9)		60.5	(3)	56.3	(2.4)	
Mother' age at childbirth >35 (%)	16.3	(1.4)	5.9	(3.7)	16.7	(1.5)		12.2	(2)	19.0	(1.9)	***
Mother education: No schooling (%)	36.5	(1.8)	60.8	(7.7)	35.5	(1.9)	***	36.8	(2.9)	36.3	(2.3)	
Mother education: Primary school (%)	25.6	(1.7)	21.2	(6.5)	25.8	(1.7)		27.5	(2.7)	24.4	(2.1)	
Mother education: Secondary school (%)	36.7	(1.8)	14.1	(5.5)	37.6	(1.9)	***	33.8	(2.9)	38.7	(2.4)	
<b>b. Kasai</b>												
Mother is HHH (%)	25.3	(1.4)	24.0	(5.7)	25.4	(1.5)		27.1	(2.1)	23.7	(2)	
Mother is spouse of HHH (%)	63.1	(1.6)	68.2	(6.2)	62.7	(1.7)		60.2	(2.3)	65.6	(2.2)	
Mother is daughter of HHH (%)	8.2	(0.9)	4.6	(2.8)	8.5	(1)		9.6	(1.4)	7.0	(1.2)	
Mother is DiL of HHH (%)	0.8	(0.3)	0.0	(0)	0.9	(0.3)		0.6	(0.4)	1.0	(0.5)	
Mother current age (#)	31.7	(0.3)	32.0	(1.4)	31.7	(0.3)		32.0	(0.5)	31.5	(0.4)	
Mother' age at childbirth < 20 (%)	13.2	(1.1)	9.6	(3.9)	13.4	(1.2)		14.7	(1.7)	11.8	(1.5)	
Mother' age at childbirth 20-34 (%)	57.9	(1.6)	67.0	(6.2)	57.2	(1.7)		58.5	(2.3)	57.4	(2.3)	
Mother' age at childbirth >35 (%)	20.2	(1.3)	9.2	(3.8)	21.0	(1.4)	***	17.0	(1.8)	23.1	(2)	***
Mother education: No schooling (%)	19.2	(1.3)	22.6	(5.5)	19.0	(1.3)		18.7	(1.8)	19.7	(1.9)	
Mother education: Primary school (%)	46.3	(1.7)	61.7	(6.4)	45.2	(1.7)	***	48.4	(2.4)	44.4	(2.3)	
Mother education: Secondary school (%)	34.4	(1.6)	15.7	(4.8)	35.7	(1.6)	***	32.9	(2.2)	35.7	(2.2)	
<b>c. Kasai Central</b>												
Mother is HHH (%)	19.4	(1.3)	29.7	(5.8)	18.7	(1.4)		20.7	(1.9)	17.9	(1.8)	
Mother is spouse of HHH (%)	70.6	(1.5)	53.9	(6.4)	71.6	(1.6)	***	71.8	(2.2)	69.1	(2.2)	
Mother is daughter of HHH (%)	6.9	(0.9)	3.2	(2.3)	7.1	(0.9)		5.1	(1.1)	9.0	(1.4)	***
Mother is DiL of HHH (%)	1.6	(0.4)	7.5	(3.4)	1.2	(0.4)	***	1.1	(0.5)	2.2	(0.7)	
Mother current age (#)	31.2	(0.3)	31.3	(1.1)	31.2	(0.3)		31.0	(0.4)	31.4	(0.5)	
Mother' age at childbirth < 20 (%)	10.8	(1.1)	15.8	(4.7)	10.5	(1.1)		10.6	(1.5)	11.0	(1.5)	
Mother' age at childbirth 20-34 (%)	67.5	(1.6)	59.1	(6.3)	68.0	(1.6)		70.7	(2.2)	63.9	(2.3)	***
Mother' age at childbirth >35 (%)	13.8	(1.2)	14.4	(4.5)	13.7	(1.2)		12.0	(1.6)	15.8	(1.8)	
Mother education: No schooling (%)	30.2	(1.6)	25.7	(5.6)	30.5	(1.6)		33.6	(2.3)	26.3	(2.1)	***
Mother education: Primary school (%)	38.4	(1.7)	44.5	(6.4)	38.1	(1.7)		40.3	(2.4)	36.3	(2.3)	
Mother education: Secondary school (%)	30.0	(1.6)	29.8	(5.9)	30.0	(1.6)		25.5	(2.1)	35.2	(2.3)	***
<b>d. DRC National</b>												
Mother is HHH (%)	19.8	(0.3)	18.8	(1)	19.9	(0.3)		20.7	(0.4)	19.2	(0.4)	***
Mother is spouse of HHH (%)	65.5	(0.3)	67.8	(1.2)	65.4	(0.3)		65.3	(0.5)	65.7	(0.4)	
Mother is daughter of HHH (%)	9.4	(0.2)	9.4	(0.8)	9.4	(0.2)		9.3	(0.3)	9.5	(0.3)	
Mother is DiL of HHH (%)	2.0	(0.1)	1.5	(0.3)	2.0	(0.1)		1.7	(0.1)	2.3	(0.1)	***
Mother current age (#)	31.3	(0.1)	31.6	(0.2)	31.3	(0.1)		31.3	(0.1)	31.3	(0.1)	
Mother' age at childbirth < 20 (%)	12.2	(0.2)	10.8	(0.8)	12.3	(0.2)		13.8	(0.4)	11.1	(0.3)	***
Mother' age at childbirth 20-34 (%)	63.5	(0.3)	64.2	(1.3)	63.4	(0.3)		63.0	(0.5)	63.9	(0.4)	
Mother' age at childbirth >35 (%)	16.0	(0.3)	18.1	(1)	15.8	(0.3)	***	14.3	(0.4)	17.1	(0.3)	***
Mother education: No schooling (%)	18.8	(0.3)	21.5	(1.1)	18.6	(0.3)	***	22.6	(0.4)	16.0	(0.3)	***
Mother education: Primary school (%)	34.1	(0.3)	37.3	(1.3)	33.9	(0.3)	***	39.4	(0.5)	30.4	(0.4)	***
Mother education: Secondary school (%)	46.2	(0.3)	40.7	(1.3)	46.5	(0.4)	***	37.2	(0.5)	52.6	(0.5)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the representativeness of the sample at the province level. The column All reports the summary statistics for all children. Panel A reports the statistics in the subpopulations of wasted and non-wasted children under five, and the results of t-test mean comparison between the two groups. Panel B reports the statistics in the subpopulations of stunted and non-stunted children under five, and the results of t-test mean comparison between the two groups. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A17: Household characteristics and wasting and stunting by province**

	All		Distribution among				Distribution among					
			Wasted		Non-Wasted		Sig	Stunted		Non-Stunted		Sig
	Est.	SD	Est.	SD	Est.	SD		Est.	SD	Est.	SD	
<b>a. Tanganyika</b>												
HH is rural (%)	65.7	(1.8)	91.0	(4.5)	64.7	(1.9)	***	69.4	(2.8)	63.2	(2.3)	
Number children under 5 (#)	2.0	(0)	2.1	(0.1)	2.0	(0.0)		1.9	(0.0)	2.1	(3.9)	***
Number children aged 5-17 (#)	1.9	(0.1)	0.8	(0.2)	1.9	(0.1)	***	1.7	(0.1)	2.0	(0.1)	***
HH size (#)	6.1	(0.1)	5.3	(0.3)	6.1	(0.1)		5.7	(0.1)	6.3	(0.1)	***
Head of HH age (#)	38.5	(0.4)	35.1	(1.6)	38.7	(0.4)		36.6	(0.6)	39.8	(0.6)	***
Drinking water source: Safe (%)	73.3	(1.7)	65.5	(7.5)	73.6	(1.7)		74.0	(2.7)	72.7	(2.2)	
Drinking water source: Unsafe (%)	15.1	(1.4)	30.9	(7.3)	14.4	(1.4)	***	12.7	(2)	16.6	(1.8)	
Type of toilet: Modern (%)	8.5	(1.1)	0.0	(0)	8.8	(1.1)		9.7	(1.8)	7.7	(1.3)	
Type of toilet: Traditional safe (%)	82.2	(1.5)	64.9	(7.5)	82.9	(1.5)	***	79.3	(2.5)	84.3	(1.8)	
Type of toilet: Open defecation (%)	8.2	(1)	35.1	(7.5)	7.1	(1)	***	8.4	(1.7)	8.1	(1.3)	
Handwashing station (%)	26.3	(1.7)	3.4	(2.9)	27.2	(1.7)	***	26.4	(2.7)	26.2	(2.1)	
Has bed net (%)	55.8	(1.9)	41.5	(7.8)	56.3	(1.9)		53.6	(3)	57.2	(2.4)	
HH wealth quintile 1st (%)	26.7	(1.7)	52.4	(7.9)	25.7	(1.7)	***	29.1	(2.8)	25.1	(2.1)	
HH wealth quintile 2nd (%)	19.6	(1.5)	26.1	(6.9)	19.3	(1.5)		22.7	(2.6)	17.4	(1.8)	
HH wealth quintile 3rd (%)	23.9	(1.6)	17.5	(6)	24.2	(1.7)		20.2	(2.5)	26.5	(2.1)	
HH wealth quintile 4th (%)	25.2	(1.6)	4.0	(3.1)	26.0	(1.7)	***	24.2	(2.6)	25.8	(2.1)	
HH wealth quintile 5th (%)	4.6	(0.8)	0.0	(0)	4.8	(0.8)		3.8	(1.2)	5.2	(1.1)	
<b>b. Kasai</b>												
HH is rural (%)	98.0	(0.5)	98.0	(1.9)	98.0	(0.5)		98.0	(0.7)	97.9	(0.7)	
Number children under 5 (#)	2.0	(0.0)	1.9	(0.1)	2.0	(0)		2.0	(0)	2.0	(3.3)	
Number children aged 5-17 (#)	2.4	(0.1)	2.6	(0.2)	2.3	(0.1)		2.3	(0.1)	2.4	(8.3)	
HH size (#)	6.7	(0.1)	6.9	(0.4)	6.7	(0.1)		6.6	(0.1)	6.7	(0.1)	
Head of HH age (#)	39.4	(0.4)	38.0	(1.5)	39.5	(0.4)		39.2	(0.5)	39.5	(0.1)	
Drinking water source: Safe (%)	12.4	(1.1)	9.9	(4)	12.6	(1.1)		14.2	(1.7)	10.8	(1.4)	
Drinking water source: Unsafe (%)	6.2	(0.8)	4.5	(2.7)	6.3	(0.8)		7.7	(1.3)	4.8	(1)	
Type of toilet: Modern (%)	0.0	(0)	0.0	(0)	0.0	(0)	***	0.0	(0)	0.0	(0)	***
Type of toilet: Traditional safe (%)	59.5	(1.6)	41.9	(6.5)	60.7	(1.7)	***	60.4	(2.3)	58.6	(2.3)	
Type of toilet: Open defecation (%)	40.5	(1.6)	58.1	(6.5)	39.3	(1.7)	***	39.6	(2.3)	41.4	(2.3)	
Handwashing station (%)	1.0	(0.3)	1.5	(1.6)	0.9	(0.3)		0.6	(0.4)	1.3	(0.5)	
Has bed net (%)	32.1	(1.6)	33.5	(6.2)	32.0	(1.6)		26.2	(2.1)	37.4	(2.3)	***
HH wealth quintile 1st (%)	51.8	(1.7)	75.3	(5.7)	50.1	(1.7)	***	54.8	(2.4)	49.2	(2.3)	
HH wealth quintile 2nd (%)	30.7	(1.5)	14.7	(4.7)	31.9	(1.6)	***	30.1	(2.2)	31.3	(2.2)	
HH wealth quintile 3rd (%)	14.2	(1.2)	8.1	(3.6)	14.6	(1.2)		12.4	(1.6)	15.7	(1.7)	
HH wealth quintile 4th (%)	3.3	(0.6)	1.9	(1.8)	3.4	(0.6)		2.7	(0.8)	3.7	(0.9)	
HH wealth quintile 5th (%)	0.0	(0)	0.0	(0)	0.0	(0)		0.0	(0)	0.0	(0)	
<b>c. Kasai Central</b>												
HH is rural (%)	93.3	(0.9)	97.3	(2.1)	93.0	(0.9)		95.6	(1)	90.5	(1.4)	***
Number children under 5 (#)	1.9	(0.0)	2.0	(0.1)	1.9	(0)		1.9	(0.0)	1.9	(0.1)	
Number children aged 5-17 (#)	2.3	(0.1)	2.6	(0.2)	2.2	(0.1)		2.2	(0.1)	2.3	(0.1)	
HH size (#)	6.5	(0.1)	7.0	(0.3)	6.4	(0.1)		6.4	(0.1)	6.6	(0.1)	
Head of HH age (#)	39.0	(0.4)	41.1	(1.4)	38.9	(0.4)		38.4	(0.5)	39.7	(0.1)	
Drinking water source: Safe (%)	17.6	(1.3)	13.5	(4.4)	17.9	(1.4)		17.0	(1.8)	18.3	(1.9)	
Drinking water source: Unsafe (%)	3.0	(0.6)	4.5	(2.6)	2.9	(0.6)		1.6	(0.6)	4.7	(1.0)	***
Type of toilet: Modern (%)	0.3	(0.2)	0.0	(0)	0.3	(0.2)		0.2	(0.2)	0.5	(0.3)	
Type of toilet: Traditional safe (%)	68.1	(1.6)	63.6	(6.2)	68.4	(1.6)		68.4	(2.2)	67.8	(2.2)	
Type of toilet: Open defecation (%)	31.6	(1.6)	36.4	(6.2)	31.3	(1.6)		31.4	(2.2)	31.8	(2.2)	
Handwashing station (%)	4.8	(0.7)	0.1	(0.4)	5.1	(0.8)		3.1	(0.8)	6.8	(1.2)	***
Has bed net (%)	88.3	(1.1)	89.8	(3.9)	88.2	(1.1)		88.3	(1.5)	88.3	(1.5)	
HH wealth quintile 1st (%)	48.3	(1.7)	32.6	(6)	49.2	(1.8)	***	52.7	(2.4)	43.1	(2.4)	***
HH wealth quintile 2nd (%)	29.9	(1.6)	36.2	(6.2)	29.5	(1.6)		31.4	(2.2)	28.1	(2.2)	
HH wealth quintile 3rd (%)	15.0	(1.2)	30.1	(5.9)	14.1	(1.2)	***	11.6	(1.5)	19.0	(1.9)	***
HH wealth quintile 4th (%)	6.8	(0.9)	1.1	(1.3)	7.2	(0.9)		4.2	(1)	9.9	(1.4)	***
HH wealth quintile 5th (%)	0.0	(0)	0.0	(0)	0.0	(0)		0.0	(0)	0.0	(0)	
<b>d. DRC National</b>												
HH is rural (%)	61.2	(0.0)	66.9	(1.2)	60.8	(0.4)	***	73.2	(0.0)	52.6	(0.5)	***

Number children under 5 (#)	2.0	(0.1)	2.0	(0)	2.0	(0)	***	2.1	(0.1)	2.0	(0.8)	***
Number children aged 5-17 (#)	2.2	(0.1)	2.2	(0)	2.2	(0)		2.3	(0.1)	2.2	(0.02)	***
HH size (#)	6.7	(0.4)	6.5	(0.1)	6.7	(0)	***	6.8	(0.5)	6.7	(0.02)	***
Head of HH age (#)	40.0	(1.3)	39.9	(0.3)	40.0	(0.1)		39.7	(1.8)	40.3	(0.1)	***
Drinking water source: Safe (%)	54.8	(0.6)	48.0	(1.3)	55.2	(0.4)	***	46.8	(0.6)	60.5	(0.5)	***
Drinking water source: Unsafe (%)	17.4	(0.2)	17.0	(1)	17.4	(0.3)		20.5	(0.2)	15.2	(0.3)	***
Type of toilet: Modern (%)	9.6	(1.6)	5.1	(0.6)	9.9	(0.2)	***	4.9	(2.2)	13.0	(0.3)	***
Type of toilet: Traditional safe (%)	77.4	(1.6)	76.4	(1.1)	77.5	(0.3)		80.6	(2.2)	75.1	(0.4)	***
Type of toilet: Open defecation (%)	13.0	(0.7)	18.4	(1)	12.6	(0.2)	***	14.4	(0.8)	12.0	(0.3)	***
Handwashing station (%)	24.6	(1.1)	17.7	(1)	25.1	(0.3)	***	22.5	(1.5)	26.2	(0.4)	***
Has bed net (%)	67.8	(1.7)	64.9	(1.3)	68.0	(0.3)	***	62.0	(2.4)	72.0	(0.4)	***
HH wealth quintile 1st (%)	23.6	(1.6)	28.7	(1.2)	23.2	(0.3)	***	29.5	(2.2)	19.3	(0.4)	***
HH wealth quintile 2nd (%)	21.6	(1.2)	22.3	(1.1)	21.6	(0.3)		26.0	(1.5)	18.5	(0.4)	***
HH wealth quintile 3rd (%)	19.8	(0.9)	21.5	(1.1)	19.7	(0.3)		21.7	(1.0)	18.5	(0.4)	***
HH wealth quintile 4th (%)	19.3	(0.0)	15.5	(1)	19.6	(0.3)	***	16.1	(0.0)	21.7	(0.4)	***
HH wealth quintile 5th (%)	15.6	(0.0)	12.0	(0.9)	15.9	(0.3)	***	6.7	(0.0)	22.1	(0.4)	***

Notes: The table presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the representativeness of the sample at the province level. The column All reports the summary statistics for all children. Panel A reports the statistics in the subpopulations of wasted and non-wasted children under five, and the results of the t-test mean comparison between the two groups. Panel B reports the statistics in the subpopulations of stunted and non-stunted children under five, and the results of t-test mean comparison between the two groups. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A18: Infant and young children feeding practices and wasting and stunting by province**

	All		Distribution among (Panel A)					Distribution among (Panel B)				
			Wasted		Non-Wasted		Sig	Stunted		Non-Stunted		Sig
	Est.	SD	Est.	SD	Est.	SD		Est.	SD	Est.	SD	
<b>a. Tanganyika</b>												
Ate grains/roots/tubers (%)	35.1	(3.3)	59.9	(10.7)	33.0	(3.4)	***	40.0	(5.9)	33.1	(4)	
Ate pulses (%)	9.0	(2)	6.8	(5.5)	9.1	(2.1)		17.6	(4.6)	5.3	(1.9)	***
Ate dairy (%)	0.2	(0.3)	0.0	(0.0)	0.2	(0.3)		0.0	(0.0)	0.3	(0.5)	
Ate meat/poultry/fish (%)	16.0	(2.5)	24.1	(9.3)	15.4	(2.6)		11.5	(3.8)	17.9	(3.2)	
Ate eggs (%)	6.7	(1.7)	12.9	(7.3)	6.2	(1.8)		9.4	(3.5)	5.6	(1.9)	
Ate leafy greens and veggies (%)	50.7	(3.4)	74.6	(9.5)	48.7	(3.6)	***	49.0	(6)	51.4	(4.2)	
Ate other Vit A-rich fruits/veggies (%)	20.0	(2.7)	61.2	(10.6)	16.5	(2.7)	***	22.1	(5)	19.0	(3.3)	
Ate other vegetables (%)	21.8	(2.8)	43.3	(10.8)	19.9	(2.9)	***	28.9	(5.4)	18.8	(3.3)	
Ate other fruits (%)	1.1	(0.7)	0.0	(0)	1.2	(0.8)		1.3	(1.3)	1.1	(0.9)	
Number of food groups eaten (#)	1.6	(0.1)	2.3	(0.5)	1.5	(0.1)	***	1.8	(0.2)	1.5	(0.1)	***
Minimum Diet Diversity (%)	6.4	(1.7)	12.8	(7.3)	5.9	(1.7)		3.2	(2.1)	7.8	(2.3)	
Intake of sodium (%)	1.1	(0.7)	6.8	(5.5)	0.6	(0.6)	***	0.0	(0)	1.6	(1)	
Intake of water (%)	69.5	(3.2)	88.1	(7.1)	67.9	(3.4)		78.3	(4.9)	65.8	(4)	
Intake of formula (%)	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)		0.0	(0.0)	0.0	(0.0)	
<b>b. Kasai</b>												
Ate grains/roots/tubers	45.4	(2.6)	66.1	(8.2)	43.4	(2.7)	***	39.8	(4.3)	29.1	(3.1)	***
Ate pulses	15.5	(1.9)	7.8	(4.7)	16.2	(2)		7.6	(2.3)	7.1	(1.8)	
Ate dairy	5.2	(1.2)	10.7	(5.4)	4.7	(1.2)		1.0	(0.9)	0.5	(0.5)	
Ate meat/poultry/fish	33.8	(2.5)	53.0	(8.7)	31.9	(2.6)	***	24.0	(3.8)	14.6	(2.4)	***
Ate eggs	2.7	(0.9)	0.5	(1.2)	2.9	(0.9)		0.6	(0.7)	2.0	(1)	
Ate leafy greens and veggies	61.4	(2.6)	69.4	(8)	60.6	(2.7)		77.2	(3.7)	52.4	(3.4)	***
Ate other Vit A-rich fruits/veggies	26.6	(2.3)	38.5	(8.5)	25.5	(2.4)		14.0	(3.1)	14.8	(2.4)	
Ate other vegetables	25.8	(2.3)	18.1	(6.7)	26.5	(2.4)		26.9	(3.9)	24.7	(3)	
Ate other fruits	20.9	(2.1)	21.1	(7.1)	20.8	(2.2)		1.6	(1.1)	0.8	(0.6)	
Number of food groups eaten	2.4	(0.1)	2.9	(0.3)	2.3	(0.1)	***	1.9	(0.1)	1.5	(0.1)	***
Minimum Diet Diversity	16.2	(1.9)	6.8	(4.4)	17.1	(2.1)		1.6	(1.1)	3.5	(1.3)	
Intake of sodium	1.6	(0.7)	3.2	(3)	1.5	(0.7)		0.5	(0.6)	1.0	(0.7)	
Intake of water	78.4	(2.2)	80.2	(6.9)	78.2	(2.3)		74.5	(3.9)	63.5	(3.3)	***
Intake of formula	6.2	(1.3)	1.0	(1.7)	6.7	(1.4)		13.5	(3)	11.1	(2.2)	
<b>c. Kasai Central</b>												
Ate grains/roots/tubers	33.7	(2.6)	19.9	(7.2)	34.8	(2.7)		56.3	(4.7)	40.1	(3.1)	***
Ate pulses	7.3	(1.4)	9.9	(5.4)	7.1	(1.5)		13.1	(3.2)	16.6	(2.4)	
Ate dairy	0.7	(0.4)	1.0	(1.8)	0.6	(0.5)		3.4	(1.7)	6.1	(1.5)	
Ate meat/poultry/fish	18.7	(2.1)	12.6	(6)	19.2	(2.2)		36.8	(4.5)	32.3	(3)	
Ate eggs	1.4	(0.6)	2.7	(2.9)	1.3	(0.6)		1.6	(1.2)	3.3	(1.1)	
Ate leafy greens and veggies	63.1	(2.6)	54.7	(8.9)	63.7	(2.7)		71.7	(4.2)	56.4	(3.2)	***
Ate other Vit A-rich fruits/veggies	14.4	(1.9)	14.5	(6.3)	14.4	(2)		30.5	(4.3)	24.8	(2.8)	
Ate other vegetables	25.7	(2.4)	13.5	(6.1)	26.7	(2.5)		21.8	(3.9)	27.7	(2.9)	
Ate other fruits	1.2	(0.6)	0.0	(0)	1.2	(0.6)		18.9	(3.7)	21.8	(2.6)	
Number of food groups eaten	1.7	(0.1)	1.3	(0.2)	1.7	(0.1)	***	2.5	(0.2)	2.3	(0.1)	***
Minimum Diet Diversity	2.7	(0.9)	2.7	(2.9)	2.7	(0.9)		15.6	(3.4)	16.4	(2.4)	
Intake of sodium	0.7	(0.5)	0.0	(0)	0.8	(0.5)		0.8	(0.8)	2.0	(0.9)	
Intake of water	68.2	(2.5)	82.9	(6.8)	67.0	(2.7)		85.7	(3.3)	74.8	(2.8)	***
Intake of formula	12.2	(1.8)	10.1	(5.4)	12.3	(1.9)		5.0	(2.1)	6.8	(1.6)	
<b>d. DRC National</b>												
Ate grains/roots/tubers	48.3	(0.6)	51.1	(1.9)	48.0	(0.6)		55.2	(1)	44.7	(0.7)	***
Ate pulses	11.5	(0.4)	8.2	(1.0)	11.8	(0.4)	***	13.1	(0.7)	10.7	(0.4)	***
Ate dairy	6.8	(0.3)	7.2	(1.0)	6.8	(0.3)		4.7	(0.4)	7.9	(0.4)	***
Ate meat/poultry/fish	37.2	(0.5)	36.5	(1.8)	37.3	(0.6)		38.8	(0.9)	36.4	(0.7)	***
Ate eggs	5.5	(0.3)	6.8	(0.9)	5.4	(0.3)		5.1	(0.4)	5.7	(0.3)	
Ate leafy greens and veggies	50.8	(0.6)	52.1	(1.9)	50.7	(0.6)		59.0	(1)	46.7	(0.7)	***
Ate other Vit A-rich fruits/veggies	18.8	(0.4)	23.5	(1.6)	18.4	(0.5)	***	20.7	(0.8)	17.9	(0.5)	***
Ate other vegetables	28.1	(0.5)	25.3	(1.6)	28.3	(0.5)		29.5	(0.9)	27.4	(0.6)	
Ate other fruits	9.5	(0.3)	8.6	(1.0)	9.6	(0.3)		9.3	(0.6)	9.6	(0.4)	

Number of food groups eaten	2.2	(0.0)	2.2	(0.1)	2.2	(0.0)	2.4	(0.1)	2.1	(0.1)	***
Minimum Diet Diversity	11.6	(0.4)	10.6	(1.1)	11.7	(0.4)	12.1	(0.6)	11.3	(0.4)	
Intake of sodium	6.1	(0.3)	6.8	(0.9)	6.0	(0.3)	5.8	(0.5)	6.2	(0.3)	
Intake of water	65.4	(0.5)	66.4	(1.8)	65.3	(0.6)	69.6	(0.9)	63.2	(0.7)	***
Intake of formula	3.3	(0.2)	1.4	(0.4)	3.5	(0.2)	3.2	(0.3)	3.4	(0.2)	

Notes: The table is limited to children under 2 years old. It presents the means and standard deviations of the variables in the rows. Units of variables are indicated in parentheses next to the variable labels. All statistics are constructed using survey weights to reflect the representativeness of the sample at the province level. The column All reports the summary statistics for all children. Panel A reports the statistics in the subpopulations of wasted and non-wasted children under five, and the results of the t-test mean comparison between the two groups. Panel B reports the statistics in the subpopulations of stunted and non-stunted children under five, and the results of t-test mean comparison between the two groups. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table A19: Full regression coefficients and standard errors of the correlates of child wasting and stunting by provinces**

Variable Description	Wasting - children under five				Stunting - children under five			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tanganyika	Kasai	Kasai Central	DRC National	Tanganyika	Kasai	Kasai Central	DRC National
Child is a girl	-0.07***	0.02	0.01	-0.02***	-0.11***	-0.09***	0.01	-0.07***
	(0.02)	(0.01)	(0.01)	(0.00)	(0.04)	(0.03)	(0.04)	(0.01)
Child's birth rank	-0.00	-0.01	-0.01	-0.01*	0.03	-0.03	0.04	0.03***
	(0.02)	(0.01)	(0.02)	(0.00)	(0.04)	(0.03)	(0.04)	(0.01)
Childbirth interval: 0 year	0.04	-0.02	-0.00	-0.01*	-0.15*	-0.08	-0.06	0.02
	(0.03)	(0.03)	(0.03)	(0.01)	(0.08)	(0.07)	(0.08)	(0.01)
Childbirth interval: 1 year	-0.01	-0.02	-0.03	-0.01	0.04	0.03	0.03	0.05***
	(0.02)	(0.02)	(0.02)	(0.00)	(0.05)	(0.04)	(0.04)	(0.01)
Child age in months	-0.00	0.00	-0.00	-0.00	0.00*	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Child is HHH son/daughter	-0.10**	0.05	-0.10	0.00	0.23*	-0.10	0.09	-0.01
	(0.05)	(0.06)	(0.07)	(0.01)	(0.12)	(0.15)	(0.16)	(0.02)
Child lives with father	0.08**	0.03	-0.09*	0.00	-0.11	0.12	0.07	-0.03*
	(0.04)	(0.06)	(0.05)	(0.01)	(0.10)	(0.14)	(0.11)	(0.02)
Child BMI Z-score	0.00	-0.11***	-0.10***	-0.00***	0.00	0.06***	0.03*	0.00***
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)
Child has disability	0.01	0.02	-0.02	-0.02***	0.04	0.06	0.10*	0.08***
	(0.05)	(0.04)	(0.02)	(0.01)	(0.11)	(0.08)	(0.06)	(0.02)
Child is still breastfed	0.03	0.01	0.00	0.02***	-0.08	0.11**	0.04	-0.00
	(0.03)	(0.02)	(0.02)	(0.01)	(0.07)	(0.05)	(0.06)	(0.01)
Child had diarrhea	0.00	-0.00	-0.00	0.01***	-0.03	0.01	0.16***	0.04***
	(0.03)	(0.02)	(0.02)	(0.01)	(0.07)	(0.04)	(0.04)	(0.01)
Child had fever	0.01	-0.03*	-0.05***	0.02***	-0.03	0.02	0.02	0.03***
	(0.02)	(0.02)	(0.02)	(0.00)	(0.05)	(0.04)	(0.04)	(0.01)
Child had cough	-0.01	-0.03	0.04**	0.01**	0.14***	0.08*	-0.02	-0.00
	(0.02)	(0.02)	(0.02)	(0.00)	(0.05)	(0.05)	(0.04)	(0.01)
Child had resp. illness	0.07*	0.00	0.03	-0.01	0.28***	0.02	-0.05	-0.01
	(0.04)	(0.03)	(0.02)	(0.01)	(0.09)	(0.08)	(0.06)	(0.01)
Mother is HHH	0.02	0.06	-0.03	-0.01	-0.37***	0.10	0.10	-0.06***
	(0.04)	(0.06)	(0.05)	(0.01)	(0.10)	(0.14)	(0.11)	(0.02)
Mother is daughter of HHH	-0.02	0.06	-0.29***	0.00	-0.10	0.36***	0.03	-0.00
	(0.05)	(0.05)	(0.05)	(0.01)	(0.13)	(0.12)	(0.13)	(0.02)
Mother current age	-0.00	-0.00**	-0.00	0.00***	-0.01**	0.00	-0.01**	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)

Notes: Linear probability model estimated using OLS regressions. For each variable, the first row is coefficient estimates and the second row is the standard error. All regressions include survey weights and dummies for strata within provinces. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table A19 continued from page 76

Variable Description	Wasting - children under five				Stunting - children under five			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tanganyika	Kasai	Kasai Central	DRC National	Tanganyika	Kasai	Kasai Central	DRC National
Mother' age at childbirth < 20	-0.03 (0.03)	-0.05* (0.03)	-0.00 (0.03)	0.00 (0.01)	0.07 (0.07)	0.02 (0.06)	0.05 (0.07)	0.04*** (0.01)
Mother education: Prim school	-0.05** (0.02)	-0.02 (0.02)	0.01 (0.02)	0.00 (0.01)	0.07 (0.06)	0.06 (0.05)	0.02 (0.05)	0.01 (0.01)
Mother education: Sec+ school	-0.04 (0.03)	-0.07*** (0.02)	-0.00 (0.02)	-0.00 (0.01)	0.11* (0.06)	-0.02 (0.06)	-0.05 (0.05)	-0.03** (0.01)
HH is rural	0.03 (0.07)	-0.03 (0.07)	0.04 (0.04)	-0.11 (0.07)	0.26 (0.17)	-0.08 (0.16)	0.04 (0.09)	-0.07 (0.14)
Number children under 5	0.02 (0.01)	-0.05*** (0.01)	0.01 (0.01)	-0.00 (0.00)	-0.07** (0.03)	-0.03 (0.03)	-0.04 (0.03)	-0.01* (0.00)
HH size	-0.01 (0.01)	0.01** (0.00)	0.00 (0.01)	0.00* (0.00)	-0.01 (0.01)	0.02* (0.01)	0.01 (0.01)	0.01*** (0.00)
Head of HH age	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	-0.00* (0.00)	-0.00 (0.00)	-0.01*** (0.00)	0.00 (0.00)	-0.00 (0.00)
Head of HH: Prim school	0.01 (0.03)	0.05* (0.03)	0.03 (0.03)	-0.02** (0.01)	0.02 (0.06)	0.01 (0.07)	-0.01 (0.07)	-0.02* (0.01)
Head of HH: Sec+ school	0.01 (0.03)	0.08** (0.03)	0.00 (0.03)	-0.02*** (0.01)	-0.07 (0.07)	0.08 (0.07)	-0.09 (0.07)	-0.03* (0.01)
Has electricity	-0.02 (0.03)	-0.04 (0.10)	0.04 (0.05)	0.01 (0.01)	0.05 (0.06)	0.05 (0.22)	-0.08 (0.12)	-0.08*** (0.01)
Drinking water source: Safe	0.05** (0.02)	0.01 (0.02)	0.01 (0.02)	-0.00 (0.00)	0.11** (0.05)	0.07 (0.05)	0.10* (0.05)	-0.01 (0.01)
Type of toilet: Open defecation	0.12*** (0.03)	0.02 (0.02)	-0.00 (0.02)	0.02*** (0.01)	0.04 (0.08)	-0.06* (0.04)	-0.05 (0.04)	-0.03** (0.01)
Water to wash hand	-0.06** (0.02)	0.04 (0.07)	-0.04 (0.03)	-0.01*** (0.00)	-0.00 (0.06)	-0.10 (0.17)	-0.27*** (0.08)	-0.03*** (0.01)
Has bed net	-0.01 (0.02)	-0.01 (0.02)	0.01 (0.02)	-0.01* (0.00)	-0.02 (0.05)	-0.06 (0.04)	-0.02 (0.05)	-0.04*** (0.01)
HH wealth quintile 2nd	0.02 (0.03)	-0.02 (0.02)	0.04** (0.02)	-0.01 (0.01)	0.06 (0.06)	-0.05 (0.04)	-0.11** (0.04)	-0.02* (0.01)
HH wealth quintile 3rd-5th	0.01 (0.03)	-0.01 (0.02)	0.06*** (0.02)	0.01* (0.01)	-0.02 (0.06)	-0.12** (0.05)	-0.16*** (0.05)	-0.06*** (0.01)
<b>Observations</b>	629	837	792	18,987	629	837	792	18,987
<b>R-squared</b>	0.14	0.35	0.32	0.04	0.19	0.19	0.14	0.13

Notes: Linear probability model estimated using OLS regressions. For each variable, the first row is coefficient estimates and the second row is the standard error. All regressions include survey weights and dummies for strata within provinces. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table A20: Full regression coefficients and standard errors of the correlates of child wasting and stunting by provinces - infant and young children feeding practices**

Variable Description	Wasting regressions - Children under 2				Stunting regressions - Children under 2			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tanganyika	Kasai	Kasai Central	DRC National	Tanganyika	Kasai	Kasai Central	DRC National
Ate grains/roots/tubers	-0.01 (0.05)	0.02 (0.03)	-0.08** (0.04)	0.01 (0.01)	0.06 (0.08)	0.12* (0.06)	-0.04 (0.08)	0.01 (0.01)
Ate pulses	-0.09 (0.08)	-0.00 (0.05)	0.02 (0.05)	-0.03*** (0.01)	0.40*** (0.14)	-0.22*** (0.08)	-0.03 (0.11)	-0.02 (0.02)
Ate dairy	-0.28 (0.39)	0.01 (0.07)	0.18 (0.16)	0.01 (0.01)	-0.23 (0.64)	-0.12 (0.12)	0.47 (0.36)	-0.08*** (0.02)
Ate meat/poultry/fish	-0.08 (0.07)	0.08** (0.03)	-0.07* (0.04)	-0.00 (0.01)	0.09 (0.12)	-0.12** (0.06)	0.07 (0.08)	-0.04*** (0.01)
Ate eggs	0.10 (0.11)	-0.10 (0.08)	0.11 (0.12)	0.02 (0.01)	0.49*** (0.18)	-0.14 (0.14)	-0.11 (0.27)	0.01 (0.02)
Ate leafy greens and veggies	0.03 (0.05)	0.01 (0.04)	-0.03 (0.04)	-0.01 (0.01)	-0.19** (0.09)	0.04 (0.07)	0.13 (0.08)	-0.03** (0.01)
Ate others Vit A-rich fruits/veggies	0.15** (0.06)	0.10** (0.04)	0.06 (0.04)	0.03*** (0.01)	-0.13 (0.10)	-0.00 (0.07)	-0.05 (0.10)	-0.03* (0.02)
Ate other vegetables	-0.03 (0.06)	-0.06* (0.03)	-0.02 (0.04)	-0.02** (0.01)	0.08 (0.10)	-0.01 (0.06)	0.04 (0.08)	-0.00 (0.01)
Ate other fruits	-0.10 (0.19)	0.07 (0.05)	0.01 (0.13)	-0.00 (0.01)	0.17 (0.31)	-0.12 (0.09)	0.29 (0.27)	-0.01 (0.02)
Infant minimum diversity (>5)	0.21 (0.14)	-0.20*** (0.07)	0.02 (0.11)	-0.02 (0.01)	-0.31 (0.23)	0.15 (0.12)	-0.33 (0.24)	0.05** (0.02)
Intake of sodium	0.33* (0.19)	0.02 (0.11)	-0.33** (0.15)	0.00 (0.01)	-0.76** (0.31)	-0.05 (0.20)	-0.41 (0.32)	0.04* (0.02)
Intake of water	0.03 (0.06)	-0.06 (0.04)	0.01 (0.04)	0.00 (0.01)	0.00 (0.09)	-0.09 (0.08)	0.04 (0.08)	-0.01 (0.01)
Intake of formula		-0.00 (0.07)	-0.03 (0.06)	-0.04** (0.02)		-0.18 (0.12)	0.04 (0.13)	0.03 (0.03)
Observations	208	354	334	7,695	208	354	334	7,695
R-squared	0.33	0.42	0.43	0.05	0.37	0.33	0.22	0.16

Notes: Linear probability model estimated using OLS regressions. For each variable, the first row is coefficient estimates and the second row is the standard error. All the regressions include the variables in Table A19 but their coefficients are not shown to simplify the table. All regressions include survey weights and dummies for strata within provinces. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Annex B2: Additional tables and figures from malnutrition analyses**
**Table A21: Key relevant literature on the correlates of child malnutrition and food security**

Authors and title	Geographies	Methods	Correlates associated with an increase of malnutrition
Bapolisi, W. A., Ferrari, G., Bisimwa, G., & Merten, S. (2021). Gendered determinants of food insecurity in ongoing regional conflicts, North and South Kivu, the Democratic Republic of Congo. <i>Agriculture &amp; Food Security, 10</i> (1), 1-9.	DRC, North and South Kivu	Data: Household survey of women Outcomes: Model: Multilevel ordinal logistic regression	Household poverty Low human capital (education) Low women's participation in household decision making Higher tolerance of gender-based violence
Boah, M., Azupogo, F., Amporfro, D. A., & Abada, L. A. (2019). The epidemiology of undernutrition and its determinants in children under five years in Ghana. <i>Plos one, 14</i> (7), e0219665.	Ghana	Data: Household survey of women (DHS) Model: Logistic regression	
Kandala, N. B., T. P. Madungu, J.B.O. Emina, K.P.D. Nzita, and F.P. Cappuccio (2011). 'Malnutrition among Children under the Age of Five in the Democratic Republic of Congo (DRC): Does Geographic Location Matter?' <i>Public Health, 11</i> (261), doi: 10.1186/1471-2458-11-261.	DRC	National household survey (2007 DHS) Food security outcomes: stunting Model: Geo-additive semi-parametric mixed model	Geographic location Female child Age of children Female head of household Low education of the mother Mother's health (as proxied by BMI) Delivery outside of a hospital Household poverty
De Sherbinin, A. (2011). The biophysical and geographical correlates of child malnutrition in Africa. <i>Population, Space and Place, 17</i> (1), 27-46.	SSA	National household surveys (DHS) Food security outcomes: underweight Model: spatial error model	Drought prevalence The percentage of households with piped water Diarrheal disease prevalence
Grace, K., Davenport, F., Funk, C., & Lerner, A. M. (2012). Child malnutrition and climate in Sub-Saharan Africa: An analysis of recent trends in Kenya. <i>Applied Geography, 35</i> (1-2), 405-413.	Kenya	National household surveys (DHS) Food security outcomes: stunting  Model: multilevel regression models	Low birth weight Low mother's height Characteristics of house materials Low mother's education Low precipitation Regions