

# Comprehensive Food Security And Vulnerability Analysis (CFSVA)

## Uganda

April 2013



World Food Programme

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## Acknowledgments

This comprehensive food security and vulnerability analysis (CSFVA) is a collaboration between the World Food Programme (WFP) Uganda and the Uganda Bureau of Statistics (UBOS). It is funded by the Bill and Melinda Gates Foundation. Angela Kiconco, Stephen Baryahirwa and James Muwonge worked on the report on behalf of UBOS alongside Richard Baslisrwa and Kenneth Anyanzo from the WFP country office, and Genevieve Chicoine from the WFP Regional Kampala Office. Astrid Mathiassen, Siemon Hollema and Katy Williams provided technical support from WFP headquarters.

### 1. Key findings

- Nationally almost half (48%) of Ugandans were food energy deficient between September 2009 and August 2010<sup>1</sup>. The proportion was relatively similar across regions, but spiked at 59% in northern Uganda, which is the most food insecure region. Some 12% of northern households were surviving on one meal a day compared with 6.3% at the national level.
- Low dietary diversity<sup>2</sup> was a key problem especially in western Uganda. Nationally over a third of Ugandans had low dietary diversity rising to well over half in the western region (55%). The region also had the highest rates of childhood stunting.
- Nearly 5% of Ugandans had poor food consumption, which reflects an extremely unbalanced diet, that is devoid of protein and chiefly comprised of starchy maize or matooke (plantain) flavoured with some vegetables. Seventeen percent had borderline food consumption, which means they consumed a slightly more varied diet with more pulses, vegetables and sugars, but still barely any animal proteins, milk or fruit.
- A third of Ugandan children were stunted, 14% severely so, and the rate was “serious”<sup>3</sup> in western (42%) and eastern (36%) Uganda. Rural Ugandans were also more likely to be stunted than urban (37% vs 14%).
- Nationally, 5% of under fives were wasted with children in rural areas three times more likely to have acute malnutrition than urban. In northern and central regions wasting was rated ‘poor’ on the basis of the WHO guidelines (i.e. above 5%), peaking at 7% in northern Uganda. Overall, 15% of under fives were underweight, though again prevalence was higher in rural Uganda and the north.
- Food insecurity was more of a rural phenomenon across all food security indicators except for caloric deficiency. Rural dwellers may tend to consume more calories by bulking up on staples to fuel them to carry out a higher level of manual work, but they are more likely to forego diversity in their diet by comparison with their urban counterparts.
- Food insecurity and malnutrition were strongly associated with monetary poverty (here measured by the expenditure quintile<sup>4</sup>). Despite Uganda’s progress in reducing the incidence of poverty, the absolute number of poor people has increased due to population growth and poverty remains firmly entrenched in rural areas, especially in the northern region. About 30% of all rural people still live below the national rural poverty line.
- The poorest households in rural Uganda were the most dependent on purchasing their food, making them highly vulnerable to food price rises for the foods they need to buy.

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<sup>1</sup> Their regular diet fails to provide them with the minimum dietary energy requirement<sup>1</sup> to lead an active and healthy life

<sup>2</sup> They consumed food from fewer than five out of seven food groups in the week leading up to the survey,

<sup>3</sup> According to WHO thresholds the chronic malnutrition situation in these regions is considered “serious” (30-39%).

<sup>4</sup> The expenditure quintiles rank the population from the poorest 20% to the richest 20% based on household aggregate consumption expenditure.

- A fifth of households depend on ‘rural mixed subsistence farming only’<sup>5</sup> for their livelihood and these farmers constituted some of the poorest (37% live below the national poverty line and 52% were in the two lowest expenditure quintiles). They scored particularly badly on the diversity indicators - more than half (52%) had low dietary diversity. But the food security situation of subsistence farmers improves dramatically when they diversify their income by engaging in ‘non-agricultural enterprises’ too.
- The almost total dependence on rain-fed agriculture means harvests were way below their potential, especially in drought prone areas such as Karamoja. Nearly three quarters (74%) of northern Ugandan households said they had suffered drought /irregular rains in the year preceding the survey, which nearly always led to a decline in food production (94%) and income (81%) forcing two fifths of them to change their dietary patterns.

## 2. Background to the CFSVA

The data for the analysis is from the Uganda National Panel Survey (UNPS) 2009/2010. This is the first round of the panel survey to be included on an annual basis. The first wave of data collection ran from September 2009 through August 2010 and the sample used for this analysis consisted of 2,563 households. The UNPS is representative at the national, urban/rural and regional levels (north, east, west and central regions). The survey includes core information for food security analysis such as food consumption, poverty, nutrition and livelihoods.

This UNPS survey program is a part of the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA), a household survey project implemented by the Living Standards Measurement Study (LSMS) unit within the Development Research Group at the World Bank. The LSMS-ISA project collaborates with the national statistics offices in Sub-Saharan Africa (SSA) to design and implement systems of multi-topic, nationally representative panel household surveys with a strong focus on agriculture.

### Objectives of the CFSVA

The overall objective of the CFSVA is to provide information on the food security, vulnerability to food security and nutritional status in Uganda by:

- Establishing the distribution of food insecure and vulnerable households in the context of the human, social, physical and natural capital.
- Establishing the various risks that households are exposed to and the coping mechanisms they employ.
- Evaluating the causal relationships between factors that determine food and nutrition security.
- Evaluating the effects of seasonality on food security outcomes

### How to measure food security and nutrition

#### Food security

‘Food security’ defines a situation in which all people at all times have physical and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO, 1996).

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<sup>5</sup> Subsistence farmers are defined as persons who grow crops largely for home consumption though they occasionally sell any surpluses for money.

This report provides an overview of food security at the national (urban and rural) and regional level in Uganda. Food security depends upon three main factors:

**Availability of food** -This is the extent to which sufficient quantity and quality of food is physically present in an area. This includes food found in markets, produced on local farms or home gardens or provided as food aid or gifts.

**Access to food** - Even if food is available people cannot always access it. Food access is ensured when communities, households and all individuals have enough resources to obtain sufficient quantity and quality of food for a nutritious diet through a combination of home production, stocks, purchase, barter, gifts, borrowing or food aid.

**Utilization of food** - Even if food is available and can be accessed, inefficient absorption of food by the body will lead to malnutrition. Food utilisation may be affected by endemic disease, unsafe drinking water, poor sanitation or lack of appropriate nutritional knowledge, especially child feeding practices.

## Nutrition

The nutritional status of a population can be assessed by anthropometric measurements of the most vulnerable i.e., children under the age of five and women, as well as micro-nutrient measurements.

The critical period is the first thousand days of a child's life. When deprived of nutritious food, a child's physical development is impaired and he or she matures into an adult that is less likely to reach his or her optimal cognitive development and is more prone to disease. This adult will be less productive with a far greater likelihood of being stuck in poverty, thereby perpetuating the cycle of food insecurity and malnutrition.

Malnutrition is not a simple problem with a single cause and silver bullet solution. Its immediate causes are inadequate dietary intake and illness which can create a vicious circle: a malnourished child is more susceptible to illness and inversely when a child is ill, he/she is more prone to becoming malnourished. Children entering this cycle can fall into a potentially fatal spiral as one condition perpetuates the other.

These immediate causes of malnutrition have underlying causes themselves, such as inadequate access to food in a household, insufficient health services, an unhealthy living environment and inadequate care for women and children.

There is no single measure to judge food security and nutrition status, but a variety of measurement techniques provide insight into the many aspects of consumption and nutrition.

In this analysis the state of household food insecurity is assessed by:

### Measuring the quantity of food that its members consume

Households consuming less than a threshold amount of calories required to stay healthy and maintain regular physical activity can be classified as food insecure. Daily energy consumption needs vary according to the age, build, sex and activity levels of household members ( FAO/WHO/UNU 200). When it lacks energy, the body compensates by slowing down its physical and mental activities.

### Measuring the quality/diversity of food that its members consume

Households consuming a, non-diversified, unbalanced and unhealthy diet, can be classified as food insecure. Hungry people spend a larger share, if not all, of their food budget on macronutrient dense staples, such as rice and wheat, which provide cheap and accessible sources of calories. They don't consume nutrient dense foods providing a good source of protein

and micronutrients. Therefore the less varied the food intake by members of a household, the more likely they are to be food insecure. Dietary diversity can be captured by simply measuring the number of food groups (out of seven) that a household consumes over a reference period of seven days.

### **Calculating the food consumption score**

This combines food diversity, food frequency (the number of days each food group is consumed) weighted by the relative nutritional importance of different food groups. Cereals, tubers and root crops are assigned a weighting of 2; pulses a weighting of 3; vegetables, relish and fruit 1; meat, eggs, fish and dairy 4; sugar, oils, fats and butter 0.5. The food consumption score uses standardized thresholds that subsequently divide households into three groups: poor food consumption, borderline food consumption and acceptable food consumption.

### **Measuring nutrition**

This is done by comparing the anthropometric indicators for children under the age of five (stunting, wasting and underweight) against a healthy reference population as defined by the World Health Organisation. Stunting or low height-for-age is defined as having a height at least two standard deviations below the median height for a reference population. Stunting among children is a strong nutritional indicator for chronic food insecurity as insufficient calorie intake translates into reduced child growth. Underweight or low weight-for-age is similarly defined and reflects both chronic and acute malnutrition. Wasting is based on standardized weight-for-height and low values can be a measure of acute malnutrition.

Food security can be transitory or chronic in nature. Transitory food insecurity is of a temporary nature and caused by a negative event such as a natural disaster, illness of household member or loss of employment. Chronic food insecurity is the persistent inability of a household to meet its dietary needs over a long period. Its main underlying cause is poverty and is characterized by seasonal shortages of food. Transitory food insecurity can lead to chronic food insecurity.

The above illustrates the complexity of measuring food security outcomes. Household coping strategies include a reduction of the quantity or the quality of their food consumption. However both are measures of food insecurity. Households that meet both the quantity and quality thresholds are classified as food secure while those that are unable to meet one or either are food insecure.

## **3. Uganda context**

Uganda has plentiful natural resources including fertile soils, regular rainfall, abundant lakes and rivers, deposits of copper, gold and other minerals and an estimated 3 billion barrels of soon-to-be-tapped oil reserves.

Since the mid eighties it has rebounded from civil war and economic collapse to become relatively peaceful, stable and prosperous. While the global economic downturn has hit exports, GDP growth was still relatively strong at 6.7% in 2010/2011. On the back of subdued export performance, high inflation and subsequent tightening of monetary policy to restore macroeconomic stability, GDP

growth is expected to slow to 4.3% in FY2011/12 and not beyond 5% in FY2012/2013.<sup>6</sup> In 2011 the trade deficit stood at \$3.2bn. Exports totalled \$2.5bn in 2011 with coffee (22%), fish, tea and tobacco the main export products, chiefly to Uganda's neighbours (S Sudan, DR Congo and Kenya) and, to a lesser extent, the EU. Imports totalled \$5.7bn, largely consisting of petrol and related products and road vehicles.

Uganda has made enormous progress in reducing poverty, halving the countrywide incidence from 56% of the population in 1992 to 24.5% in 2009/2010.<sup>7</sup> The reduction in poverty in urban areas has been especially marked. But the absolute number of poor people has increased due to population growth. Nearly 7.5 million Ugandans - or a quarter of the population - still live below the poverty line. Poverty remains firmly entrenched in rural areas, which are home to 87% of Ugandans. About 30% of all rural people still live below the national rural poverty line.

More than a quarter of Ugandans are illiterate, which locks them into a cycle of low paid work and perpetuates poverty and food insecurity. While the primary school attendance rate is 81%, the enrolment rate in secondary school (13-18 years) sinks to 17% (35% in urban Uganda versus 14% in rural).<sup>8</sup>

At more than six children per woman<sup>9</sup> the total fertility rate<sup>10</sup> is the second highest in the world after Niger<sup>11</sup>. Uganda's population of about 33 million is growing by 3.2% a year and was projected to reach 34.1 million by mid 2012.<sup>12</sup>

Although the incidence of HIV/AIDS has been reduced from around 10.5% in 1991 stabilising at about 6.5% since 2001, the actual number of people living with the disease has increased, now standing at 1.2 million (up from 1 million from 1991 – 2006).<sup>13</sup> The pandemic has killed large numbers of young adults and orphaned 1.2 million children, placing an extra economic burden on those who care for them.

The lives of hundreds of thousands of people in the north have been blighted by one of Africa's most brutal rebellions by the cult-like Lord's Resistance Army (LRA) led by Joseph Kony. Over the last two decades, tens of thousands have been abducted and killed and 1.8 million displaced<sup>14</sup>. The impact on people's lives in the north, especially in the north east district of Karamoja, cannot be underestimated, although progress has been made in addressing the displacement situation with almost 80% of IDPs having returned to their villages<sup>15</sup>.

## Uganda produces a wide range of food

Endowed with large fresh-water resources as well as favourable soil conditions and climate, Uganda has great agricultural potential.

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<sup>6</sup> The World Bank

<sup>7</sup> UBOS The official poverty line for Uganda is based on the cost of the basic food and non-food essentials and was calculated from the 1992 household budget survey, updated for spatial and temporal differences using price indices.

<sup>8</sup> Uganda Demographic and Health Survey 2011

<sup>9</sup> Demographic and Health Survey 2011

<sup>10</sup> The average number of children that would be born if all women lived to the end of their child bearing years

<sup>11</sup> UDHS 2006

<sup>12</sup> Uganda Bureau of Statistics (2007), Projections of Demographic trends in Uganda 2007-2017; vol. 1

<sup>13</sup> UNAIDS

<sup>14</sup> OCHA

<sup>15</sup> OCHA

Overall about 81% of all households (4.2 million) are engaged in agriculture<sup>16</sup> though it's as high as 95%, 93% and 91% in the northern, western and eastern regions respectively and dips to 74% in central Uganda.

Although the contribution of the agricultural sector to the economy is declining, it is still the mainstay of the economy, employing two thirds of the country's 11.5 million-strong workforce and contributing 22.5% to GDP.<sup>17</sup>

Agricultural households grow a wide variety of crops with maize, beans, bananas, cassava and sweet potatoes the most commonly grown. In fact more than 1.5m households grow maize, beans and bananas and more than a million grow cassava and sweet potatoes.<sup>18</sup> These five crops are grown in the highest quantities, but added to this many households grow millet, sorghum, rice, field peas, cow peas, pigeon peas, groundnuts, simsim, soya beans and Irish potatoes.

According to UN Food and Agriculture Organisation (FAO) figures the country produces enough plantain and cassava – the two most important staples – to feed its people. And it produces a surplus of maize and beans, enabling it to export a large quantity of maize and to a lesser extent beans to neighbouring deficit countries such as Kenya and South Sudan. (see Table below)

Production of sorghum, rice, beans, groundnuts, field peas, cow peas, simsim, soya beans, cassava, Irish and sweet potatoes all increased between UNHS 2005/06 and the Uganda Census of Agriculture 2008/09.

Central and Western Uganda are the major banana producing regions while eastern Uganda is the main maize producing region, see table 1. The Northern region produces fewer food crops (maize, bananas, beans and sweet potatoes) than other regions.

Crop	Central	Eastern	Northern	Western
Maize	712	948	376	587
Beans	263	180	95	314
Cassava	471	435	415	116
Bananas for food	4,296	239	35	3,430
Sweet Potatoes	423	458	278	313

**Table 1: Production of major crops ('000 metric tons) by region**

<sup>16</sup> A household is said to be engaged in agriculture if any member of the household is involved in cultivating crops during the first and/or the second cropping season.

<sup>17</sup> Ministry of Agriculture, Animal Industries and Fisheries

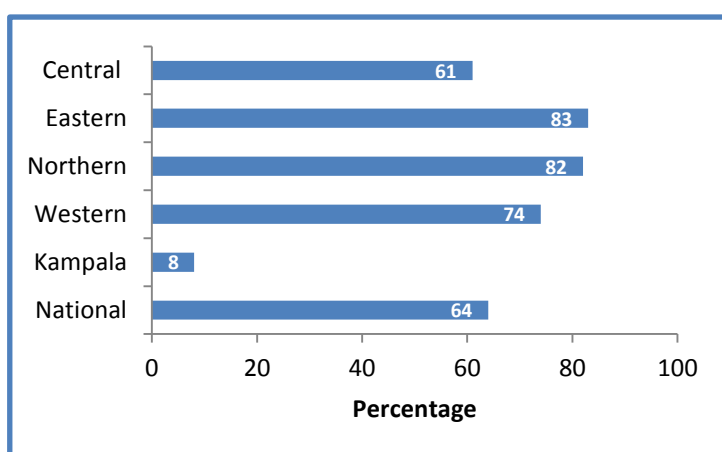
<sup>18</sup> Uganda Census of Agriculture 2008/2009



Commodity	2007	2008	2009	2010	2011	2007-2011 average
Maize	101,233	66,671	94,440	166,251	89,246	103,568
Beans and other Legumes	22,532	37,211	38,140	24,417	35,920	31,644
Sesame seeds	5,945	14,154	12,107	12,065	14,841	11,822
Soya beans	5,798	3,250	2,630	918	1,579	2,835

Source: FAO CountryStat data for Uganda

**Table 2: Uganda's staple food exports (metric tons)**



**Figure 1: Percentage of households engaged in livestock farming by region (%)**

livestock extension interventions<sup>20</sup>. The eastern and northern regions are the main livestock farming areas (figure 1).

But prolonged seasonal dry spells, particularly in Karamoja in the north east limit livestock access to pastures and water, reducing livestock production and forcing pastoralists and agro pastoralists to migrate westward to dry season grazing areas.<sup>21</sup>

A fifth of Uganda's surface area is under water with five major lakes (Victoria, Albert, Kyoja, Edward and George) and 160 minor lakes, rivers and wetlands. It has an estimated production potential of over 800,000 metric tonnes (MT) of fish although the current catch is estimated at 475,000 MT. This is attributed to the inadequate capacity of Beach Management Units in fisheries management, the resurgence of water hyacinth and emergence of new weeds, lack of species specific management plans, use of inappropriate fishing gear and lack of clear understanding of the economies of fisheries development. No working cold rooms were recorded at landing sites in 2010 (although five had been recorded in 2008) and just 4% of landing sites have mains electricity, required for ice making and cooling facilities. Fish exports almost halved between 2007 and 2010 to 15.42 MT.<sup>22</sup>

<sup>19</sup> Livestock refers to all animals and birds kept or reared specifically for agricultural purposes including cattle, sheep, goats, pigs, horses, poultry, rabbits and donkeys. The definition is regardless of the number owned.

<sup>20</sup> Ministry of Agriculture, Animal Industry and Fisheries, Statistical Abstract 2011

<sup>21</sup> FEWSNET Food Security Outlook September 2009-August 2010

<sup>22</sup> Ministry of Agriculture, Animal Industry and Fisheries, Statistical Abstract 2011

So, since Uganda's fertile soils and generally clement climate enable households throughout the country to grow a wide variety of staples and to farm livestock, food availability is not a major problem for Uganda as a whole.

### **Food availability varies by season and region**

However food availability is seasonal with a marked divide between 'bimodal' and 'unimodal' regions. Most of Uganda has a sub tropical 'bimodal' climate with two rainy seasons (March – June and mid August – December) with dry seasons following them. This means it has two growing seasons with the first season harvests taking place between June and August and the second from November to January.

Unlike the rest of Uganda, Karamoja, which comprises five districts (Abim, Kaabong, Kotido, Moroto and Nakapiripirit) has a 'unimodal' climate with roughly six months of rains (April – October) followed by a six month dry season so it benefits from only one annual harvest, normally around the month of October. This means that the effects of a poor harvest are felt more keenly in Karamoja than elsewhere in the country, because the resulting 'food gap' lasts for twice as long. Its hunger season generally lasts from April through to the following harvest (Sept/Oct) though it can often start earlier if the previous harvest has been poor because of climatic conditions. In fact the region experienced three consecutive seasons of poor harvests (2006 – 2009) with delayed, lower than normal and poorly distributed rains reducing crop yields, pastures and livestock production and prompting high crop prices – all of which led to greater food insecurity. In July 2009 FEWSNET reported that some 1.15 million people in Karamoja were food insecure rising to about 1.4 million by January 2010. More than 95% of the region's population were reliant on WFP food aid.

The seasonality of the cropping calendar as well as extreme weather conditions affect the supply of food commodities in the markets, and when supply is more scarce food price levels rise.

### **Food market structure, market integration and food prices**

Ugandans are fairly market dependent and markets are the main source of food calories for about 50% of Ugandan households. This contributes to households' vulnerability to food insecurity if food prices rise sharply.

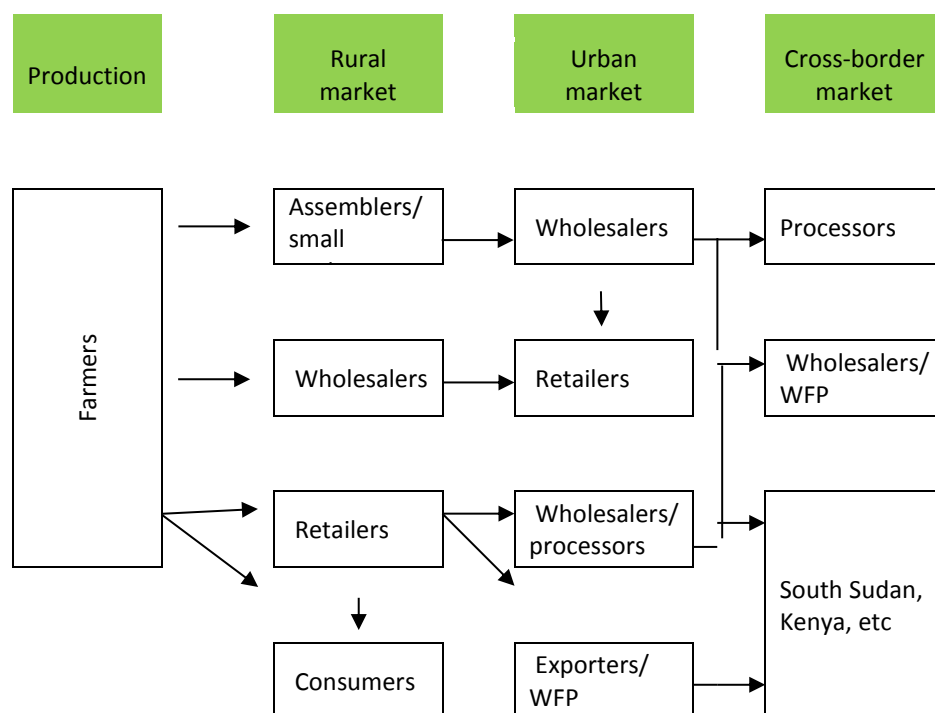
Smallholder farmers produce most of the food that passes through the market outlets in the country. Their lack of proper storage facilities and limited access to credit and sources of income compel them to sell their surpluses immediately after harvest. Consequently, the marketing chains are long with a number of intermediaries operating between farmers in producing areas and consumers.

Cereals are the most traded food items with maize taking the largest share in terms of market volumes handled. Maize is grown in all regions, with the Eastern region accounting for the largest portion of total production.

The maize market is structured such that there are players at the local, regional as well as national levels. Assemblers, who are also mainly farmers, buy grain from other farmers' markets to resell to consumers or local and regional wholesalers. Although some of the assemblers operate independently, they can also act as agents for wholesalers.

Note that many of the actors in the maize market also handle other produce, such as rice and beans, so the market structure for these commodities tends to be similar to that of maize. The main

difference is that there is more done to add value to maize (milling flour of different grades) and involves millers at different levels.



**Figure 2: Marketing chain for locally produced major staples (maize and beans) in Uganda<sup>23</sup>**

WFP is also one of the major wholesale buyers of maize grain - and to a lesser extent beans - in Uganda, both for its food assistance programmes within Uganda as well as programmes in neighbouring countries and the Horn of Africa region.

The fresh food market tends to be more loosely structured, although it follows a similar pattern to that of the cereals and grain market. Food items such as fresh potatoes and cassava are sold by farmers on an ad hoc basis, mostly at village level markets, and usually to raise money to meet particular needs or to buy other food items.

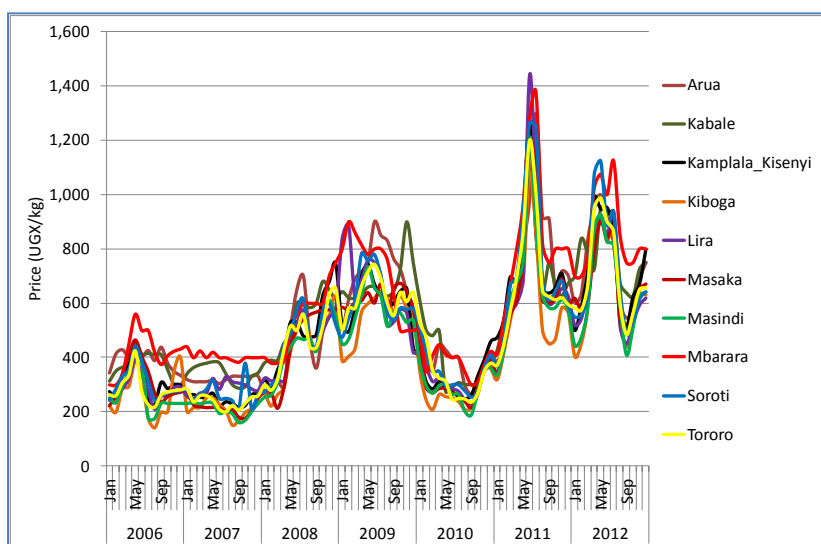
Beyond this level, travelling traders play a significant role. These traders work with village middlemen who scout for the produce until sufficient quantities can be raised. The travelling traders then collect the aggregated bulk that they mainly transport to the capital Kampala, where they sell to wholesalers, who supply different vendors around various markets in the city. However it is not uncommon, depending on availability of the produce, for the wholesalers to engage in retail sales at the same time.

Monthly wholesale maize and beans prices across Ugandan markets for the period January 2006 to December 2012 exhibit strong co-movement. Further, prices are well correlated over time and distance between markets, indicating a relatively strong level of market integration (Annex 2, tables A2 and A3). Increased investment in road infrastructure and improved access to real time market information thanks to the widespread presence, affordability and use of mobile phone services for checking price information may have contributed to this.

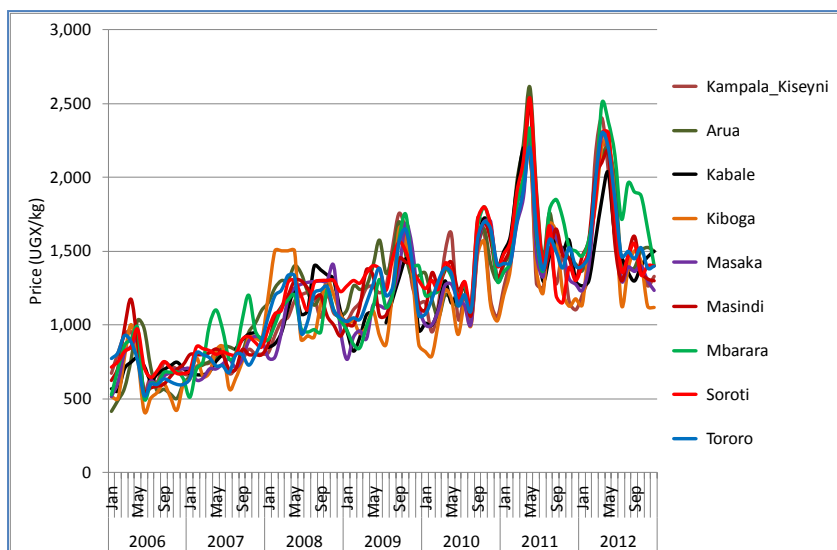
<sup>23</sup> Adapted from IPRA and WFP, Making the Market Work for the Food-Insecure in Uganda: A Market Profile, Final Report Kampala, 25 September 2007

There was a sharp increase in nominal wholesale maize prices in 2008 and 2009<sup>24</sup>. This was followed by a sharp decline in prices in 2010 because of bumper harvests in 2009/2010 resulting from favourable weather conditions and the fact that producers upped their output in response to the high prices in 2008/2009. (See figure 3)

There has been a general increase in nominal wholesale beans prices since January 2006 with some decline in 2010 following the bumper harvests of 2009/2010. In both 2011 and 2012, wholesale beans prices increased substantially during the lean/hunger season (March-May) and fell after the first season harvest (June-September). (See figure 4)



**Figure 3: Nominal wholesale maize price trends in selected Uganda markets 2006-2012**



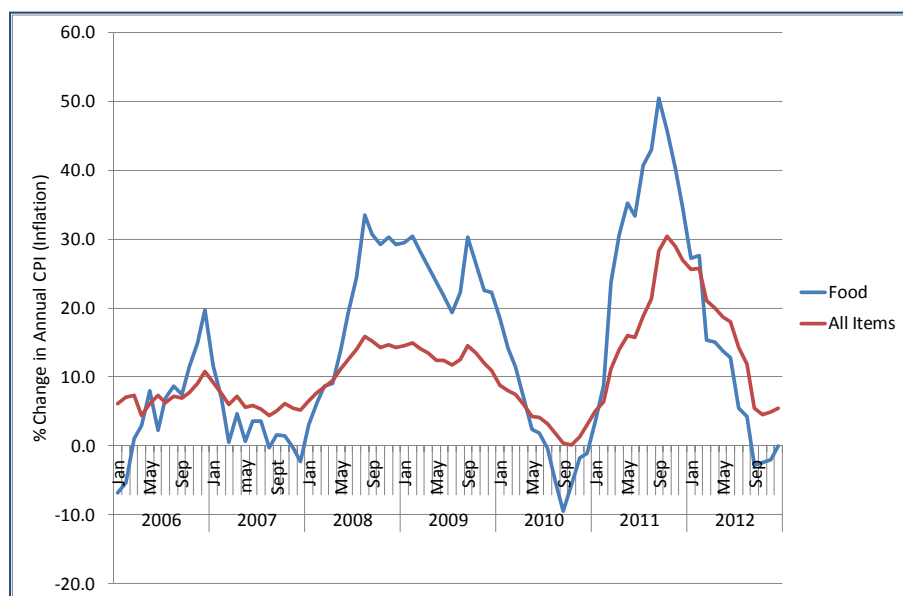
**Figure 4: Nominal wholesale beans price trends in selected Uganda markets 2006-2012**

When adjusted for inflation using all-items Consumer Price Indices (CPI), the increase in wholesale maize and beans prices becomes less pronounced, with notable increases during the lean (pre-harvest) seasons of both 2011 and 2012. Similarly, when wholesale beans prices are adjusted for

<sup>24</sup> This section uses wholesale maize and beans price data collected by Farmgain Africa over the last seven years.

inflation, the increase is less dramatic although prices tend to increase sharply during the lean (pre-harvest) season every year.

As shown in figures 3 and 4, food prices appear to have become more volatile in recent years which is likely to adversely affect the food security of both producer (net seller) and consumer households.



**Figure 5: Food and overall (all items) inflation in Uganda, 2006-2012**

Based on analysis of the monthly Consumer Price Indices (CPI) from the Uganda Bureau of Statistics (UBOS), overall annual inflation for 2006 to 2007 was close to or below 10% (see figure 5). In 2008 to 2009, during the global food and fuel price crisis, food inflation rose sharply accompanied by a less dramatic increase in overall inflation. In 2010, food and overall inflation declined concurrently followed by sharp and concurrent increases in 2011 (when prices of some commodities like sugar, fish and milk rose by over 200%<sup>25</sup>) before both declined to near record low levels in late 2012.

In the absence of increases in wage rates and/or safety net programmes, the rising inflation of 2011 is likely to have had a negative impact on the food security of the rural and urban poor who are heavily dependent on food markets for their consumption.

So what caused these volatile and inflated food prices? According to the Association for Strengthening Agricultural Research in Eastern & Central Africa (ASARECA) the reasons are complex and intertwined.

Firstly the seasonal cropping calendar is reflected in the price movements of staple crops throughout the year: during the lean seasons markets are least well supplied and therefore prices are at their highest, coinciding with the time when households are generally more dependent on markets as their own stocks are exhausted.

Add to that prolonged dry spells in some regions, particularly the north east, coupled with flooding in other regions: these extreme weather conditions curtail supplies to markets. The fact that there were buoyant harvests of major cereals (maize and rice) in 2010 meant markets were better supplied and prices lowered.

<sup>25</sup> *Understanding the Recent Food Price Trends in Uganda*, ASARECA, Transforming Agriculture for Improved Livelihoods

The high food prices in Uganda are also linked to rising food and fuel prices in the international markets and varying exchange rates. For example high fuel prices affect the production and transportation costs of food items. The onset of high inflation in June 2009 coincided with a time when the Ugandan shilling was weak against the US dollar and fuel prices were on the rise.

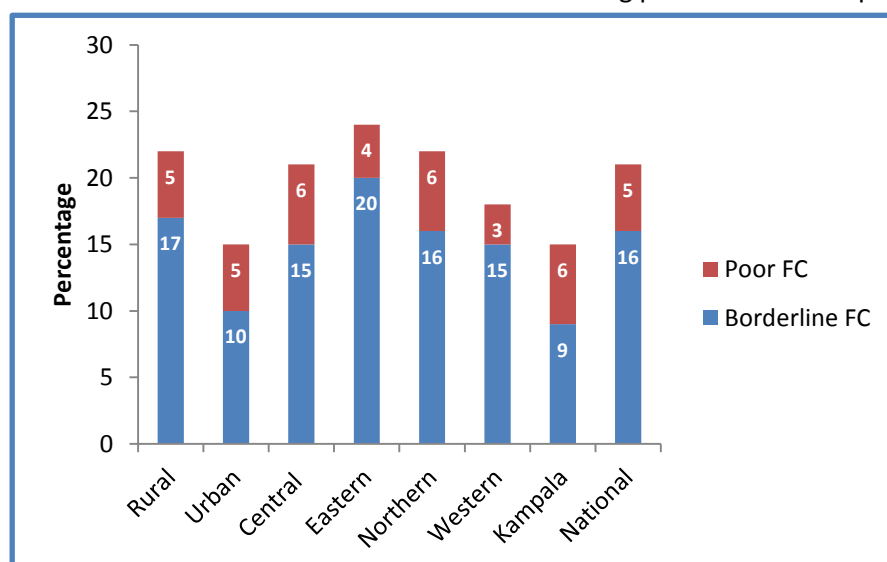
According to ASARECA higher food production districts tend to have lower and relatively more stable prices compared to lower production districts. To illustrate this Masindi and Kabale, which are high producers of maize and beans, recorded the lowest average prices when the country was facing surging food prices.

## 4. Overview of food security and nutrition

This chapter gives a general snapshot of the Uganda diet and the household level food security situation by examining several indicators including the food consumption score, staple dependency, food energy deficiency and dietary diversity (please refer back to methodology section 2.2).

More than a fifth (20.3%) of Ugandans have ‘unacceptable’ food consumption (i.e., 4.7% poor and 15.6% borderline), which represents a marked improvement on the 2009 CFSVA when 6.3% had poor food consumption and 21.3% borderline. As explained above this measurement combines food diversity, food frequency (the number of days each food group is consumed) and the relative nutritional importance of different food groups. The 4.7% of households with poor food consumption – rising to over 6% in northern and central regions as well as Kampala - have an extremely unbalanced diet, that is likely energy- deficient, devoid of protein and chiefly comprised of starchy maize or matooke (plantain) flavoured with some vegetables.

Those living in rural Uganda are more likely to have unacceptable food consumption than those in urban (21.5% vs 20.3%). Westerners fare much better on the food consumption score than elsewhere with fewer than 3% of households having poor food consumption and 14.6% borderline.



Ugandans consume a wide range of staples by comparison with most countries in the region, deriving 69% of their food energy from them. Plantains (matooke), cassava and maize are the most important staples in terms of caloric intake followed by sweet potatoes. Rice and wheat are not traditional staples but they are growing in

**Figure 6: Percentage of households with poor and borderline food consumption**

importance especially for urban and high income households. Beans, groundnuts, sorghum, millet, Irish potatoes, peas, simsim and green leafy vegetables generally complement a diet of staples.

On average Ugandans eat cereals every day, vegetables six days a week and pulses four times a week. Fruits, animal protein (meat/fish) and milk are consumed twice a week, though less frequently in northern and western Uganda (see figure 7). Predictably urban Ugandans (especially those in Kampala) and the wealthier eat considerably more fruits, meat, fish, eggs, milk, oil and sugar than rural Ugandans who are more dependent on cereals and pulses.

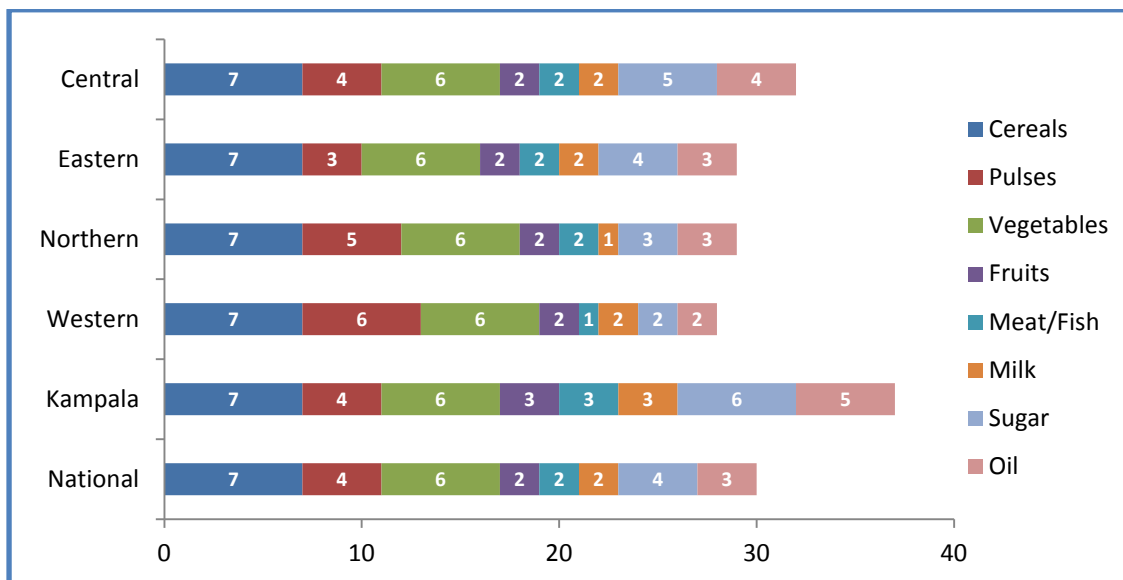


Figure 7: Number of days food groups were consumed in the previous week

In the week preceding the survey those with poor food consumption consumed cereals on about four days only and vegetables on two, figure 7. Other food groups barely registered in their diet except for some sugar (1.4 days). Those with borderline food consumption consume a slightly more varied diet with more pulses, vegetables and sugars, but still barely any animal proteins, milk or fruit. Comparison of these findings with the 2009 CFSVA report indicates that, generally, all food groups are being consumed slightly more frequently – except for beans.

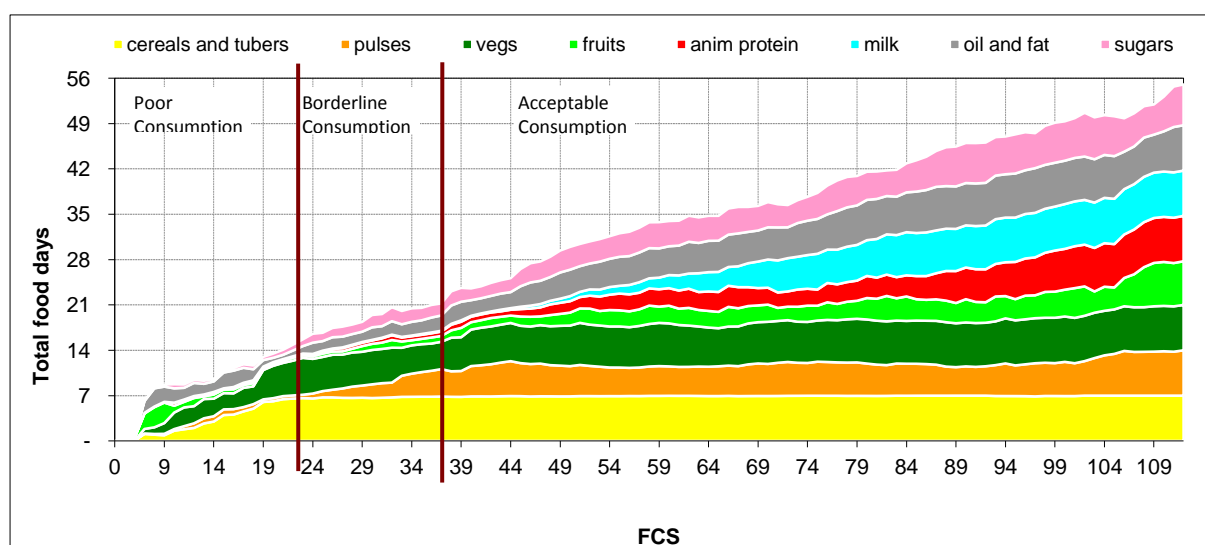


Figure 8: Cumulative days of food consumption and dietary diversity

Nationally almost half (48%) of Ugandans are food energy deficient, i.e., their regular diet fails to provide them with the minimum dietary energy requirement<sup>26</sup> to lead an active and healthy life (see figure 8 and Annex 3). The proportion is relatively similar across regions, although it spikes at 59% in northern Uganda.

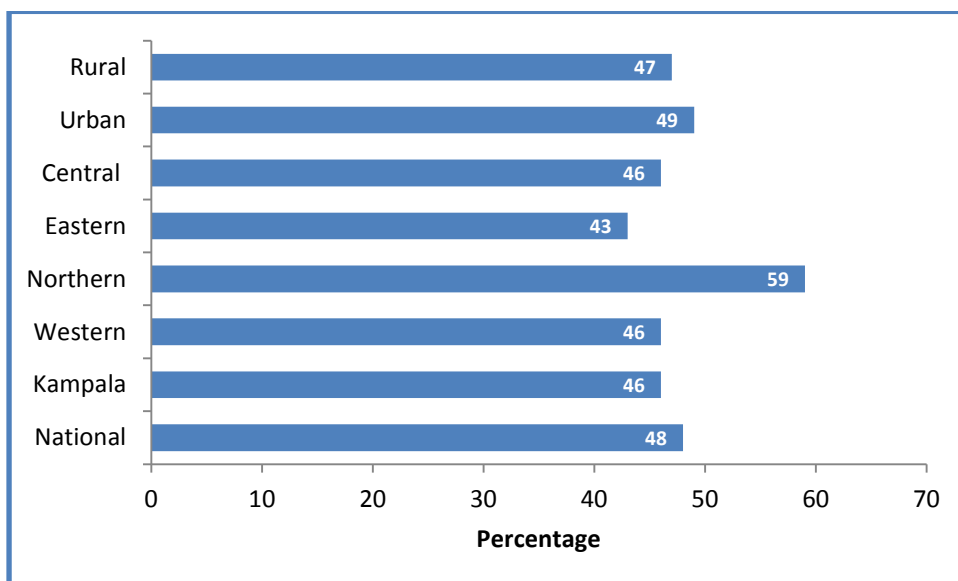


Figure 9: Percentage of population that are energy deficient

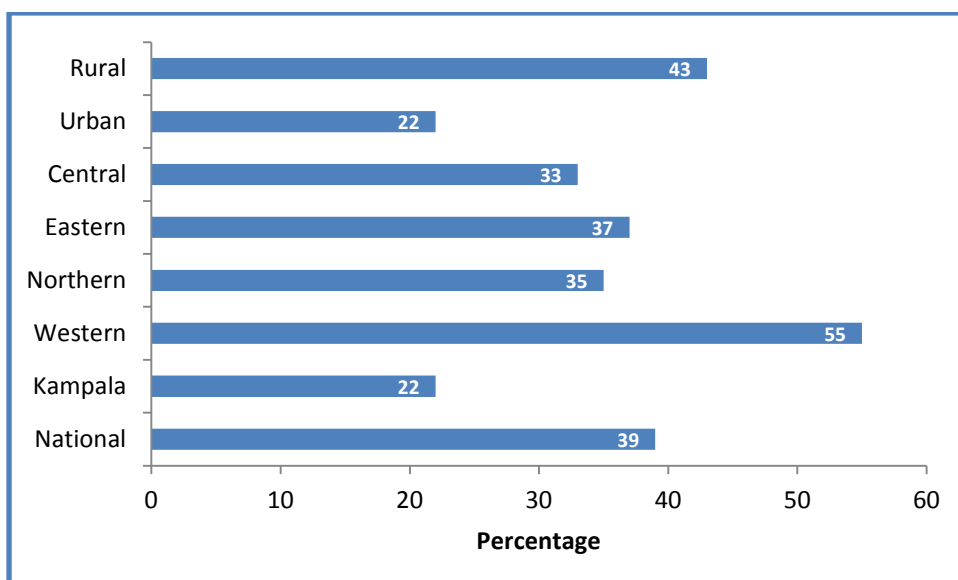


Figure 10: Percentage of households with low dietary diversity

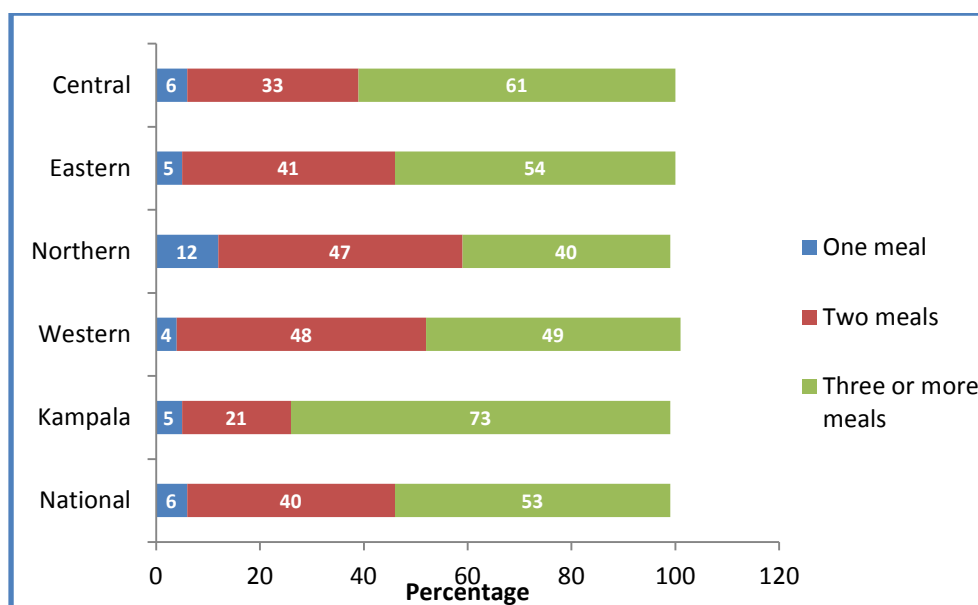
<sup>26</sup> Population with daily energy consumption below daily energy requirements (based on age/sex/activity level of HH members) according to FAO 2004. Recommendation for light activity see IFPRI 2007 appendix 8



Low dietary diversity remains a key problem especially in western Uganda. On average nationally over a third of Ugandans have low dietary diversity i.e., they consumed food from fewer than five out of seven food groups (cereals/tubers, pulses/nuts, vegetables, fruits, milk, meat/fish/eggs, and oil) in the week leading up to the survey. But in the western region well over half (55%) have a diet that's lacking in diversity.

Staple dependency is considerably higher in rural (71%) than urban (59%) Uganda (see appendix table 1). Nearly half of rural households obtain a very high share (more than 75%) of their energy from staples - much higher than the fifth that do so in Kampala and other urban areas. Eastern and western Ugandans are the most staple dependent by region, with households deriving on average around three quarters of their energy from staples in both regions - and more than half of households gaining a very high share from staples. The poorer the household, measured by the expenditure quintile the more likely it is to be staple dependent and obtain more than three quarters of its energy from staples.

As figure 11 shows some 12% of northern households are surviving on one meal a day. Overall two in five households restrict themselves to two meals a day though the proportion is again higher for those living in the north and west where nearly half of households eat just twice daily. Meanwhile three quarters of Kampala residents consume three meals daily.

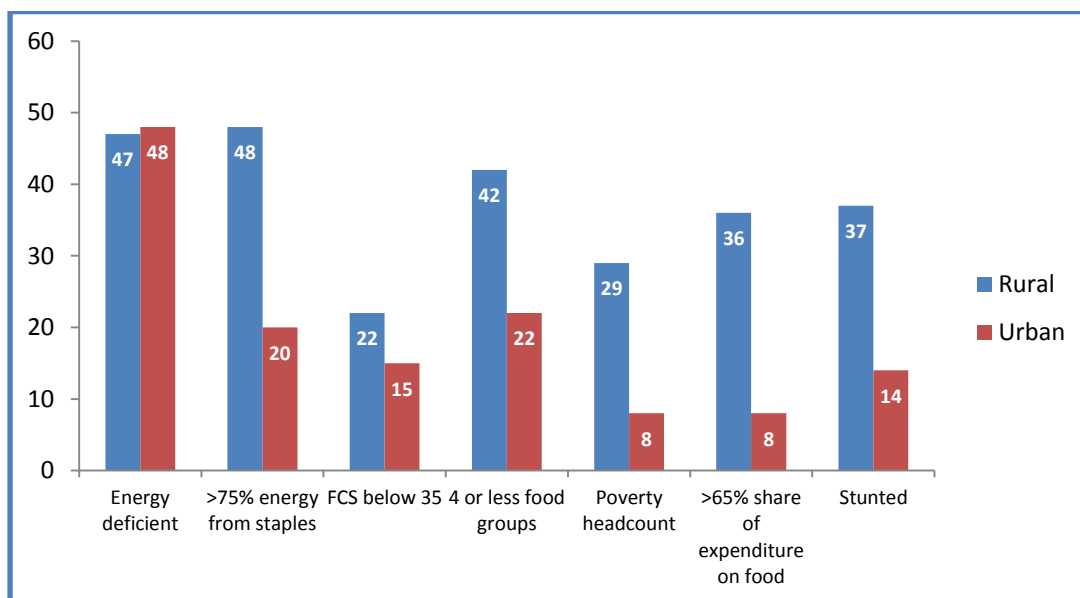


**Figure 11: Percentage of households consuming one, two and three meals a day by region (%)**

### Urban vs rural food insecurity

Figure 12 summarizes household food security status (urban vs rural) using the indicators discussed above but also includes poverty<sup>27</sup> and high expenditure on food. Those with high expenditure on food (more than 65% of their total household expenditure, including from their own production is spent on food) and those living in poverty are likely to be more vulnerable to food insecurity because they have less of a buffer when confronted with a shock such as food price rises, illness or accident of a household member or adverse climatic events such as floods or drought.

<sup>27</sup> The official poverty line for Uganda is based on the cost of the basic needs, food and non-food essentials. It was calculated from the household budget survey in 1992, and is updated for spatial and temporal differences using price indices.



**Figure 12: Summary of Uganda's food security indicators (urban vs rural)**

Food insecurity is more of a rural phenomenon across all food security indicators except for caloric deficiency. The relatively high caloric deprivation in urban areas may be because out of household consumption is higher, yet under-reported, coupled with the fact that rural dwellers tend to consume more calories to fuel them to carry out a higher level of manual labour. So rural Ugandans are more likely to bulk up on staples to meet their energy requirements but forego diversity in their diet by comparison with their urban counterparts.

As we will discuss later (Where are the food insecure), the western region fares worst on dietary diversity and high dependency on staples for energy, even though it has a lower prevalence of households with inadequate food consumption. The north fares worst on energy deficiency, poverty and higher share of expenditure on food.

### **Nutrition – stunting is ‘serious’ and wasting is ‘poor’**

Stunting or height-for-age is associated with poor overall economic conditions, chronic or repeated infections as well as long term inadequate nutrient intake. It is not sensitive to recent, short-term changes in dietary intake, rather it is a strong indicator of chronic under nutrition. When deprived of nutritious food – especially during the critical first thousand days of life, a child's physical development is impaired and he or she matures into an adult that is less likely to reach his or her cerebral potential and is more prone to disease. This adult will be less productive with a far greater likelihood of being stuck in poverty, thereby perpetuating the cycle of food insecurity and malnutrition.

As figure 13 illustrates, a third of Ugandan children are stunted, 14% severely so, and the rate is “serious”<sup>28</sup> in western (42%) and eastern (36%) Uganda. Rural Ugandans are more likely to be stunted than their urban counterparts (37% vs 14%).

Nationally, the prevalence of wasting or global acute malnutrition (GAM) in under fives is 5% with children in rural areas three times more likely to have acute malnutrition as urban children (2%). In northern and central regions it is rated ‘poor’ on the basis of the WHO guidelines (i.e. above 5%),

<sup>28</sup>According to WHO thresholds the chronic malnutrition situation in these regions is considered “serious” (30-39%).

peaking at 7.2% in northern Uganda. This finding is consistent with the preliminary estimates of the most recent Uganda Demographic and Health Survey - UDHS 2011.

Overall, 15% of under fives are underweight (low weight for a specific age and sex) though again prevalence is higher in rural Uganda than urban. The severe underweight rate has risen slightly since UDHS 2006 from 4% to 5%. The highest underweight rate is in the northern region at 18% and the lowest in Kampala at 11%. The highest rate of severe underweight is in the eastern region (6%).

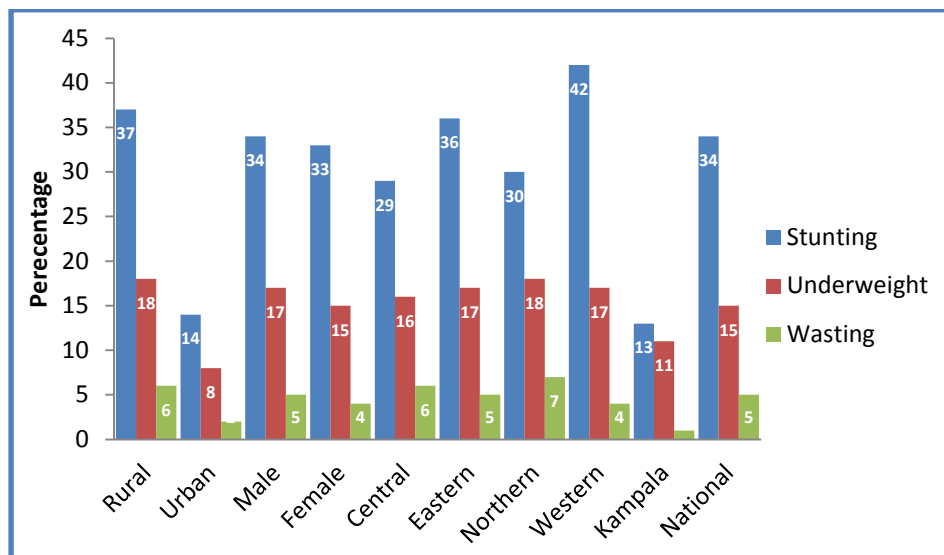


Figure 13: Nutritional status (stunting, underweight and wasting) of children 6-59 months (%)

## 5. Who are the food insecure and malnourished?

### The poor

Uganda has made enormous progress in reducing poverty, slashing the countrywide incidence from 56% of the population in 1992 to 24.5% in 2009. The reduction of poverty in urban areas has been especially marked. Notwithstanding these gains, however, the absolute number of poor people has increased due to population growth. And poverty remains firmly entrenched in rural areas, home to 87% of Ugandans. Approximately 30% of all rural people still live below the national rural poverty line.

The poorer the household, the more likely it is to be food energy deficient, to have low dietary diversity, derive more energy from staples and have poor or borderline food consumption (see figure 14). Some 15% of the bottom fifth of the population (in terms of expenditure) have a poor food consumption score, compared with a 4.7% average, and three quarters have low dietary diversity (i.e., they consume food from fewer than four food groups) and an energy

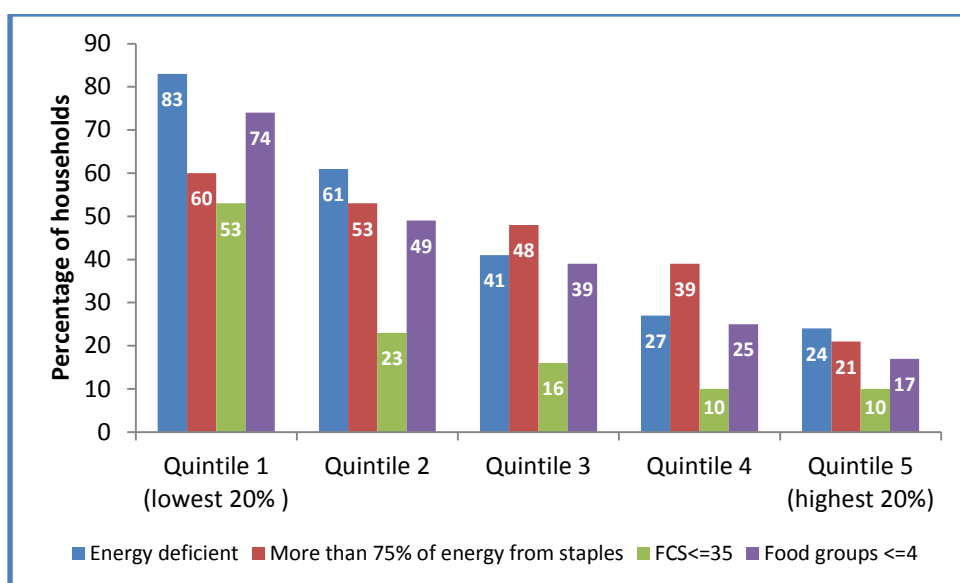
### Analysing poverty in Uganda

The official poverty line for Uganda is based on the cost of the basic food and non-food essentials and was calculated from the 1992 household budget survey, updated for spatial and temporal differences using price indices. The food poverty line represents the cost of a food bundle of the poorest 50% of the population that provides the necessary energy requirements per person per day (around 2,300 kilocalories).

The non food poverty line represents an allowance for basic non food needs of the population whose total consumption is near to the food poverty line.

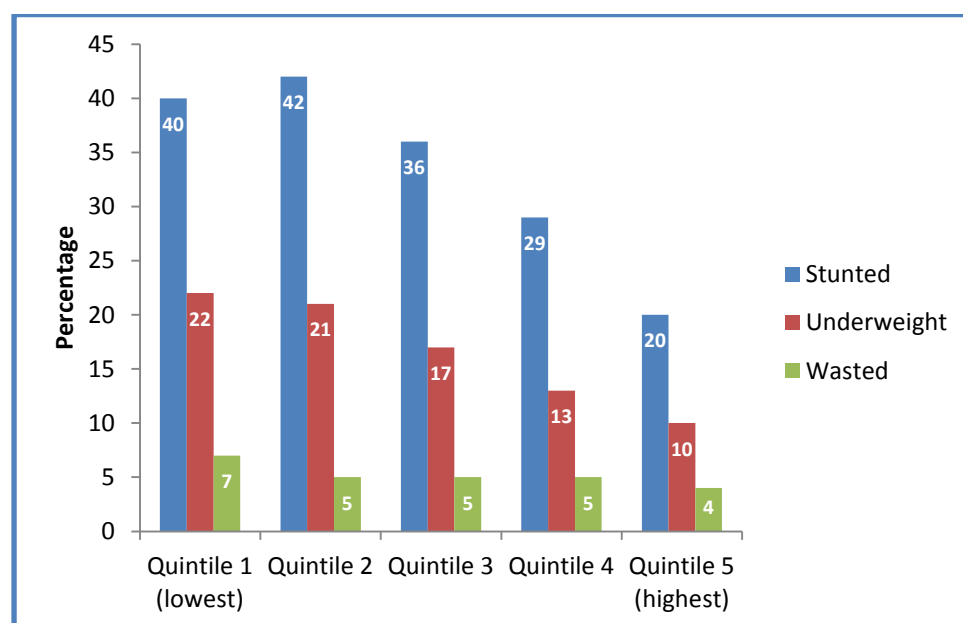
A household is defined as poor if its total expenditure per capita (including purchases, in-kind and consumption from own production) falls below the poverty line.

deficient diet.



**Figure 14: Food security indicators by expenditure quintile**

There is also a direct relationship between poverty and malnutrition. As figure 15 shows, the poorer the household the more likely it is to have stunted and underweight children.



**Figure 15: Childhood malnutrition by expenditure quintiles**

Poverty is often the root cause of food insecurity because poor households lack the resources required to access enough nutritious food to live a healthy active life. Poor households are unable to invest in the inputs required to boost their own yields. Poor farmers may have to sell any surplus soon after harvest to earn income and repay debts, at once exposing themselves to fluctuating market prices as well as not being able to benefit from selling when prices rise.

The extreme poor have no financial buffer to protect them from shocks such as accident or illness of a household member or poor harvests/crop failure due to drought. In times of such stress households often resort to corrosive coping mechanisms that may involve reducing food intake and

removing children from school, coping strategies that often perpetuate a cycle of poverty and further undermine their already fragile food security status.

Other indicators of poverty – such as poor sanitation and unimproved drinking water also correlate with food insecurity indicators. Hence households with no toilet facilities and/or non improved drinking water sources are more likely to have borderline food consumption, derive more energy from staples, be energy deficient and have poor dietary diversity. More than a quarter of Uganda households (28%) have unimproved drinking water and 7% no toilet facilities (see figure 16). In the north almost a quarter of households have no toilets, whilst drinking water sources are least improved in central and western Uganda.

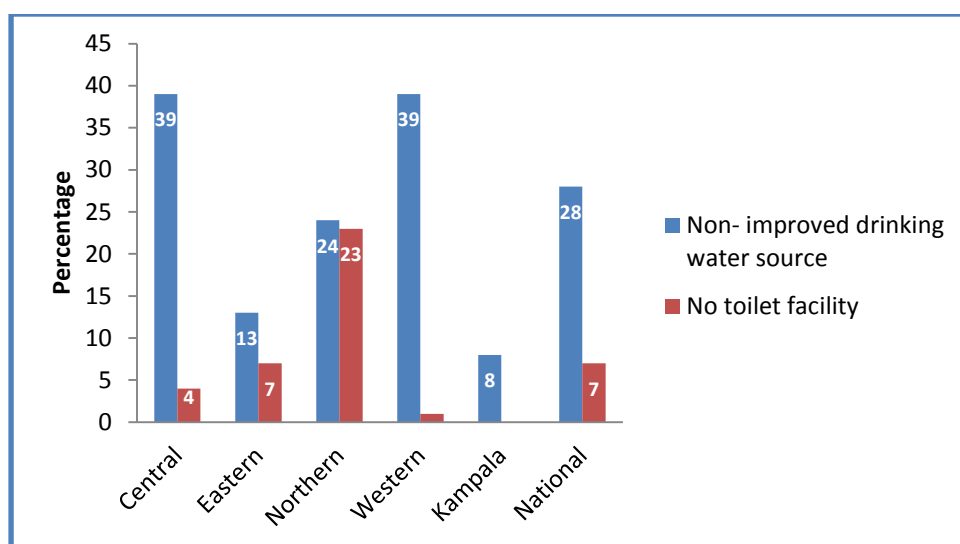


Figure 16: Percentage of households with non improved drinking water source and no toilet by region

### Households headed by women

A quarter of households headed by a woman have inadequate food consumption compared with about a fifth of those headed by a man. As figure 17 shows some 46% have low dietary diversity (36% for male headed). More than half of women headed households are energy deficient

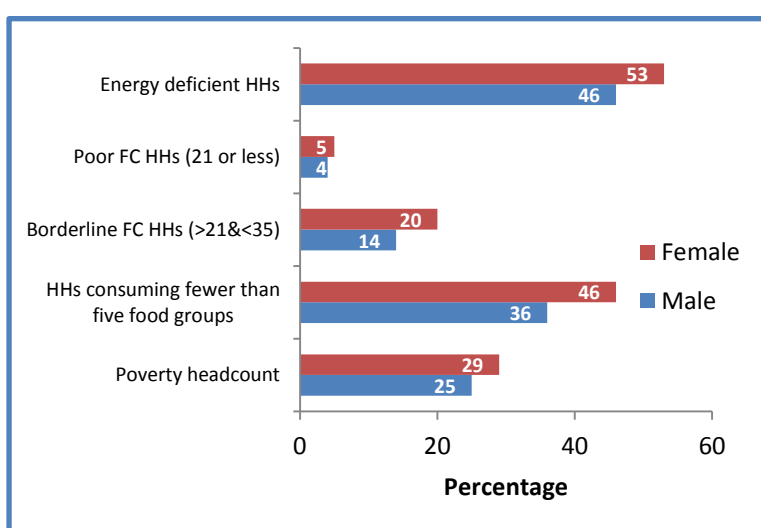
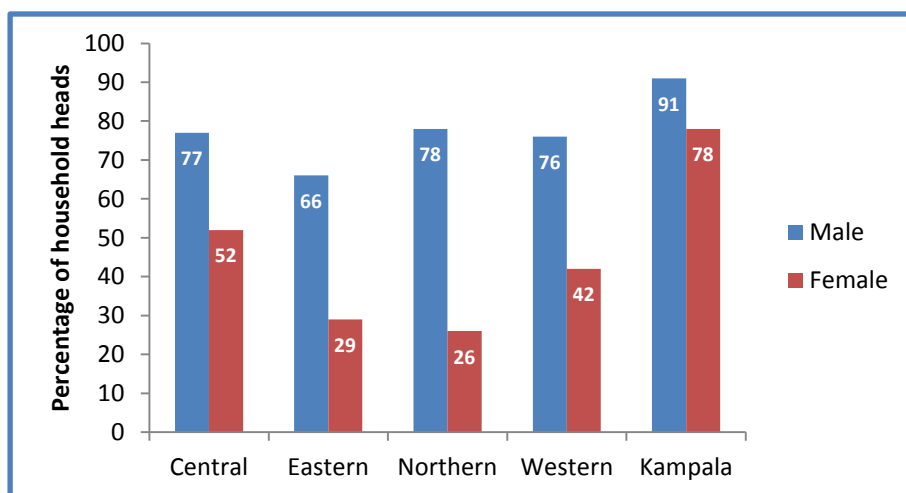


Figure 17: Food security indicators by sex of head

compared with 46% of those headed by a man. Underscoring all of this is the fact that women-headed households tend to be poorer. Why?

Female heads are less likely to take out loans (44.5% vs 39%) or access credit than male household heads: credit or loans could be used for smoothing out consumption over the year or investment in productive activities. Women are probably likely to work far longer hours than men and bear the double burden of ensuring that their households are fed adequately while caring for dependents – not only children but often the sick, the elderly and orphaned children.

Across all regions women household heads are far less likely to be able to read or write. As figure 18 illustrates the literacy levels of women household heads in rural Uganda – especially in the north and east are very high. Lack of schooling, poverty, and food insecurity go hand in hand. Children from the poorest households are forced to drop out of school for lack of money and to work to contribute



to household income. As illiterate adults they are less likely to secure well-paid positions, locking them into a cycle of poverty and food insecurity.

Figure 18: Literacy of household head by sex and region (%)

### Subsistence farmers

Grouping Ugandan households into different ‘livelihoods’ (see figure 19) according to the income activity they chiefly rely upon reveals that almost a fifth are dependent on ‘rural mixed subsistence farming only’,<sup>29</sup> while almost the same percentage are reliant on non agricultural enterprises, wage employment and a mix of non agricultural enterprises with rural mixed subsistence.

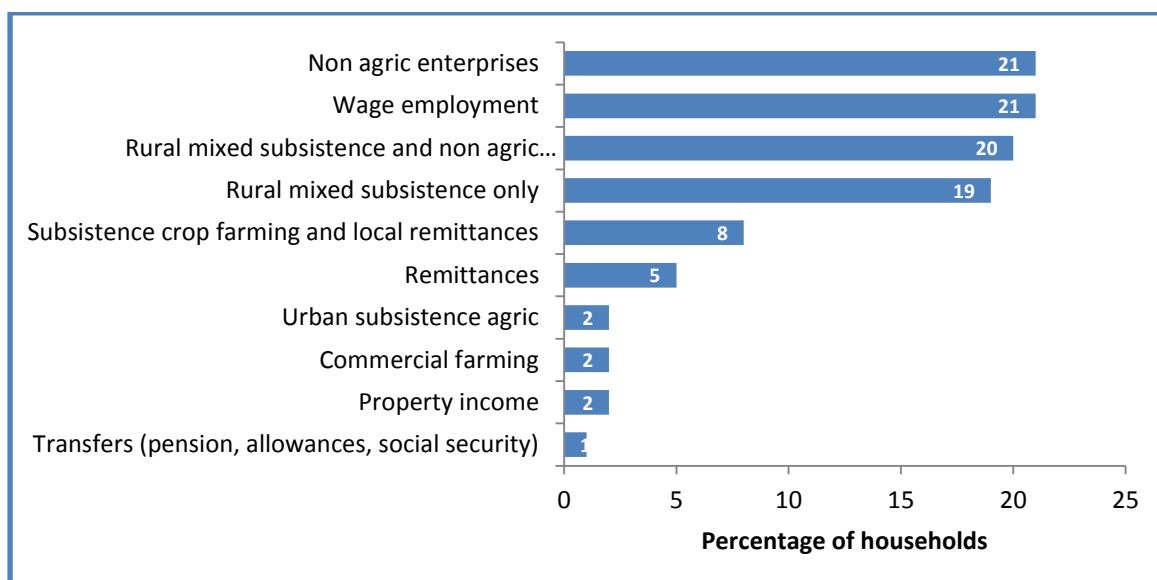
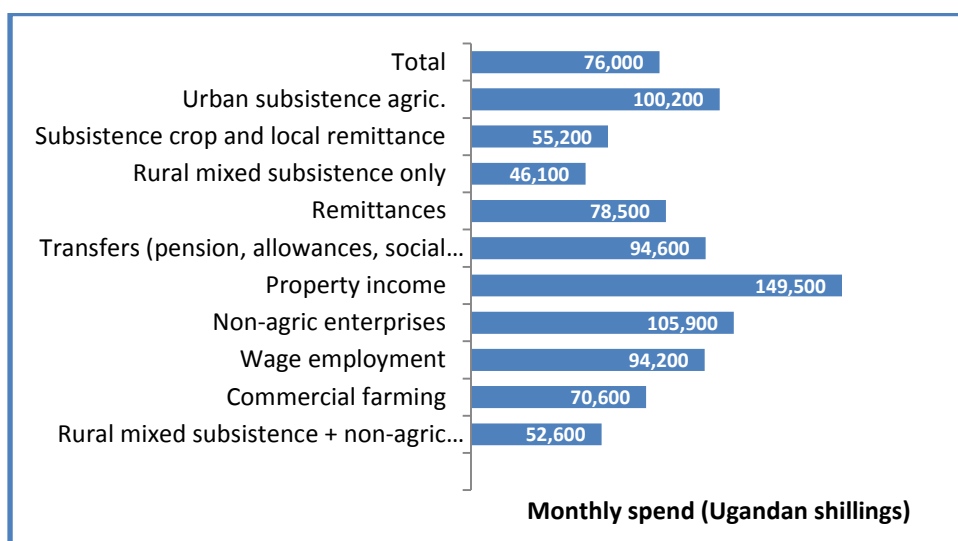


Figure 19: Distribution of households by livelihood strategies

According to UBOS in 2009/2010 three quarters of the working population were self employed and two thirds worked in agriculture. Those households engaged in subsistence farming scattered throughout the country constitute some of Uganda’s poorest. Their monthly average expenditure is

<sup>29</sup> Subsistence farmers are defined as persons who grow crops largely for home consumption though they occasionally sell any surpluses for money.

far below that of all other livelihood groups at just 46,100 Ugandan shillings per adult male equivalent a month (US\$19) and over half of that is spent on food.



**Figure 20: Average monthly expenditure per adult male equivalent by livelihood groups (Ugandan shillings)**

Rural mixed subsistence farmers have the highest proportion in the lowest two expenditure quintiles (52%) and, at 45%, the highest percentage with little or no education (followed by ‘rural mixed subsistence farmers and non agricultural enterprises’). Western Uganda has the highest concentration of households dependent on this livelihood strategy (31%) followed by eastern (22%) and northern (16%).

Given their wealth status and lack of education it’s not surprising that subsistence farmers have failed to benefit from Uganda’s steady economic growth and modernization. In remote rural areas, smallholder farmers are likely not to have access to the vehicles and roads they need to transport their produce. They lack inputs and technology to help them increase their yields and reduce pests and disease. They lack access to financial services, which would enable them to boost their incomes – both by improving and expanding their production, and by establishing small enterprises<sup>30</sup>.

As figure 21 illustrates a quarter of subsistence farmers have unacceptable food consumption. They score particularly badly on the diversity indicators and poverty: 37% are poor and more than half (52%) have low dietary diversity and derive more than 75% of their energy from staples. Energy deficiency is more in line with the other livelihoods.

Households reliant on a combination of subsistence crop farming and local remittances fare no better. Again a quarter have unacceptable food consumption, more than half are energy deficient and 47% have low dietary diversity. They are more likely to have no formal education and to be in the lowest two expenditure quintiles.

However, when rural subsistence farmers also engage in non-agricultural enterprises their food security situation improves dramatically (15% have unacceptable food consumption), indicating that subsistence farming is positive if the household is diversifying its income.

<sup>30</sup> www.ifad.org

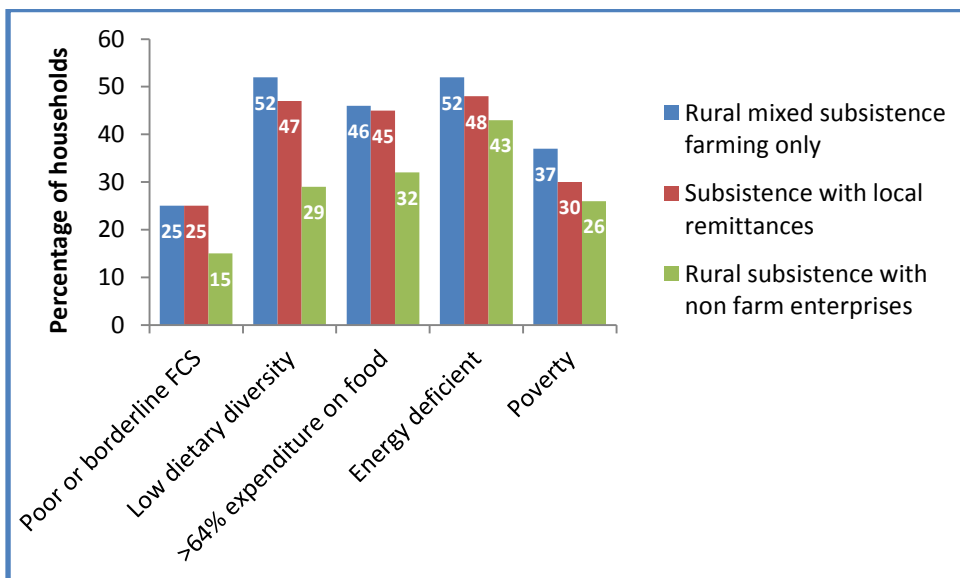


Figure 21: Food security indicators by selected livelihood groups

## 6. Where are the food insecure and malnourished?

### Northern Uganda

Northerners are far more likely to be lacking in food energy than Ugandans elsewhere in the country: some 54% are food energy deficient compared with an average of 48% nationally. They are more likely to have poor food consumption (6.2% vs 4.6% national average), which, as discussed above, suggests they have an extremely limited and one sided diet. And some 12% of northern households are surviving on one meal a day compared with 6.3% at the national level.

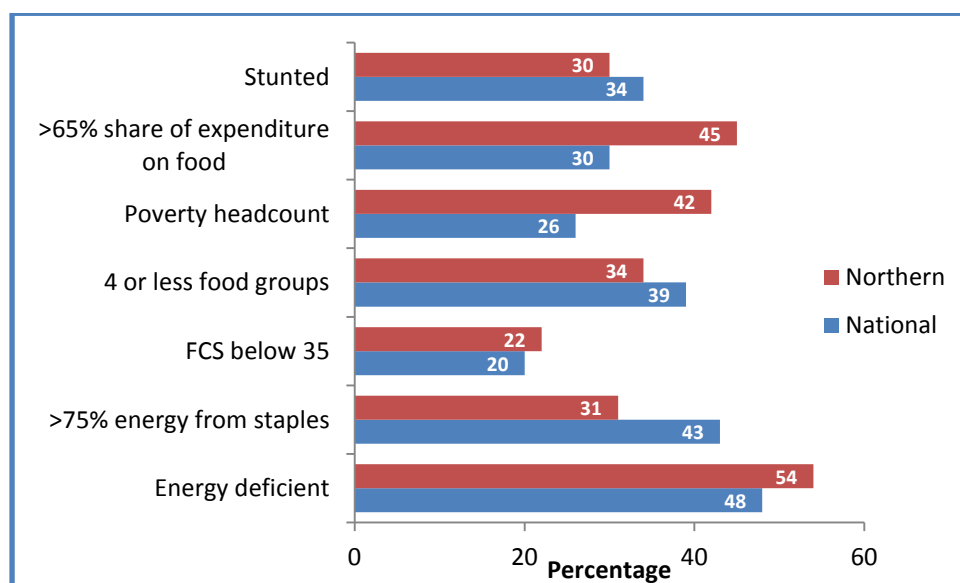
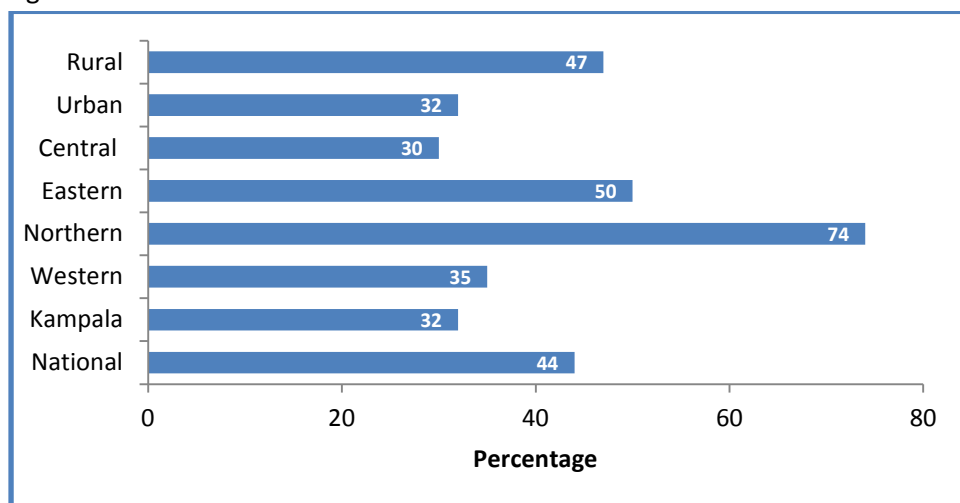


Figure 22: Selected food insecurity indicators, northern Uganda vs national

Households in this part of the country spend a higher share of their overall expenditure on food than other regions (56% vs. 51% average). In fact some 45% spend more than 65% of their overall income on food (nationally 30% of households spend more than this portion of their income on food).



In the survey households were asked whether they had faced a situation when they did not have enough food to feed the household members in the year before the survey (September 2008 – 2009). Nationally some 44% of households responded that they had –rising to 74% in northern Uganda.



**Figure 23: Households that reported they did not have enough to eat by region Sept 08-09 (%)<sup>31</sup>**

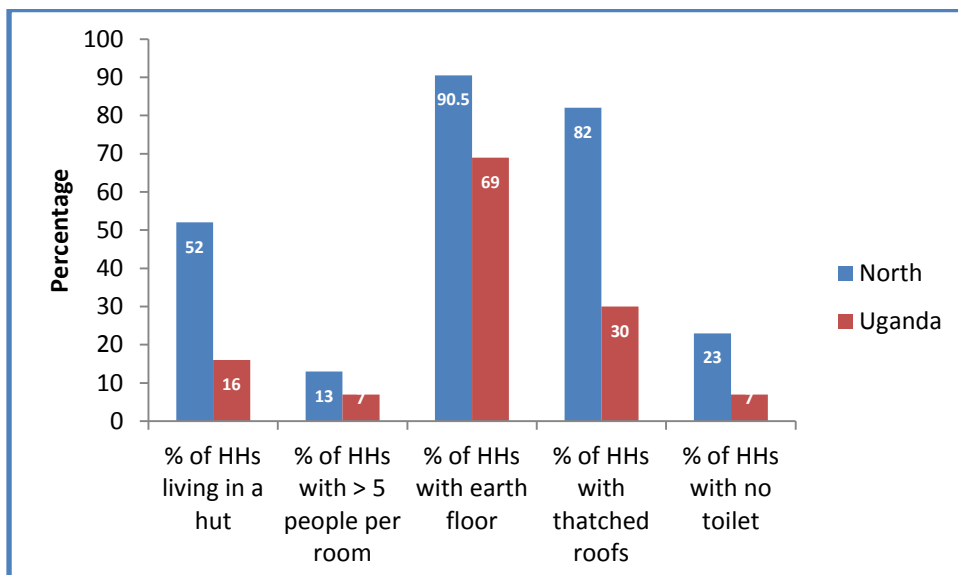
Northern Uganda has the highest rate of acute childhood malnutrition (wasting) at 7%, some two percentage points higher than the national average, and the highest rate of underweight children at 18%, three percentage points higher than the national rate.

Many of the factors underlying food insecurity and malnutrition are most severe in northern Uganda. Firstly 43.5% of the population is poor<sup>32</sup> – much higher than the national average of 26%. These people cannot access enough nutritious food to live a healthy and active life and are continually forced to skip meals and cut portion sizes.

Housing is much more rudimentary in the north with more than half living in huts with thatched roofs and earth floors. 13% have more than five people sharing a room, almost double the national average. Sanitation is much poorer than elsewhere in the country with almost a quarter of households devoid of toilet facilities and forced to defecate in the bush. Of course both factors are an indicator of poverty but poor quality housing and sanitation can also lead to disease, a leading cause of malnutrition.

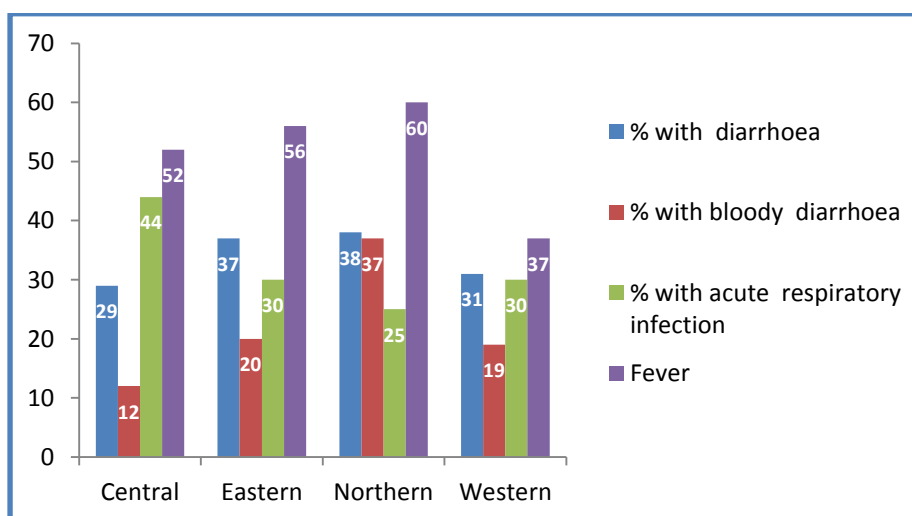
<sup>31</sup> Note this is not a quantitative measure, but a perception

<sup>32</sup> This is using the national poverty line



**Figure 24: Housing, sanitation and crowding: northern Uganda vs national average**

With the exception of acute respiratory infection, child illness rates (diarrhoea, bloody diarrhoea and fever) are the highest in the country. Furthermore, vaccination rates for children (for Tuberculosis, Diphtheria, whooping cough (Pertuasis), Tetanus, Hepatitis B, Haemophilus Influenza, Polio and Measles) are the lowest in the country. A fifth of communities have experienced epidemic outbreaks since 2008, the highest in the country.



**Figure 25: Child illness by region in the two weeks preceding the survey**

The dependency ratio is the highest (1.7 vs 1.4 national average) and more than a third of households (34%) are headed by women (against a 29% national average), see table 3. Almost 9% of household heads have a physical/mental impairment which is considerably higher than the national average of 6%. Northern households tend to have a lower percentage of working age men, though higher proportion of dependent boys and higher percentage of elderly men and women. Only a quarter of women can read and write which is well below the average for other regions (see figure 18 above).

	Average dependency ratio	% of female headed HHs	% of HH heads with physical/mental impairment	Males (0-15)	Males (16-60)	Males (>60)	Females (>60)
<b>Northern</b>	1.7	34.3	8.8	52.5	37.6	10	12.8
<b>Uganda</b>	1.4	28.6	5.9	49.9	41.3	8.7	10.8

**Table 3: Demographic statistics northern Uganda vs national average**

Some three quarters of northern households suffered drought in the year preceding the survey, which negatively affected their levels of income, food production and food purchase. As discussed above, Karamoja’s erratic rainfall variability coupled with poorer soil fertility makes it a particularly difficult region to farm. This, coupled with sporadic civil insecurity, cattle raiding and livestock diseases, renders many Karamojong generally chronically food insecure with a hunger period normally extending from April to July when stocks are lowest or depleted. This period may start as early as February following a particularly poor harvest in the past year. Livestock diseases include Pest des Petits Ruminants, a highly contagious disease affecting sheep and goats.

When households suffer drought it hits or even destroys their produce (96% of cases reporting drought) and their income (85% of households that reported this shock) because they no longer have any surplus to sell, which in turn impedes their ability to buy food (71.5%).

Many of these food security and malnutrition indicators may be linked to the conflict that has blighted the lives of hundreds of thousands of people in the north for 20 years, particularly the Acholi people in the districts of Gulu, Kitgum and Pader.

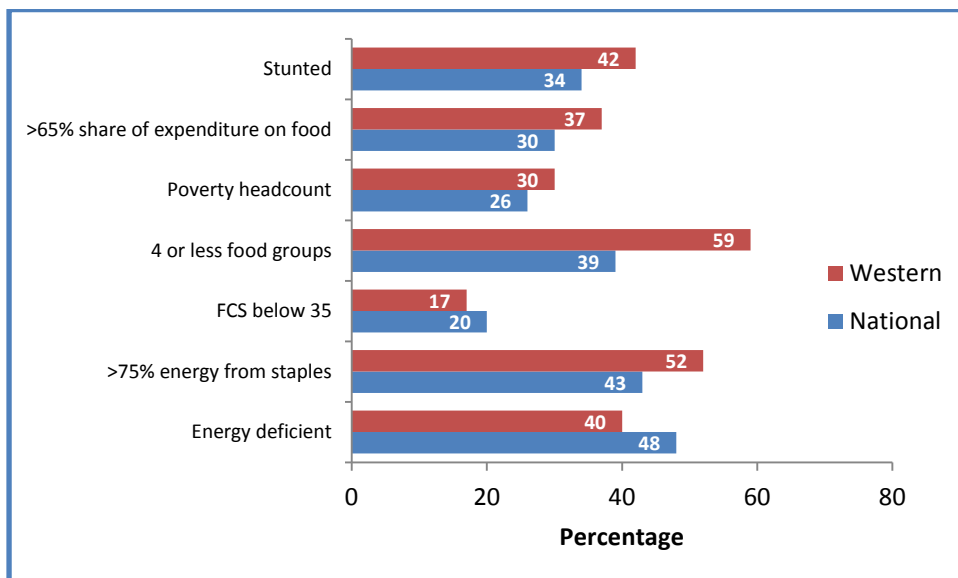
Tens of thousands have been abducted and killed, and 1.3 million displaced (OCHA). It has been described as one of the most effective guerrilla armies in Africa.

Conflict disrupts all aspects of the rural economy and affects everyone, irrespective of their socio-economic status. Its multi-dimensional effect on livelihoods and food security should not be underestimated. Protracted insurgency and civil insecurity have limited internally displaced persons’ (IDPs) movements and access to adequate land to cultivate crops over many years leading to their limited capacity to produce and access adequate food supplies. It has also eroded the traditional livelihoods of IDP communities and limited their livelihood options. Inadequate access to healthcare, safe drinking water and sanitation limits IDPs’ proper utilization of available food and leads to disease outbreaks and malnutrition.

## Western Uganda

Generally this region does not have such an issue regarding lack of food energy, especially when compared with the north. However, lack of diversity is a major problem. Some 55% have low dietary diversity i.e., they consume food from fewer than five of the seven<sup>33</sup> food groups (on average 39% have low diversity). Western Ugandans eat fruit, meat, fish, milk, sugar and oil less frequently than the average and derive less of their energy from these foods, but they consume cereals and pulses more frequently and are more dependent on them for energy. Fewer than half of households enjoy three meals a day.

<sup>33</sup> Recall that sugar is not counted as a food group in the diversity score as it does not considered a nutritious food group.



**Figure 26: Selected food insecurity indicators - western Uganda vs national average**

As discussed in the previous analyses, the west has the highest share of subsistence farmers, who tend to be heavily dependent on their own production with little recourse to supplementary income to buy food. As we will see further on households that rely mainly on their own production tend to produce and consume enough food/ sufficient energy, but they lack variety in their diets i.e they are less likely to eat a sufficiently diverse diet. This helps explain why the region has the highest rates of childhood stunting in the country at 42% compared with an average of 34%.

Poverty rates are the second highest in the country, but at 30% the situation is not nearly as severe as in the north. Alongside the north, primary school enrolment is the lowest at 70% for boys and 73.5% for girls, though literacy rates are better than other rural regions.

## 7. Other factors that drive food insecurity in Uganda

As we have seen poverty is strongly associated with the food insecurity indicators. It could be said to be the chief driving force behind food insecurity because the poor cannot produce or purchase the quantity and/or quality of food required to ensure their families are healthy and well nourished. Poor children are more likely to drop out of school and therefore less likely to command well paid jobs as adults, ensuring a cycle of deprivation and increased vulnerability to food insecurity. In addition households headed by women are more likely to be poor and less food secure than those headed by men as are the uneducated, elderly and those reliant on less secure livelihood activities such as subsistence farming in particular. This section focuses on additional issues particularly relevant to food insecurity.

## Agricultural constraints

As far as agricultural production and yields are concerned, land scarcity and access are constraints. On average Ugandan agricultural households have 1.34 hectares (3.3 acres) and 61% cultivate less than a hectare. Those in the north have more land available, but often it takes them longer to reach it (figures 27 and 28).

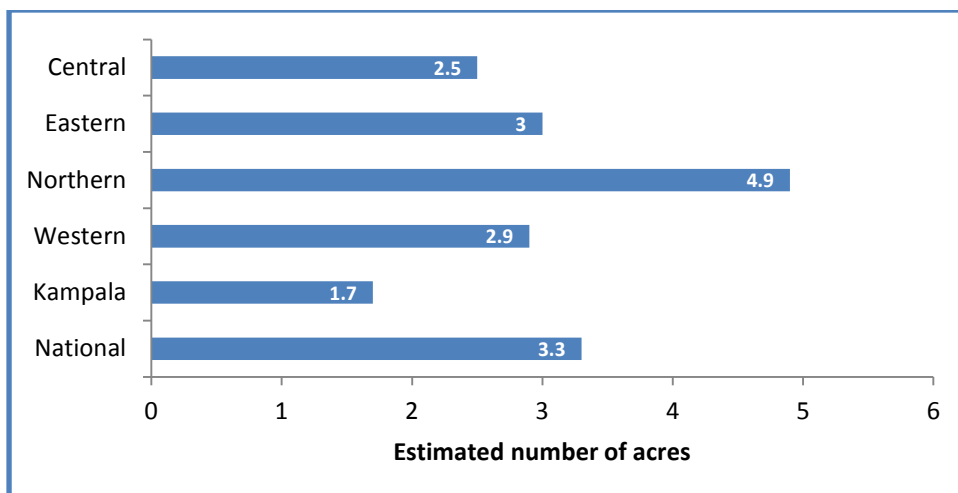


Figure 27: Acreage available per household

While it takes the majority less than 15 minutes to access their land, 13% have to walk between half an hour and an hour to tend to their land. In the north, almost a fifth (19%) of farmers take two hours or more to access some of their land, which could be a factor that prevents them from cultivating well or frequently, thereby limiting food availability.

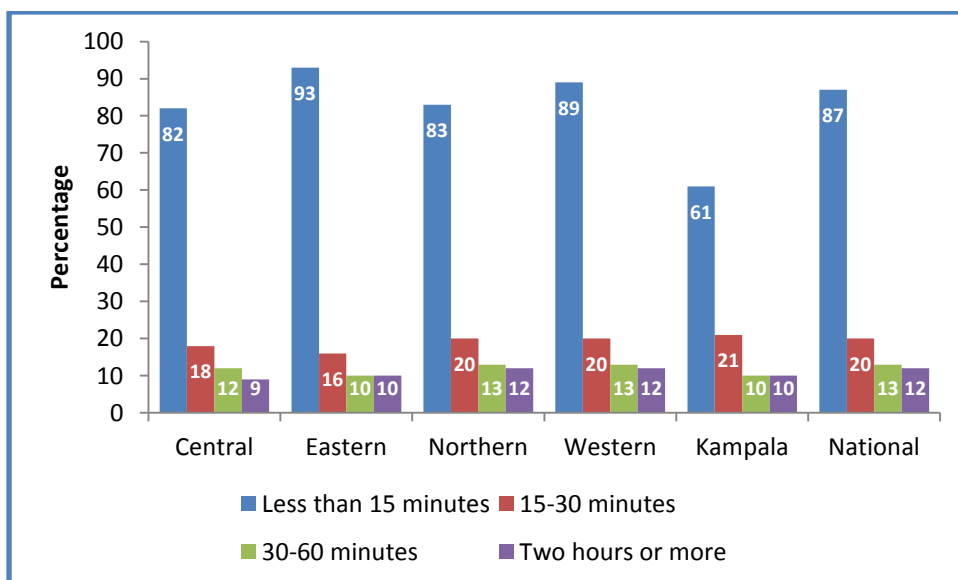
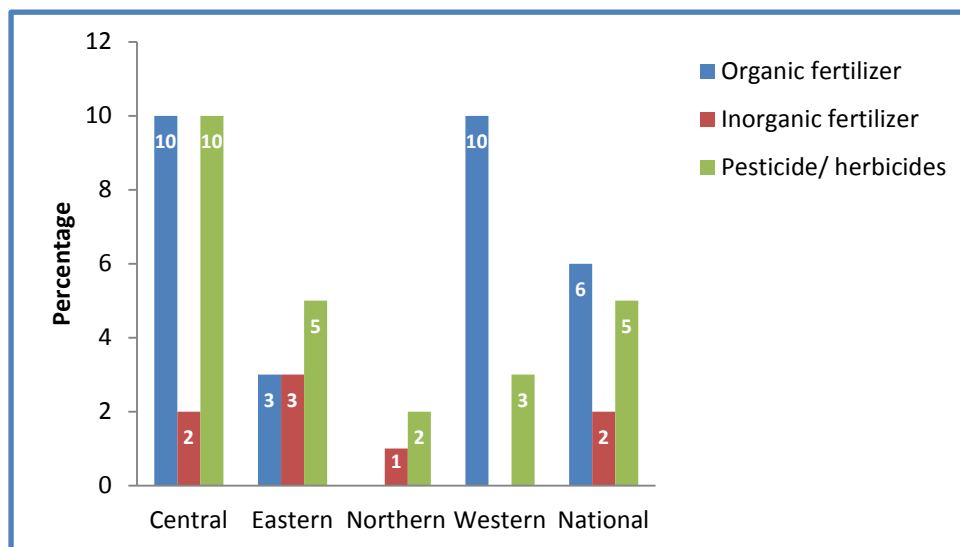


Figure 28: Time taken for households to reach at least one parcel of their land, by region

Just 10% of agricultural households accessed credit in the five years up to 2009/2010.<sup>34</sup> This is one factor that limits farmers' use of inputs including improved seed, fertilizers, herbicides/ fungicides and traction power, which is widely regarded as a major constraint to agricultural productivity

<sup>34</sup> UBOS

growth in Uganda.<sup>35</sup> Out of the 3.95 million farming households just 30,000 use tractors and the same number use irrigation.<sup>36</sup> This high dependence on rainfed crop production exposes farmers to the vagaries of the climate, especially to prolonged periods of low rainfall and drought. Karamoja in the north east has a uni-modal season with unreliable climatic conditions. These are fragile, dry and sub-humid regions where the extreme variability of rainfall and soil fertility means that farming presents a challenge. Here, household-level production often falls short of minimum household needs, rendering families particularly vulnerable to food insecurity. In October 2009 WFP was providing rations to 1.15 million people living in the Karamoja region.<sup>37</sup>



**Figure 29: Percentage of households using fertilizer by region**

The results from the survey show that use of organic fertilizers is very low at 6%, with farmers in the central and western regions slightly more likely to use it (10%). The use of chemical fertilizers is almost negligible throughout the country with only 1.5% reporting use of it. Just 5% of households use pesticides/herbicides - varying from 10% in the central region to 2% in the north (figure 29).<sup>38</sup>

Central households are generally better connected to markets (to buy inputs and sell outputs) than those elsewhere. As figure 30 shows Ugandans, on average, have to travel around half a kilometre to buy agricultural output/produce, agricultural input and non-agricultural produce. In the east and especially the north farming households have to travel further to purchase the agricultural inputs needed to boost their production.

<sup>35</sup> Ministry of Finance Planning and Economic Development (MFPED), 2008, MAAIF, 2010

<sup>36</sup> Ministry of Agriculture, Animal Industry and Fisheries, Statistical Abstract 2011

<sup>37</sup> FEWSNET Food Security Outlook September 2009 – August 2010

<sup>38</sup> Please note these statistics refer to all farmers and not just subsistence

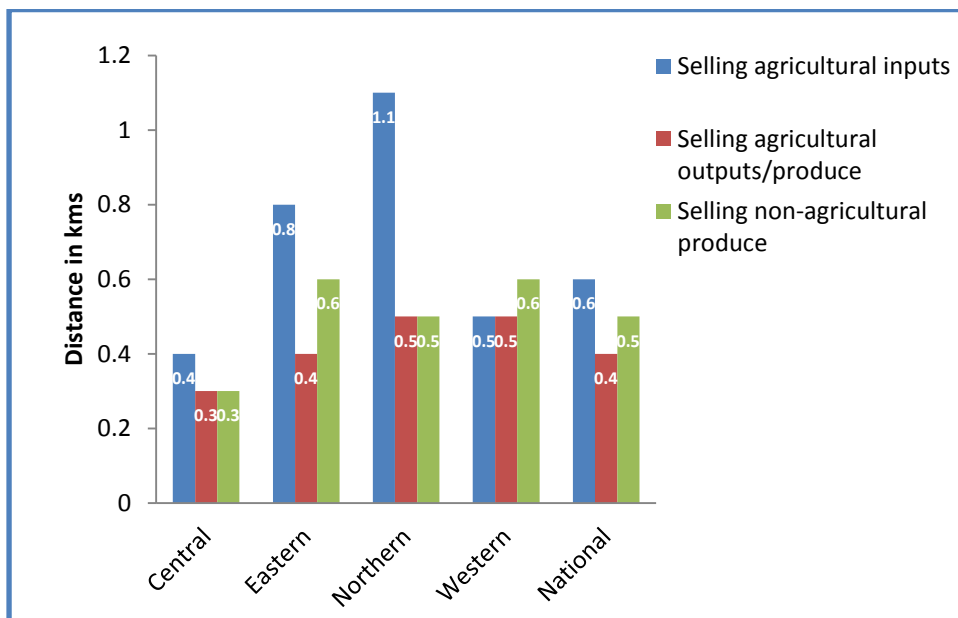


Figure 30: Average distance of household to nearest market by region

If Uganda is to be able to feed its fast growing population it needs to increase yields in a sustainable way. The almost total dependence on rain fed agriculture means harvests are way below their potential especially in drought prone areas such as Karamoja where seasonal lack of stocks and limited market supplies combine with high food prices to create recurring acute food insecurity.<sup>39</sup>

## Seasonality

As discussed in the Context chapter above most of the country has two rainy seasons (March – June and mid August – December), which gives it two growing seasons and two harvests (June - August and November – January). Hence there is a natural variation in food availability and security as the figure below shows with both poor diversity and energy deficiency peaks coinciding around March – April 2010 for the bimodal regions.

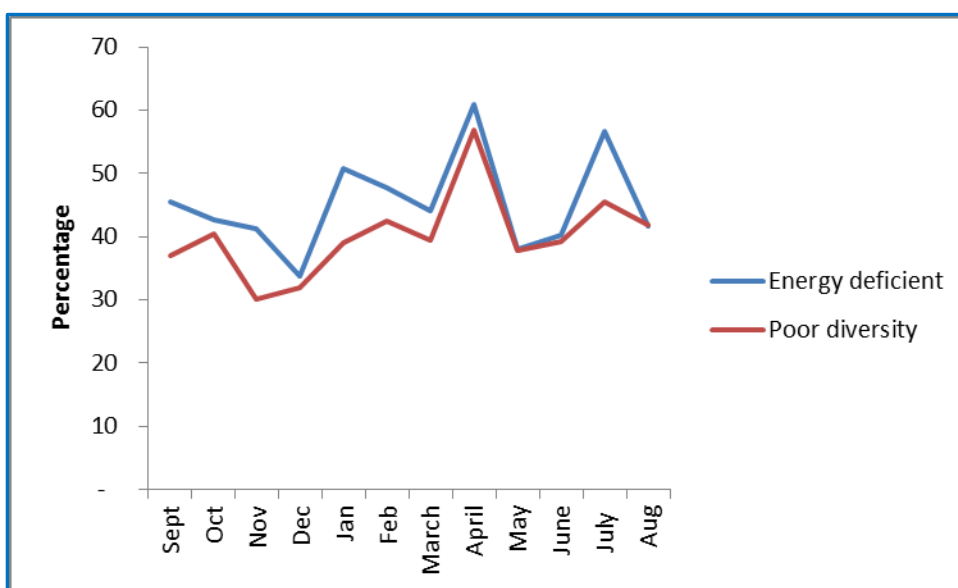
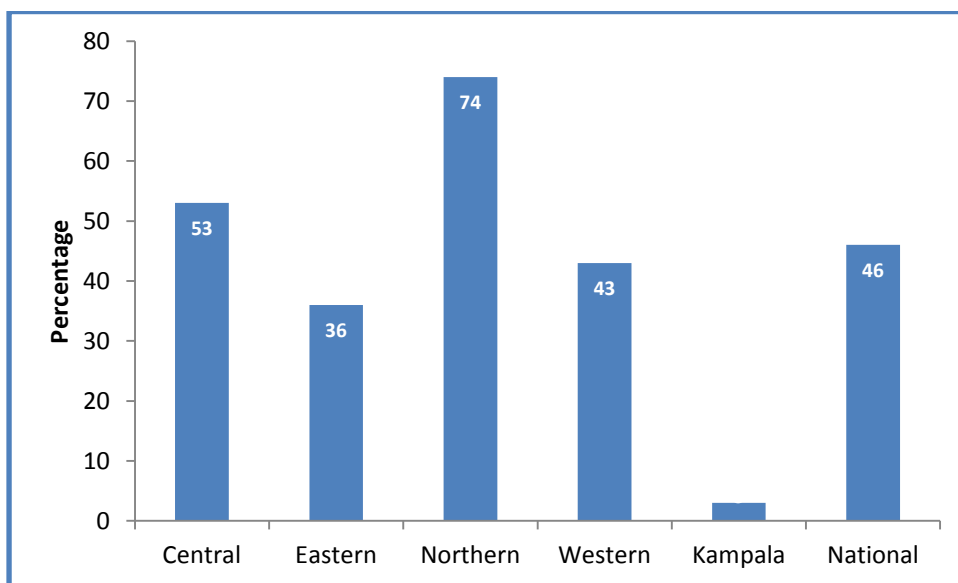


Figure 31: Selected food insecurity indicators for bimodal regions (excluding the north)

<sup>39</sup> FEWSNET Food Security Outlook, September 2009 – August 2010

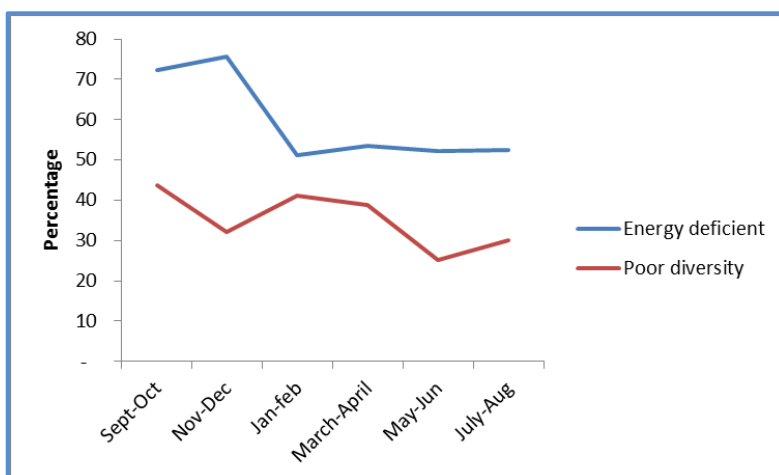
It is the households in the five north eastern districts that are far more exposed to seasonal food insecurity because the Karamoja region has just one rainy season and one harvest. If that harvest is poor, as it was from 2006 – 2009, the onset of the lean season is much earlier than April, which is when it tends to start following a good October harvest.

Since the survey is only representative at regional level we look at the north as a whole rather than drilling down to district level. Some 74% of northern households said they had suffered drought /irregular rains between September 2008-2009 (see figure 32), which confirms the rainfall pattern for that year (FEWSNET). However, it should be noted that the following years have registered rainfall patterns often beyond average likely leading to a general increase in food security and decreasing malnutrition rates (including in Karamoja).



**Figure 32: Percentage of households that experienced drought/irregular rains in previous year by region**

In the north, as figure 33 shows, households’ energy deficiency tended to peak (around 80% of households) as early as November - December 2009, well before the usual onset of the hunger season. From then households may have boosted their food security by increasing their consumption of foods such as sweet potatoes and cassava, through fuel wood and charcoal sales and collection of wild fruits and berries, according to FEWSNET. Thus, this picture does not reflect the “normal” seasonal pattern of food availability.



**Figure 33: Food energy deficiency and low diversity in northern Uganda Sept 09 - Aug 10**



## Climate

According to the State of Environment Report for Uganda, 2008, 'climate change is already affecting food security in the country through reduced production of major food crops as a result of increased occurrence of droughts, floods, and soil erosion through landslides' (NEMA, 2008: 82). Prolonged dry spells hit agricultural productivity, cut yields from rain-fed agriculture, and kill livestock, while floods pose immediate danger to lives, livelihoods and property and have the potential to cause widespread crop damage. Temperature increases can lead to the emergence of new crop pests and crop and animal diseases which will also endanger food security by affecting yields. Already, climate change is thought to be adversely affecting the suitability of certain areas to the growth of traditional food crops such as beans, cassava, maize and matoke (Oxfam, 2008).

For those that do not depend so directly on utilization of the land, such as the urban poor, the impacts of prolonged droughts, flood events and temperature increases are still likely to impact on food security through increased food prices.

In the north-eastern Karamoja region, consecutive years of crop failure and low livestock productivity due to erratic weather conditions and below normal rainfall have had a strong and adverse impact on food security throughout the sub-region. From 2001, the weather patterns have been extreme and intense, resulting in frequent extended dry spells (2002, 2004, 2006, 2007, 2008, 2009). The 2010/2011 rainfall deficit caused an estimated loss and damage value of \$1.2bn or 7.5% of Uganda's GDP.<sup>40</sup>

Nearly all households that experienced drought, claimed the shock had led to a decline in food production (94%) and income (81%). When confronted with these falls in income and production, two fifths were forced to change their dietary patterns, such as eating less preferred food, cutting portion sizes and the number of meals they eat or skipping meals. As indicated above, some 12% of northern households are surviving on one meal a day and nearly half of households in the north and west eat just twice daily. This diet -related coping mechanism is coupled with relying on savings (17%) while 11% find non-farm employment and 9% rely on help from family and friends.

Floods are also a major concern. In 2007, the eastern Teso region experienced its heaviest rainfall in 35 years (One World, 2008). An estimated 50,000 households were affected, many people faced food insecurity due to the loss of their first and second season harvests, and water and sanitation facilities were severely impacted (NEMA, 2008). In Butaleja district in the eastern region of Uganda, in March 2010, floods submerged crop fields and vital infrastructure including some roads, schools and houses (OCHA, 2010).

In March 2010, following unusually heavy rains, landslides occurred in the Bududa district of the Mount Elgon region. Landslides buried three whole villages and caused numerous deaths. Hundreds of households were displaced, two primary schools were destroyed and the main health centre serving the area was severely damaged.

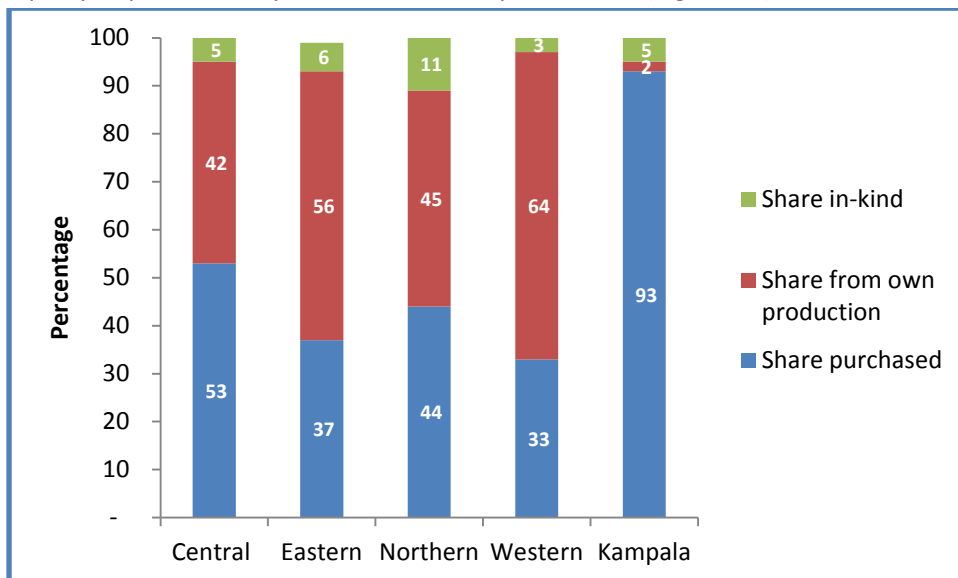
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<sup>40</sup> The 2010-2011 Integrated Rainfall Variability Impacts, Needs Assessment and Drought Risk Management Strategy, Department of Disaster Risk Management, Office of the Prime Minister

## Sources of food

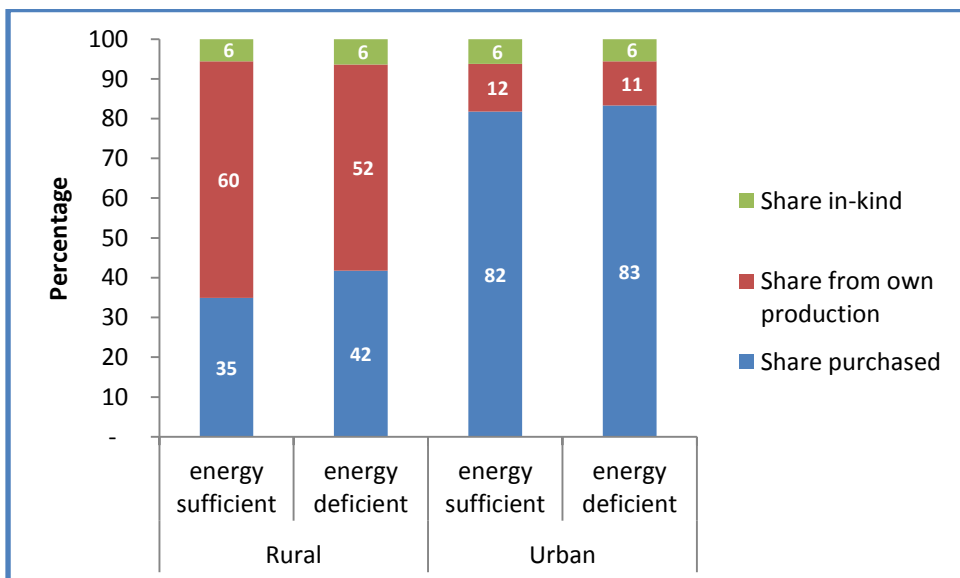
The rate of dependency on bought food vs home produced indicates the extent to which households are vulnerable to high food prices. On average Ugandans tend to derive around half of their calories from home produced food and half from purchased but this masks a wide variation between urban and rural households. Unsurprisingly rural households are far more likely to produce their own than urban with 56% of their calories home produced and 38% bought compared with 12% home produced for urban and 82% purchased. (In each case the remaining 6% is given in kind).

By region, westerners rely substantially more on their own production than the other regions: on average 64% of the calories eaten in a western household come from own production. Meanwhile central Ugandans are more market dependent, deriving 53% from purchase, while northerners are equally dependent on purchase and own production. (Figure 34)



**Figure 34: Share of calories by source of food and region**

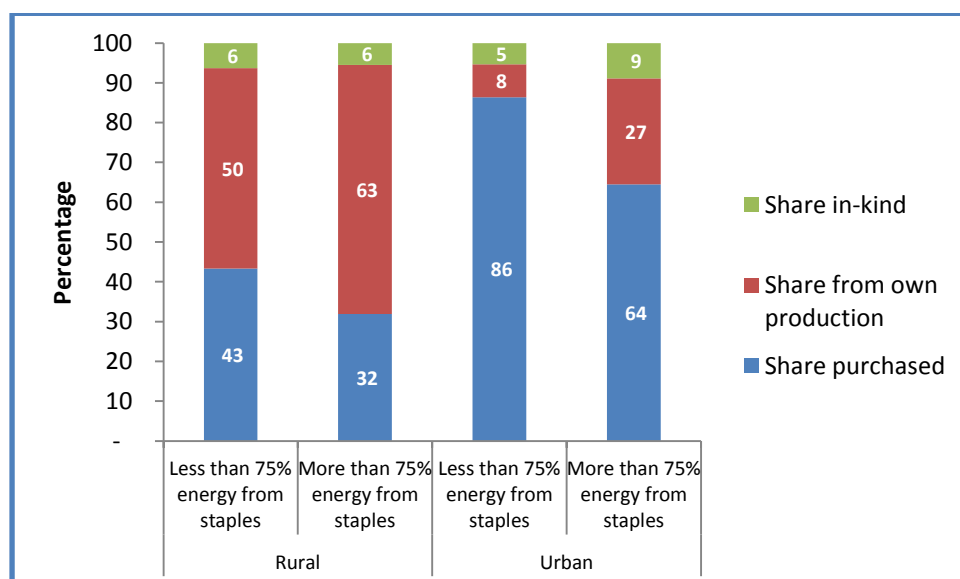
In rural Uganda, energy sufficiency is more closely associated with home production: among the food energy sufficient households, 60% of their caloric consumption is derived from food they produce compared to 52% in energy deficient households. This may be because the energy deficient households are unable to produce sufficient quantities of food to meet their own consumption needs and are often caloric deficient. These households presumably lack the economic means to purchase their production shortfalls in sufficient quantities.



**Figure 35: Energy deficiency/sufficiency by source of food (urban vs rural)**

However, energy sufficiency merely reflects whether households are able to consume enough energy to meet their dietary needs and does not depict the quality of the diet, particularly the consumption of micronutrient-rich foods which may not offer a lot of kilocalories. In fact, as figure 36 demonstrates, home production is more closely associated with high staple consumption, an indicator of low diversity/poor quality diet. Households that buy a higher share of food are likely to have a better quality diet (i.e. less than 75% of their energy comes from staples) than those who are mostly consuming food from their own production. (i.e. in rural settings, those who gain less than three quarters of their energy from staples buy 43% of their food, while those who gain more than three quarters from staples buy 32%).

Thus these figures indicate that households producing their own food - most probably a staple - tend to cover their energy needs, but not their diversity requirements.



**Figure 36: Staple dependency (reflecting diet quality) levels by food source (urban vs rural)**

Figure 37 shows the share of calories from each source (purchase, own production and in kind) by the five expenditure quintiles for rural and urban Uganda. It demonstrates that the wealthiest rural households (quintile 5) are the only quintile that is purchasing more food than they are producing (48% vs. 46%). These households are likely to be engaged in income generating activities beyond subsistence agriculture and are presumably purchasing more expensive food items such as meat and dairy. This figure also shows that households in the poorest quintile in rural Uganda are more dependent on purchase than those in other quintiles (2-4), making them highly vulnerable to price rises for the foods they need to buy.

For urban Uganda, the picture is reversed: the poorest (quintile 1) are more dependent on own production than the others with calories derived from own production decreasing with each quintile. But overall, since urban households are generally much more reliant on purchase they are more vulnerable to fluctuating food prices.

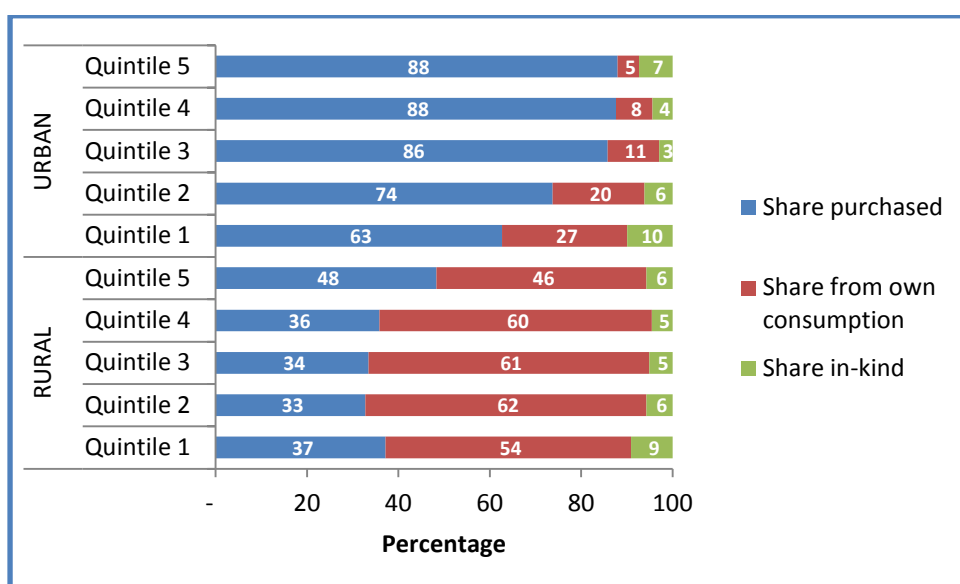


Figure 37: Source of calories by expenditure quintile (urban vs rural)

## Other shocks

As discussed above drought is the main shock reported by Ugandan households. In addition, in central Uganda one in ten households had suffered crop pest and disease as well as serious illness/accident of at least one income earner. Unsurprisingly income falls if a main earner is incapacitated by illness or an accident and food production is cut if crops are diseased or damaged.

Changing patterns of eating is also the most common recourse for those hit by crop pests and disease (a fifth are forced to employ this strategy) followed by changing cropping practices and relying on savings (both 11%).

Meanwhile when income earners are struck by illness or accident, households tend to be more able to rely on unconditional help from family and friends and on savings, though 8% still resort to changing their eating patterns. See table 4.

Hazard/shock	Main impact on food availability and access	Food consumption related coping strategies
1. Drought/rainfall deficit, a major issue in northern Uganda for three in four households, averaging 46% of households nationally	Almost 100% of rural households that suffer this shock report that it hits their production/harvest, thereby decreasing staple food availability. For more than 80% of households in eastern, northern and western Uganda this shock hits their income. Food prices are bound to rise and half of households say it affects their food purchases/access	The main coping strategy is to change dietary habits (39%), such as reducing portion size, relying on less preferred food or skipping meals
2. Serious illness/accident of income earner(s) reported by one in 10 households in central Uganda. Also serious illness/accident of other HH member reported by 6.2% of households	Inevitably for almost all households reporting this shock it hits their income (more than 90%) because of the reduced earning capacity. This is bound to impact on food purchases	8% changed their eating patterns involuntarily
3. Crop pests & diseases - only really reported in central and eastern Uganda by 11% and 8% of households respectively	For three quarters experiencing this shock it hits their income and, inevitably, for almost all (90% of eastern and 82% of central households) it hits food production	A fifth were forced to change their dietary patterns
4. Theft of money/theft of agricultural assets – chiefly a central issue reported by 7% and 8% of households respectively	For more than 60% this impacts on their income. Theft of agricultural assets has a high impact on food production (60%). A fifth of households that are victims of money theft are less able to purchase food.	The main coping mechanism for those whose agricultural assets have been stolen is to change eating habits (12%). 5% of those who have experienced money theft adopt food related strategies though the first recourse is to rely on savings or help from friends/relatives

**Table 4: Main shocks that households experienced, their impact and how families coped**

## 8. Drivers of malnutrition

### Poor quality diet

Inadequate food intake -either in quantity or quality- is an important cause of malnutrition. As we have seen nearly half of the Ugandan population is food energy deficient while many rural Ugandans in particular have a diet that is poor in micronutrient rich foods such as meat, fish, fruit and dairy.

Children in households that are more food insecure (using the indicators ‘share of expenditure on food’, ‘food consumption score’, ‘dietary diversity’ and ‘high share of energy from staples’) are more likely to be stunted. For instance, households in the western region are far more likely to have a low

diversity diet than those in other regions and the region has the highest rates of childhood stunting in the country at 44% compared with an average of 34.5%.

### Maternal health and young child feeding practices

However poor diet is not the only cause of malnutrition. Insufficient or inappropriate caring and hygiene practices, poor infant and young child feeding practices (i.e. initiation of breastfeeding, breastfeeding practices and introduction of solid/semi-solid foods), use of unsafe water, inadequacy or absence of sanitation systems and inadequate access to maternal and child health services can all lead to ill-health, which affects a person’s ability to absorb the required nutrients from available foods, leading to malnutrition. The critical period is the first 1000 days, from the beginning of pregnancy to the first two years of a child’s life, the optimal three years for growth, health and development.

The percentage of women giving birth in health facilities has increased to 57% from 42% in 2006. In addition, 58% of women in Uganda are now giving birth with the assistance of a skilled birth attendant. However, there is still a long way to go and a large disparity between rural and urban areas, with 54% of women in rural areas seeking skilled attendants for delivery compared to 90% of women in urban areas.<sup>41</sup>

Early initiation of breastfeeding is encouraged because it helps in the contraction of the uterus and reduces postpartum blood loss in women by stimulating the release of oxytocin. In addition, the first breast milk contains highly nutritious colostrum, which contains antibodies that protect the newborn from diseases. Early initiation also fosters the bond between mother and child.

Although early initiation of breastfeeding is progressing, almost one in five children are still not breastfed within the first six hours of life. In Kampala and the northern region less than three quarters are breastfed within six hours of being born.

UNICEF and WHO recommend that children be exclusively breastfed during their first six months of life and then given complementary food in addition to continued breastfeeding until the age of two or more when the child is fully weaned. Only 68% of under twos were still being breastfed at the time of the survey, figure 38, while only 4% had been exclusively breastfed for the recommended six months, figure 39.

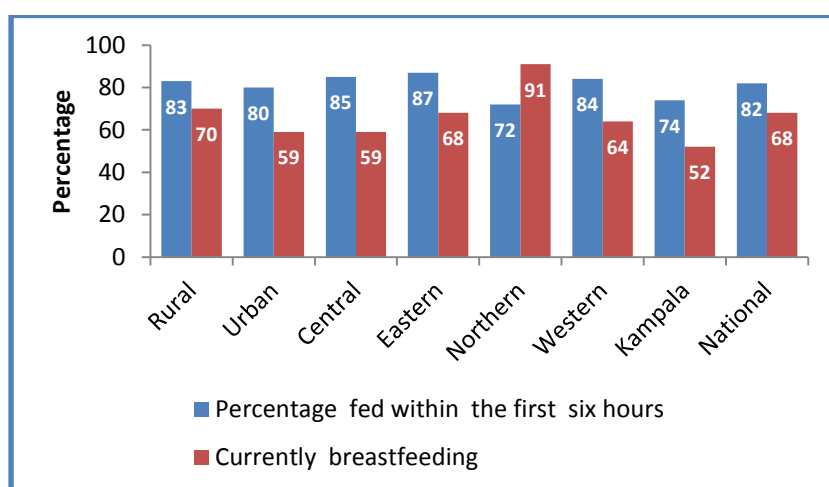
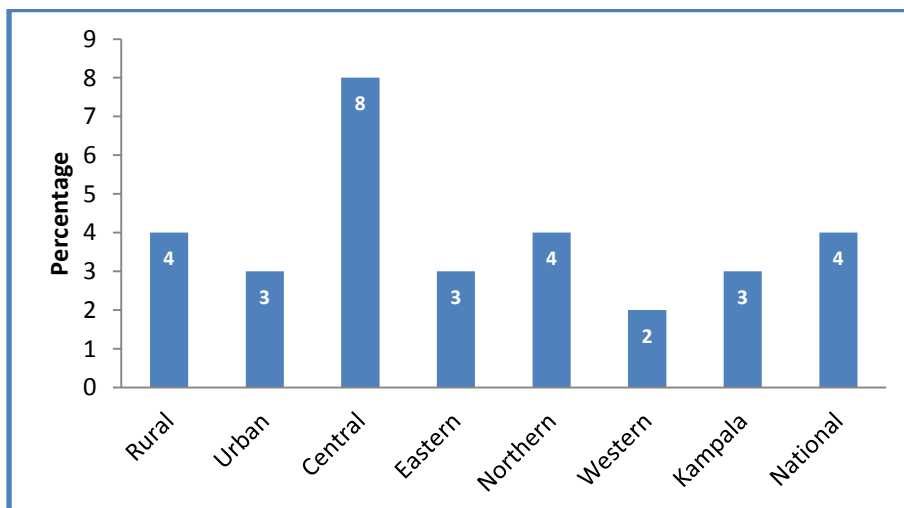


Figure 38: Breastfeeding practices for children age 0 to 24 months by region and urban/rural

<sup>41</sup> 2011 Uganda Demographic and Health Survey, UBOS



**Figure 39: Percentage of children exclusively breastfed for six months**

On average infants were breastfed for 14 months, though northern and the poorest children tend to be breastfed for longer (18 months and 16 months respectively).

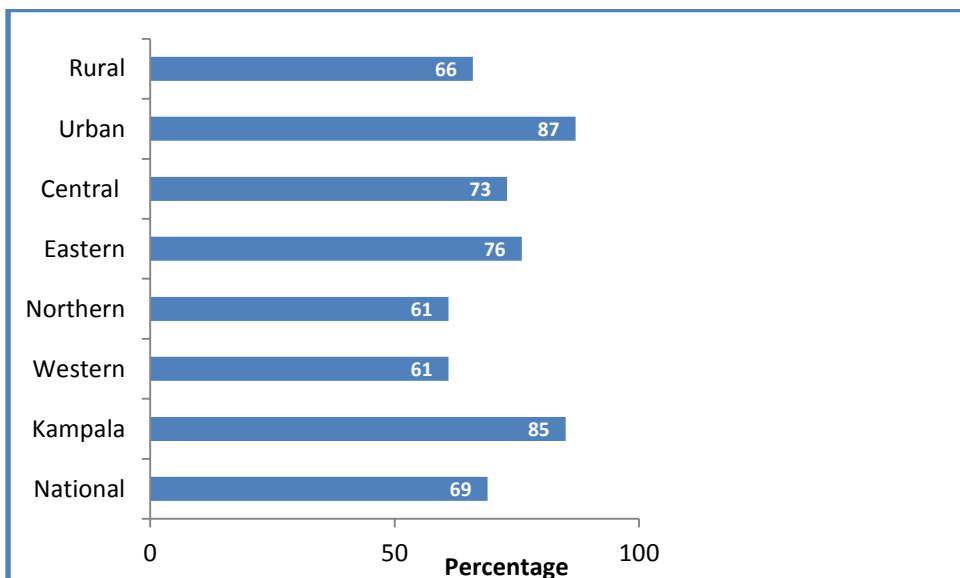
Supplementary feeding is usually discouraged before the age of six months because it exposes infants to pathogens and increases their risk of infection. In addition, it decreases infants' intake of breast milk and in households with low welfare levels, the supplementary food given is usually less nutrient-dense. It is recommended that a child is introduced to solid/semi solid food and fluids at six months since breast milk alone is no longer sufficient to maintain the child's optimal growth. Ugandan children are on average introduced to complementary foods at 5.4 months.

### **Illness, disease and immunization of young children**

Childhood immunization against preventable diseases as well as prompt and appropriate treatment for diseases like malaria and diarrhoea is vital if child malnutrition is to be prevented.

On the basis of sub-clinical data, vitamin A deficiency is considered a severe public health problem among children. Vitamin A is a fundamental micronutrient for the proper functioning of one's immune system, and is useful in maintaining the epithelial tissue in the body. Deficiency not only increases the severity of some infectious diseases like measles and diarrhoea in children, but also slows recovery from illnesses and may result in impaired vision or blindness. It can be obtained from breast milk, other milk, liver, eggs, fish, butter, red palm oil, mangoes, papayas, carrots, pumpkins and dark green vegetables. Since the human liver can store an adequate amount of vitamin A for between four and six months, periodic dosing (usually every six months) is one way to ensure that children are protected from deficiency.

Almost seven in ten children age 0 to 24 months were reported to have taken a vitamin A capsule in the six months preceding the survey with those in urban areas (87%) and Kampala (85%) more likely to have been given one. However, only six in ten children in northern and western Uganda were given the capsule in the last six months before the survey.

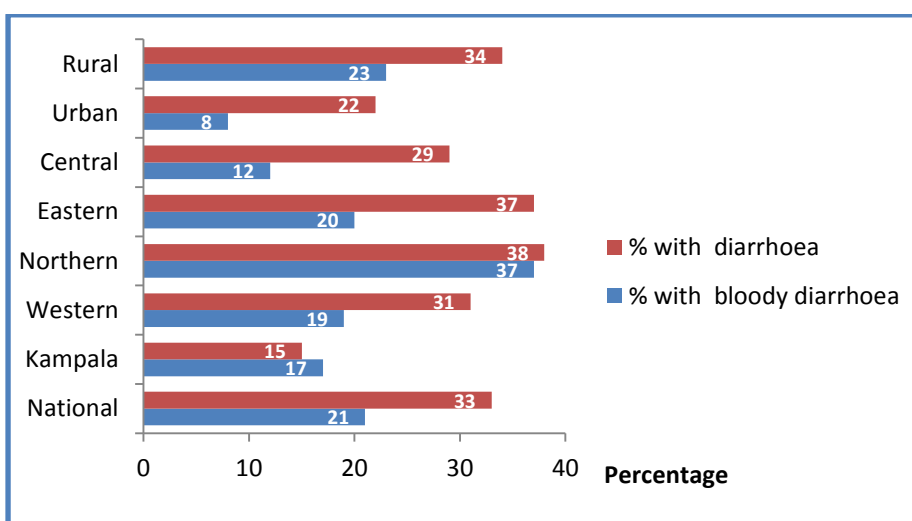


**Figure 40: Vitamin A supplementation among children aged 0 to 24 months by region and urban/rural**

Infection is categorized as an immediate cause of malnutrition among children (UNICEF, 1999) because it depletes the critical body stores of protein, energy, minerals and vitamins. A dual response on nutrition and infection is therefore needed for an optimal response in preventing the deterioration of children’s nutritional status.

Diarrhoea is usually caused by exposure to and use of contaminated water and unhygienic practices in food preparation and disposal of excreta. Severe diarrhoea causes dehydration and high mortality rates. Overall, a third of under twos had diarrhoea in the two weeks preceding the survey. Again, the poorest rural children in the northern region of Uganda were more likely to be afflicted. Furthermore, a fifth revealed the diarrhoea contained blood rising to around a third in the north.

In spite of the risk of dehydration resulting from an episode of diarrhoea, almost half (45%) of under fives were given the same or somewhat less to drink and 36% were given *much* less to drink.<sup>42</sup> A fifth were given less to eat and one in ten were not given anything.



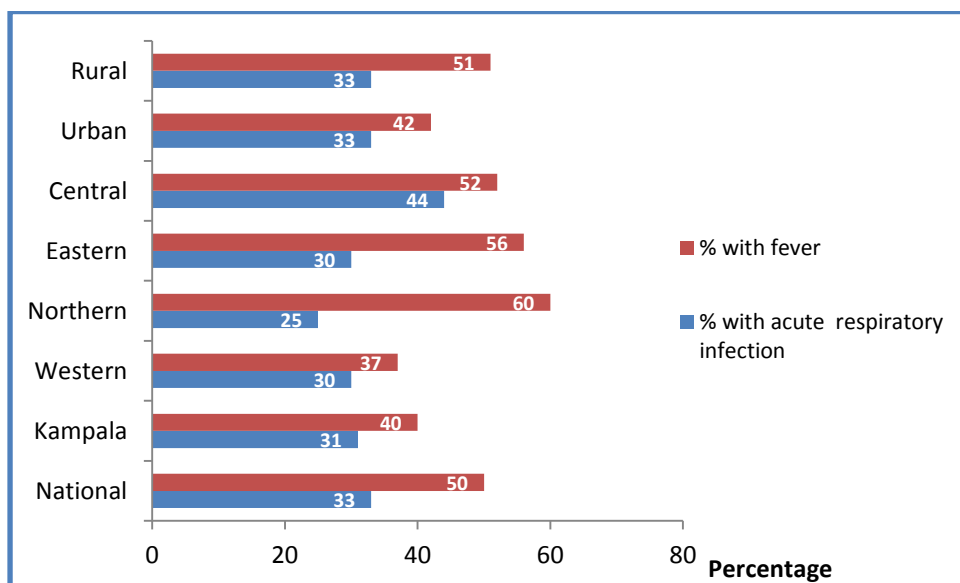
**Figure 41: Percentage of children that had diarrhoea or bloody diarrhoea by region and urban/rural**

<sup>42</sup> This is how the responses were pre-coded in the questionnaire, so ‘much less’ is a subjective quantity.



Similarly around a third (32.5%) of under twos were reported to have had a cough during which he/she breathed faster than usual with short quick breaths, or had difficulty breathing in the two weeks preceding the survey. There was no difference in prevalence between urban and rural Uganda, but these acute respiratory infections were more common among children in the central region (44%), and those from households in the lowest (39%) and, curiously, the highest (39%) expenditure quintiles.

Malaria remains one of the leading causes of childhood morbidity and mortality in Uganda and is usually signalled by fever. Half of the 0 to 24 month old children had a fever in the two weeks preceding the survey though fewer did in urban areas (42%).<sup>43</sup> Once again the prevalence was considerably higher among children in the north (60%).



**Figure 42: Percentage of children under two that had acute respiratory infection and/or fever by region and urban/rural**

The prevalence of vaccinations is a general proxy for access to healthcare. More than a quarter (27%) of children hadn't been vaccinated against measles and a fifth hadn't been vaccinated against diphtheria, pertussis (whooping cough) and tetanus. Again children in the north were less likely to be vaccinated than elsewhere while girls were less likely to have received a measles immunisation than boys (67% vs 71%). The poorer the household the less likely the children were to be immunised against measles or DPT3 with the proportion having been vaccinated generally decreasing with each decreasing expenditure quintile.

As figure 16 above shows, fewer than three quarters (72%) of households accessed improved water overall.<sup>44</sup> Close to four in every ten households in the western and central regions (39% respectively) were still using non-improved sources of drinking water.

The survey findings further reveal that slightly over three-quarters (76%) of households reported that their members usually used covered pit latrines while 7% had no access to a toilet facility, though this average figure is highly skewed by the situation in northern Uganda, where some 23% were still forced to defecate in the bush.

<sup>43</sup> Note this is not a figure representing malaria itself but an association

<sup>44</sup> Improved water sources include piped water, public taps, boreholes, protected well/spring, rain water and gravity flow schemes.

## 9. Conclusion

The LSMS has proved a valuable source of food security information and this analysis has illustrated the value of WFP collaborating with Uganda's statistical bureau in spite of the fact that the number of households covered were relatively few.

The report confirms that food security cannot be viewed in one dimension: while the north suffers most from seasonal food deficits exacerbated by drought, it is in the west that lack of food diversity and stunting are more concerning. As underlined in this report, special attention needs to be given to the north which suffers from so many of the factors that underlie food insecurity and malnutrition such as regular rainfall deficits, the effects of a long conflict, low education levels and extreme poverty. Lower level analysis, particularly in these regions is required to ascertain how programme and policy decisions could target these areas.

The poorest sections of society have been excluded from Uganda's steady economic transformation. The absolute numbers of poor are likely to rise if so many continue to remain illiterate and if the fertility rate and population growth does not abate. Poverty is entrenched in rural areas and the poorer the household, the more likely it is to be food energy deficient, to have low dietary diversity, derive more energy from staples and have poor or borderline food consumption. In addition, the poorest rural households are more market dependent than the middle quintiles, meaning they are more exposed to high food prices, which have hit Ugandans in recent years largely due to poor harvests prompted by rainfall deficits, that have disrupted the expected seasonal pattern.

Illiteracy rates remain appallingly high especially amongst women in northern and eastern Uganda. This urgently needs addressing to help women out of a cycle of low paid work, poverty and poor child feeding and caring practices.

Smallholder farmers need to be able to invest in inputs and improved techniques, but are prevented from doing so since they lack income opportunities and access to credit. They need inputs and infrastructures to be able to take full advantage of Uganda's fertile soils and abundant water sources in order to boost their yields, as well as to protect them from the unpredictable vagaries of Uganda's climate, such as rainfall shortages, floods and rising temperatures.

A household's overall food security status greatly impacts on the nutritional status of the under fives. This is very much the case in western Uganda where stunting rates are at their highest and dietary diversity is the most limited.

But other factors need to be addressed to improve child nutrition in Uganda. Morbidity rates in children could be lowered by improving hygiene practices and treatment for diarrhoea, boosting immunisation and vitamin A coverage, and taking action to lower malaria rates. Programmes must be created (or scaled up if they already exist) to promote the benefits of early initiation of breastfeeding and adequate child feeding practices.

## Annex I Overview of the food security situation in Uganda

Table A1

		Food Quantity			Food Quality							Economic Vulnerability				# obs
		Calories per capita per day	Calories per adult equiv. per day	% pop. energy deficient	Mean share of calories from staples	% of HHs with > 75% energy from staples	Mean FCS	% of HHs with poor food consumption	% of HHs with borderline food consumption	Mean dietary diversity score	% HHs consuming <=4 food groups	Poverty head-count	Mean share of exp. on food	% HHs with > 65% of exp. on food	% HHs with >75% of exp. on food	
National		<b>2167</b>	<b>2958</b>	<b>47.6</b>	<b>68.8</b>	<b>42.6</b>	<b>52</b>	<b>4.7</b>	<b>15.6</b>	<b>4.8</b>	<b>38.7</b>	<b>25.7</b>	<b>50.7</b>	<b>29.6</b>	<b>4</b>	<b>2523</b>
Rural / Urban	Rural	2147	2954	47.4	71	47.7	50	4.6	16.9	4.7	42.5	29.1	53	36.1	4.5	1952
	Urban	2271	2978	48.6	58.5	19.5	60	4.9	9.9	5.4	22.1	7.9	40.3	8	1.8	571
Region	Kampala	2412	3129	45.9	54.2	10.4	62	6.2	8.6	5.5	21.7	1.9	38.4	3.5	1.5	183
	Central without Kampala	2160	2936	46.3	67.7	40.6	53	6	14.6	5	32.6	15.1	46.8	20.1	4	575
	Eastern	2223	3075	43.3	73.6	53.9	52	3.8	20.4	4.9	36.6	26.1	53	35.5	4	584
	Northern	1910	2637	58.9	64.8	33.6	48	6.2	15.8	4.8	35.3	43.5	55.6	45.3	6.3	613
	Western	2238	3050	45.5	73.1	51.3	52	2.6	14.6	4.3	54.8	29.2	52.8	36.8	3.1	568
Expenditure quintile	Quintile 1	1227	1698	83	75	59.8	36	14.6	35.8	3.8	73.8		56.8	48.4	7.2	453
	Quintile 2	1817	2514	60.9	72.8	53.3	46	2.3	20.8	4.4	48.8		55.9	43.5	4.4	493
	Quintile 3	2219	3066	40.8	71.6	47.9	51	2.8	13.1	4.8	39		53.9	40.2	2.7	484
	Quintile 4	2582	3581	26.9	68.3	38.5	58	0.3	9.2	5.3	25		50.9	27.3	3.5	504
	Quintile 5	3058	4016	24.3	59.1	21.3	64	4.6	4.8	5.6	17.4		39.3	9.6	2.9	589
Sex of head	Male	2191	2982	46	69.3	43.8	53	4.5	14	4.9	35.9	24.7	50.7	29.1	3.7	1791
	Female	2090	2880	52.6	67.7	39.5	49	5.2	19.9	4.6	45.8	29	50.5	30.9	4.9	732

		Food Quantity			Food Quality							Economic Vulnerability				
		Calories per capita per day	Calories per adult equiv. per day	% pop. energy deficient	Mean share of calories from staples	% of HHs with > 75% energy from staples	Mean FCS	% of HHs with poor food consumption	% of HHs with borderline food consumption	Mean dietary diversity score	% HHs consuming <=4 food groups	Poverty head-count	Mean share of exp. on food	% HHs with > 65% of exp. on food	% HHs with >75% of exp. on food	# obs
Livelihood groups	Rural mixed subsistence farming and non farm enterprising	2292	3163	43.1	71.5	47.8	53	2	13.1	5	29.4	26.2	53	32	3	502
	Commercial Farming	2172	3025	54.5	65.8	31.6	58	0	5.8	5.1	31.8	22.2	47.5	18.5	1.9	47
	Wage Employment	2106	2874	46.7	64.7	35.5	53	5.7	15.6	4.8	38	22.7	48.9	26.5	4.9	509
	Non-agric Enterprises	2109	2852	50.6	65.1	33.4	56	5.9	11.1	5	33.2	19.3	46.5	20.2	2.7	521
	Property Income	2525	3262	41.5	63.8	30.5	63	0	11.8	5.7	16.5	0	37.4	5.9	0	41
	Transfers (pension, allowances, social security)	2118	2760	48.4	65.3	31.3	59	7.8	13.4	4.7	44.1	8.8	40.9	7.8	3.2	34
	Remittances	2063	2817	48.3	69.1	47.7	46	10	23.2	4.4	49.5	24.3	50.4	32.1	6.5	129
	Rural mixed subsistence only	2120	2926	48.3	73.5	52.8	47	3.7	20.8	4.4	51.8	36.6	56	45.5	5	442
	Subsistence crop farming and local remittances	2177	2951	51.6	73.5	53.8	46	5.5	19.8	4.5	47.1	30.4	53.9	44.9	5.6	199
	Urban subsistence agriculture	2242	2865	51.9	67	35.8	52	4.8	20	4.9	33.6	18.8	45.1	15.4	2.2	93

## Annex 2 Market integration and prices

Table A2 Correlation coefficient of first differences for wholesale maize prices in selected Uganda markets

Markets	Arua	Kabale	Kamplala/ Kisenyi	Kiboga	Lira	Masaka	Masindi	Mbarara	Soroti	Tororo
Arua	1									
Kabale	.538**	1								
Kamplala/ Kisenyi	.369**	.477**	1							
Kiboga	.532**	.537**	.797**	1						
Lira	.393**	.587**	.703**	.723**	1					
Masaka	.529**	.734**	.711**	.799**	.803**	1				
Masindi	.412**	.532**	.851**	.865**	.774**	.811**	1			
Mbarara	.648**	.652**	.487**	.678**	.672**	.807**	.622**	1		
Soroti	.634**	.627**	.649**	.766**	.669**	.798**	.768**	.798**	1	
Tororo	.559**	.587**	.785**	.854**	.744**	.821**	.862**	.722**	.851**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

Table A3 Correlation coefficient in first differences for wholesale beans prices in selected Uganda markets

Markets	Kampala/ Kiseyani	Arua	Kabale	Kiboga	Masaka	Masindi	Mbarara	Soroti	Tororo
Kampala/ Kiseyani	1								
Arua	.688**	1							
Kabale	.536**	.611**	1						
Kiboga	.703**	.679**	.627**	1					
Masaka	.717**	.713**	.740**	.706**	1				
Masindi	.710**	.624**	.651**	.728**	.753**	1			
Mbarara	.699**	.694**	.610**	.763**	.788**	.663**	1		
Soroti	.701**	.806**	.695**	.717**	.763**	.756**	.740**	1	
Tororo	.717**	.694**	.741**	.801**	.780**	.736**	.780**	.814**	1

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Annex 3 Caloric computation Uganda based on UNPS 2009/10

We have followed FAO, 2008 and IFPRI's (Smith, 2007) guidelines for calculating calories per capita. In particular, for items with missing on quantity or conversion factor we impute the caloric consumption by dividing the value of the consumption by the cost per calorie. This is mainly consumption in restaurants, but includes also some "other" food groups.

Note that the caloric figures as presented in UBoS, Statistical Abstract 2010, do not include imputation of calories, the figures stated in this report are given in Table . For comparison, following the similar method the caloric figures from 2009-10 give results as Table A5, column 3. Column 2 shows the results when

including imputed calories. As consumption in restaurants are mainly an urban phenomena it has a larger effect on the urban caloric consumption and result in a lower level calories per capita in urban than in rural. Comparing to 2005/06 we find that caloric consumption per capita overall has declined, although there has been a small increase in caloric consumption in urban.

**Table A4 Calories per capita per day**

	1999-	2002	2005/06
National	2193	2066	2190
Rural			2326
Urban			1853

**Table A5 Calories per capita per day from 2009-10**

	Following the method above	without imputing calories
National	2167	2000
Rural	2147	2017
Urban	2271	1914

**References:**

FAO 2008 “Measuring Hunger at sub national levels from Household surveys using the FAO approach. Manual” Statistics Division Working Paper Series, NO ESS/ESSA/005e

Smith, L. and Subandoro, A. 2007: “Measuring Food Security using Household Expenditure Surveys” IFPRI, Washington

UBoS 2010: “2010 Statistical Abstract”, Uganda Bureau of Statistics, Statistics House, Kampala



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