SAVING LIVES
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Fill the Nutrient Gap
Uganda

Final Report

WFP
World Food Programme

UKaid
from the British people

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The summary report and the slide deck can be found here:

wfp.org/fillthenutrientgap

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For more information please contact:

Nutrition Division (OSN) World Food Programme
nutrition@wfp.org
Via C.G. Viola, 68/70, 00148, Rome, Italy

World Food Programme Uganda
wfp.kampala@wfp.org
Clement Hill Road, Plot 17-19, P.O.Box 7159, Kampala, Uganda.

Foreword

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List of Acronyms

CotD	Cost of the Diet
FAO	Food and Agriculture Organisation
FNG	Fill the Nutrient Gap
FSNA	Food Security and Nutrition Assessment
GFA	General Food Assistance
KNP	Karamoja Nutrition Programme
LP	Linear Programming
MAD	Minimum Acceptable Diet
MCHN	Maternal and Child Health and Nutrition
MMT	Multiple Micronutrient Tablet
OPM	Office of the Prime Minister
PDM	Post-Distribution Monitoring
SBCC	Social and Behaviour Change Communication
UDHS	Uganda Demographic and Health Survey
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
VMP	Vitamin and Mineral Powder
WASH	Water Hygiene and Sanitation
WHO	World Health Organisation
WFP	World Food Programme

Introduction

The Fill the Nutrient Gap (FNG) is a nutrition situation analysis and multi-sectoral decision-making tool that combines secondary data review with a Cost of the Diet (CotD) analysis to identify context-specific entry-points for food, health and social protection systems to improve nutrition through increasing availability, access, affordability and choice of nutritious foods.

The tool has been developed by the WFP with technical support from research institutes: the University of California Davis; the International Food Policy Research Institute (IFPRI) (Washington DC); Epicentre (Paris); Harvard University (Boston); Mahidol University (Bangkok), UNICEF and Save the Children, UK (London). FNG provides a framework for strengthened situation analysis and multi-sectoral decision making that identifies context-specific barriers to adequate nutrient intake among specific target groups. It engages different sectors to propose cost-effective strategies to overcome barriers. It has been used in almost 20 countries to date.

The FNG combines review of secondary data and information with linear programming analysis using the CotD software developed by Save the Children United Kingdom. The FNG analysis considers a range of factors that reflect or affect dietary intake, including local malnutrition characteristics; the enabling policy environment; type and availability of nutritious foods in local markets; affordability of nutritious foods; nutrient intake; local practices; and cost optimisation.

The consolidated information is analysed, and the findings are reviewed by a multi-sectoral group of stakeholders at relevant levels, to come to a shared understanding of the issues, context and solutions. Through this consultation process, context-specific optimal policy and programme actions, including possible entry points for interventions, are jointly identified for different sectors, for example, health, social protection and the food system, and stakeholders from the public and private sectors.

The overarching objective of the FNG in Uganda was to bring stakeholders from sectors including health and nutrition, education, social protection and agriculture as well as academia and the private sector together to identify and prioritise context specific policies and programmes, aimed at improving the nutrient intakes of key target groups across the lifecycle. The results from the FNG at the National level are to be used to inform and complement the Uganda Nutrition Action Plan II.

The World Food Programme (WFP) Country Office FNG team also identified a need for two additional FNG analyses to be used to inform WFP and stakeholder programmes in Karamoja and in the refugee settlement areas. In Karamoja the analysis is intended to inform the four-year DFID funded Karamoja Nutrition Programme (KNP) proposal, developed in conjunction with UNICEF. For the refugee settlement areas, the analysis will be used to inform WFP and wider stakeholder programming, including recommendations on beneficiary targeting and transfer modalities. The FNG analysis in

both areas has also identified current knowledge gaps to support detailed assessments planned to address them, to ensure that programme design is evidence-based. Furthermore, the FNG process has brought stakeholders together to share their programming experiences across the country, as well as identify priority nutrition-specific and -sensitive interventions.

Method

FNG Process in Uganda

The FNG process in Uganda ran from November 2017 to April 2018. The analysis was comprised of a comprehensive literature review of available secondary data sources in combination with linear programming (LP) using the CotD software. The aim was to understand context-specific barriers to adequate nutrient intake and to model potential interventions to improve access to nutrients, particularly from nutritious foods.

The National FNG assessment was led by the Office of the Prime Minister (OPM), with technical assistance from the World Food Programme (WFP) country office, regional bureau in Nairobi and Rome headquarters, which together formed Uganda's FNG team. At the start of the process, the Uganda FNG team met with Government, non-government, United Nations (UN), academic and donor stakeholders to introduce the FNG process; collate key secondary data sources and; identify possible interventions, entry points and transfer mechanisms to test in the CotD modelling. Over 170 data sources were identified and reviewed, and a number of data gaps were identified, as discussed in the key findings. The CotD analysis intervention modelling was then carried out and the findings were presented internally to all nutrition specific and sensitive units within the WFP country office, to OPM and the technical working group and then to the wider stakeholder group as part of a recommendation's formulation workshop.

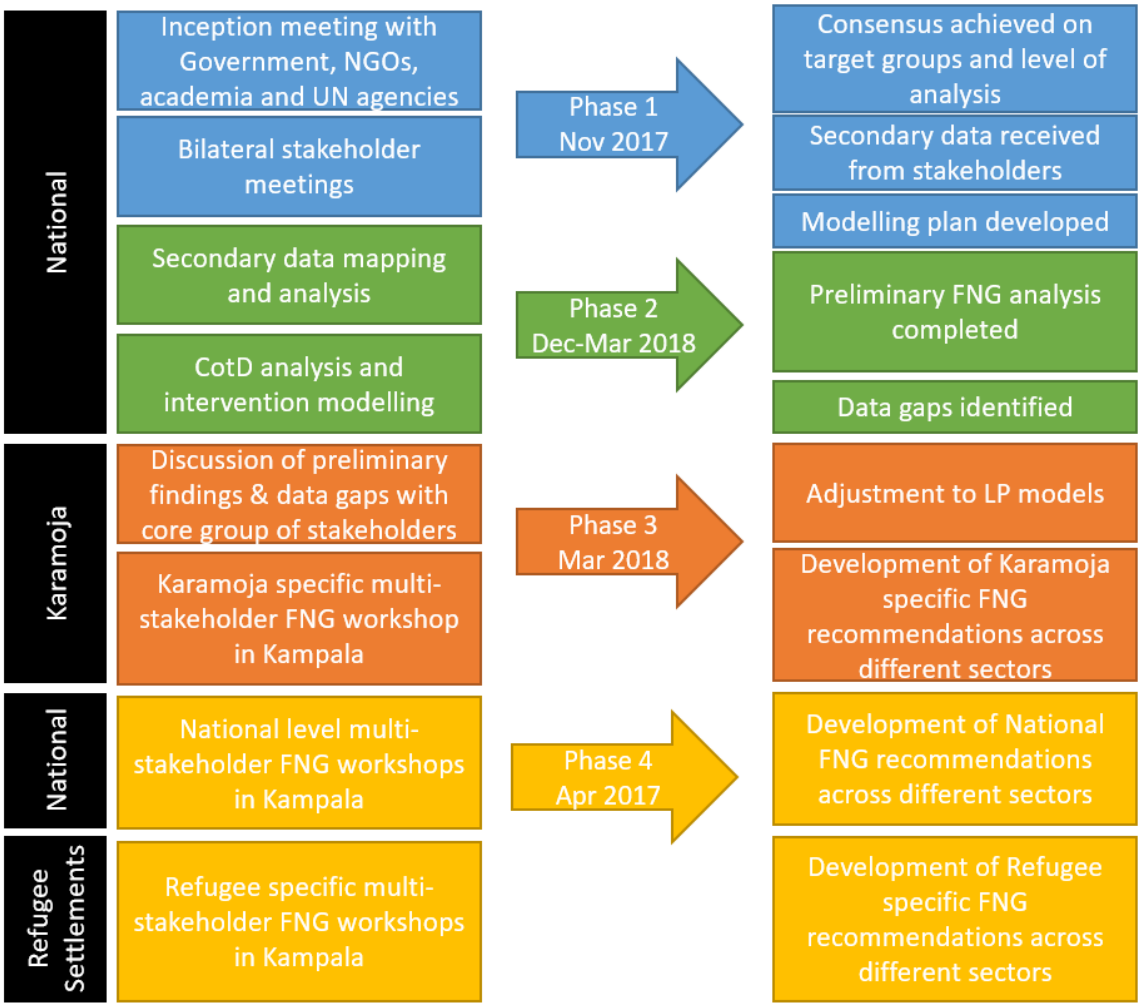
For the Karamoja FNG, the Ugandan FNG team met with non-government, United Nations (UN) and donor stakeholders working in Karamoja to introduce the FNG process; collate key secondary data sources and; identify possible interventions, entry points and transfer mechanisms to test in the CotD modelling. Over 50 data sources were identified and reviewed, and a number of data gaps were identified. The results were first presented internally to all nutrition specific and sensitive units within the WFP country office and then to the wider stakeholder group as part of a recommendations workshop. The workshop was run jointly by the FNG and Nutrition Sensitive team from WFP Headquarters to help identify the priorities for the KNP.

The Refugee analysis was led in conjunction with the United Nations High Commissioner for Refugees (UNHCR). As with the other FNG analyses the Ugandan FNG team met with non-government, United Nations (UN) and donor stakeholders working in the Refugee settlement areas to introduce the FNG process; collate key secondary data sources and; identify possible interventions, entry points and transfer mechanisms

to test in the CotD modelling. Over 70 data sources were identified and reviewed and the full findings were presented internally to all units within the WFP country office working in the refugee settlements first and then to the wider stakeholder group as part of a recommendations workshop.

The detailed FNG process in Uganda is illustrated in Figure 1.

Figure 1. The FNG process followed in Uganda.



Collation and Analysis of Secondary Data

The FNG framework for analysis depicted in Figure 2 helps to consolidate and analyse existing secondary data at country level based on the following categories:

Malnutrition Characteristics: review prevalence data of malnutrition characteristics (Stunting, Wasting, Anaemia, Underweight, Overweight) and if possible data on certain Micronutrient Deficiencies. If relevant, seasonal patterns of various nutritional problems within populations can be considered. Malnutrition characteristics are reviewed in the initial stage to define priority groups for the analysis.

Enabling Policy Environment: analyse if the policy environment adequately facilitates access and availability of nutritious foods for the population by identifying possible gaps in national policy, and national legal or regulatory frameworks related to access and availability. Enforcement of these policies and regulations is a key part of the analysis; for example, while there may be a mandatory national fortification policy, compliance of this policy may be low in reality. This section is crucial in identifying current or potential entry points for nutrition interventions.

Availability of Nutritious Foods: review information on local availability of nutritious foods (natural and fortified) as well as on local production and processing capacity to assess whether it would be possible to meet nutrient needs from locally available foods.

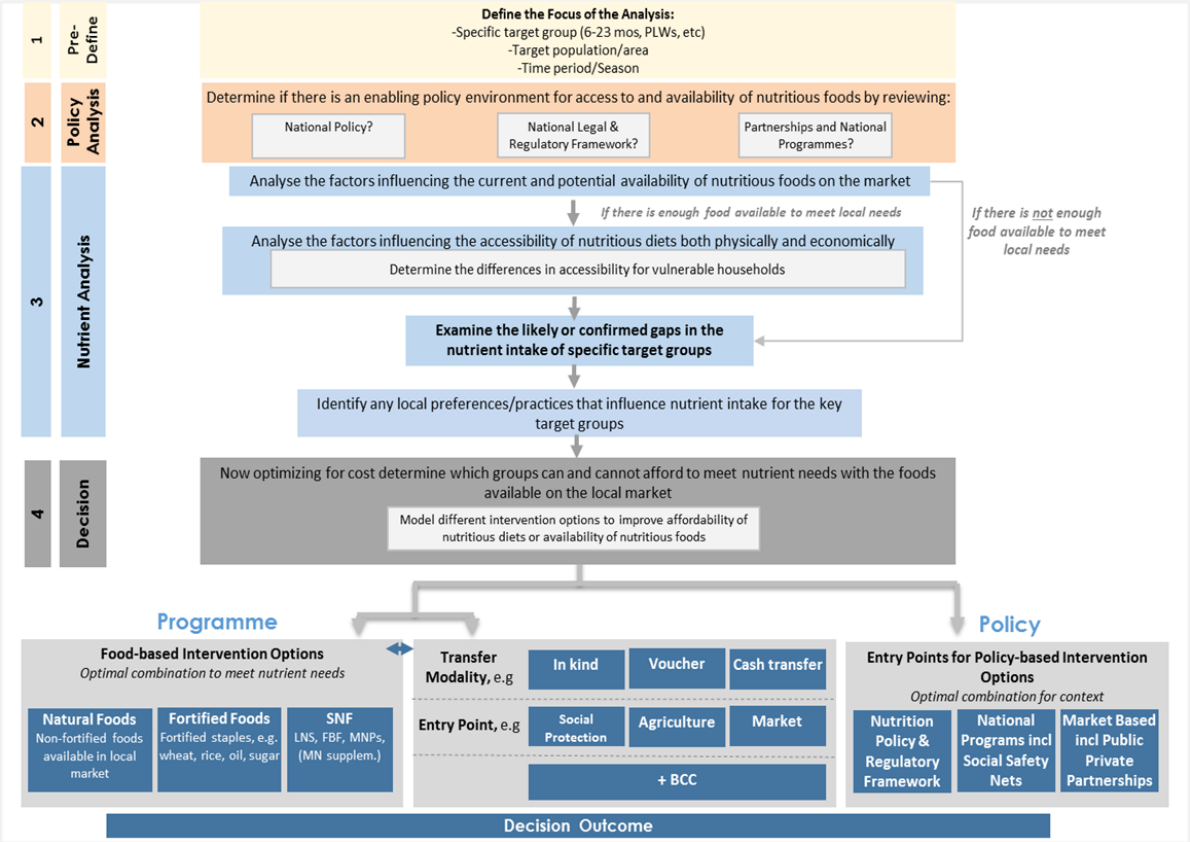
Access to Nutritious Foods: determine if the target populations have access to nutritious foods in both lean and non-lean seasons, in urban vs rural areas etc. Also gain a better understanding of the adequacy of nutrient intake at the household level and the ability of households to cope with potential shocks.

Nutrient Intake: examine likely or confirmed gaps in nutrient intake at the individual/target group level, in particular related to Infant and Young Child Feeding (IYCF) practices and the coverage of supplementation and/or fortification programmes. Each age group will have different nutrient requirements (e.g. a 6-11 month old child will require a diet with much greater nutrient density in iron and zinc per 100 kcal than an adult male).

Local Practices: identify socioeconomic and cultural factors influencing food purchasing patterns and feeding practices that currently act as a barrier to adequate nutrient intake or could in the future limit the effectiveness of certain food-based interventions, particularly among target groups of interest. Information gathered with tools such as ProPAN can be very useful to gain insights into local preferences and behaviours, which can inform strategies such as Social and Behaviour Change Communication (SBCC) to improve feeding practices. Focus Ethnographic Studies or Focus Group Discussions carried out by local academia or NGOs can provide key insights into this often overlooked area of analysis.

Cost Optimization: utilising linear programming tools, such as Optifood and CotD, the minimum cost of a locally available nutritious diet can be estimated. An insight can also be gained into what proportion of the population can afford this diet in different geographic areas or among social safety net beneficiaries compared to non-beneficiaries. Tools such as CotD can also be used to model possible intervention options that might improve affordability, such as introduction of fortified foods and/or Specialised Nutritious Foods (SNFs) through market channels or social protection programmes, and Cash Transfers.

Figure 2. FNG Framework for situation analysis and decision making.



Between November 2017 and March 2018, the secondary data analysis was carried out by the FNG team. A data mapping template was developed to assist the identification and review of different information sources relevant to the FNG analysis and to highlight areas where data had not been found. Data sources were identified, mapped and reviewed over three main stages:

1. Consultation with National Stakeholders: Prior to and during the November mission to Uganda, information about the data requirements for the FNG analysis and the FNG data mapping template were shared with the WFP country office and national stakeholders, who, in turn, shared relevant datasets, reports, articles, and documents on standards and regulations with the FNG team.

2. Literature Search: In addition to obtaining data through national stakeholders, a web-based literature search was carried out to identify any further articles or reports relevant to the FNG analysis and to provide a contextual overview of the nutrition situation in Uganda. PubMed and Google Scholar were used to search for data from studies in academic journals, institutional reports, and working paper series published in the last 10 years.

3. Follow up on identified data gaps: Once the data mapping spreadsheet had been populated with information sources from stakeholders and the literature review, data gaps, in terms of themes, areas of the country or population groups, could be identified. The FNG team then shared this list virtually in January 2018 to inquire whether any additional information sources could be shared. A further, targeted literature search focussing on these specific gaps was also conducted.

Through consultation with national and international stakeholders and a review of relevant literature, 170 data sources for the national level analysis, 40 for Karamoja and 70 data sources for the refugees were identified and reviewed. This review identified a number of data gaps that were unable to be filled, as detailed in the 'Data Gaps' section.

Cost of the Diet Assessment

For the national level FNG a CotD analysis was undertaken for each of 15 sub-regions as defined by the Uganda Demographic and Health Survey (UDHS): South central, North central, Kampala, Busoga, Bukedi, Bugisu, Teso, Karamoja, Lango, Acholi, West Nile, Bunyoro, Tooro, Kigezi, Ankole. The locations of the refugee settlements fall within five of these regions: Acholi, West Nile, Bunyoro, Tooro and Ankole. For the Karamoja FNG, additional CotD analysis was undertaken for this sub-region.

Food Price Data

Food prices on sub-regional level were calculated by using the 2016 Wave 5 Panel Survey (UNPS 2016/17). This fifth wave (i.e. fifth survey) multi-topic survey was carried out annually on a nationally representative sample of 3,220 households. A key difference between the panel survey and the Uganda National Household Survey (UNHS 2017) is the sample size. While the panel survey is representative at national level, the household survey is representative at the subnational level (i.e for the 15 sub-regions). However, as the 2017 Uganda National Household Survey data was made available in July 2018, after the analysis had been finalised and approved by the Office of the Prime Minister, a recalculation was not feasible. For actual variation in Karamoja data, see Annex 2. It is also important to note that the price data for the refugee settlements is also from the 2016 Wave 5 Panel Survey and may not be representative of the food availability in markets that serve the settlements.

Household Size and Composition

The 2016 Wave 5 Panel Survey was used to determine an average household size of five people. The household composition used was based upon the target groups for the FNG analysis as identified by key stakeholders. The household included a child 12-23 months of age, a lactating woman and an adolescent girl (14-15 years old) – the three primary target groups impacting the critical window of the first 1000 days of life – as

well as a child 6-7 years of age and an adult man. For this analysis the 12-23 month old child is to be used as a proxy for breastfed children 6-23 months, the child 6-7 years as a proxy for a school aged child and the lactating woman as a proxy for a pregnant or a lactating woman (PLW).

Staple – Adjusted Nutritious Diet

The FNG approach defines the Staple Adjusted Nutritious Diet: the lowest cost diet that meets recommended intakes for energy, protein, fat and 13 micronutrients, with inclusion of the main staple foods and excluding food prohibitions. Staple foods are defined as foods that are generally eaten every day by all household members. Prohibited foods are defined as foods which are not consumed for cultural or religious reasons but not due to not liking them. This diet is not intended to reflect what individuals or households are currently eating, nor should it be used to develop food-based recommendations or dietary guidelines.

The 2016 Wave 5 Panel Survey was used to determine staple preferences, and these were reviewed and agreed by stakeholders in the technical working group. The same preferences were also applied to the refugee analysis. One portion of each staple food shown in Table 1 was included for all household members per day, except for the child aged 12–23 months, who received half a portion of each a day. As no prohibited foods were identified by the secondary data and stakeholder consultation that were particularly relevant to the modelled family members, no foods were excluded from the analysis.

Table 1 summarises the staples chosen for the 15 sub-regions. This 'staple adjusted' nutritious diet is referred to as the 'nutritious' diet throughout this report.

Table 1. The staple preferences used to calculate the nutritious diet for the national and refugee FNG analysis.

Sub region	Staple 1	Staple 2
South Central	Matoke	Maize flour
North Central	Maize flour	Matoke
Kampala	Matoke	Maize flour
Busoga	Maize flour	Sweet potatoes
Bukedi	Cassava flour	Maize flour
Bugiso	Maize flour	Matoke
Teso	Cassava flour	Sweet potatoes
Karamoja	Sorghum flour	Maize flour
Lango	Cassava	Maize flour
Acholi	Sorghum flour	Cassava
West Nile	Cassava	Sorghum flour
Bunyoro	Cassava	Beans
Tooro	Matoke	Cassava flour
Kigezi	Beans	Maize flour

Sub region	Staple 1	Staple 2
Ankole	Matoke	Maize flour

Affordability Analysis

The cost of the nutritious diet becomes a more meaningful figure when compared with the money that households currently spend on food. This facilitates an understanding of what percentage of households within the population can or cannot afford the nutritious diet. To estimate affordability, percentiles of per capita monthly food expenditure data were generated at the sub-regional level using the 2016 Wave 5 Panel Survey. These per capita figures were multiplied by the number of individuals in a typical household (5) to estimate monthly household food expenditure.

Affordability was not estimated for the refugee analysis since households of this population rely on WFP food assistance to meet the majority of their food needs and therefore have very low and very comparable food expenditure.

Intervention Modelling

To improve affordability of the nutritious diet, a number of interventions were modelled targeting the key vulnerable groups: children aged 6-23 months, adolescent girls and PLW. Interventions were also modelled targeting school aged children and the household overall. These interventions were identified primarily through consultations with national stakeholders as well as from the analysis of the secondary data and were modelled in: Kampala, Busoga, Bukedi, Bugisu, Teso, Karamoja, Lango, Acholi, West Nile, Bunyoro, Tooro, Kigezi, Ankole sub-regions. These sub-regions were chosen in consultation with the technical working group and are to be used as a proxy of the national nutrition situation.

For the refugee analysis, the aim of the intervention modelling was to reduce the cost of the nutritious diet and analyses were conducted for the five sub-regions that the settlements fall within.

The interventions included:

- Improving access to local nutritious foods through kitchen garden and smallholder livestock interventions.
- Fortification and biofortification of staple foods.
- Improving access to Specialised Nutritious Foods for specific target groups.
- Micronutrient supplementation.
- Determining adequate cash transfer values for vulnerable households targeted through social safety net programmes (national level).
- Adequate cash transfer values or in-kind food assistance for refugee households targeted through WFP assistance programmes

The modelled interventions are theoretical, assume that households have access to markets, and would need to consider gender dynamics in the design to promote women's empowerment and be accompanied by complementary behaviour change interventions to stimulate buying and consuming nutritious foods.

Refer to Annex 3 for the modelling plans, assumptions and specifications.

FNG in Uganda: Findings

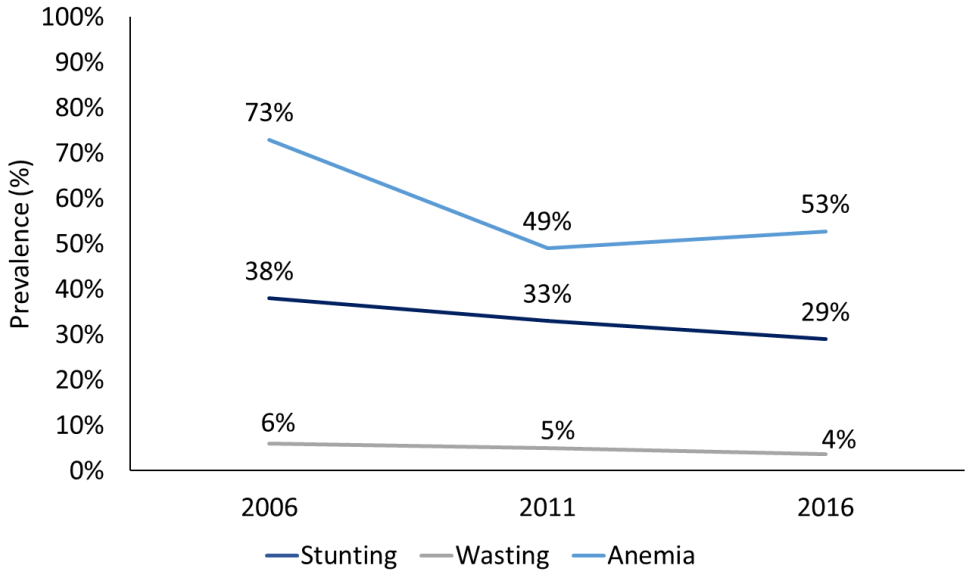
Malnutrition Characteristics

Children's and Women's Nutritional Status

Undernutrition is widespread and varies geographically, while overnutrition in women is on the rise. Preventative action against the double burden of malnutrition is required.

The Uganda Demographic and Health Survey (UDHS) results show that national progress has been made in reducing infant and young child malnutrition over the past 10 years in Uganda, as shown in Figure 3 (UDHS 2006, 2011, 2016). Among children under five, anaemia (hemoglobin <110 g/L) has been reduced by 20 percentage points over 10 years and there is a steady decline of stunting (height-for-age <-2 Z-scores) from 38 percent in 2006 to 29 percent in 2016 (UDHS 2006, 2011, 2016). Over the same period of time, wasting (weight-for-height <-2 Z-scores) has seen a reduction from 6 percent to 4 percent. Despite the overall progress, the prevalence of anaemia of 53 percent is still a severe public health problem as defined by the World Health Organization (WHO) criteria. Likewise, the prevalence of stunting is of high public health significance at 29 percent, according to revised WHO cut-offs (WHO, UNICEF, World Bank Trends and Levels in Child Malnutrition 2018).

Figure 3. The prevalence of child undernutrition from 2006 to 2016 in Uganda (UDHS 2006-2016)



In addition, it is important to note that the country's population has also increased by a third, i.e. 10 million people, during the reference timeframe (2002 to 2014) of prevalence of the last two census (Uganda National Census 2016), which suggests similar population growth between 2006 and 2016. Using this reference time frame would mean that despite successful efforts to reduce stunting by 9 percentage points, 200,000 more children under the age of five years were stunted in 2016 compared to 2006 (from 2 million children in 2006 to 2.2 million in 2016). As of 2016 the burden of wasting and anaemia is 300,000 (unchanged from 2006) and 4 million children (an increase of 900,000 children from 2006), respectively. This shows that the actual caseloads may not follow the same trend as prevalence and that the demand on individual health clinics and other facilities may have actually increased, unless improved health infrastructure is also made available.

Geographically, child malnutrition rates vary across the country (Figure 4 - Figure 6) They show that generally, children in the southern regions experience lower levels of undernutrition compared to children in the north. Stunting is between 20-30 percent in the south compared to 30-40 percent in the north. The exception is the southern region of Tooro where stunting is the highest in the country at 40 percent. Between 40-50 percent of children in the south suffer from anaemia compared to 50-60 percent in the north. The northern regions of Karamoja and West Nile also experience high levels of wasting (10-15 percent of children). No historical analysis is currently possible as the regional definition changed between the 2011 and 2016 UDHS. In the 2016 UDHS malnutrition characteristics are reported on a more disaggregated sub-regional level, whereas the 2011 UDHS reported mainly on 5 regional levels. On a sub-regional level, malnutrition also varies (FSNA 2016, 2017). In the case of Karamoja (for an in-depth analysis of Karamoja refer to section 2 in this report), stunting, wasting and anaemia

show no clear overlap, i.e. they vary across regions, with stunting being the highest in the north-east and anaemia being higher in the south-west.

Figure 4. Wasting in children under 5 years old (UDHS 2016)

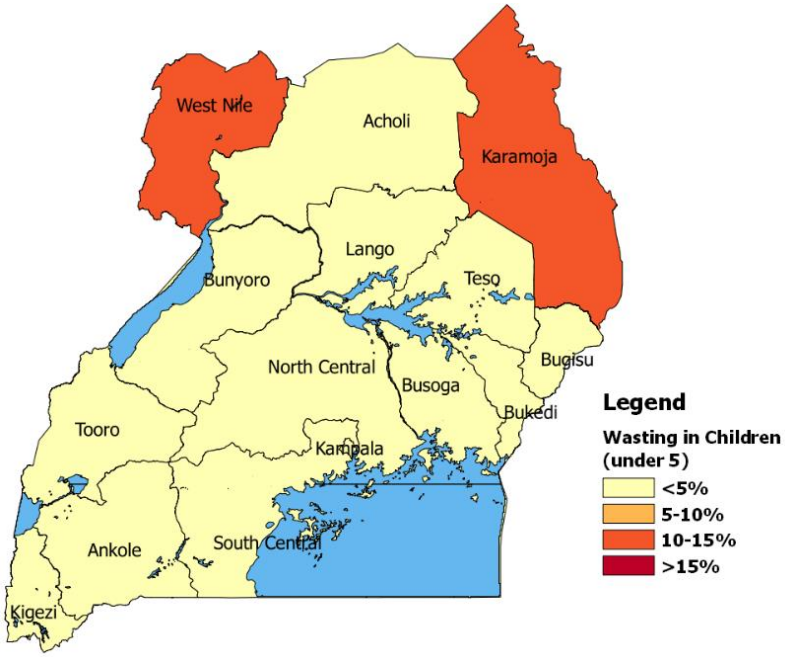


Figure 5. Anaemia in Children under 5 year old (UDHS 2016)

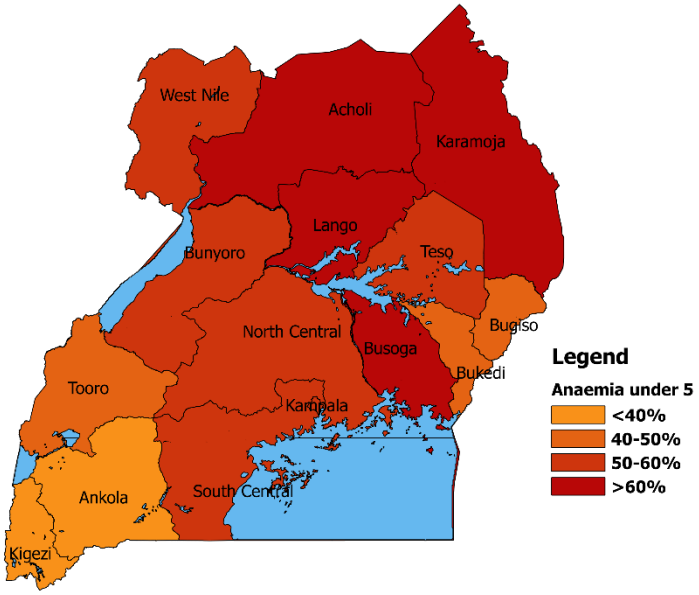
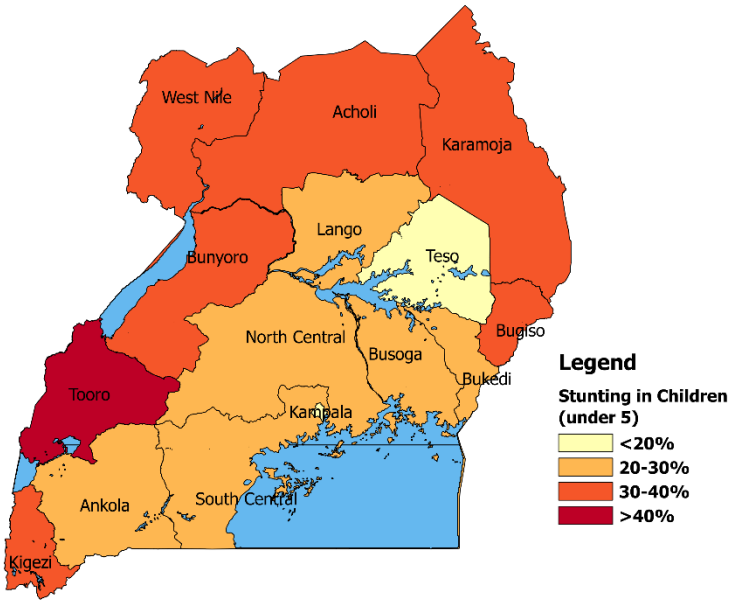


Figure 6. Stunting in Children under 5 (UDHS 2016)

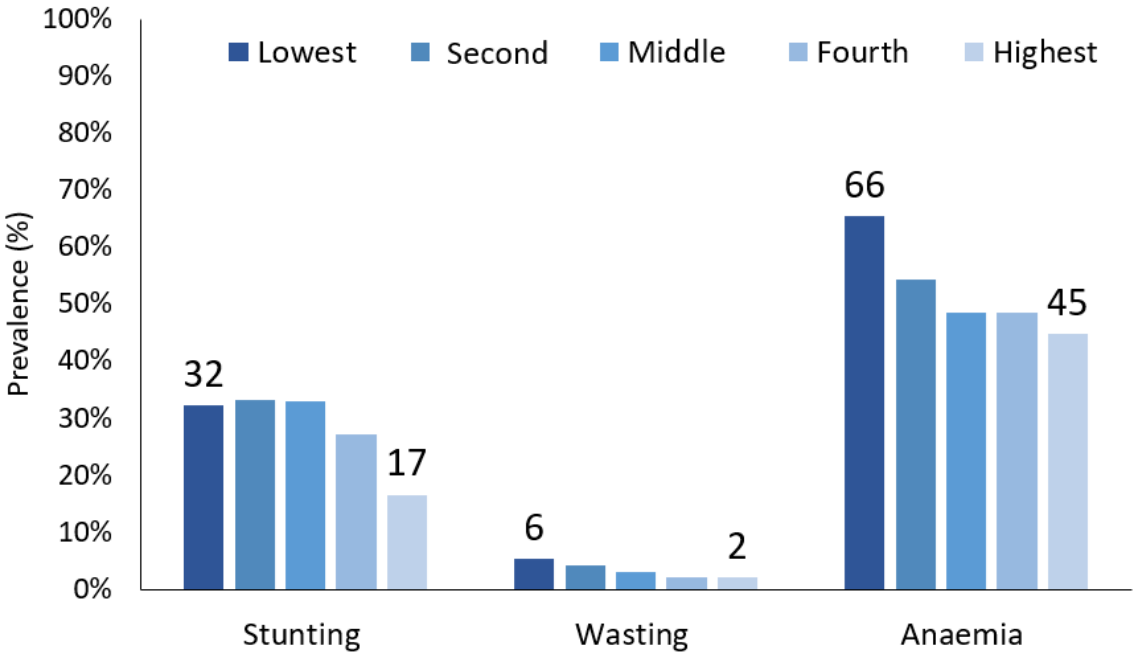


Anaemia prevalence is high not only in children, but also in women (32 percent). However, there is very little data on the likely causes of anaemia and its associations with other indicators for Uganda. There is no information on other micronutrient deficiencies in the country in both women and children. The percentage of children consuming iron rich foods is low at 40 percent and only 23 percent of women took iron tablets (or syrup) as recommended during pregnancy (>90 days). Only 7 percent of children under five were given an iron supplement and 8 percent received a vitamin and mineral powder during the 7 days preceding the UDHS survey (UDHS 2016). 62 percent of children (U5) were given a vitamin A supplement in the 6 months preceding the survey and 66 percent of children 6-23 months of age consumed vitamin A rich foods in the previous 24 hours. Nationally, around 13 percent of children under 5 years have sickle cell trait and less than 1 percent (0.7 percent) of children have sickle cell disease (Ndeezi et al. 2016). Sixty five percent of children and 60 percent of women (during last pregnancy) received deworming tablets. An upcoming micronutrient survey that will be undertaken by UNICEF will ensure that these dynamics are better understood and help identify related factors.

Children in the wealthiest households are somewhat protected from stunting, wasting and anaemia, with the highest wealth quintile showing consistently the lowest prevalence these indicators (Figure 7). However, anaemia in the highest wealth quintile remains a severe public health problem, which shows that different public health strategies may be required to tackle this issue in different wealth groups. Data from the

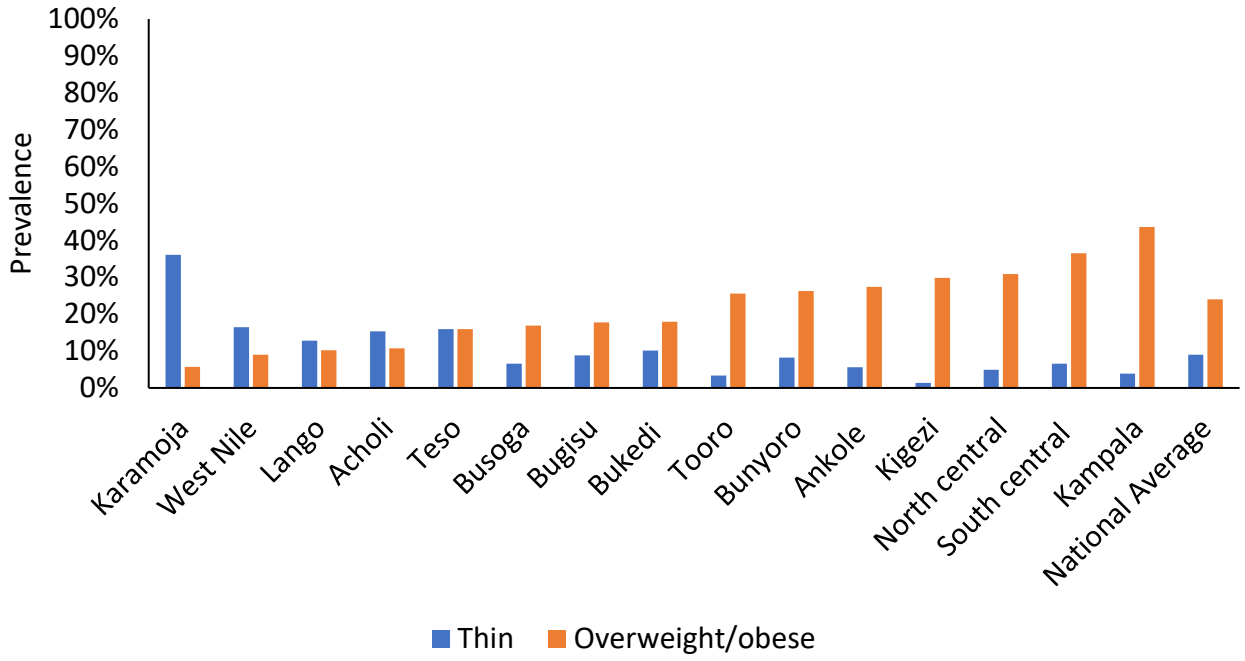
UDHS shows a strong relationship between undernutrition and mother's educational level and nutritional status. For example, stunting and anaemia in children is 25 and 21 percentage points lower respectively, if mothers have completed tertiary education compared to mothers who have no education. Stunting and wasting is 11 and 7 percentage points lower if mothers have a normal Body Mass Index (18.5 - 24.9) compared to mothers who are thin (<18.5).

Figure 7. Prevalence of Stunting, Wasting and Anaemia among under five year olds by wealth quintile (UDHS 2016)



Although thinness in women has declined nationally to 9 percent, regional analysis shows that women in the north of the country, such as Karamoja where this number is 36 percent, are more vulnerable to this form of undernutrition (Figure 8). Adolescent girls ages 15-18 years are more likely to be thin compared to older women aged 40-49 years (13 percent compared to 8 percent). Conversely, national overweight and obesity, particularly in women of reproductive age in the south and central regions is on the rise (Figure 8). Nationally, overweight and obesity in women has risen by 8 percentage points in the last 10 years and is as high as 44 percent in Kampala and 34 percent in women aged 40-49 years, nationally.

Figure 8. The prevalence of thinness, overweight and obesity in women aged 15-49 in the 15 sub-regions of Uganda (UDHS 2016).



Given that stunting and anaemia in children are of public health significance and overweight and obesity among women are on the rise, it is essential that preventative actions against the double burden of malnutrition are prioritised.

Nutrient Intake

Adolescent Girls' and Women's Diets

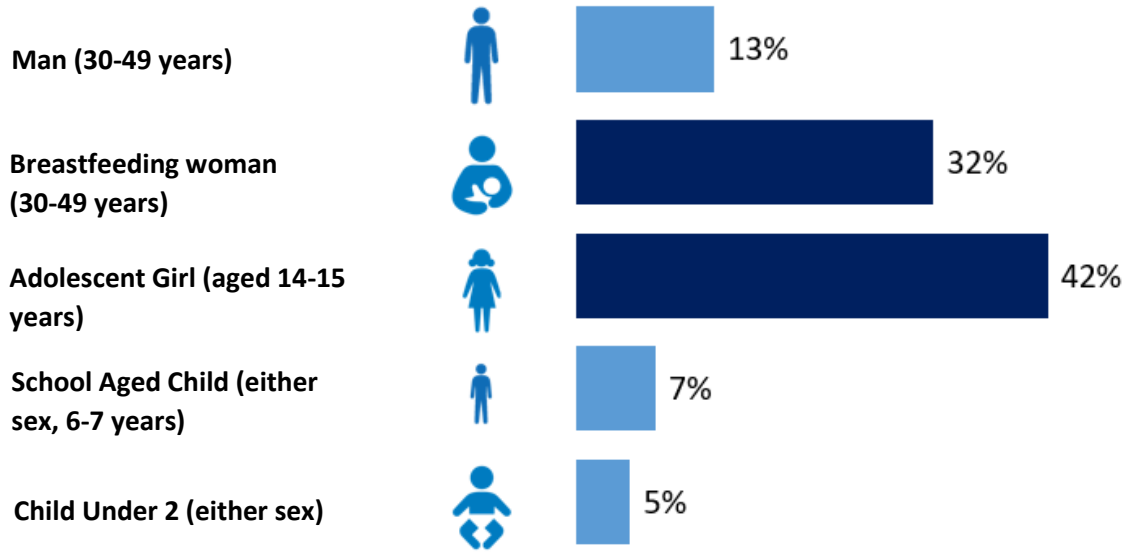
The nutrient needs of women, especially pregnant and lactating women, and adolescent girls are high and data suggests that their diets are poor. This contributes to malnutrition in their children.

The CotD analysis found that meeting the nutritional needs of the adolescent girl and lactating woman were the most expensive, with the two making up almost 75 percent of total household cost (Figure 9). This is due to their increased needs for micronutrients, such as iron, which are typically provided by expensive foods such as meat, eggs, and milk in addition to green leafy vegetables.

Although not unusual, these proportions are higher than normally seen within a CotD analysis. It is common for these two household members to take up 50-60 percent of the proportion of a household cost for a nutritious diet. In the Ugandan context the food list used in the 2016 Wave 5 Panel Survey to calculate the price data included few foods rich in iron. It is likely that the high requirements of iron for these two target groups coupled with limited options to meet these requirements are resulting in their

high proportional costs (see limitations section for more detail). The finding however illustrates an important point for allocation of cost and/or food. Although energy cost are relatively higher for the adult man, his relative cost of micronutrients are low compared to those of the adolescent girl and the breastfeeding mother. As food is typically allocated based on perceived energy needs, the breastfeeding mother are less likely to meet their nutrient requirements and hence are more likely to be micronutrient deficient. The same applies to the under-two as their nutrition needs relative to energy, i.e. how much micronutrients they consumer per kilocalories, are also very high.

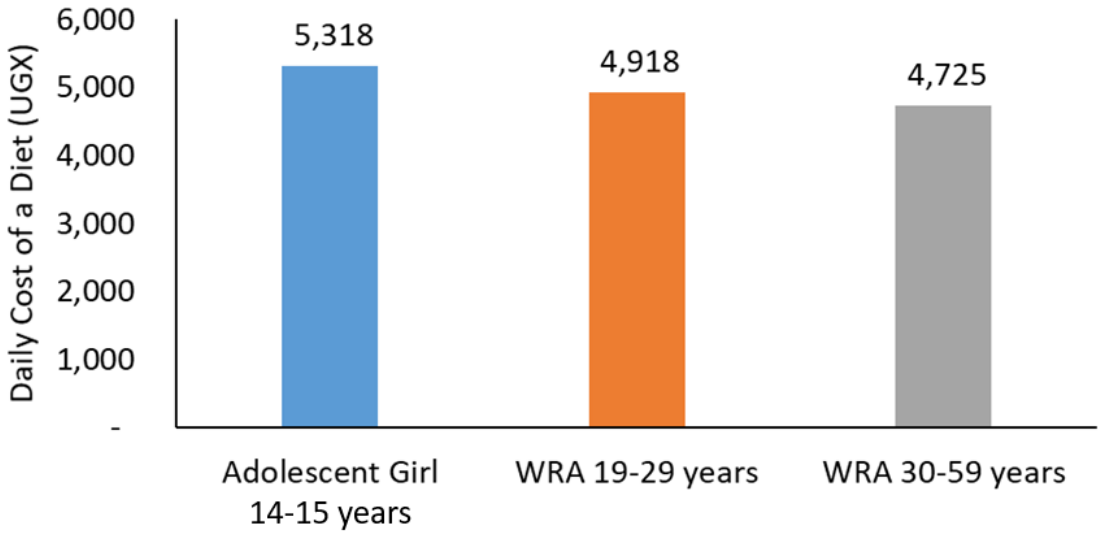
Figure 9. The proportion of the cost of a nutritious diet attributed to different household members, according to CotD analysis (WFP 2018)



Little data exists on the diet of women and adolescent girls, but what is available suggests that both dietary diversity and food frequency are poor. Data from the UDHS also shows that at a national level, adolescent girls aged 15-19 years, are slightly thinner and more anaemic then women of reproductive age. However, in certain geographical areas the nutritional situation of adolescent girls is of even greater concern. For example, in Karamoja underweight and anaemia is two to three times higher for this age group (at 33 percent and 43 percent respectively) compared to the national average for this age group (12 percent and 23 percent respectively) (see Karamoja section of this report).

Twenty four percent of women in Uganda began childbearing between the ages of 15-19 (UDHS 2016). A focus on improve the diet and nutrient intakes of adolescent girls is therefore essential to break the intergenerational cycle of stunting. The CotD analysis further emphasises the importance of targeting adolescent girls and Figure 10 shows that a nutritious diet is 400 UGX and 593 UGX more expensive for this group compared to a woman aged 19-29 and 30-59 years of age.

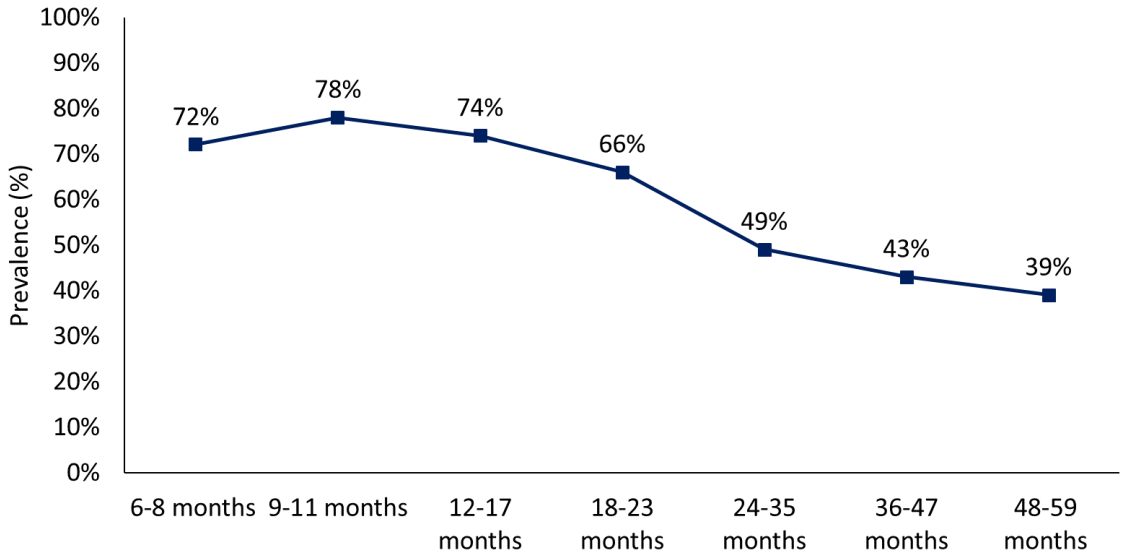
Figure 10. The cost of a nutritious diet for an adolescent girl compared to a woman of reproductive age (WRA) in two age categories (WFP 2018).



Despite their higher requirements, data suggests that women's diets do not change during pregnancy or breastfeeding. This is because women are not treated or prioritised differently during this stage of the lifecycle (UNICEF 2015). They are therefore impacted by the same barriers to adequate nutrient intake (food availability and economic access) as the rest of the household and as dictated by social norms. In addition, they have multiple responsibilities such as caring and providing for the household and contributing to household economy, which leaves little time to rest or prepare extra meals or additional foods for themselves (Nankumbi and Muliira 2015). In fact, a UNICEF study pointed out that it is often the women that are being de-prioritized when it comes to meals. Men and children eat first, with the women often eating the leftovers. This is also in line with coping strategies reported by households, where women report that they are reducing the quantities so their children can eat (UNICEF 2015). This means that in times of crisis, women might have an even harder time to meet their nutrient requirements, both relative to the rest of the household and during times of normal consumption.

The associations between maternal and child nutritional status has been described previously in this report. Although information could not be found on women's diet during pregnancy, Figure 11 shows the trends in anaemia prevalence by a child's age which suggests that insufficient iron stores are being laid down for the child's first 6 months of life. This is also unsurprising given that only 23 percent of women took iron tablets (or syrup) during pregnancy as recommended.

Figure 11. Trends in anaemia prevalence by a child's age (UDHS 2016).



Six models were included in the CotD analysis to model improved access to micronutrients (see Annex 3). Interventions range from short- to long-term solutions and span across several modalities and possible entry points.

Figure 12 shows that a number of proposed interventions are effective in reducing the cost of a nutritious diet for an adolescent girl and a PLW. Multiple Micronutrient Tablets (MMT) being able to reduce the cost the furthest, by 65-70 percent. This is mainly due to the fact that the MMT contains the recommended amount of 9 micronutrients[1] modelled in the CotD (see Figure 13)[2]. However, it is important to highlight that this is more of a short-medium term intervention to improved nutrition on a population level and that long-term interventions such as nutrition-sensitive agriculture, food fortification and fresh food vouchers are needed to make nutrition sustainable for years. Those interventions, that are usually working along the whole food supply chain, beginning with producers and home gardens, take longer to scale up and take effect, but are essential in improving nutrition on a population level. Therefore, the largest amount of price decrease should not be understood as being the highest recommendation for an indefinite period of time.

Stakeholders were also interested in understanding the difference in the reduction in cost between the provision of SuperCereal (commonly given to PLW) and SuperCereal Plus (commonly given to children under 5 years but also being provided to PLW in some WFP programmes in East Africa). Figure 12 shows that SuperCereal Plus has a greater reduction in cost for both an adolescent girl and a PLW, although the difference is greater for the PLW. SuperCereal Plus reduces the cost of a nutritious diet by 398 UGX a day more for adolescent girls and 712 UGX more in PLW compared to SuperCereal,

[1] Vitamin A, C, B1, B2, B3, B6, folic acid, B12, iron

[2] As there is an upper limit for kilocalories, this is one of the main cost drivers in individual diets, as nutrient-dense commodities – those that provide many nutrients per kilocalorie – are usually more expensive than energy-dense commodities.

likely due to its increased calcium content compared to SuperCereal. The impact of programming and the global supply chain of both products would need to be considered before a change in programming.

Figure 12. The daily cost of a nutritious diet in UGX with interventions to improve nutrient intake for the adolescent girl and lactating woman (CotD 2018).

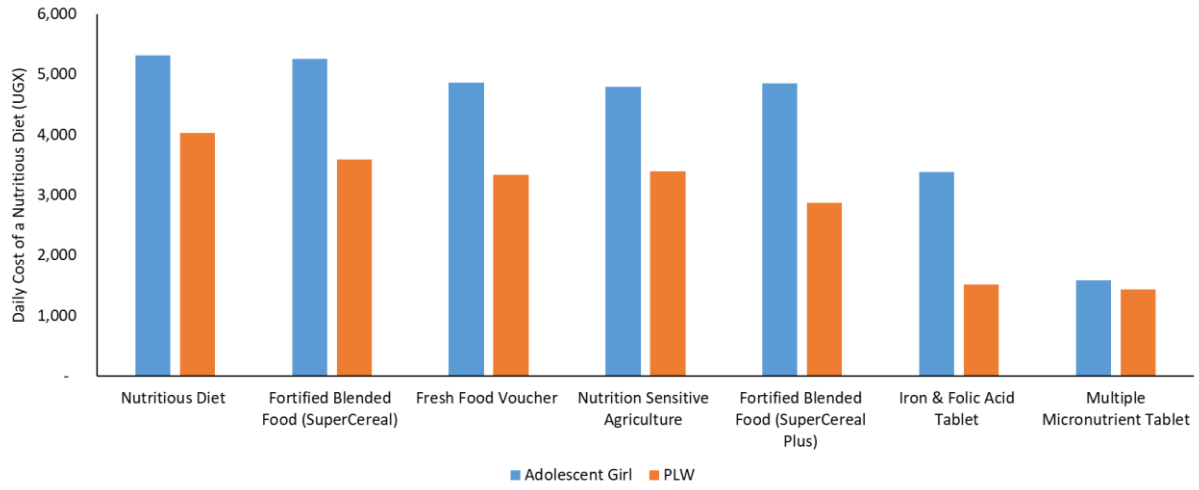
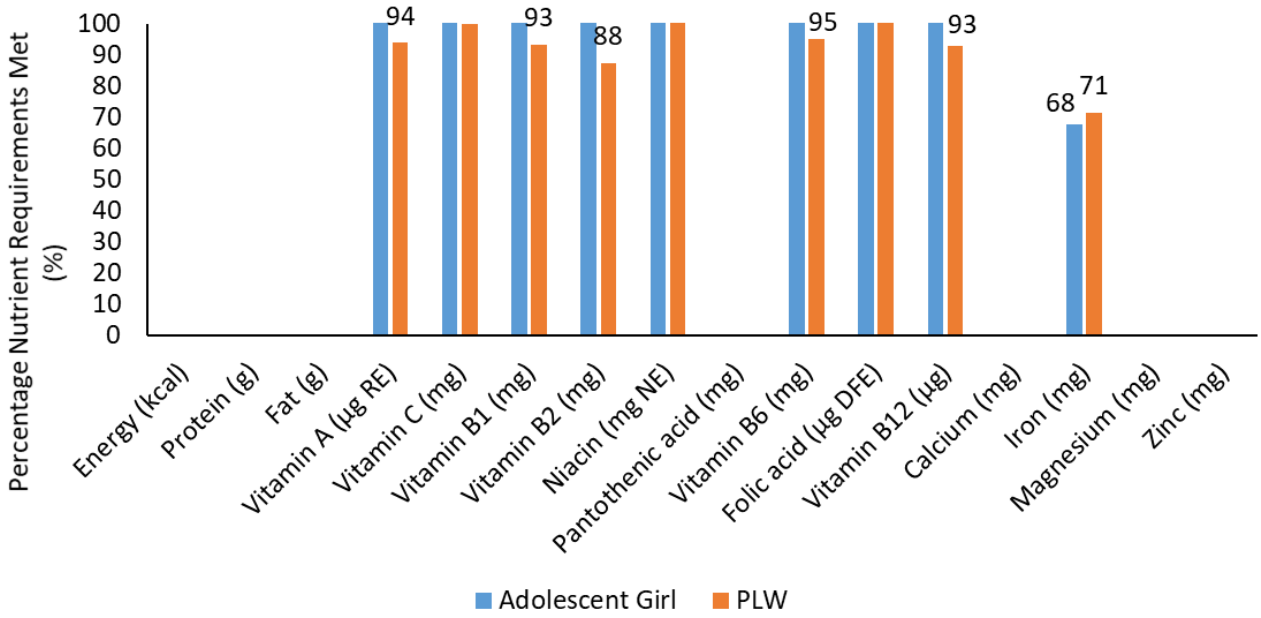


Figure 13. The percentage of nutrient requirements met by a daily MMT for an adolescent girl and a PLW (CotD 2018).

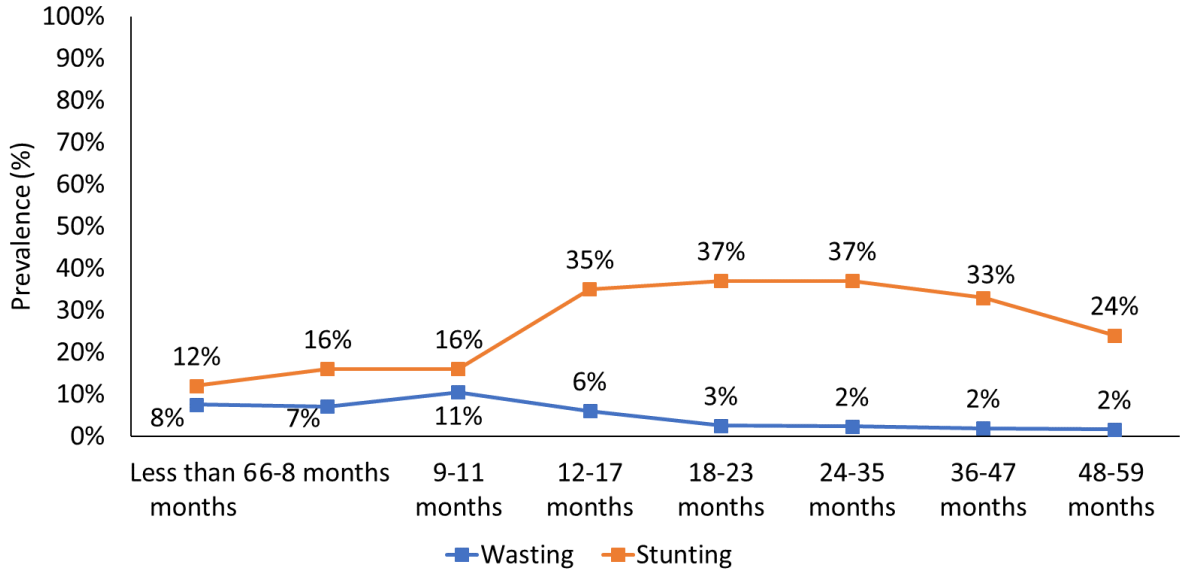


Infant and Young Child Feeding

Breastfeeding is widely practiced but exclusive breastfeeding does not last long enough. Complementary feeding is suboptimal, resulting in an inadequate nutrient intake among children aged 6-23 months.

Data on undernutrition disaggregated by a child's age (in months) suggest that infant and young child feeding practices and hygiene and sanitation practices are suboptimal. The prevalence of stunting and wasting increases the most between the age of 6 months and 12 months, by 19 and 4 percentage points respectively as shown in Figure 14. The increase in stunting could to a large extent be due to poor achievement of Minimum Acceptable Diet (MAD) (see more below), particularly low dietary diversity. The increase in wasting to a high public health significance could be due to poor hand washing practices as well as crawling in an unhygienic or unsanitary environment, increasing the risk of diarrhoea and the cyclical nature of disease and undernutrition. According to the 2016 UDHS, 20 percent of children experienced diarrhoea two weeks prior to the survey. Furthermore, 59 percent of households had access to hand washing facilities although only 44 percent of these had water and soap.

Figure 14. Malnutrition prevalence by age group (UDHS 2016)



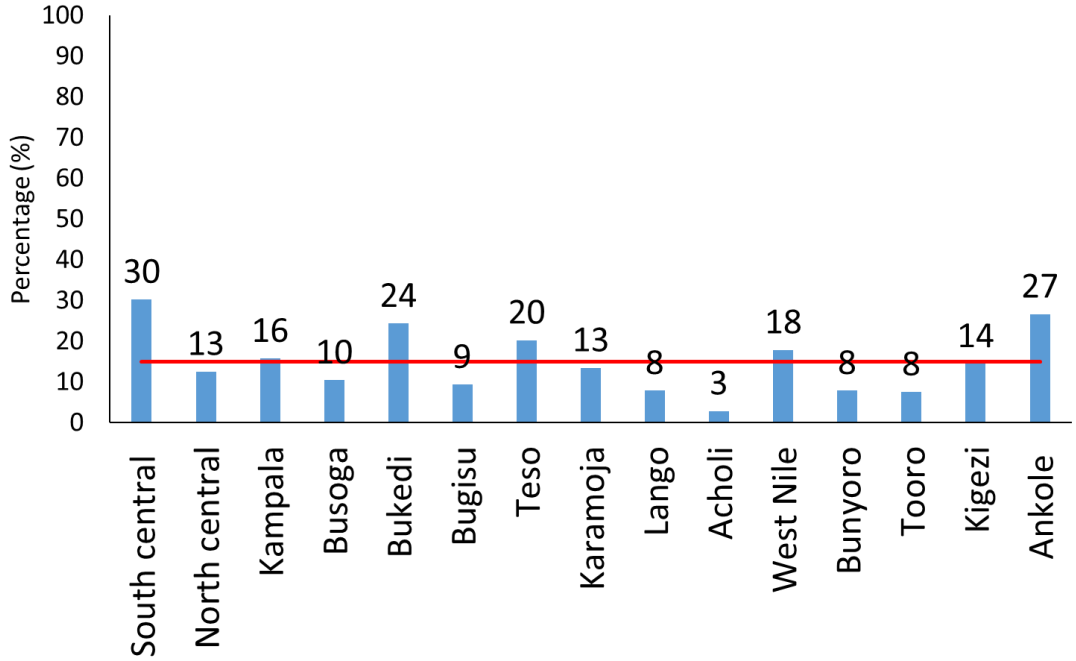
Although age appropriate breastfeeding is relatively high at 70 percent for children 0-23 months, less than half (43 percent) of children are exclusively breastfed for the first six months of life, as recommended by the WHO. Median duration of breastfeeding (in months) is generally shorter in central and southern compared to other regions and decreases as households become wealthier and mothers, more educated (UDHS 2016). The main challenges of age appropriate breastfeeding as reported by mothers was the need to return to work to contribute to the economy of the household. In many cases this type of work is unregulated and informal, limiting mother's ability to care for young children. The child is therefore left with siblings or caregivers, who feed them other

liquids or semi-solid food, showing a negative impact of maternal work load on IYCF practices. Even those mothers that are able to take their child to work may not be able to adequately cater to their child needs while at work. Furthermore, many mothers felt that their breastmilk supply was inadequate and that they needed to provide other liquids or foods to satiate their child.

Other barriers to improved breastfeeding are the belief that breast milk comes 2-3 days after delivery, which may impact the provision of colostrum to the new-born, as well as the uncertainty around the appropriateness of breastfeeding if the mother is HIV positive. In addition to the beforementioned maternal workload and intrahousehold sharing, economic access to nutritious foods, including for the mother, also poses a major barrier that can impact adequate breast milk supply, especially in terms of nutritional quality. In addition to health impacts there are clear economic benefits to breastfeeding. The CotD analysis estimates that the cost of the diet of a child aged 6-23 months will increase by a minimum of 8 percent if breastmilk is removed from its diet. As households are unlikely to increase nutritional value of foods given to the child when no longer breastfed, this means that it is less likely that the child's diet meets the nutrient needs. Additionally, in the case where households do increase nutritional value of foods given to the child, as the CotD tool estimates the lowest cost of a diet through purchasing food on local markets, it is likely that the actual impact of suboptimal breastfeeding on actual nutrient intake of the child is even worse than estimated. This is particularly true if breastmilk is inappropriately substituted by expensive commercial formula products.

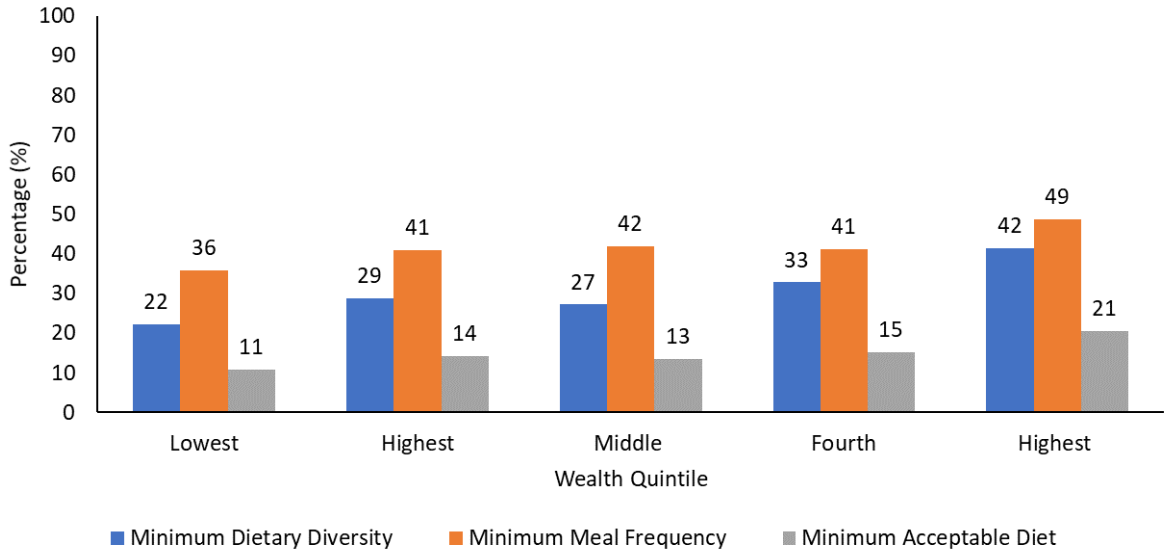
Only 15 percent of children under the age of 2 years are fed a Minimum Acceptable Diet (i.e. both diversity and frequency requirements are met). Achieving Minimum Dietary Diversity (MDD) is a greater barrier than achieving Minimum Meal Frequency (MMF), but both indicators are low at 30 percent and 42 percent of children, respectively. Figure 15 shows that there are substantial differences in the achievement of MAD by district with this indicator being as low as 3 percent in Acholi to 30 percent in South Central.

Figure 15. The percentage of children aged 6-23 months achieving MAD by region. Red line indicates national average of 15 percent (UDHS 2016).



The UDHS found very little difference in the achievement of MAD in children by gender (15 percent boy vs. 14 percent girls) and locality (16 percent urban vs. 14 percent rural). Figure 16 shows that MAD and its composite indicators improve by wealth but still only 21 percent of children in the highest wealth quintiles achieved MAD. More information on the barriers to optimal complementary feeding by wealth group, particularly for households in the highest quintile, would be useful to better understand whether these are similar or different across wealth groups.

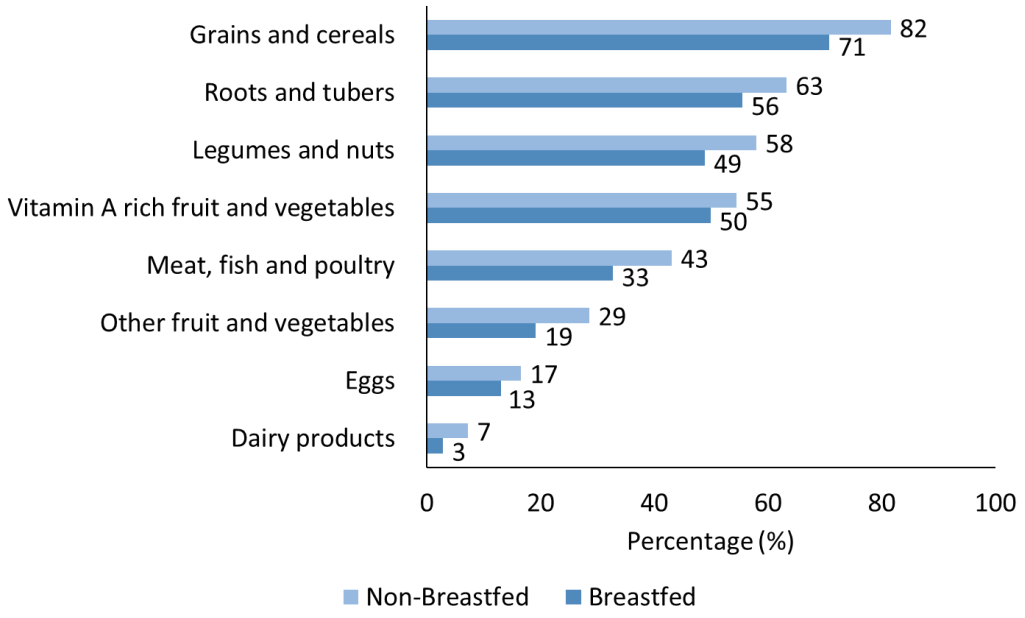
Figure 16. The percentage of children achieving MAD and its composite indicators by wealth quintile (UDHS 2016).



The UDHS found that mothers education was the factor that was most strongly correlated with MAD with 9 percent being fed an optimal diet in households where a mother had no education compared to 26 percent of children whose mother had more than secondary education. Maternal education reflects socio-economic status as well as knowledge and agency, i.e. ability to negotiate as well as acquire knowledge and act on it.

Figure 17 shows that children's diets mainly comprise of cereals, roots and tubers and pulses, with two thirds (66%) consuming vitamin A rich foods and even less receiving animal products. These micronutrient rich foods are essential for growth and development. This consumption pattern is similar to the households', emphasising that food availability and economic access are important barriers to adequate infant and young child feeding. Food availability is particularly an issue where home grown food is scarce or frequently interrupted by natural occurrences such as flood and drought, like in Karamoja for example.

Figure 17. The percentage of children aged 6-23 months who reportedly consume different food groups in the previous 24 hours (UDHS 2016)



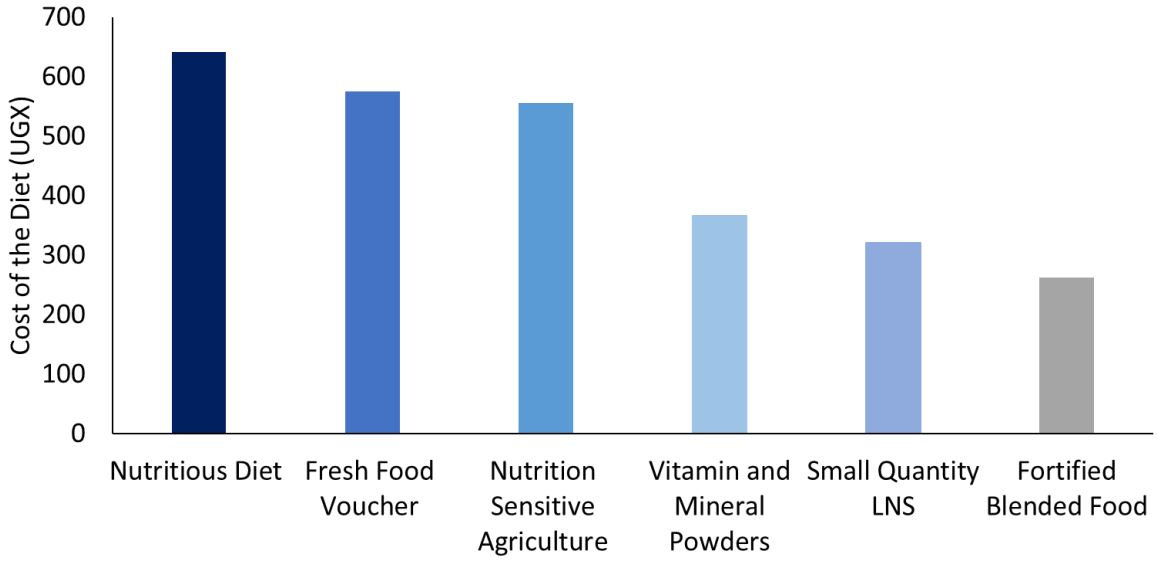
Economic access, more specifically the inability or limitation to purchase nutritious foods, can be a barrier across the country, but is naturally a bigger issue in lower wealth quintiles. Besides simply not having sufficient money to purchase nutritious foods, economic access issues can also occur where the money is managed by heads of household, who do not prioritize nutrition and food for vulnerable target groups. Other barriers included maternal workload, which limits a mother's time they have to prepare extra meals for the child. There have been several anecdotal references where women's responsibilities take them out of their home, leaving them unable to prepare foods for the family. This in turn causes children to eat what, where and when the rest of the family eats. Since children have specific nutrient needs that require heightened

attention to their diet, the absence of the mother may leave other household members, e.g. siblings, grandparents or the father in charge of addressing this need. However, it has been observed that men often provide little care duty support, letting the nutrition of the child at crucial stages in life fall through the cracks (UNICEF 2015, WHO 2015).

To better understand how effective different types of interventions could be in reducing the cost of a nutritious diet for a child under 2 years of age, five different models were included in the Fill the Nutrient Gap analysis. These span across different entry points and transfer modalities and range across both short-term and long-term solutions. For a full list of assumptions and specifications for each model, please refer to Annex 3.

Figure 18 shows that fresh foods, specialised nutritious foods and home fortificants have the potential to reduce the cost for the age group, with fortified blended flours showing the greatest impact in terms of direct reduction of cost (59 percent). It should be noted that no single one of these interventions is considered a silver bullet, and that only the combination of short-term and long-term interventions can make a sustained impact in the nutrition of that target group. It may therefore be the case that nutrition sensitive agriculture is the longer-term solution that addresses the nutrient gap the best, but that there is also a programmatic need to act immediately in the short-term, for which SQ LNS or fortified blended flours provide a first solution. The largest reduction in cost does not imply that the intervention is the best solution. As the CotD analysis only looks at cost to the household, the cost to the implementer are not considered and may make different interventions more or less feasible.

Figure 18. The daily cost of a nutritious diet in UGX for a child under 2 years with nutrition specific and sensitive interventions.

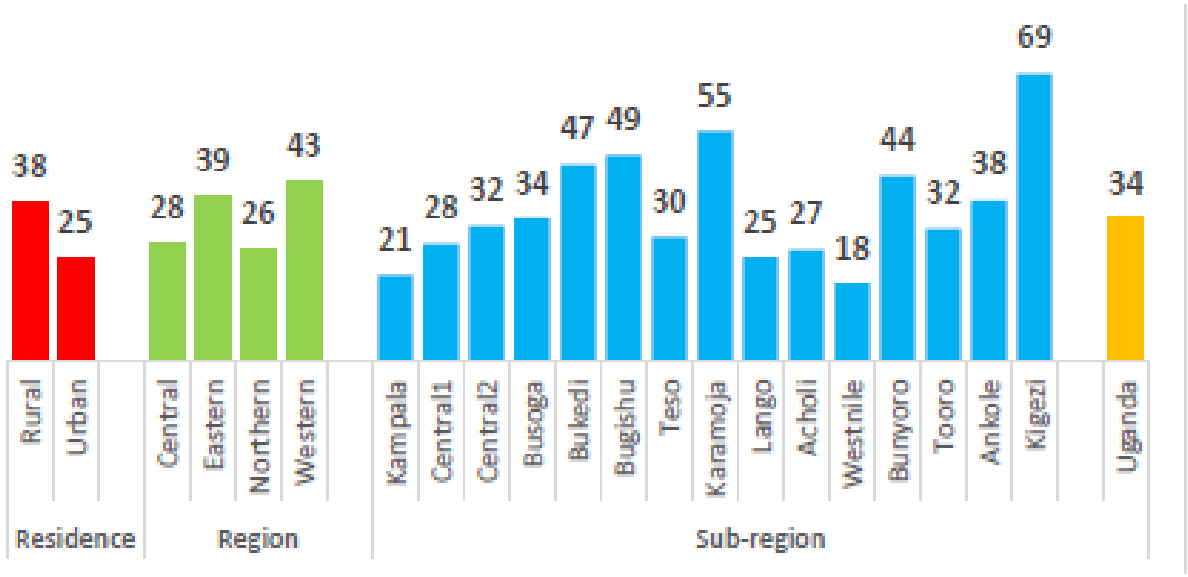


Household Food Consumption and Dietary Diversity

Household dietary diversity is low and the consumption of energy-dense but micronutrient poor staples is on the rise.

Little data exists on the quantities of foods consumed by households in Uganda. The information that does exist suggests that the quality of the diet is poor, with one third of households consuming a diet low in diversity (defined as four or less food groups per day) as shown in Figure 19 (UNHS 2016/2017). As with malnutrition characteristics, dietary diversity across Uganda is heterogenous, with some regions having a low dietary diversity for near or above half of all households (Kigezi, Karamoja, Bugishu, Bukedi) and more urban households consuming a diverse diet (75 percent of households consume 5 or more food groups) than the rural households (62 percent).

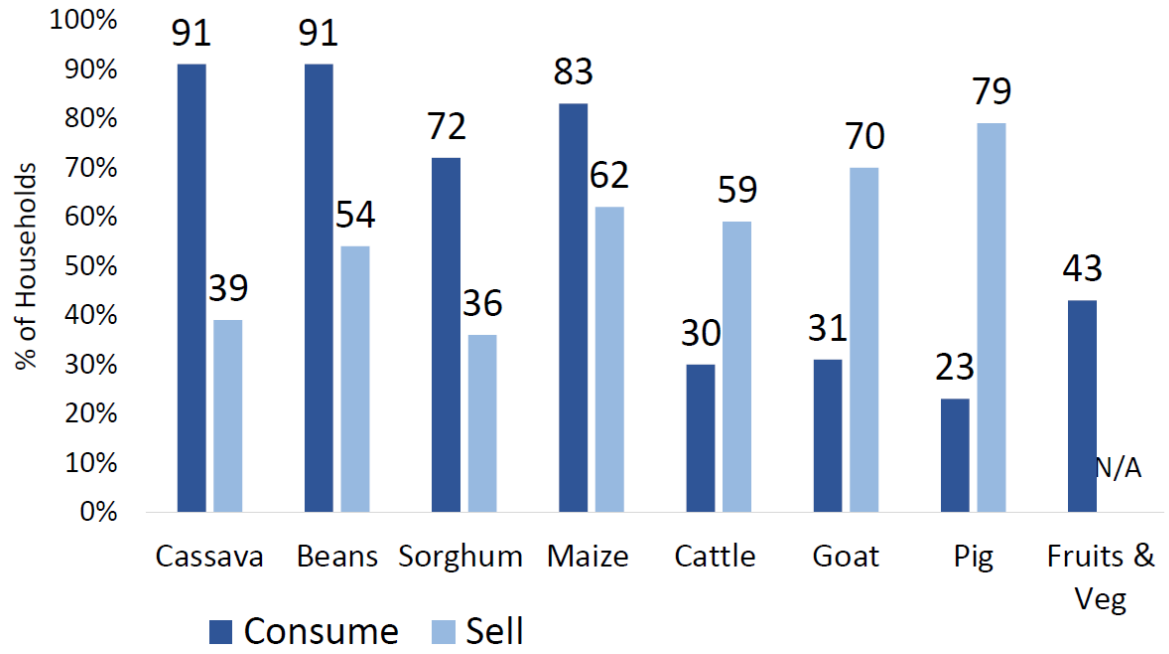
Figure 19. Household dietary diversity score by residence, region and sub-region.



The average food consumption score is 52 out of 112, with both the urban and rural regions falling within the 'Acceptable' range (60 and 50, respectively). Food consumption scores are strongly associated with wealth, with over half of households in the poorest wealth quintile having a food consumption score below 35, compared to 10 percent of households in the two wealthiest quintiles (WFP VAM CFSVA 2013). This suggests that there is a dependency on money for adequate consumption, with few consumption patterns being behavioural rather than economic.

Household's diets, particularly in rural areas, consist predominantly of energy dense staple foods and this is largely influenced by economic access and food availability. Most households that produce nutritious foods, particularly meat, tend to sell these as a source of income instead of consuming them as part of their diet (CGAP 2016, FEWS 2017). For example, a National Smallholder Farmer Survey found that 70 percent of goats reared by households were sold but only 30 percent were consumed. Similar trends are observable for cattle and pig, with the reverse being true for cassava, beans, sorghum and maize. For the latter commodities, most of produce is consumed (see Figure 20). For fruits and vegetables, it was only surveyed whether producers consumed their own products, so no comparison regarding sold products is possible, but the fact that only 43% answered that they consumed their produce indicates that also for fruits and vegetables selling is common.

Figure 20. Proportion of sold or consumed foods by commodity type. (Note: Survey allowed to specify more than one option, which means that the total of consumption and sold can exceed 100 percent) (CGAP 2016)



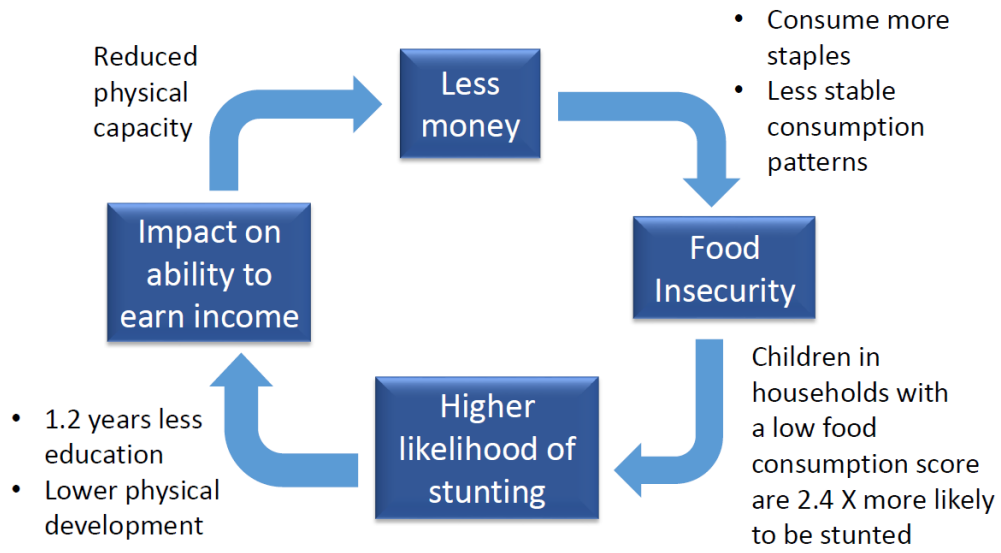
Consumption data shows that over the years, there has been a shift in the type of staples consumed by households, from millet and sorghum, which are, in addition to energy, relatively rich sources of essential micronutrients compared to cassava, rice and white maize, which are less micronutrient dense (UNPS 2016). Given the reliance on staples in households' daily diets, this consumption pattern will have an important and potentially negative impact on micronutrient intakes especially for key vulnerable groups if the intake of other nutritious foods are not increased. A comparison of the two staple preferences modelled in the CotD software shows that previous staple preferences were 15 percent cheaper than current ones, reducing household costs from 12,420 to 10,783 UGX daily cost of the diet per household (refer to Annex 3 for previous staple preferences).

This switch from more nutritious staples to those with less micronutrient content can, alongside other developments, explain the increase of overweight and obesity. Mitigation strategies to address this change, include SBCC around nutrient intake. While this dynamic this does highlight the nutritional value of traditional eating patterns, many of the changes appear also to be facilitated by easier processing of current staples. Whereas millet and sorghum are considered labour-intensive in their preparation, rice and maize can be cooked more easily, with less, freeing up women's household labour for other economic activities.

As this analysis and many sources point out, these developments and changes are best understood in direct relation of each other. This means that positive changes can be enablers across sectors, but also that poverty, food insecurity and malnutrition are

factors that re-enforce each other, creating vicious cycles and dependencies that are hard to break through (COHA 2013). The below graph illustrates how the lack of money impacts the consumption of foods and the stability of food consumption, which impacts household food security. Children in households with low food security in turn are 2.4x more likely to be stunted than others. In the longer term, stunting is associated with lower physical development and less years spend in the education system, which are determinants for the ability to earn income. This in term influences a household's economic security, which is where the circle closes. It is easy to see how all four of these main factors can become an obstacle that is hard to break through, but it shows that the impact of household consumption reaches far beyond being hungry or not on any specific day.

Figure 21. The relationship of different factors on food security. Based on COHA 2013.



Availability of Nutritious Foods

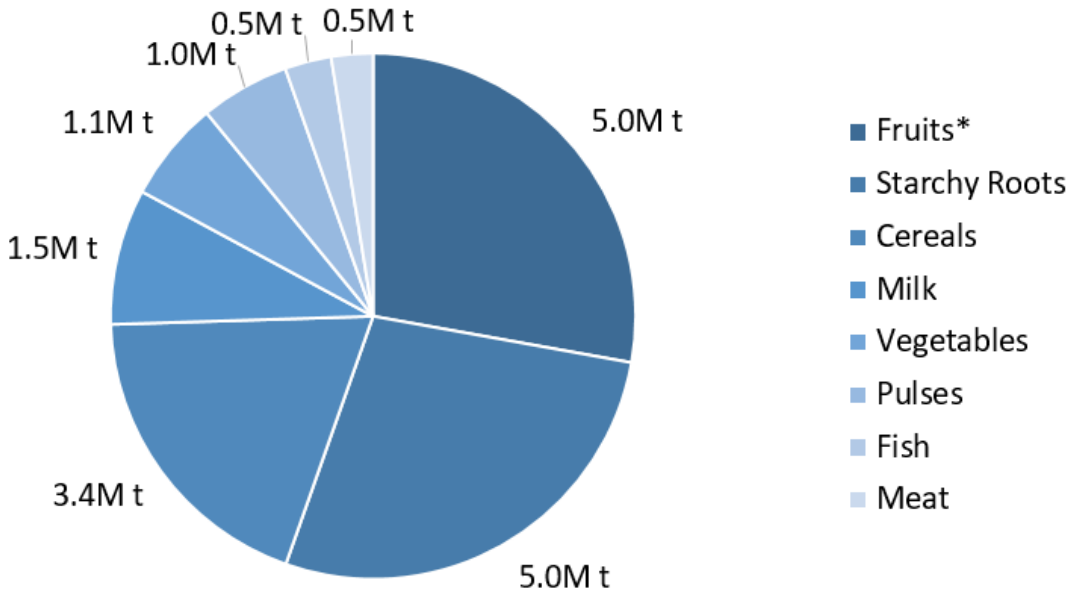
Crop Production and Diversification

The climate and ecology of Uganda are ideal for growing food and nutritious foods are being grown, but less so than staples. Continuing to ensure crop diversification, through agricultural policies, is critical to support improved nutritional outcomes of the population.

Agriculture is an important livelihood in Uganda, contributing to 23 percent of Gross Domestic Product and employing 36 percent of the working population. Forty percent of the country's land is used to grow foods and the bi-modal season results in two harvest a year (except in the North East, e.g. Karamoja, which only has one harvest a year).

Figure 22 shows that the majority of produce grown is plantain (which contributes to 4.3M tonnes in the fruit section of the pie chart), roots and tubers and cereals[3].

Figure 22. Total agriculture production by food group (FAO 2013). M t refers to million tonnes.



* Fruit includes 4.3M t Plantain and 0.7M t other fruits.

These foods are important in providing the population's energy requirements but foods that provide essential micronutrients such as fruits, vegetables and animal source foods amount to a total production of 1.1Mt and 1.0 Mt or less. When comparing the quantity of fruits (excluding plantain, which are counted as staples) and vegetables grown to the staples foods, this equates to a ratio of 1.8:12.7 or 1 Mt of fruit and vegetables grown to 7 Mt of staples.

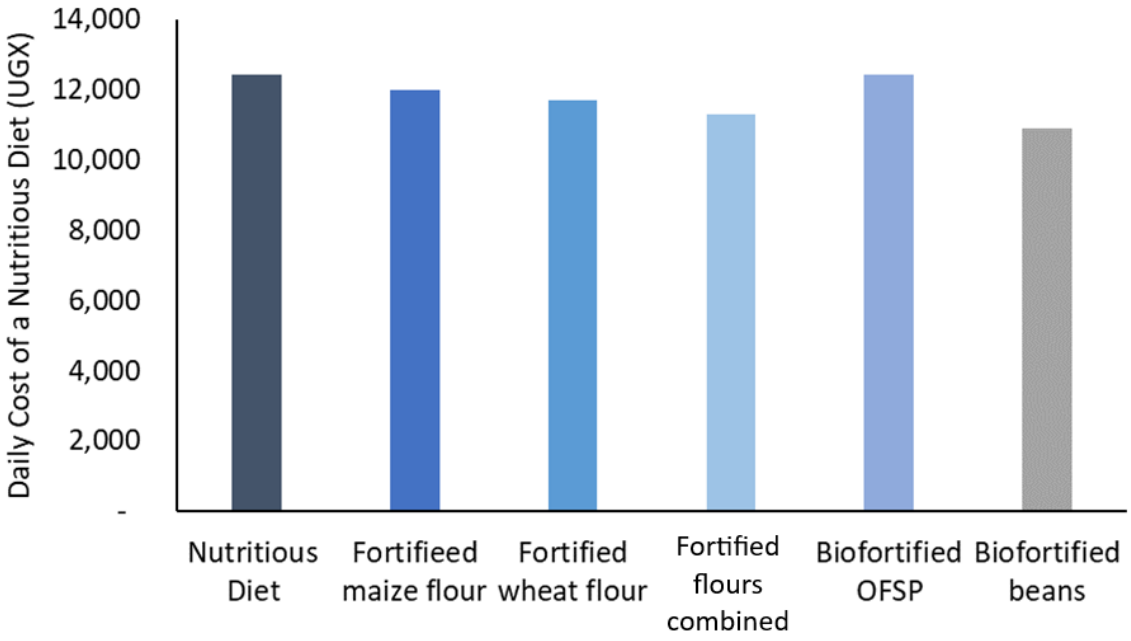
The agriculture sector strategic plan suggests that the major barrier to increased agricultural productivity is limited use of inputs, such as improved seeds and fertilisers (MAAIF 2016). The document succinctly highlights the need for improved food and nutrition security and emphasizes the unique position agriculture and agricultural policies have. Their suggestions are very much in line with the key findings put forward in this report and range from "promoting appropriate agricultural technologies and crops that provide significant nutritional advantages with a focus on food stressed areas. This might include, for example, promoting the production and consumption of nutrient-dense foods, including bio-fortified crops; encouraging dietary diversity and

[3] Namely maize, sorghum, millet and rice

household-level food processing technologies to "promote awareness on food availability across agricultural zones" (MAAIF 2016). These recommendations, however, stand in contrast to the de-facto prioritization of commodities grown by farmers, where both dietary diversity across and within regions are considerably low.

The Global Alliance for Improved Nutrition supported the Ministry of Health in establishing a Working Group on Food Fortification and developing the standards for fortification of wheat and maize flour and oil (MoH 2008). Steps to implement these standards have been taken. However, manufacturer compliance of the fortificant levels in these foods is inconsistent. The CotD analysis found that when fortified and biofortified foods would be available on the market at the same price as their unfortified/biofortified counterparts, their consumption could reduce the cost of a nutritious diet by 9-12 percent (Figure 23). Naturally, many other considerations such as market feasibility, infrastructure for fortification, policy environment for compliance need to be taken into account when preparing for such interventions.

Figure 23. The daily cost of a nutritious diet for a household of 5 people in UGX with fortified and biofortified foods.



Although nutritious foods are being grown, fruits (excluding plantain) are priority commodities, as defined by the Agriculture Sector Strategic Plan (MAAIF 2016) in only three of the ten agricultural regions of Uganda and vegetables in only six of ten. In these areas the availability of these commodities is high within the markets. The 2016 Panel Survey data indicates, however, that outside of these regions, the price of these foods are more expensive and their availability is lower (UNPS 2016). This is not surprising, given that transportation cost will drive up the price of any commodity, it reinforces the

point made by the agricultural policies that food and nutrition security are highly dependent on local production.

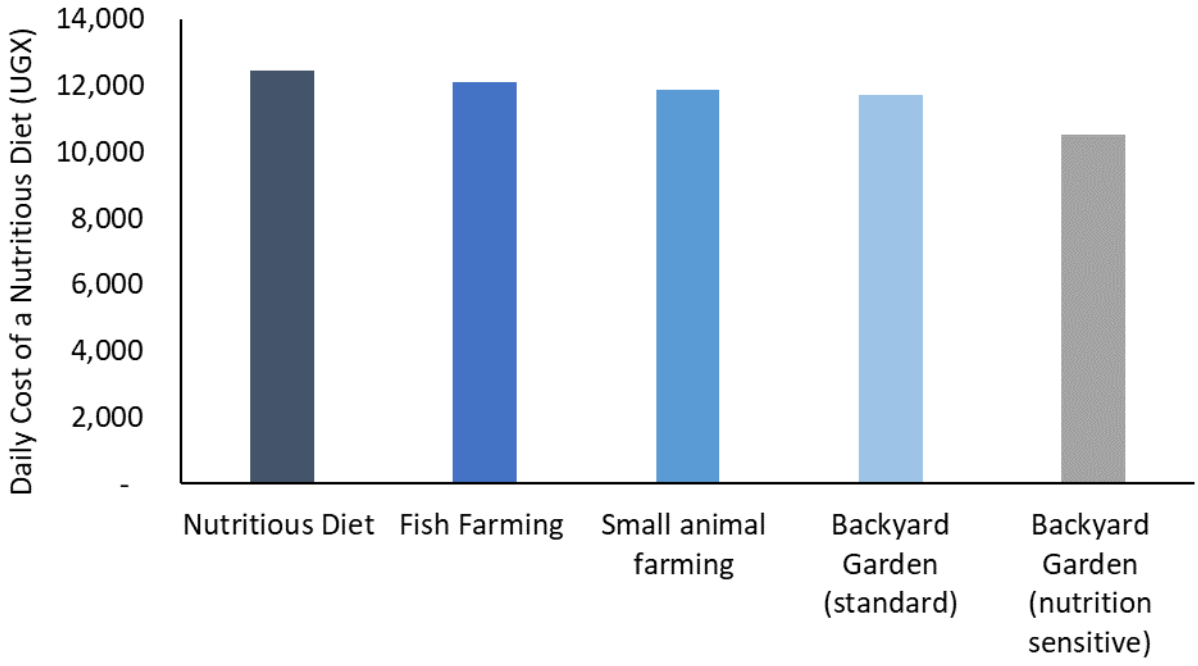
Backyard gardens and small-scale fish or poultry production could be viable interventions that improve food availability and diversity at a household level. During the stakeholder workshops, participants were interested in better understanding the potential of these interventions in reducing the cost of a nutritious diet, however there was little information provided on the current yields of these interventions, hence the assumptions used are from other countries. For the fish pond and poultry intervention, it was assumed that households would consume 1kg of fish and 21 eggs per week[4]. Two backyard gardens models were run, both assumed that the garden would be 0.2 hectares in size and yield 40kg of vegetables a month[5]. The first included foods that were the most commonly grown according to the 2011 Agriculture Census and included cassava, maize, matoke, white sweet potato and beans. These foods were then changed to provide a more nutritious backyard garden and included maize, matoke, biofortified high iron beans and orange flesh sweet potato and dodo (amaranth) leaves.

Figure 24 shows that a nutrition sensitive backyard could reduce the cost of the nutritious diet by up to 15 percent. It is important to stress that while the potential impact is positive, i.e. a reduction in household cost is foreseen through this intervention, any programme needs to carefully evaluate factors such as women's workload and the need for biofortified seeds or saplings.

[4] Fish pond estimates based upon World Fish studies in Cambodia. Egg estimates based upon 4 hens laying three eggs a day.

[5] Based upon a Helen Keller International study in Bangladesh.

Figure 24. The daily cost of a nutritious diet in UGX for a household of 5 people with interventions that aim to improve the consumption of nutritious foods at a household level.



Many data gaps remain around household consumption, among them a better understanding of household dietary diversity and use of wild foods, the impact of aflatoxins and other naturally occurring toxins on health and development as well as the cost of energy used in preparation of staple foods.

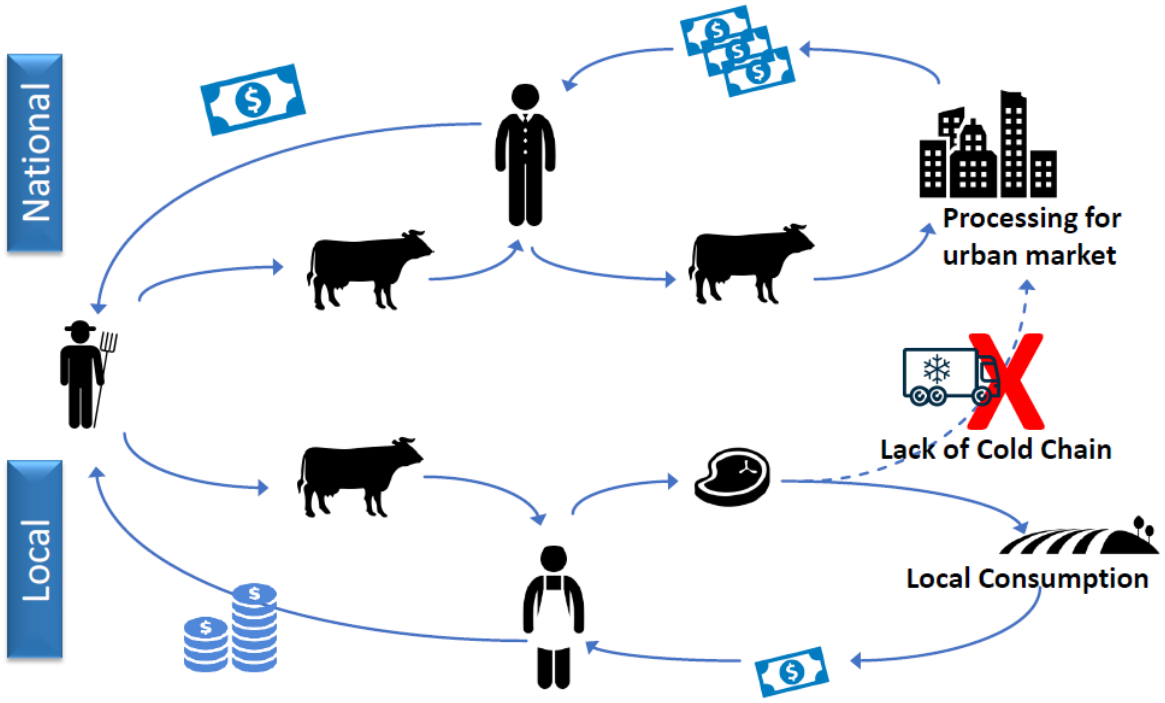
Supply Chain and Markets

Small scale agriculture is the primary livelihood in Uganda. Both crop-based and livestock-based livelihoods require investment to improve use of inputs, processing and market access.

Agriculture is the primary livelihood in Uganda and employs 36 percent of the workforce. Estimates place 82 percent of the national commodity production from small holders, however many face a multiple challenges: lack of modern inputs and techniques; lack of knowledge and training pertaining to agricultural best practices; post-harvest loss; an inefficient supply chain and lastly lack of access to credit to invest in existing livelihoods. The opportunities to counteract these challenges range from simple inputs such as fertilizer and improved seeds, to better processing and storage techniques to modernizing and mechanizing agriculture to scale up labour (FEWS 2015, MAAIF 2016).

Most of the country engages in crop production, with few regions – among them Karamoja – producing a major surplus of livestock (FEWS 2015). However, the supply chain infrastructure is weak, particularly for access to fresh nutritious foods on a regional level. Additionally, pastoralists and other livestock-based livelihoods are not maximising their profits. For example, in Karamoja, slaughter facilities and value-added enterprises such as meat butchering and canning are inadequate and require investment and there is no cold-chain to export carcasses (Mercy Corps 2016, see Figure 25). That means that if meat is produced through slaughtering locally it will likely have to be consumed in a short period of time unless cold storage or other means of preservation for large quantities of meat are accessible, such as smoking. To transfer meat to other regions and capitalize on the surplus of meat – as well as increasing access to meat in other regions – cold chain would allow production and processing of meat to remain within regions. Addressing this is vital to improving nutritional outcomes and animal products were identified by the CotD analyses as a key source of essential nutrients.

Figure 25. Supply Chain barriers to maximizing profits on livestock. Based on Mercy Corps 2016.



Reducing post-harvest loss also shows great potential to achieve fast gains. Currently it is estimated that around one third of production is lost post-harvest, mainly staple crops such as maize, beans and cereals (Ugandan Farmers Federation 2011). According to calculations by the authors, based on current yields and farming preferences (UNPS 2016 and 2011 agricultural census), minimizing all losses on a 1ha harvesting area can result in up to 750,000 UGX or the equivalent of 225kg Maize, 113kg Beans and 83kg

Sorghum, annually.[6] This would be roughly 28% of total products saved, on average across the country and commodities.

This in turn could improve food security due to lower losses and higher incomes, as well as generate more labour and employment opportunities. Current initiatives that are targeting some of the above are taking an approach that is based on local cooperatives and self-organized farmers groups. Hermetic storage (Figure 26) for cereals and pulses has shown to be a first successful step toward making existing stocks last longer and similar approaches are piloted to see effectiveness of post-harvest loss reduction at consumer level, such as schools.

Figure 26. Hermetic storage, or grain silos, to reduce post-harvest losses. (Picture: WFP CO Uganda 2017)

Access to Nutritious Foods

Market access

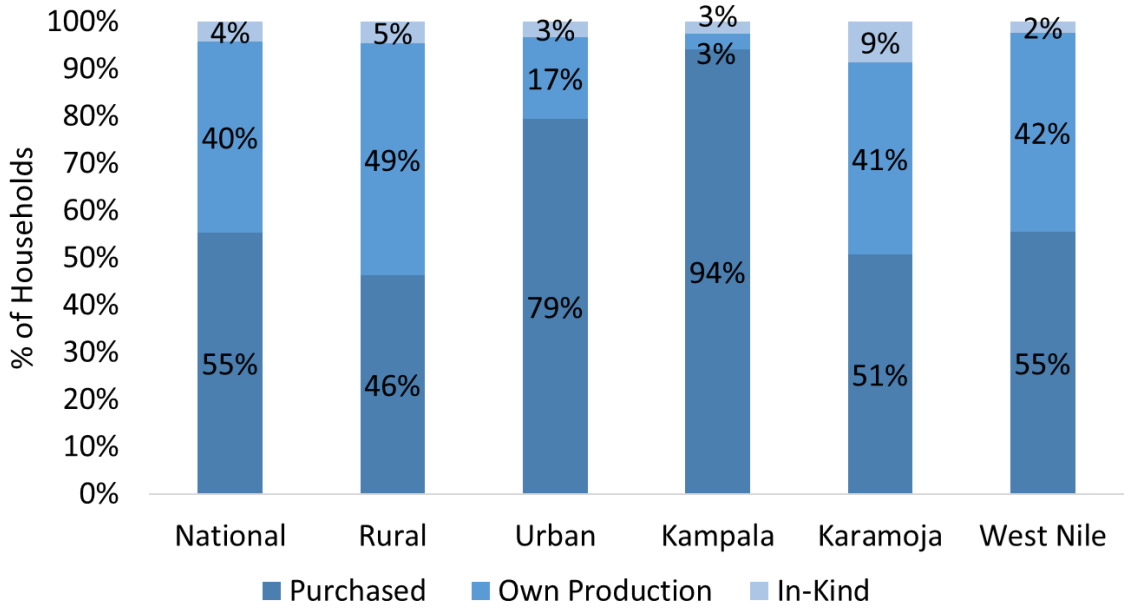
Markets are frequently used and accessible and provide a key entry point for improving access to nutritious foods. Functional supply chains however need to be established to ensure that nutritious foods are available to households across all regions.

Markets are a key entry point for improving nutrient intake of the population as market dependency for food purchases is high throughout the country. Figure 27 shows that

[6] Savings per household for average of 1ha harvesting area (variation across regions from 0.8ha in Western to 1.6ha in Northern), complete reduction of 28% harvest loss (based on Ugandan Farmers Federation estimates). See Annex XXX for full methodology and documentation

nationally over half (55 percent) of food is purchased from markets. Unsurprisingly, markets are used more by urban households (79 percent of foods purchased from markets) compared to rural (46 percent), but purchasing patterns also vary geographically: 94 percent of households purchase their foods from markets in Kampala and 51 percent in Karamoja, highlighting the difference in food security and nutrition between urban and rural contexts.

Figure 27. How households predominantly access food in Uganda (UNHS 2017)



Geographic access to markets is generally good with the average distance travelled by households to reach a market being half a kilometre (CFSVA 2013). Still, in some rural regions the distance to markets is up to 10km, a characteristic seen particularly in the north of Karamoja (FSNA 2017).

In many regions there is often only one road connecting villages and nationally, only 19 percent of roads are paved (CGAP 2016, FAO 2013). It is difficult and expensive to move nutritious foods from regions that produce them to regions that do not. As a result, food availability is a major factor affecting food security, particularly in the north, where agricultural production is primarily staples. It is also important to highlight the difference between food availability on a national level, which seems not to be a major issue, and availability on a local level. While there appear to be mechanisms in place that transport commodities from farmer through local markets to urban wholesalers, it isn't clear whether there is also cross-distribution of fresh foods between regions. A more in-depth market analysis would help to understand whether improved supply chains could support the availability of nutritious foods on a regional level and whether there is lack of demand or availability on a regional level.

The Fill the Nutrient Gap Analysis looked at several models to estimate the impact of interventions to improve the access to nutrients, in the form of nutritious foods: fresh food vouchers, fortified foods and biofortified foods, all of which are highly feasible in

the Ugandan context. A fresh food voucher scheme of 40,000 UGX per household per month would be able to create stable demand for nutritious foods. Assuming sufficient quantities and stable prices across markets, it would enable households to purchase a combination of eggs, green leafy vegetables, fish and milk, which could reduce the daily cost of the household to achieve a nutritious diet by 18 percent, from around 12,500 to 10,000.[7]

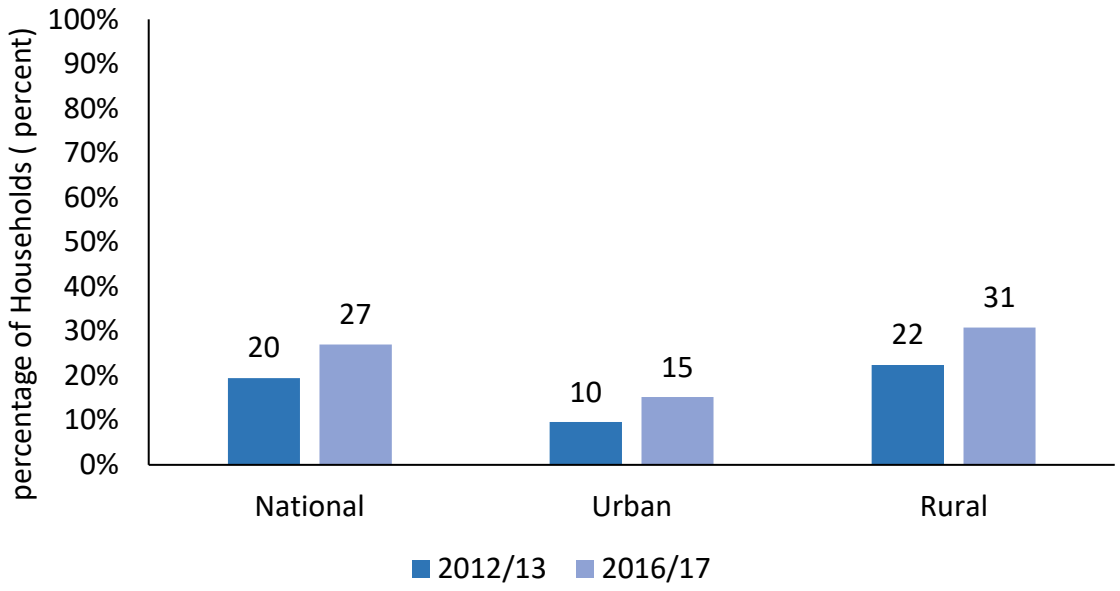
Economic Access

Diets that meet energy requirements are generally affordable for households. The opposite is true for a nutritious diet which is unaffordable to most. Economic access is a key barrier to achieving adequate nutrient intakes.

Poverty in Uganda, measured by the percentage of population that is spending less than what is necessary to meet energy requirements, is on the rise. This calculation estimates the percentage of the population living in households which spend less than what is necessary to meet their caloric requirements (based on the food basket of the poorest half of the population) and a mark-up for non-food needs. On a national level 27 percent of households spent too little money on food in 2016/17, up from 20 percent in 2012/13 (UNHS 2017). The same trend is visible for urban and rural regions, with the rural regions having twice as many households not spending sufficient amounts on food (Figure 28). As food prices in the same period of time have increased by around 30 percent (UNHS 2017), this suggests that prices have risen quicker than income or expenditure. Although this can be due to consumer behaviours, the sharp incline of food Consumer Price Index implies an economic barrier as the major constraint to purchasing foods.

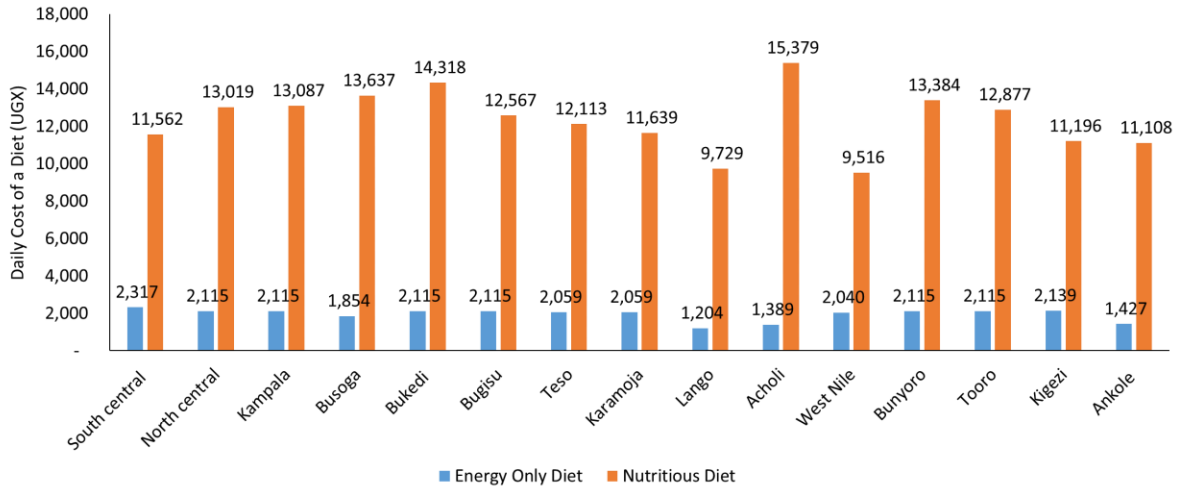
[7] Prices assumed were averages across markets and therefore the value and commodity of the specific voucher could vary between markets to achieve these results. Please see Annex 3 for the assumptions made for this model.

Figure 28. Percentage of households spending below their energy requirements (UNHS 2017)



The CotD analysis found that it costs seven times more money for a household to purchase a nutritious diet, compared to a diet that meets only their energy requirements. The average daily national cost for an energy only diet was 1,950 UGX and the average cost for a nutritious diet was 12,437 UGX (Figure 29).

Figure 29. Daily cost of an energy-only and nutritious diet in UGX by sub-region (CotD 2018).



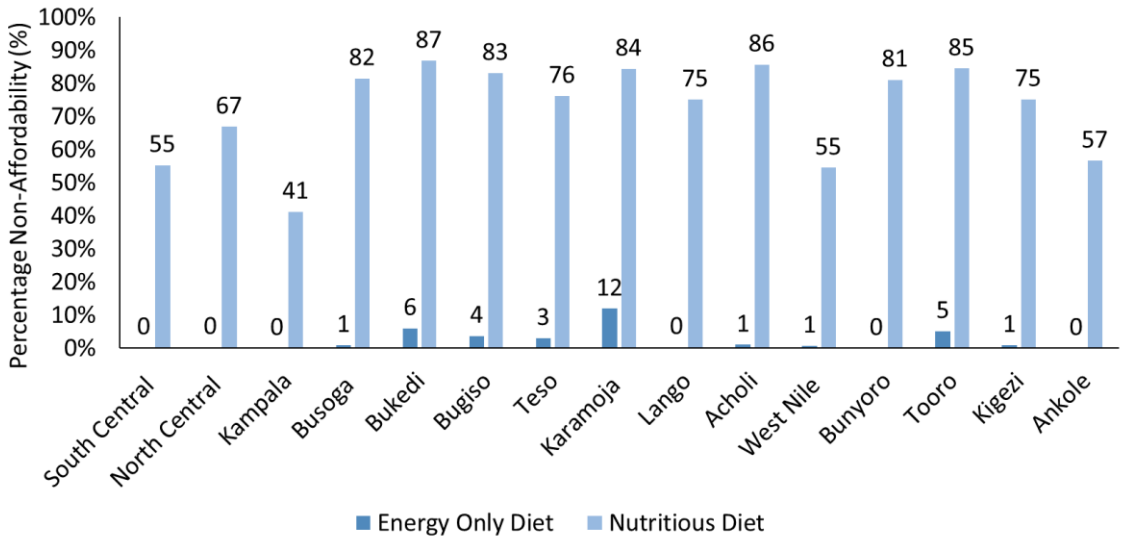
There are many aspects that can explain this difference between the cost of the energy only diet and nutritious diet. For one, a greater variety of foods is needed to meet micronutrient needs, compared to just energy needs. In the case of Uganda, the software picked out grain flours, cassava flour, matoke and beans for an energy only diet, and sweet potatoes, groundnuts, amaranth (dodo), tomatoes, avocadoes, mangoes, eggs, dried fish and milk for a nutritious diet. In general, those foods are more expensive, driving up the price. Additionally, the food list used for the Wave 5 Panel survey which food prices were based upon for this analysis were low in foods high

in iron, which is one of the most expensive nutrients. This could be indicative of high iron foods not being widely available in Uganda.

When compared against food expenditure, most households could afford a diet that meets only their energy needs. Figure 30 shows that regions in the north of the country, particularly Karamoja, are more susceptible to not being able to afford even their energy needs. As Figure 32 shows, this is not driven by the cost of an energy only diet, which is homogenous across most regions, but mainly driven by food expenditure in those regions, which is linked to poverty.

The non-affordability of a nutritious diet, however, is much more common. Nearly three quarters (73 percent) of households could not afford a nutritious diet and this is widespread across the regions (Figure 33). As mentioned in the methods section affordability is calculated based on a specific 5 person household composition and adjusted expenditure, so the reference might not be representative to the whole population. However, if we assume the composition to reflect the lifecycle of a household the numbers still display a high level of non-affordability both nationally and by sub-region.

Figure 30. The percentage non-affordability among households of an energy only and nutritious diet by sub-region (WFP 2018)



Economic Access and Malnutrition

The relationship between stunting and economic access to a nutritious diet varies geographically. Stunting prevalence is high in areas of low and high non-affordability. High food prices are not the only driver of non-affordability.

As can be seen from Figure 30 and Figure 33, the range of non-affordability across the regions is fairly high – from 41 percent in Kampala to 87 percent in Bukedi. The majority of sub-regions have a non-affordability above 75 percent and it is only Kampala that is below 50 percent. As prices and expenditure were not disaggregated by urban/rural, we

cannot estimate non-affordability for those localities. It is worth emphasizing that high non-affordability and variation in those numbers are not purely driven by the cost of a nutritious diet, but also by the household's food expenditure. As Figure 32 and Figure 33 show, the cost of a nutritious diet may be comparatively low, but non-affordability comparatively high, as with Karamoja and Bugiso, or the other way around, as with North Central and Kampala. Sensitivity analyses carried out by the authors have shown, for example, that if Karamoja had the monthly food expenditure of Kampala region, non-affordability would be decreased by more than 25 percentage points, to below 60 percent.

There are no clear patterns between non-affordability and malnutrition characteristics, but stunting prevalence shows an association with non-affordability of a nutritious diet (Figure 31 and Figure 33). This relationship is strongest in the North East and parts of the South West of the country which have a high prevalence of stunting and non-affordability. Some regions, such as West Nile, do not follow this pattern. This could be explained by the refugee situation in that part of the country, where the low prices for some commodities may be related to an increased subsidy or in-kind provision of foods. Of course, affordability is only one aspect that impacts stunting, so other factors may also contribute to the high prevalence: culture, beliefs, knowledge around nutritious foods, infant and young child feeding practices and the diet of mothers during pregnancy and lactation (see key message 2-4 of this report), general health practices and helminth infestation (see key message 1) related to sanitation.

Figure 31. The prevalence of stunting in children under 5 years for the 15 sub-regions of Uganda (UDHS 2016)

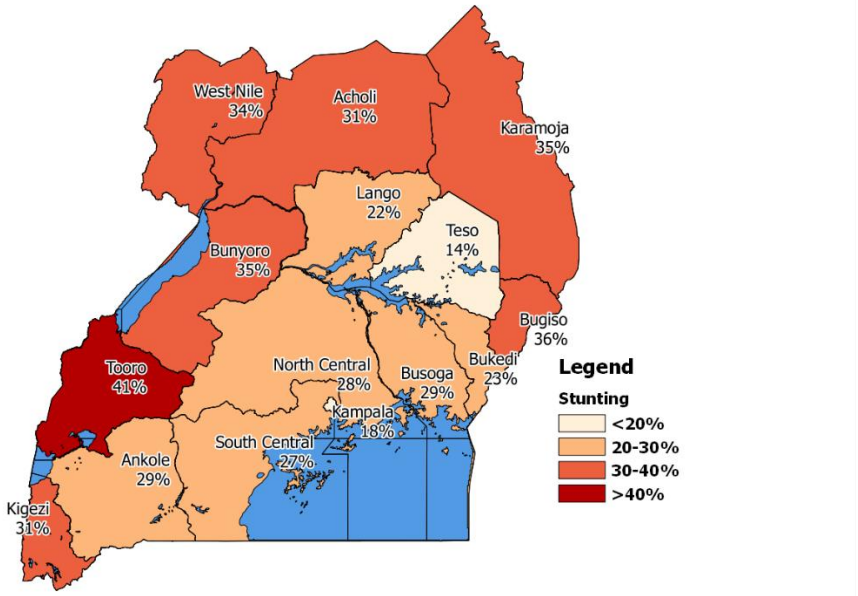


Figure 32. The cost of a nutritious diet (UGX/Household/Day) for the 15 sub-regions of Uganda (WFP 2018).

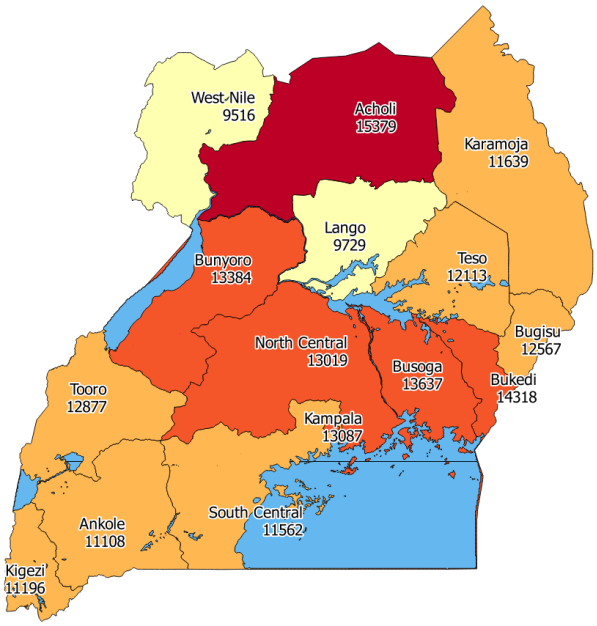
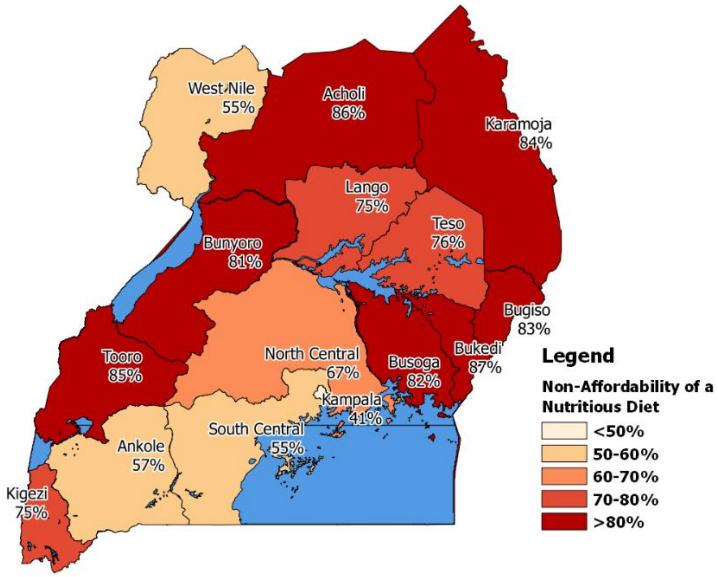


Figure 33. The percentage non-affordability of a nutritious diet for the 15 sub-regions of Uganda (WFP 2018).



Social protection and social safety net schemes are effective interventions that protect economically vulnerable households. Uganda already has some of these interventions in place, targeting both specific age groups as well as vulnerable individuals with cash transfers. Senior Citizens will receive around 25,000 UGX per month through a cash transfer through a Senior Citizens Grant (SCG) and vulnerable households will get 118,250 UGX per month through a mechanism called NUSAF III. CotD modelling was used to assess the impact these amounts would make to the household's cost of a nutritious diet.

The SCG has the potential of providing an average of one quarter of the cost of a nutritious diet of an elderly individual (60+ years) if the amount spent on food (46 percent of total grant based upon current food expenditure patterns) was dedicated directly to that. However, if the grant were shared within the household, it is not enough to purchase even an energy only diet let alone a nutritious diet.

The NUSAF III grant does free up money that can be spend on nutritious foods and covers around half of the daily household cost for an energy only diet. However, from a nutrition perspective, the amount would need to be increased to be able to make more difference in terms of consumption of nutritious foods, and hence for the cash transfer to be more nutrition-sensitive. This means that social protection as an entry point for nutrition is not fully realized and could be fine-tuned to better take into consideration food and nutrition vulnerabilities.

Potential Entry Points for Nutrition

Education

Education is a key platform to engage school aged children and adolescents in nutrition, but despite progressive policies, one in five children drops out of school between the age of 13 and 18 years. A combination of fresh foods and nutritional supplements have the greatest impact in reducing the cost of meeting micronutrient needs of this target group.

Educational attainment varies across the country. Although a progressive policy is in place that, in theory, makes education accessible for all school aged children (6-13 years for primary, 13-19 years for secondary), data suggests that one in five children drop out of school between the ages of 13 and 18, whilst almost 10 percent of children between the ages of 6 and 12 do not attend school (UNHS 2017). Although it is difficult to estimate the total number of drop outs and non-attendance, this is a substantial part of the overall population given that 38 percent of the population are school aged (6-19 years) and 52 percent are under 18 years of age (UNHS 2017).

The rates of unemployment are the highest in the out of school under 18 years of age group at 32 percent[8]. While the relationship between unemployment, education attainment and dropping out is not explored specifically for Uganda, this shows that education may not provide everyone with the skills to successfully enter the labour market after graduation. It also indicates that even cheap and short-term employment can pose a pull-factor, offering an incentive to leave school to earn money. This is

[8] As the surveyed age group for unemployment was set from 14-64 years, the under 18 prevalence could potentially overlap with school children, who may be technically unemployed, but are not seeking employment due to their enrolment.

corroborated by a high number of boys citing looking for jobs as the main reason to drop out (see below).

The Ministry of Education and Sports have developed a school feeding guideline whereby parents are responsible for providing money or food to schools for school meals (MoE 2013). With this policy in place nationally 30 percent of children had access to school meals, yet two thirds do not receive a school meal (OPM and WFP 2017). The percentage of children that do have access to a school meal, either provided in-kind or paid by the parents, varies largely across regions. It might also be linked with wealth: 42 percent of primary school children in the Central region have access to a meal, but only 12 percent of primary school children in the North, an economically poorer region, receive a school meal. Unfortunately, the data was not disaggregated by wealth, so it is difficult to substantiate this further.

The CotD analysis emphasises the economic challenges that households face to purchase a nutritious diet. It is therefore likely that some parents will not be able to afford to pay for school meals, and that for many any contribution outside of basic foods will be difficult. Furthermore, secondary data suggests that non-attendance are highly linked to economic barriers as well. Among the main reasons given for non-attendance are looking for jobs (29 percent especially for boys) or pregnancy and getting married (32 percent especially for girls) (UNPS 2016/17). That means that many school aged children may not eat a nutritious meal because they aren't at school and if they were their parents might not be able to afford it.

While the policy may have positive effects in raising awareness of the importance of healthy school meals with parents, it may also have spill-over effects that further exacerbate malnutrition among the poor. For many individuals, education is the last entry point through which they can be systemically reached before they move on to adulthood. This is particularly true for adolescent girls whose non-attendance is often associated with young motherhood. During teen pregnancy they might not be reached through education-based interventions anymore and won't be reached through safety nets for mothers yet. It is also noteworthy that lack of maternal education is heavily associated with higher malnutrition in children, both nationally as shown in the UDHS (UDHS 2016) and globally (Smith & Haddad 2015).

To provide a nutritious school meal would not only be an incentive for school aged children to attend school, it can also contribute to filling part of the gap between recommended and actual nutrient intake for those individuals that are already disadvantaged. In addition to using education as an entry point to achieve long-term economic and educational results that influence nutrition, it is also a platform to provide food to children, a platform that can be leveraged to improve nutritional outcomes. As part of the modelling to improve access to nutrients, a basic school meal (150g of staples, 30g of beans and 10g of fortified oil)[9] and the SNV school milk

[9] Based upon WFP programming in Karamoja

programme (1 litre of milk per child per week), was modelled. Figure 34 shows that these interventions could reduce the household's cost of providing a nutritious diet for a school aged child by 3-8 percent. This is very low, considering that the meals provides 25-35 percent of energy needs, costs would be reduced much further if the meal also provided a similar proportion of the other nutrient needs.

Figure 34. The daily cost of a nutritious diet for a school aged child in UGX with the school milk programme or a basic school meal.

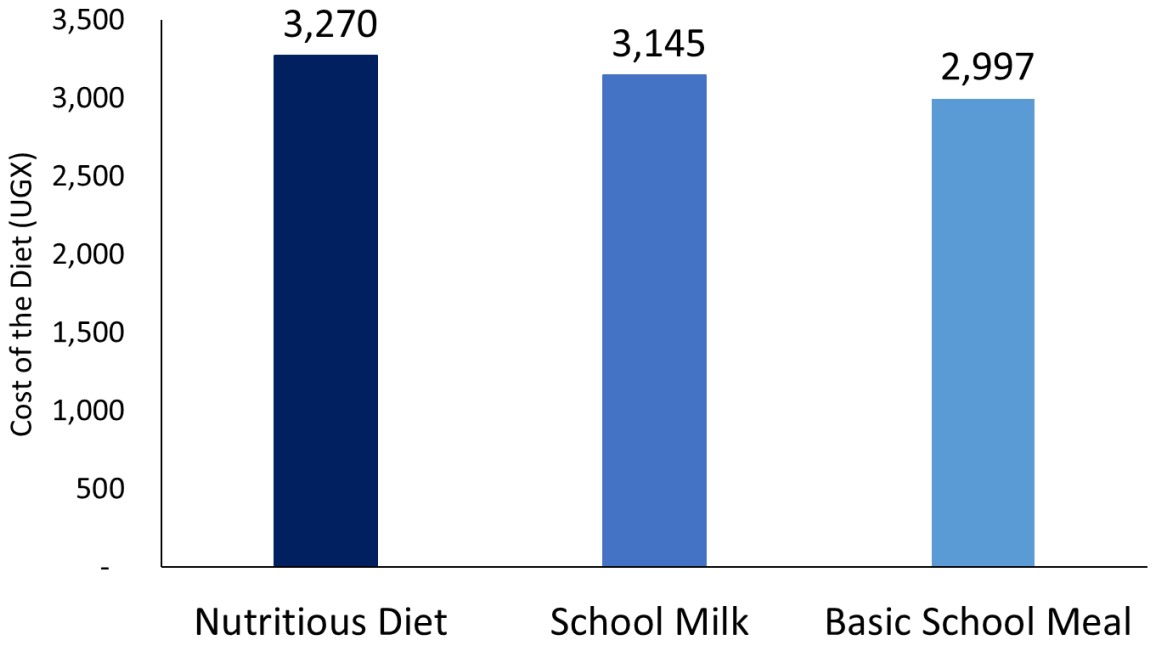
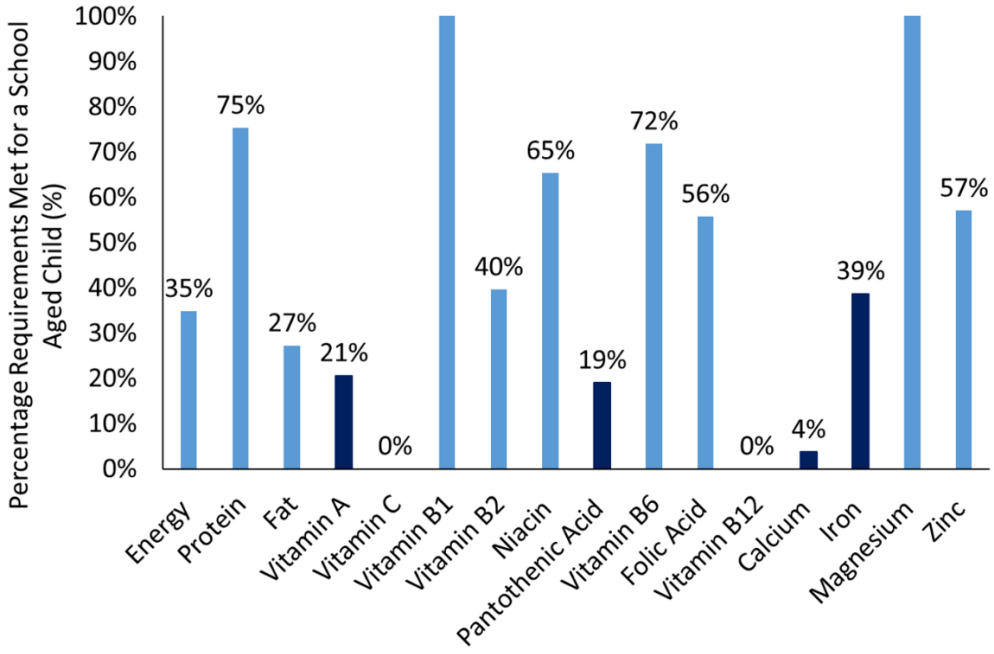


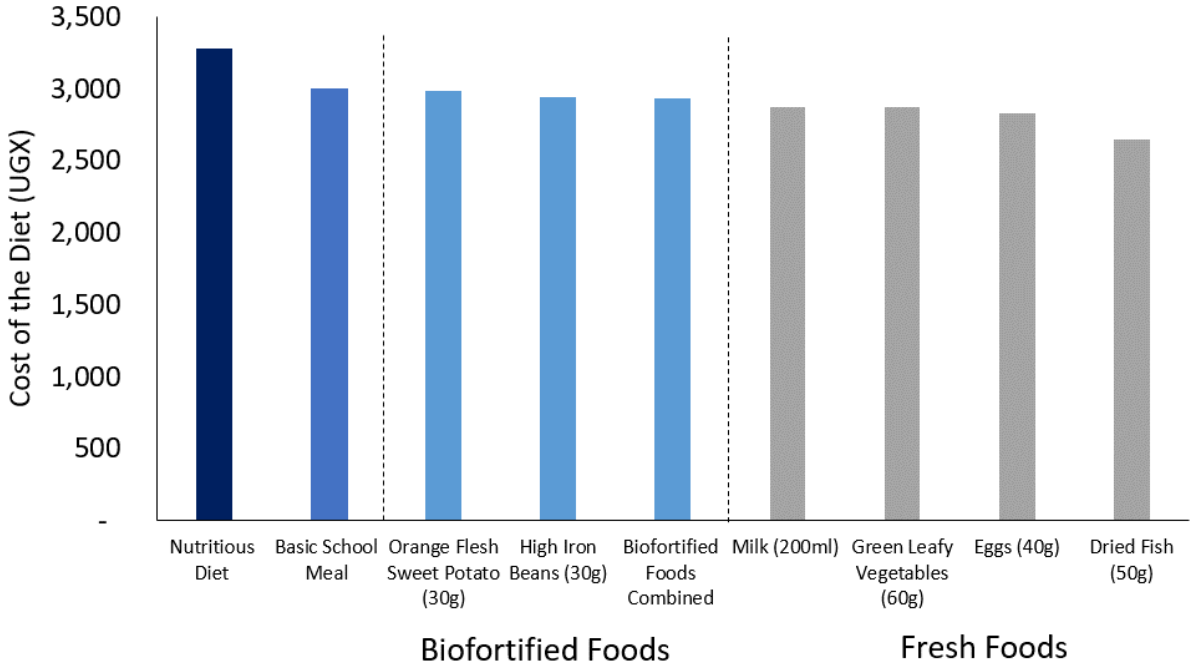
Figure 35 shows that the basic school ration does provide a range of macro and micronutrients but is particularly low in vitamin A, C, pantothenic acid, vitamin B12, calcium and iron.

Figure 35. The percentage nutrients requirements met per day for a school aged child with a basic school meal.



The CotD analysis was used to determine the most nutrient dense combinations of foods that could be provided to improve a school meal ration. Starting with a basic school meal ration of the staple, a pulse and fortified oil, different combinations of locally available foods, biofortified and nutrient supplements were added (refer to Annex 3 for more details). These foods had been identified by the CotD software as inexpensive sources of essential micronutrients. Figure 36 shows that adding biofortified foods to a school meal could reduce the cost of a nutritious diet by 3 percent. The CotD analysis found that adding 50g of dried fish to the school meal reduced the cost of nutritious diet by 20 percent.

Figure 36. The potential impact that different school meal rations could have on reducing the cost to a household of providing a nutritious diet for a school aged child (average 3-16 years) (WFP 2018).



The fresh and biofortified foods were then modelled in combination with each other and a VMP to determine the most optimal combination of foods for a school meal. Figure 37 shows that a combination of a daily VMP, dried fish and dodo leaves, added to the basic school meal, have the greatest potential to optimise the nutrients in a school meal and reduce the cost of a nutritious diet for a school aged child by almost 50%.

Figure 37. The daily cost of a nutritious diet in UGX for a school aged child with different school meal rations.

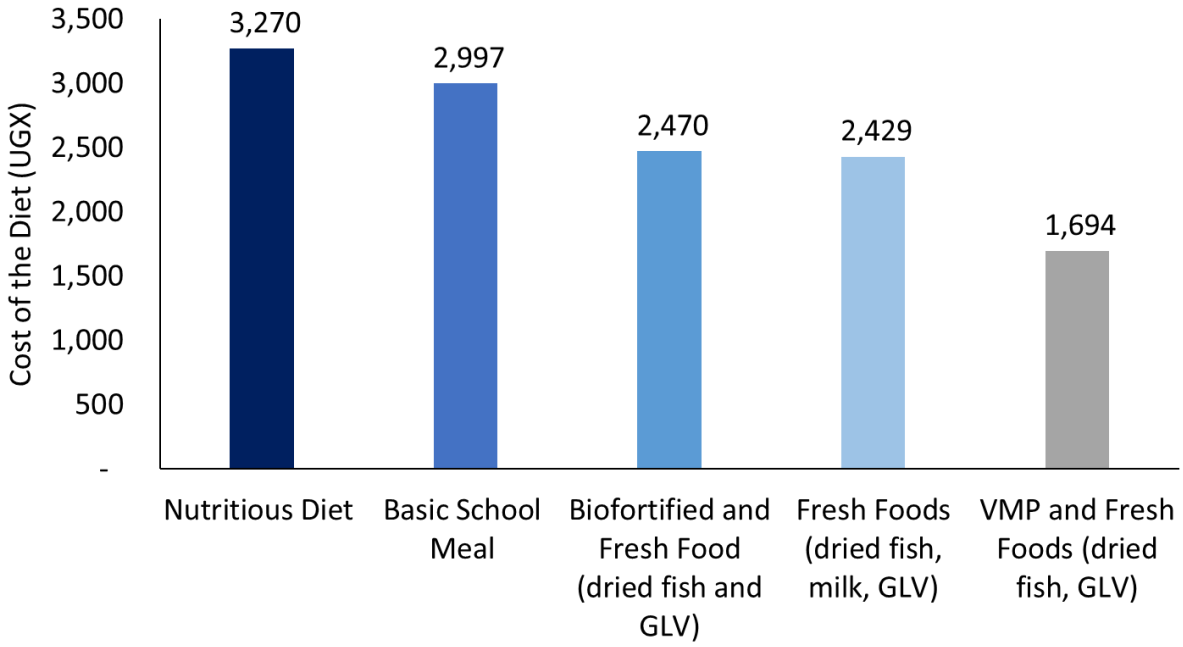
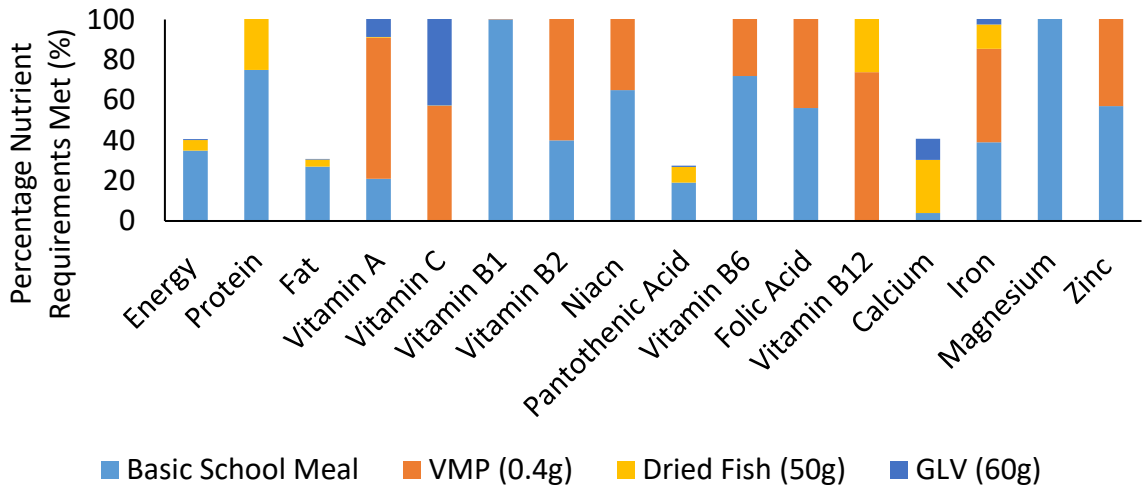


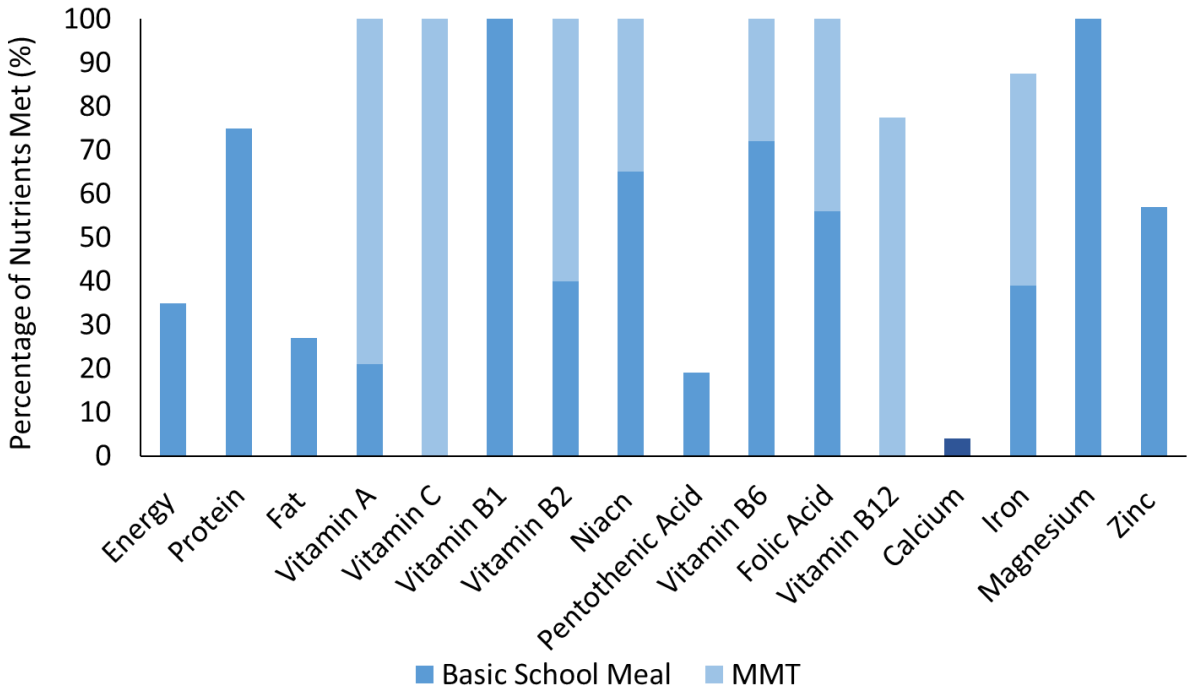
Figure 38 shows the percentage of nutrient requirements met for a school aged child per day with this optimal school meal and shows how important a combination of fresh foods and the VMP is. For example the VMP and the basic school meal ration does not contain calcium, which is provided by the dried fish and dodo leaves. Dodo also provides an important contribution to vitamin A and vitamin C requirements whilst dried fish also provides vitamin B12. Given that the household's diet is low in animal source foods, prioritising the inclusion of these (milk, eggs and dried fish being excellent options) in a school meal would ensure that school aged child received at least one portion of high calcium food a day.

Figure 38. The percentage of nutrients requirements met per day for a school aged child with a basic school meal ration and a VMP, dried fish and dodo leaves.



There is a great opportunity to use the education platform to deliver targeted interventions to the adolescent girls in Uganda. Adding a multiple micronutrient tablet to the basic school meal of an adolescent girl showed excellent potential to improve her nutrient intakes and reduce her cost of a nutritious diet. Assuming delivery and consumption of both, her cost decreased from 5,318 UGX to 1,229UGX, an overall reduction of 76 percent. Figure 39 highlights the potential of multiple micronutrient tablets to improve micronutrient content, where with the exception of pantothenic acid and calcium all micronutrients are provided at sufficient levels.

Figure 39. The percentage of nutrient requirements met per day for an adolescent girl with a basic school meal and a daily MMT.



Modelling Dietary Improvement

A package of interventions implemented across multiple sector(s) entry points could greatly improve household's capacity to access a nutritious diet.

As shown throughout this report, a range of interventions, for individual target groups and the household, have been modelled, as guided by the secondary data analysis and stakeholder consultation. The full results of those interventions by sub-region are shown in Annex 4. Below is a summary of the most effective results.

- SuperCereal plus was the most effective at reducing the cost of meeting nutrient needs for children aged 6-23 months, although the provision of a VMP and Small-Quantity Lipid Based Nutrition Supplement would also make important contributions.
- A combination of a basic school feeding ration, with a VMP and fresh foods such as dried fish and green leafy vegetables would be the most effective in reducing the cost of meeting micronutrient needs for school aged children.
- A multiple micronutrient tablet (MMT) would be the most effective at reducing the cost of a nutritious diet for adolescent girls and PLW.
- Assuming improved availability of foods at the market, Action Against Hunger's fresh food voucher was the most effective in reducing the cost of meeting nutrient needs for the household - showing a 1:1.5 return on investment, assuming improved supply and stable cost to meet the increased requirement of

the fresh food voucher (40,000 UGX spend on nutritious foods reduced the monthly cost for the household by 60,000).[10] Nutrition sensitive agriculture and making biofortified high iron beans available on the market would also make important contributions.

- If current food expenditure (46 percent) is applied to the NUSAF III cash value, non-affordability of a nutritious diet could reduce by an average of 12 percentage points. If 100 percent of the cash value is spent on food, this transfer could reduce non-affordability by 33 percent.
- If all the SCG was spent on food for an elderly individual, this could on average provide 53 percent of the cost of the nutritious diet. If current food expenditure is applied the SCG value (i.e. 46% spent on food) would only be enough to cover energy needs.

These interventions were combined into a package as shown in Table 2. The most effective interventions in reducing the cost of a nutrition diet, as indicated by the CotD analysis. Figure 40 summarizes the impact of these packages separately and in combination with the affordability of a nutritious diet. The impact of the NUSAF III cash transfer was also modelled separately, for which it was assumed that 46 percent would be spent on food as per the national average household food expenditure.

Table 2. The most effective interventions in reducing the cost of a nutrition diet, as indicated by the CotD analysis.

Target Group	Intervention
Child 6-23 months	Fortified Blended Flour (SuperCereal plus)
School Aged Child (6-19 years)	Basic School Feeding Ration with VMP, Dried Fish and Green Leafy Vegetables
Adolescent Pregnant and Lactating Woman	Multiple Micronutrient Tablet (MMT)
Household	Nutrition Sensitive Agriculture
	Biofortified High Iron Beans
Cash Transfer	NUSAF III

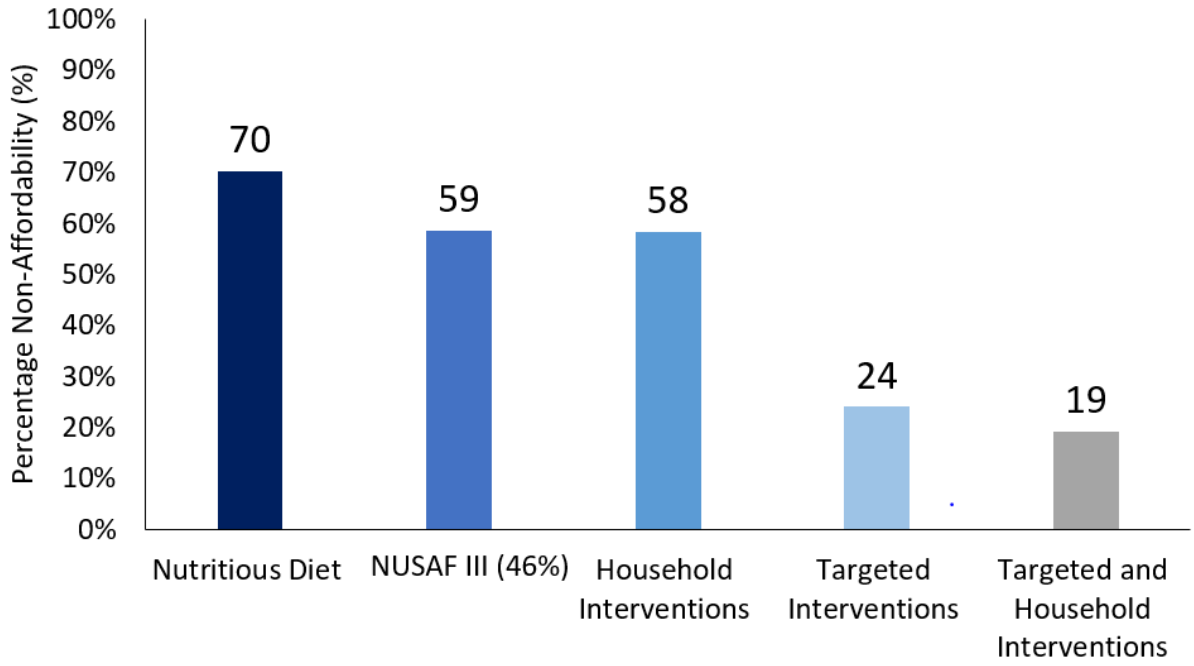
Figure 40 shows that a combination of multi-sectoral household and targeted interventions could improve the affordability of a nutritious diet at a national level by 51 percentage points, from 70 percent to 19 percent. It is noteworthy how much better the combination of intervention fares, compared to specific unilateral interventions, such as NUSAF III or nutrition-sensitive agriculture at the household level. This shows that there is no intervention alone can solve malnutrition and that to improve nutrition on population level, interventions need to be implemented across sectors, with different time frames and targeting different individuals. While some of the most effective

[10] Repeat footnote from the previous section

interventions in this package are product-based and would be implemented for a short-medium period of time (such as fortified blended flour or multiple micronutrient tablets), long term solutions must also be prioritized such as strengthening the food system to deliver safe, nutritious fresh and fortified foods at affordable prices to households across the country.

The results of the package assume optimized behaviour, which means that not only do these interventions need to be implemented effectively at scale, Social Behaviour Change Communication is also required to accompany any intervention to ensure uptake by the population and restricted spending on high-sugar and high-fat foods and drinks.

Figure 40. The potential impact that a package of a range of both targeted and household level interventions and a cash transfer (46% spent on food) could have on improving the affordability of a nutritious diet (WFP, 2018).



Recommendations

During the recommendations workshop section of the dissemination, the main findings of the FNG analysis were shared and discussed with the wider stakeholder group. Participants then formed four work groups, each comprised of different complementary entry points for policy and programmatic strategies - health and nutrition; agriculture and markets; social protection and general assistance; education. Each group was asked to brainstorm interventions which, based on the findings, could contribute to improving the dietary intake of key target groups and well as the overall refugee and host population. They were then asked to prioritise one intervention, for which they

identified target groups and objectives and determine short-term (0-6 months), medium (6-12 months) and long-term (>12 months) activities.

Social Protection

The social protection group identified Fresh Food Voucher for the first 1,000 days as a key intervention. This intervention targets pregnant women until her child is 2 years of age. Main objectives described were the reduction of anaemia in women and children under 2 years as well as the reduction of stunting in children. Additional objectives of this intervention include stimulating demand and supply of nutritious foods in market (increasing income of small holder farmers) and improving supply chain mechanisms for fresh nutritious foods. Ripple effects are foreseen to reduce sickness for women and children, increase the dietary diversity for HHs altogether without necessarily only prioritising women and the youngest children. Combining this intervention with community outreach and behaviour change communication could also impact increasing knowledge around the importance of nutritious foods for women and children, as well as knowledge on WASH and food safety.

Short term activities (0-6 months) to implement this intervention focussed on improving the availability of nutritious foods, spreading knowledge around the seasonality of nutritious foods and better coordination of information on market traders, for example better sharing of information on availability. The group emphasized that local food producers needed to be engaged directly to respond to increased demand for nutritious food, taking into account food consumption habits (especially prohibited foods for children + PLW) what geographic targeting would work best and how to decide on the value of the voucher.

In the medium term (6-12 months), the group envisaged pilots of the voucher scheme to strengthen the connection between markets and purchasers, additionally focussing on the review and lessons learned of the implementation approach.

In the long term (>12 months) both the engagement work of the short term activities and the evaluation exercises of the medium activity would enable to link programme with agriculture extension works to promote local production and ensuring sustainability.

Additional aspects to keep in mind by this group were a) keeping track of dietary diversity, stunting, anaemia, nutrition knowledge to be able to create evidence around programming for social protection. It was also suggested to use existing community health workers to follow up on the impact of this intervention. Among perceived challenges are, but not limited to: cultural practices, funding, capacity and human resources, lack of monitoring and supervision. Important other sectors to engage are: Agriculture, Health, Education, Wash, Ministry of Gender, Finance.

Agriculture and Markets

The agriculture & markets group identified two main interventions to improve nutrition through the respective sector: Capacity Building of women, youth & school aged children for improved awareness of growing and consuming nutritious foods and Promotion of biofortified foods.

Target groups for capacity building are in particular Women, Youth & school aged children, due to the leverage that these groups have over the nutrition of their families and dependents. Main objectives for this intervention are to increase production and consumption of nutritious foods, general promotion of food security and creation of awareness around nutritious foods and diets. These interventions are also thought to impact the general availability of fresh foods and improve the income of households.

Short term activities (0-6 months) developed to start the process included: establishing demonstration gardens, mobilizing the local community and leaders, make advance loans available & combine them with financial training. Additionally, the group advocated to seek support from private sector companies to ensure that inputs are available. Other suggestions included setting up women support groups, demonstrations around how to cook & prepare nutritious foods and targeting post-harvest losses.

For medium term activities (6-12 months) stakeholders identified the M&E around earlier activities, the analysis of value chain, training on machines in agriculture, irrigation and storage of fresh foods as priorities. They pointed out that for the intervention to remain viable, a framework for training needed to be established and SBCC for men around growing practices & decision making would have to be made available. The group also highlighted the importance of landownership of women & the underlying cultural beliefs. Cultural beliefs also play a major role when it comes to knowledge on mechanization & the modernization of existing agriculture.

Challenges that were identified are in particular: cultural issues that limit changes regarding land ownership and work load of women, limited resources and inadequate capacity to train and general access to land (enabling environment), bureaucracy, lack of technological enhancement of agriculture. The intervention outlined would engage stakeholders across all sectors, such as Finance, Gender & Social Protection, Policy Makers & Planners, Education and Trade & Industry.

The second intervention outlined by this group was the promotion of biofortified foods, both production and consumption with the objective of enhancing intake of micronutrients among the population.

Short-term activities (0-6 months) prioritized for this intervention included: SBCC for nutrition sensitive agriculture to build awareness around the need for nutritious foods. It was also highlighted by this group to exploit linkages with existing government and NGO programmes to distribute biofortified crops (OWE/ NAADS) and provide agricultural inputs through the private sector or NGOs.

To drive this intervention in the medium term, the group focussed on the ability to produce nutritious foods, particularly on preserving harvested commodities. For this they emphasized the importance of Post-Harvest Loss Reduction initiatives and establishing storage facilities to ensure availability and maximum utility of products. To facilitate learning, the group also suggested the set-up demonstration gardens in schools, health centres and communities.

To make these innovations sustainable in the long term, stakeholders identified actions around processing and value addition. For this they suggested increased research on biofortified crops and their impact on Nutrition to enable evidence generation.

The main challenges foreseen by this group were focussed on climate change, in particular access to irrigation methods, the cultural mindset of communities that might object to "new" foods and financial constraints, such as the lack of loans. Stakeholders that were mentioned to be important to engage included the ministry of agriculture, government development partners such as NGOs and UN agencies, private sector and media outlets (especially for SBCC).

Health and Nutrition

The stakeholder group that was working on the Health and Nutrition intervention, particularly focussed on the promotion of mother, infants, young child and adolescent's nutrition. There was consensus in the group that while several interventions for this exist, they need to be enhanced to provide meaningful impact for those target groups. The primary objective for this group was to increase the rate of exclusive breastfeeding and consumption of a minimum acceptable diet (MAD).

For the short-term, interventions were identified to focus on reviewing existing IYCF strategies and strengthening initiatives already present. For this they highlighted an increased promotion of breastfeeding centres, training of health workers and strengthening of nutrition education in health services.

In the medium term the group suggested to establish demonstration gardens at Health Facility (HF) level and develop Village Health Team (VHT) Training and task VHTs with supervision around the demonstration gardens. This would use an existing platform that is already well established to link to other sectors, e.g. agriculture, and demonstrate the cross-cutting nature of Nutrition.

In the long term the group highlighted the importance of keeping demonstrations of production and cooking present on community level, to ensure initiatives are being carried forward. Furthermore, the group pointed out that resource transfer mechanisms (supplements or cash) are in place to ensure access to Nutrients for those that couldn't afford them otherwise.

The main challenges foreseen were around lack of financial resources on community level, the low attendance in ante-natal care groups and generally low male involvement.

Inadequate leverage and utilization of existing health services was the main gap identified in current programming. Sectors to engage and integrate into Health & Nutrition included: WASH, Agriculture, Education, Finance, Gender & Social Protection.

Education

The stakeholder group working on interventions through the educational platform particularly focussed on promoting School Feeding.

Based on the evidence of only 33% of students receiving a school meal at school, they emphasised the potential of reaching through early childhood care and development centres for 3-5 year olds and school going children 6-12 year old. Several objectives were thought to be reachable through an educational platform, among which are: the promotion of education outcomes and improved enrolment as well as the retention and completion of literacy levels. Improving nutrition in school feeding was also thought to impact the reduction of short-term hunger and improve nutrition outcomes, e.g. stunting, wasting, micro-nutrient intake. Linking up agricultural production with school meal programmes also has great potential to improve local economic productivity and promote community participation in those initiatives.

Short term activities designed by this group largely focussed on creating awareness of the importance of school feeding and enable parent involvement and contribution. The group emphasized on sensitizing parents on school feeding and creating mechanisms through which parents can provide food for school going children. Examples are home grown school meals or school kitchen gardens. The stakeholder group highlighted the need to provide food to the most vulnerable parts of the population and to design mechanisms that ensure inclusion of the poorest. In addition they recommended to commence communication and dissemination of the school feeding guidelines more explicitly and widely. Lastly, they suggested to develop guidelines around how education on Nutrition & Social Behaviour Change Communication can be facilitated through the educational platform.

Most medium term activities were concentrated on continuation of short term activities, with heightened sensitization around the issue taking place on a political level and ensuring adequate monitoring activities to inform lessons learned.

In the long term, this group recommended to develop School gardens and farming of bio-fortified crops close to the school sites. It was strongly emphasized that lobbying and political work was needed to come up with a revised school feeding policy, which currently poses a barrier for nation-wide, government-led school meals.

Major challenges foreseen by this group were policy issues – especially the stance contra school meals currently taken by the Ministry of Education. Poor policy dissemination and food insecurity at household level exacerbate the economic inability of poor households to provide children with school meals. Climate change impacts and general low income can cause instability in continuous home grown school meals,

making the ability of all households to source school meals themselves dependent on seasonality. Important sectors to engage around school feeding were listed as Agriculture, Health, Gender, Finance, and Private Sector partners.

Special Focus I: Karamoja

The key aim of the Fill the Nutrient Gap assessment focusing on the Karamoja region was to inform the Karamoja Nutrition Plan and the respective proposal for DFID. Together with UNICEF, the WFP team worked to unpack the drivers of malnutrition and potential entry points and target groups. As part of this, the team evaluated ongoing and potential programmes and identified recommendations from stakeholders on next steps. These findings were used to inform a revised way forward for WFP and UNICEF programming.

FNG in Karamoja: Findings

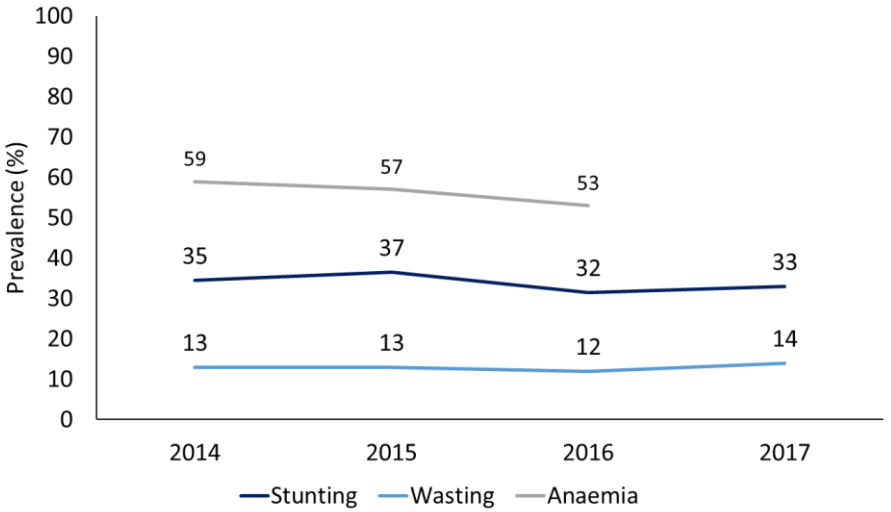
Malnutrition Characteristics

Child and Maternal Malnutrition

Karamoja has some of the highest rates of malnutrition in Uganda. Malnutrition varies geographically within the region and is impacted by socioeconomic factors and mothers' nutritional and educational status. More information is required on the causes of anaemia.

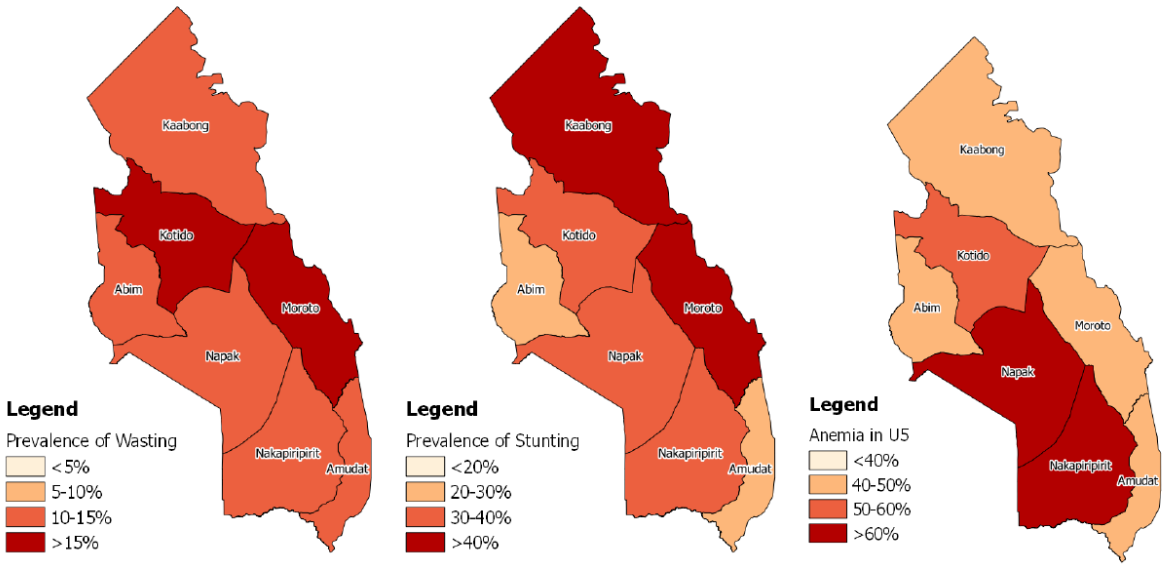
Despite national progress in reducing infant and young child malnutrition over the past 10 years (see Figure 41), the improvement has not been consistent across the country and Karamoja continues to have some of the worst child malnutrition rates. According to the 2016 and 2017 Food Security and Nutrition Assessments (FSNA) conducted by WFP and UNICEF, 33 percent of children are stunted, 14 percent are wasted and 53 percent are anaemic. These levels are defined by the World Health Organisation (WHO) criteria as being of high public health significance. The progress in reducing these rates over time has been slow and inconsistent, which is reflected by similar trends over the past 10 years.

Figure 41. The prevalence of child undernutrition in Karamoja from 2014 to 2017 (WFP and UNICEF, 2014-2017)



FSNA data also suggests that the child malnutrition rates vary within Karamoja, although no very clear patterns are discernible across indicators (Figure 42). For example, while Kaabong and Moroto have relatively high prevalence of stunting, prevalence of Anaemia is relatively low, although still just below the WHO cut-off for severe public health significance (40 percent). This emphasises the need to understand and address the underlying drivers of different forms of malnutrition as they are not necessarily concurrent with each other.

Figure 42. The prevalence of undernutrition in children under 5 years of age in Karamoja by district.



Data from the FSNA shows a strong relationship between stunting and wasting and mother's educational status and nutritional status, both of which are poor. In 2017, almost three quarters (72 percent) of mothers reported having no education and over a

third (39 percent) were underweight (Figure 43 and Figure 44). There has also been little progress in improving these indicators over time. Figure 45 shows that only in the wealthiest households is there a somewhat lower prevalence of child stunting and wasting, emphasising the extent of the overall poverty in the region, which is estimated at 61 percent.

Figure 43. The prevalence of children under 5 years' undernutrition by their mother's educational sentence.

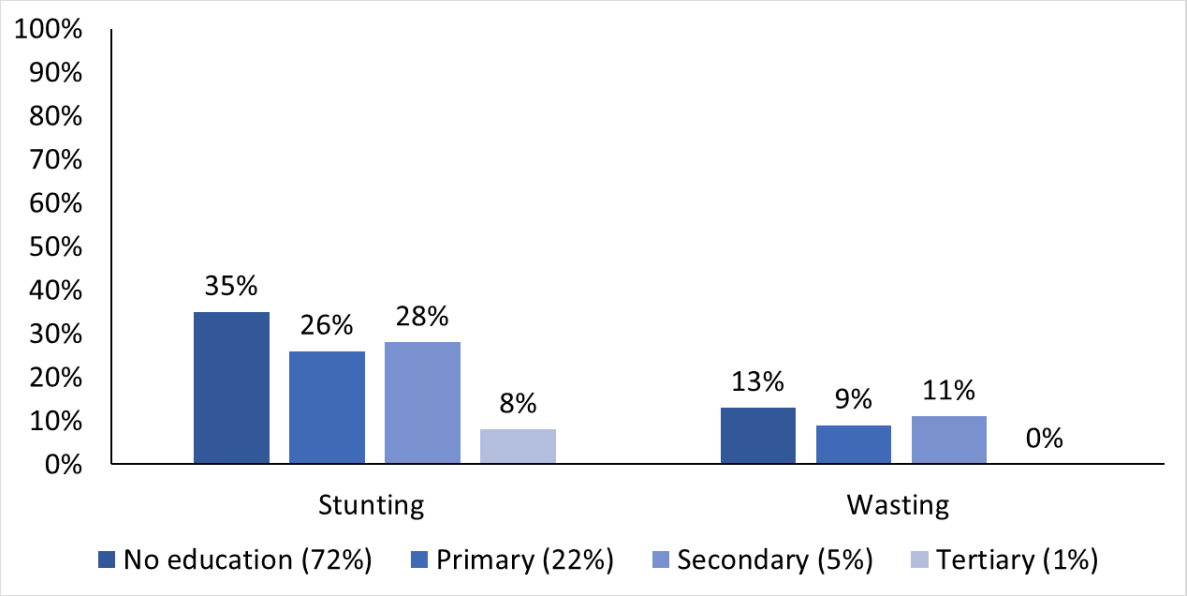
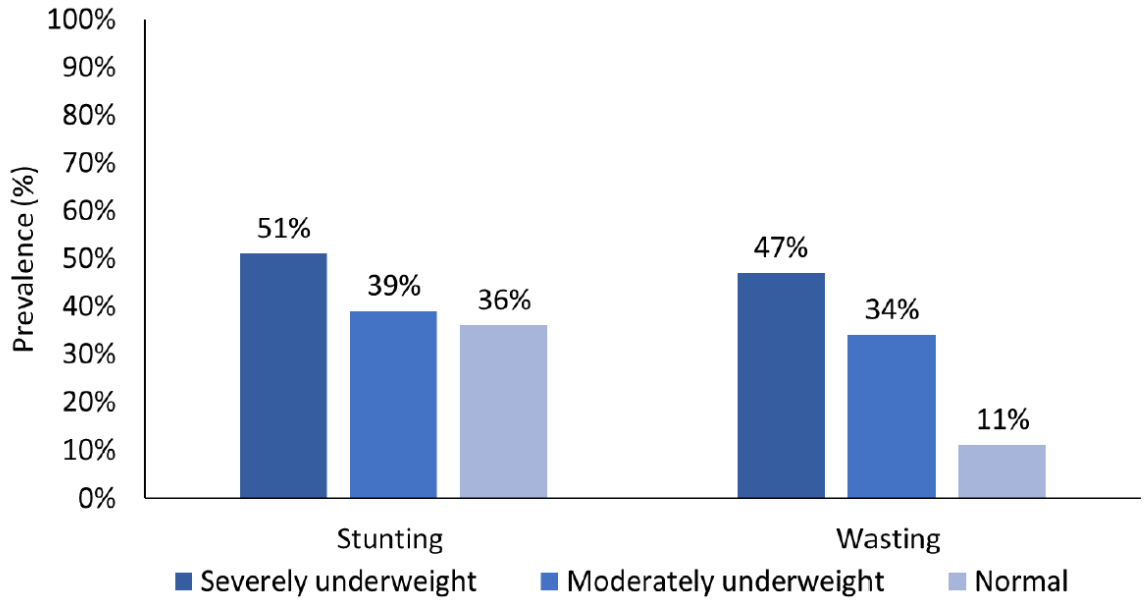
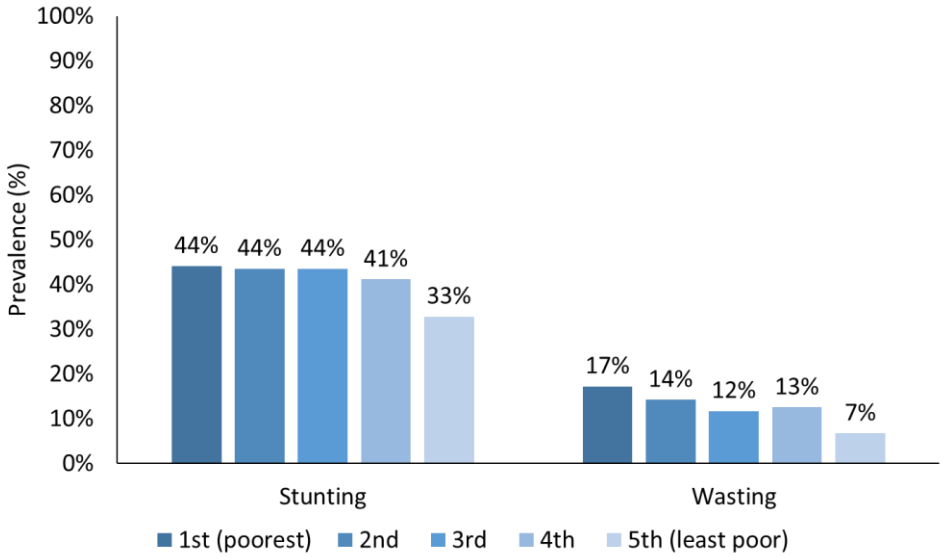


Figure 44. The prevalence of children under 5 years' undernutrition by their mother's Body Mass Index.



Source: FSNA 2016

Figure 45. Stunting and wasting prevalence in children under 5 years by wealth quintile (WFP and UNICEF, 2016)



Anaemia prevalence is a severe public health problem not only in children (all districts above 40 percent prevalence), but also in women (4 of 7 districts at or above 40 percent prevalence). Data from the UDHS also shows that anaemia prevalence is three times higher for girls aged 15-19 years in Karamoja (43 percent) compared to the national average (23 percent).There is very little data on the causes of anaemia and its associations for Karamoja, and data that is available, such as consumption of heme iron rich foods[11], show a variable relationship with anaemia prevalence with no clear pattern. While the high prevalence of anaemia could indicate a high rate of micronutrient deficiencies, this information is not available for the region, nor the rest of the country. Other proxy indicators show an unclear situation. The percentage of children who receive deworming tablets is the highest in the country at 80 percent. Approximately 1 percent of children in the region suffer from sickle cell disease, but this analysis has not been done for women. Malaria-related anaemia affects 6 percent of children at a national level, but is not known for Karamoja, despite 69 percent of children testing positive for the disease by rapid diagnostic test. Associations between anaemia and wealth quintile, mother education and nutritional status could only be found at a national level.

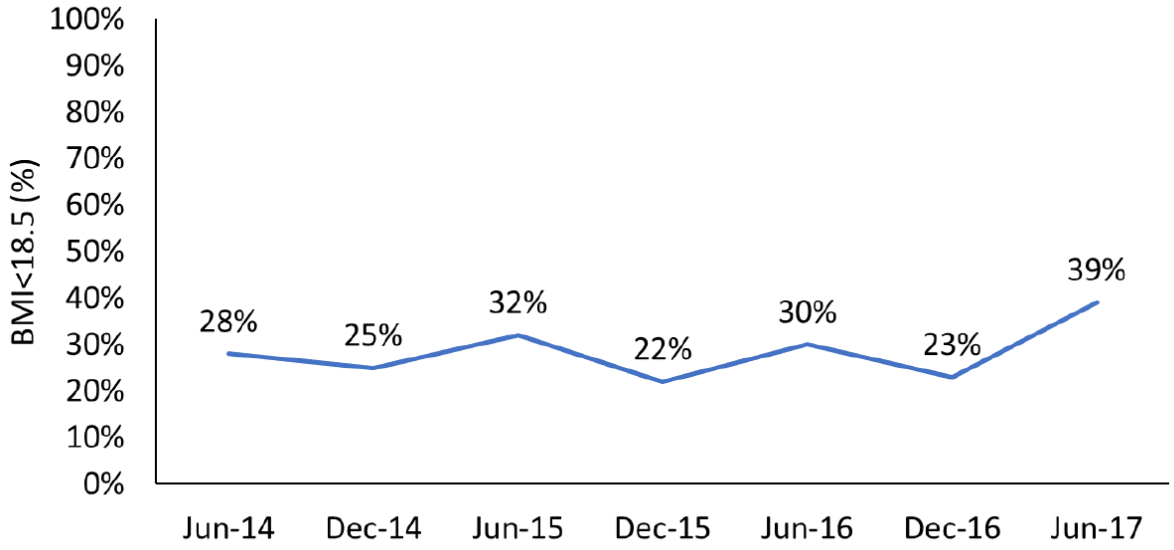
Biannual FSNA data on underweight shows a seasonal trend in the Body Mass Index (BMI)[12] of women, with the prevalence rising in June, during the lean season and decreasing in December (Figure 46). Data from the UDHS also shows that underweight is almost three times higher for girls aged 15-19 years in Karamoja (33 percent) compared to the national average (12 percent). In addition to general food insecurity

[11] Heme-iron rich foods are animal sourced foods, especially flesh foods.

[12] Calculated by dividing weight in kilograms by height in meters squared (kg/m^2). Defined as follows: Thin (less than 18.5), normal (18.5 and 24.9), overweight (25.0 and 29.9), obese (greater than or equal to 30.0)

during the lean season this may indicate that there are practices which expose women in particular to underweight, such as coping strategies and intra-household sharing.

Figure 46. Underweight (BMI <18.5) in women aged 15-49 by season (WFP and UNICEF 2017).



There is strong evidence, both globally and locally, that mother's nutritional status, well-being, education and age at birth are associated with the nutritional status of the child (Fink and Rockers 2014, UDHS 2016). More extensive data collection and additional analysis is needed to better understand the associations of these indicators, particularly the relationship between child and maternal anaemia by wealth quintiles. Current monitoring and assessment programs provide an ideal platform to collect and evaluate this information.

Nutrient Intake

Household Food Security and Consumption

Household food security and the consumption of nutritious foods is low and driven by food availability, economic access and stability.

The food security situation in Karamoja ranges from 'stressed' to 'crisis', depending on the district and the time of year. Figure 47 shows how the percentage of food insecure households has changed from 2009-2015 across the seven districts and in both the harvest and lean season. These figures emphasise how rapidly the food security situation can change across the region, reinforcing instability of the context.

Figure 47. The percentage of food insecure households in the seven districts of Karamoja, from 2009-2015 (WFP, 2015)

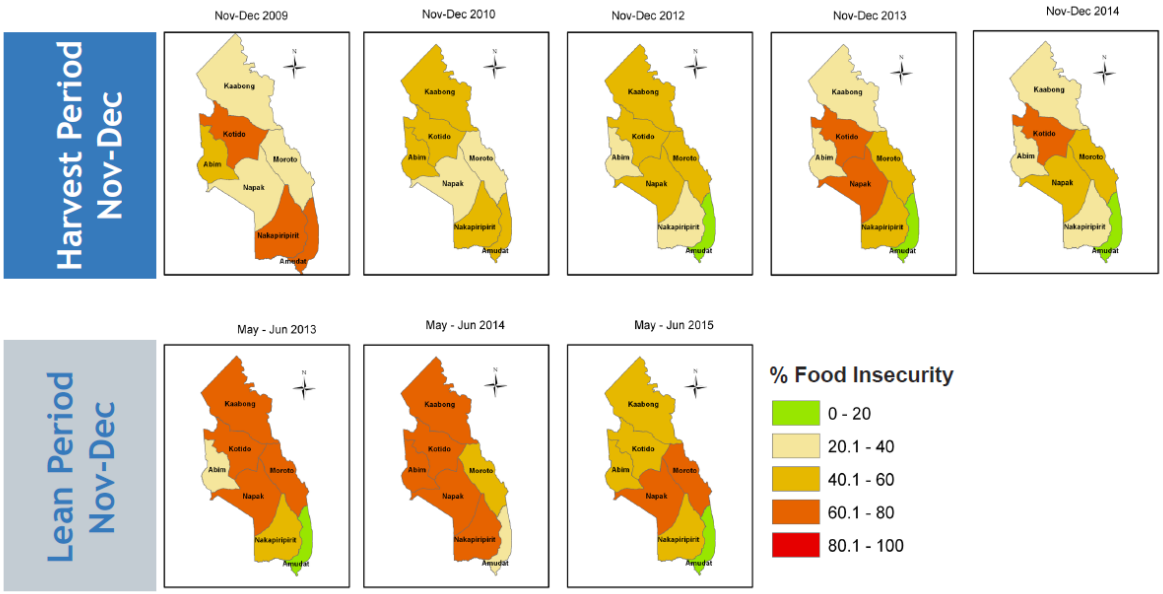
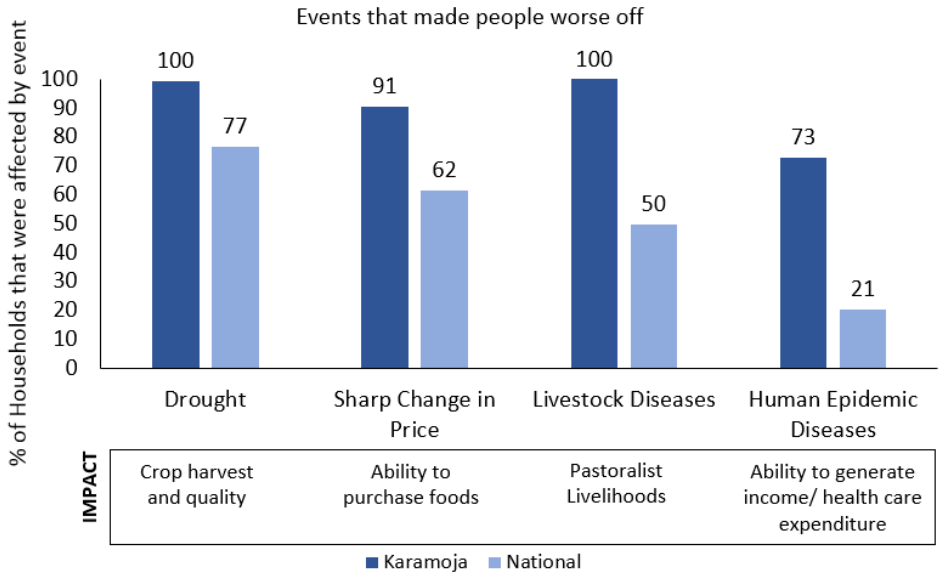


Figure 47 shows that factors that impact food security in Karamoja are much worse than the rest of the country, with 100 percent of households in the region reporting that they experience drought and livestock disease compared to 77 percent and 50 percent of households, respectively, at a national level. To cope, households reported reducing their food intake (78 percent reduced the number of meals, 73 percent reported reducing portion sizes) as well as consuming less of their preferred foods (81 percent). Other coping strategies included borrowing food (60 percent) and reducing explicitly the quantity of food consumed by adults (65 percent of households).

Figure 48. Reported events that made people worse off in Karamoja compared to nationally compared to in Karamoja (FSNA 2017).



The 2016 Uganda National Household Survey reported that 55 percent of households in Karamoja have low dietary diversity[13]. Nationally, this ranges from 21 percent in Kampala to 69 percent in Kigezi and the average is 34 percent. Within Karamoja only few households achieve high dietary diversity (between 20 percent and <10 percent per district) and only one in three achieve minimum meal frequency for under 2 year olds (FSNA 2017).[14] These findings suggests that households in Karamoja consume a diet that is not sufficiently diversified nor consumed frequently enough.

This is backed up by reported consumption of food groups, where animal source foods is particularly low, at around once per week (Figure 49). The CotD analysis identified eggs, milk, dried fish and beef as key sources of essential micronutrients such as vitamin B12, iron and calcium. WFP FSNA data suggests that there is an association with livestock ownership and stunting and found that 37 percent of children were stunted in households with a medium to high presence[15] of livestock, compared to 44 percent of children in households with no livestock. This association was weaker for wasting: 12 percent of children were wasted in households with a medium to high presence of livestock compared to 14 percent of children in households with no livestock (FSNA 2016).

There also appears to be a loose relationship between type of livelihood and the consumption of heme iron rich foods, where those households that still fall into crop-only agriculture livelihoods appear to have a higher prevalence of no consumption of

[13] Defined as consuming ≤4 out of 7 food groups.
[14] Minimum Meal Frequency is defined as 2x daily for breastfed children 6-9mts, 3x daily for breastfed children 9-23 mts and 4x daily for non-breastfed children 6-23 mts (FSNA 2017).
[15] Defined as 0.5-2 Tropical Livestock Units

heme iron rich foods (FSNA 2017 and FEWS 2016). However, it should be noted that this relationship is difficult to estimate given the trend toward agro-pastoral livelihoods and no clear cut alignment of administrative and livelihood boundaries. Several sources (Development Pathways 2017, Mercy Corps 2016) point toward the breaking up of traditional livelihoods

Figure 49. Weekly consumption of food groups (FSNA 2016)

District	Starch	Pulse	Meats	Veg.	Oil	Fruit	Sugar	Milk	Condiment
Abim	6.49	5.56	.75	3.97	3.35	.82	2.40	.45	3.00
Amudat	6.13	1.54	1.43	4.54	3.72	.26	3.86	5.08	3.01
Kaabong	5.59	2.14	.65	4.63	1.93	.16	.61	.64	3.76
Kotido	5.79	3.32	1.44	4.48	1.78	.11	.29	.30	4.02
Moroto	6.00	3.73	1.47	5.01	3.16	.35	1.09	1.41	1.24
Nakapirit	6.09	3.04	1.54	5.89	3.97	.73	1.59	2.77	2.21
Napak	6.34	3.05	1.29	5.32	2.49	.20	.52	1.22	4.99
Karamoja	***6.06***	***3.19***	***1.23***	***4.84***	***2.91***	***.37***	***1.47***	***1.71***	***3.15***

Infant and Young Child Feeding Practices

Breastfeeding is widely practiced in Karamoja but complementary feeding is suboptimal, resulting in an inadequate nutrient intake among children aged 6-23 months.

There is no child malnutrition by age data for Karamoja. At a national level, the prevalence of stunting, wasting and anaemia increases the most between the age of 6 months and 12 months, as previously mentioned. For example, during this period the prevalence of anaemia increases from 16 percent to 36 percent, suggesting that the introduction of complementary feeding in Uganda is suboptimal (UDHS 2016).

Breastfeeding is almost universal in Karamoja, with 94 percent of children being exclusively breastfed to 6 months, compared to the national average of 66 percent (FSNA 2017). Key indicators are the timely introduction of breastfeeding, and continued breastfeeding up to two years of age, which are reported to be 82 percent and 50 percent of children respectively in Karamoja. Formative research undertaken by UNICEF found that the barriers to the timely introduction of breastfeeding in Karamoja were the delay in the child's naming ceremony and the belief that breastmilk does not come immediately after delivery (UNICEF 2015). Common pre-lacteal foods are water with sugar, cow's milk and herbs. The research found that the barriers to continued breastfeeding in Karamoja were maternal workload and limited spousal support, the

belief that it is dangerous to breastfeed when pregnant with another child, and poor economic access to nutritious foods to ensure adequate breastmilk supply.

Only 4 percent of children under the age of 2 years in Karamoja are fed MAD, compared to 15 percent of children nationally. Achieving MDD in Karamoja is a greater barrier than achieving MMF but both indicators are very low at 6 percent and 19 percent of children, respectively. This reflects the same pattern nationally, where 42 percent of children achieved MMF and 30 percent achieved MDD, but at a substantially lower level.

A child's diet reflects the household's diet, with food availability and economic access being the main reported barriers to adequate infant and young child feeding. Another barrier is mother's workload and limited empowerment which limits the available time, as well as control over food finances to prepare the necessary meals and foods needed for optimal infant and young child feeding. Related to maternal workload are women's responsibilities that take them out of the home and leaves them unable to prepare additional foods for younger children, which means that they only have access to food, when the whole family eats. Men in these contexts provide very little support to women, especially those who have lost their pastoral livelihood and become idle. Qualitative reports indicate that loss of livelihood can increase alcoholism, which in turn diminishes funds of the family that are dedicated to food (Feinstein International Center 2011, Mercy Corps 2016).

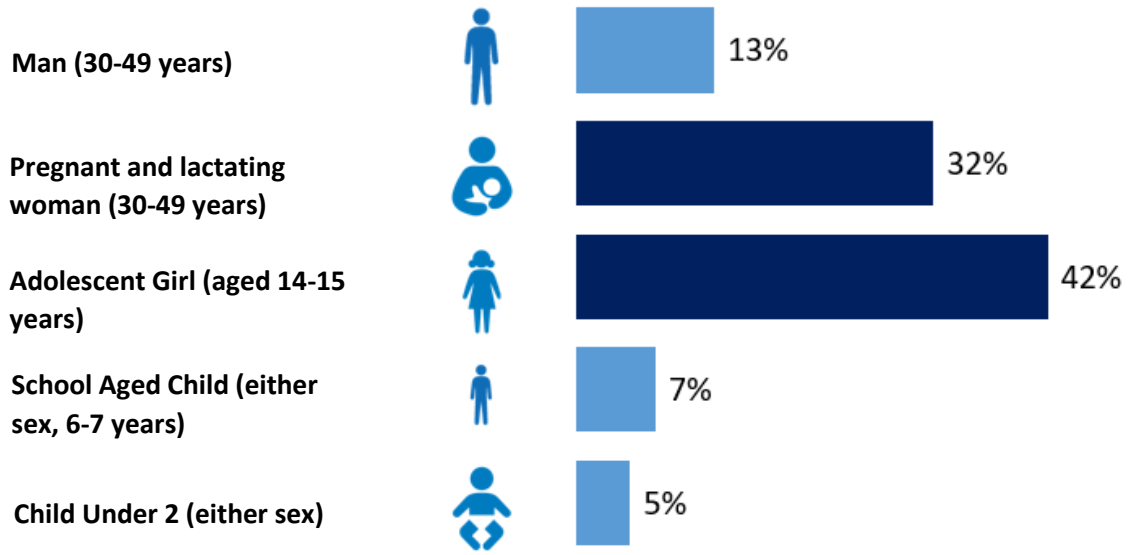
Formative research carried out by UNICEF found that knowledge regarding infant and young child feeding practices were high and that parents knew of the nutritious foods necessary to feed their children and the importance of good feeding practices. This underscores that other barriers, such as limited availability and access to diverse foods, economic access and time constraints of women are now more important to overcome.

Adolescent Girls and Women's Diets

The nutrient needs of women, especially pregnant and lactating women, and adolescent girls are high and data suggests that their diets are poor. This contributes to malnutrition in women and girls during pregnancy as well as in their children.

The CotD analysis results, shown in Figure 50, found that meeting the nutritional needs of the adolescent girl and lactating woman were the most expensive. This is due to their increased needs for micronutrients, such as iron, which are typically provided by expensive foods such as meat, eggs, and milk in addition to green leafy vegetables.

Figure 50. The proportion of the cost of a nutritious diet attributed to different household members in Karamoja according to the CotD analysis (WFP, 2018).



Little data exists on the diet of women and adolescent girls in Karamoja, but what is available suggests that both dietary diversity and food frequency are poor. This is emphasised by the seasonal underweight trend presented in Section X which is not only indicative of the coping strategies that families employ during the lean season but further compounded by the social norms that dictate that women do not get priority over food in the household, often eating whatever food is remaining once their husband and children have eaten (UNICEF 2015).

A study on adolescents in districts of Karamoja and West Nile, carried out from April – June 2017 showed that adolescents were consuming some nutritious foods such as dodo leaves, milk, meat and mangoes. While this data was not disaggregated by boys and girls and the quantities of these foods was not reported, the researchers found that adolescent boys and girls were eating remarkably similar foods (Anthrologica 2017). The study also inferred that the frequency of food consumption among adolescents was very low at one to two meals per day.

Despite their higher requirements, data suggests that women's diets do not change during pregnancy or breastfeeding. This is because women are not treated or prioritised differently during this stage of the lifecycle. They are therefore impacted by the same barriers to adequate nutrient intake (food availability and economic access) as the rest of the household and as dictated by social norms. In addition, they have multiple responsibilities such as caring and providing for the household and contributing to household economy, particularly through agriculture, which leaves little time to rest or prepare extra meals or additional foods for themselves and their children.

Access to and Availability of Nutritious Foods

Market access and Food Availability

Households rely heavily on markets to purchase food and are therefore vulnerable to volatile food prices. Data on the availability and price of nutritious foods is limited but what exists suggests that they are expensive and not widely available.

Approximately 65 percent of households rely on the market to purchase more than 75 percent of their food needs in Karamoja. Households also spend a large proportion (59 percent) of their money on food (WFP 2017). However, access to markets varies across districts in Karamoja, both in terms of distance (above 10km to the nearest market in Kaabong) and frequency of markets (whether they operate daily or weekly). For many households that are residing in homesteads in Karamoja markets may also not be the most common way to access foods. This dependency makes households vulnerable to recurrent shocks such as drought, flash flooding and livestock disease that impact food prices and food availability.

Data on the availability and cost of fresh, nutritious foods in markets in Karamoja, is limited, with price monitoring data focused primarily on staples, pulses and oil. These data show that generally the cost of these commodities increase during the lean season (March – July) and decrease during the harvest season (August – December). However, drought and unpredictable rains over the years have distorted this pattern and resulted in less predictable food prices for these commodities, as discussed in the next key section.

There is also little information on whether and how markets might respond if there were an increased demand for nutritious, fresh foods. This information is crucial for programme design if more households were to rely on the market for their food needs and for social and behaviour change communication strategies that would encourage the purchase and consumption of these fresh foods.

The 2016 Panel Survey data suggests that the diversity of foods available at markets is low in Karamoja, compared to other regions, with only 37 foods being included in the food list compared to 52 foods for the South Central region (which had the highest food availability). It is important to note however, that this survey is based upon reported food consumption using a closed food list (i.e. no data were collected on foods that were not on this list but that might have been available) and therefore the inference to food availability should be interpreted with caution. This survey also indicates that nutritious foods in these areas are expensive with the price of vegetables, pulses, fish, eggs and meat being higher than the national average.

Existing livelihoods have the potential to improve dietary diversity and household income, but investment is needed to make these livelihoods viable.

Livelihoods in Karamoja are livestock based, crop based or a mixture of both (Development Pathways 2017). Twenty three percent of households have high or slightly high ownership of livestock[16], but only 11 percent list livestock as their main source of income, highlighting the decrease of traditional pastoralism. For agricultural livelihoods, the main crops produced are sorghum (77 percent of households), maize (57 percent) and beans (35 percent). Agropastoralism, households that engage in a mixture of both, is on the rise and mainly practiced in central Karamoja, with pastoralism practiced more in the east and purely agricultural livelihoods confined to pockets in the north-west and south (FEWS 2015).

Pastoralism, the practice of herding livestock across regions (as opposed to settled livestock production), holds great social and cultural significance. Policies and interventions that have aimed to resettle the Karamojong over the years, have impacted their movement, security and the ability of pastoralism to remain a viable and profitable livelihood. This has increased pressure on households in pastoralist areas to transition into crop production, which in turn has disproportionately increased the workload of women, whose responsibility is to tend to the land.

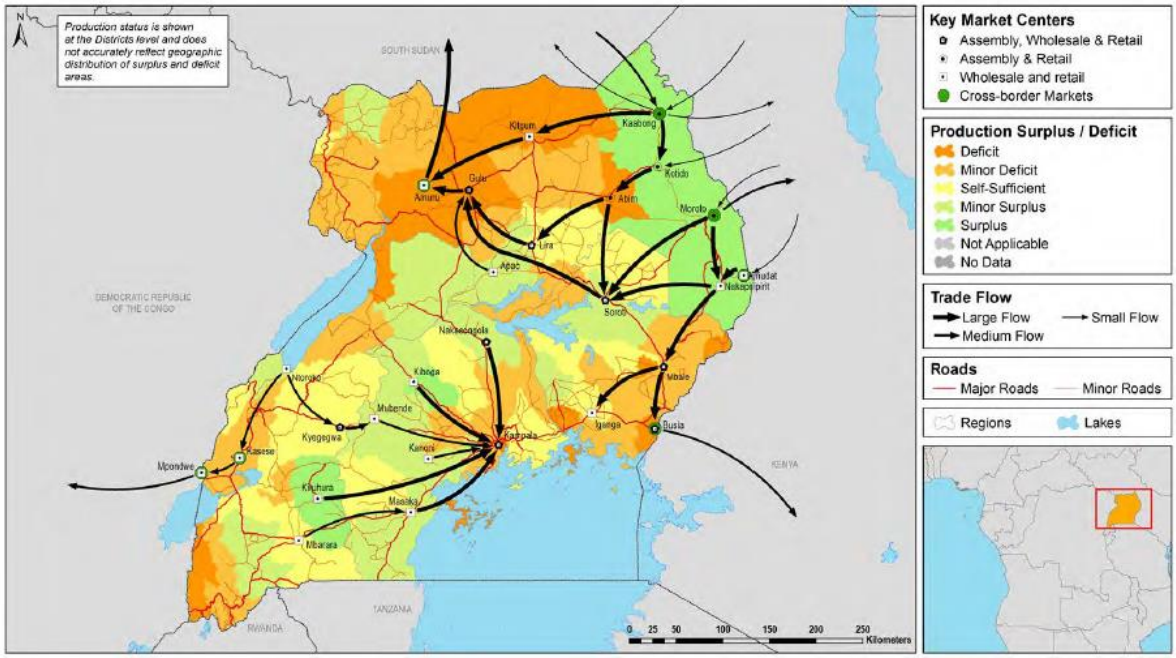
The cultural significance, existing (agro)-pastoralism, trade flows and surplus in livestock suggest that livestock-based livelihoods remain a viable source of income. However, to retain the existing position and improve competitive advantage, market access needs to be improved. As traditional pastoralism will remain viable only for a minority, identification of alternative livelihoods is crucial to ensure continuous income generation in households. In a mapping exercise done by Mercy Corps, two options for transforming traditional pastoralism into livestock-based livelihoods were identified: commercializing and modernizing existing pastoralism and converting to settled livestock production (Mercy Corps, 2016). To commercialize existing pastoralists, it was highlighted that there needs to be an increased focus on domestic and export trade, with enhanced mobility of the herds, which may also create labour opportunities for poorer pastoralists, such as shepherding. Alternatively, the report suggested that increasing peri-urban livestock and concentrating on specialized livestock production would also be first successful steps toward settled livestock production.

Despite the attempts to transition from pastoralist livelihood to sedentary lifestyles, and by that focus on crop production, as well as reported high burden of livestock disease, Karamoja still produces a surplus of cattle (FEWS 2015). Large trade flows of cattle originate in Kaabong and Moroto, moving into the neighbouring subregions (see Figure 51). However, the supply chain infrastructure is weak and pastoralists are not maximising their profits. Slaughter facilities and value-added enterprises, such as meat butchering and canning, are inadequate and require investment and there is no cold-

[16] Definition of slightly high is above 2 TLU (Tropical livestock unit, a measure for livestock in a common unit). TLU conversion for animals is cattle = 0.7, sheep = 0.1, goat =0.1, pigs = 0.2, chicken = 0.01 TLU.

chain infrastructure to export carcasses. Furthermore, livestock tend to be kept away from the household's physical location which limits access to daily quantities of milk from own production for key vulnerable groups.

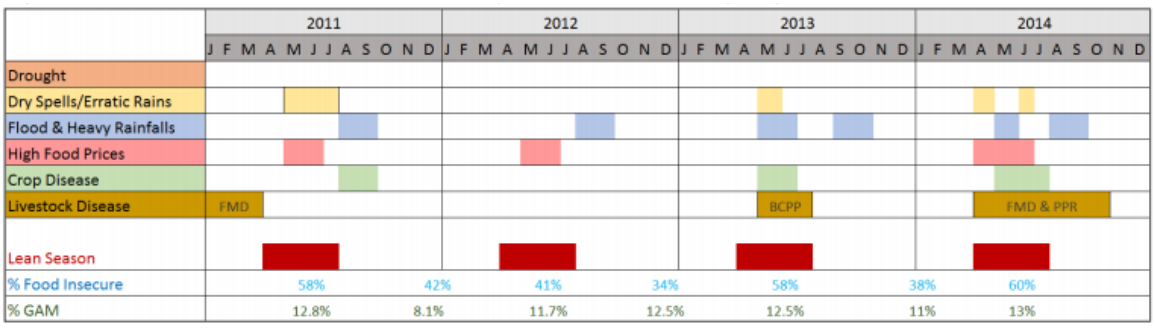
Figure 51. Trade flow of cattle in Uganda (FEWS 2015)



However, not only the livestock production, but also the supply chain related to it is facing challenges and needs to see infrastructure investments. Currently pastoralists are not maximizing the profits of their livelihood as sales are conducted by middle men or, in the case that they do not own their own herd, the owner of the livestock. Pastoralists therefore do often only receive a small percentage of the actual retail price. Furthermore, there are few value-addition enterprises in the region, rendering a lot of meat inadequate for anything but local consumption, particularly in combination with no functioning supply-chain to transport meat outside the region (Mercy Corps 2016).

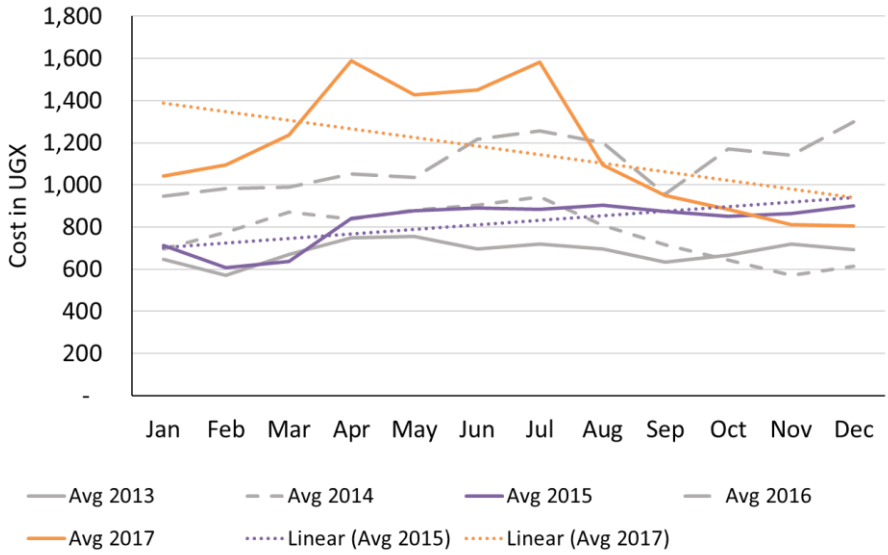
Unlike the rest of the country, which shows bi-modal weather patterns, crop-based livelihoods in Karamoja rely on a single harvest. Reliable weather patterns are therefore essential for households to be able to sustain this livelihood. Figure 52 illustrates the frequency of shocks between 2011 and 2014, which often result in low or no yield.

Figure 52. Shocks experienced in Karamoja region by month 2011-2014 (WFP 2015).



In addition, post-harvest losses are also high with an estimated 30 percent of crops being damaged or lost during the growing and production process. It has been estimated that households could save 750,000 UGX a year through the reduction of post-harvest losses.[17] Poor yields, coupled with high losses, result in high food price volatility both across seasons and over the years, as shown using sorghum in Figure 53. This figure further emphasises the unpredictability of staple food prices in Karamoja, which given the reliance on markets for food, leaves households vulnerable to food and nutrition insecurity.

Figure 53. The average price of sorghum in Karamoja from 2013-2017 (WFP 2017).



Sorghum, maize and beans are the primary crops produced in the region. To improve the availability of a range of nutritious foods through crop production, investments need to be made in the agricultural system, particularly in water management, storage facilities, processing and transportation. Linking small-holder farmers with each other, collectives and markets is another infrastructure measure that can be undertaken to improve availability of nutritious foods in the long run.

Affordability is a major barrier to achieving a nutritious diet.

The CotD analysis found that it costs five times more for a household in Karamoja to purchase a nutritious diet, compared to a diet that meets only energy requirements. When compared against food expenditure, 12 percent of households cannot even afford a diet that meets only energy needs, whilst the vast majority (84 percent) cannot afford a nutritious diet. Figure 54 shows that the cost of a nutritious diet in Karamoja is one of the lowest in the country, yet Figure 55 shows that the region has one of the highest percentages of non-affordability in the country. Non-affordability is therefore primarily driven by poverty which underlies low food expenditure and hence low purchasing power of households. Other factors include distance to markets, which vary

[17] This is based on average land size, average yield per crop and farm gate prices from UNPS 2016.

throughout Karamoja (up to 10km to the next market), as well as seasonality, which due to data availability was not possible to assess in relation to non-affordability.

Figure 54. The cost of a nutritious diet in Uganda Shillings (UGX) per household per day for the 15 sub-regions of Uganda (WFP 2018)

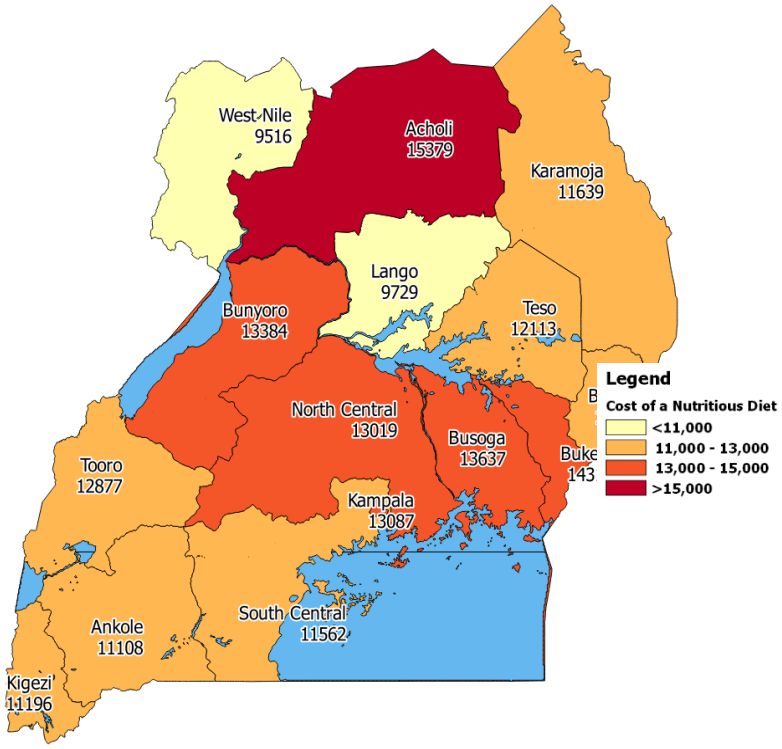
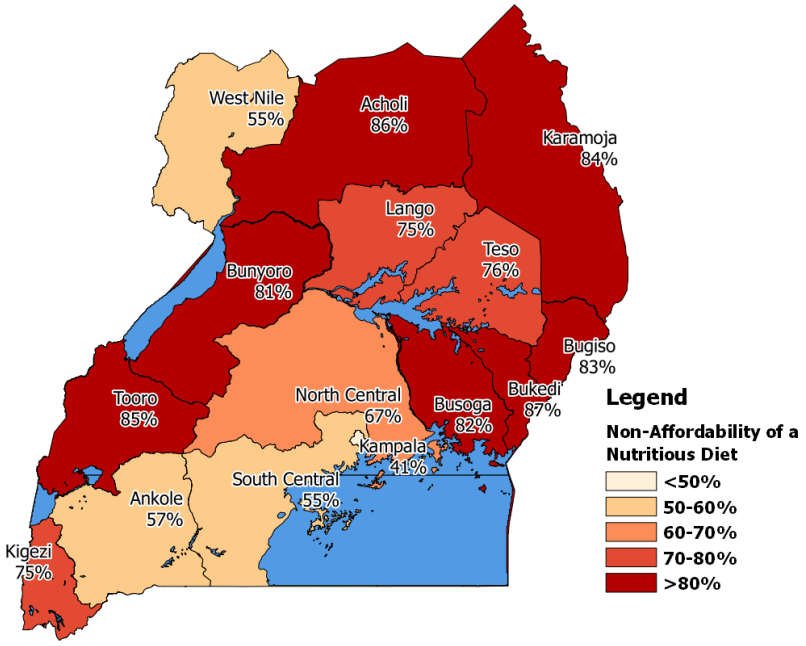


Figure 55. The non-affordability of a nutritious diet for the 15 sub-regions of Uganda (WFP 2018).



While households' non-affordability of a nutritious diet is already very high in Karamoja, the burden of not having access to a nutritious diet is spread differently across the household members. Due to the challenge of meeting elevated micronutrient requirements during specific phases of the lifecyle, both the adolescent girl and the pregnant or lactating woman bear the majority of costs of the household's nutritious diet (42 percent and 32 percent, respectively). Since the amount of energy each individual can consume also varies, the combination of these two (micronutrient density needed and kilocalories needed) can exacerbate or reduce micronutrient requirements. For example, an adult male has to absorb 0.5mg of iron from every 1000kcal of food that he consumes, whereas an adolescent girl needs to absorb 1.3mg from the same amount. This means that the adolescent girl needs more nutrient-dense foods (i.e. foods with a higher nutrient content per 1000 kcal), which are often more expensive as these are animal source foods, fruits and vegetables, which in turn makes her proportion of the required household cost higher (Figure 50)

*Figure 56. Individual kcal requirements, absolute and relative iron requirement for the modelled household (WFP 2018). Note: *denotes that breastmilk intake was deducted from required kcal amount to account for iron needs per kcal intake of complementary foods.*

Individual	Age	Required kcal	Iron RNI (absorbed)	Iron RNI/ 1000Kcal (absorbed)
	30-49 years	2750 kcal	1.4mg	0.5mg
	30-49 years	2760 kcal	2.9mg	1.1mg
	14-15 years	2449 kcal	3.1mg	1.2mg
	6-7 years	1500 kcal	0.6mg	0.4mg
	12-23 months	561 kcal*	0.6mg	1.07mg
	6-8 months	242 kcal*	0.9mg	3.75mg

Education

Adolescent girls are among the nutritionally most vulnerable individuals. Formal and informal education is a key entry point to develop a focus on adolescent girls.

In Karamoja, nearly a quarter (23 percent) of girls have given birth by the age of 18 (UDHS 2016). Strong associations between child undernutrition and the mother's nutritional and education status are well documented (FSNA 2014, 2015, 2016). Additionally, a higher percentage of adolescent girls are underweight and anaemic in the region compared to the rest of the country.

School enrolment is low for both boys and girls in Karamoja, with girls having even lower access than boys. Only 50 percent of girls are enrolled in primary school at some point (62 percent for boys), only 34 percent of girls are enrolled in primary school at an adequate age (37 percent for boys) and only 5 percent of girls are attending a secondary school when they should be (14 percent for boys) (UNHS 2017). No exact information exists on how many girls finish primary school in Karamoja (FSNA 2017).

Girls in Karamoja are less likely to attend school, limiting their future earning potential. The main reasons, as reported by their parents, is the cost of attending school, and the need for girls to undertake domestic tasks and contribute to the economy of the household, which was listed as the main reason for not attending school by one third of parents (FSNA 2017). In addition, the dowry system, where the husband to be provides a dowry to the wife's family, is still practiced in parts of the region and parents also encourage daughters to get married at a young age in order to replenish the household's cattle stock. Boys presence at school is also widely impacted by underlying wealth factors, such as the need to search for jobs, which has been given as a reason by one third of respondents (FSNA 2017).

If girls are pregnant and become adolescent mothers, they are particularly hard to reach with any services because of their unique position in society. Formative research on this group undertaken by Anthrologica has pointed out that programme implementers in Karamoja experience issues with reaching young mothers. Despite falling within the age bracket for youth services, adolescents do not see themselves as 'youth' anymore, because they have become parents. This could point towards both a behavioural component centred around self-perception, but also relate to increased work load of mothers that have less time due to a new-born child. It is important to note that this also implies that for this age group education before drop out is likely the last platform through which they can be reached.

Education is therefore a key entry point to reaching this target group and it is crucial that efforts to reach adolescents are coordinated to maximize impact. As further elaborated in the recommendations section, programmes should incentivise the enrolment and attendance of regular schooling in order to encourage girls to remain in school for longer, as well as offering vocational or technical training as a platform for girls who have already dropped out of school to start a family. Additionally, it is worthwhile to track enrolment, attendance and attainment of different age groups

more regularly. Certain elements of this can be realized even within WFP school meal programming monitoring, contributing to better understanding of the links between education and nutrition. This will also inform conception of programmes targeted at specific age groups.

Modelling Dietary Improvement

A key piece of the Fill the Nutrient Gap analysis is to identify interventions that are particularly effective at reducing the cost barrier to having an adequate nutrient intake. To model these scenarios, first current interventions are included to see what cost reduction is currently achieved. Refer to Annex 3 for the modelling plan and underlying assumptions.

Current Interventions

A combination of the current WFP interventions can contribute to reducing the cost of meeting nutrient needs for key target groups.

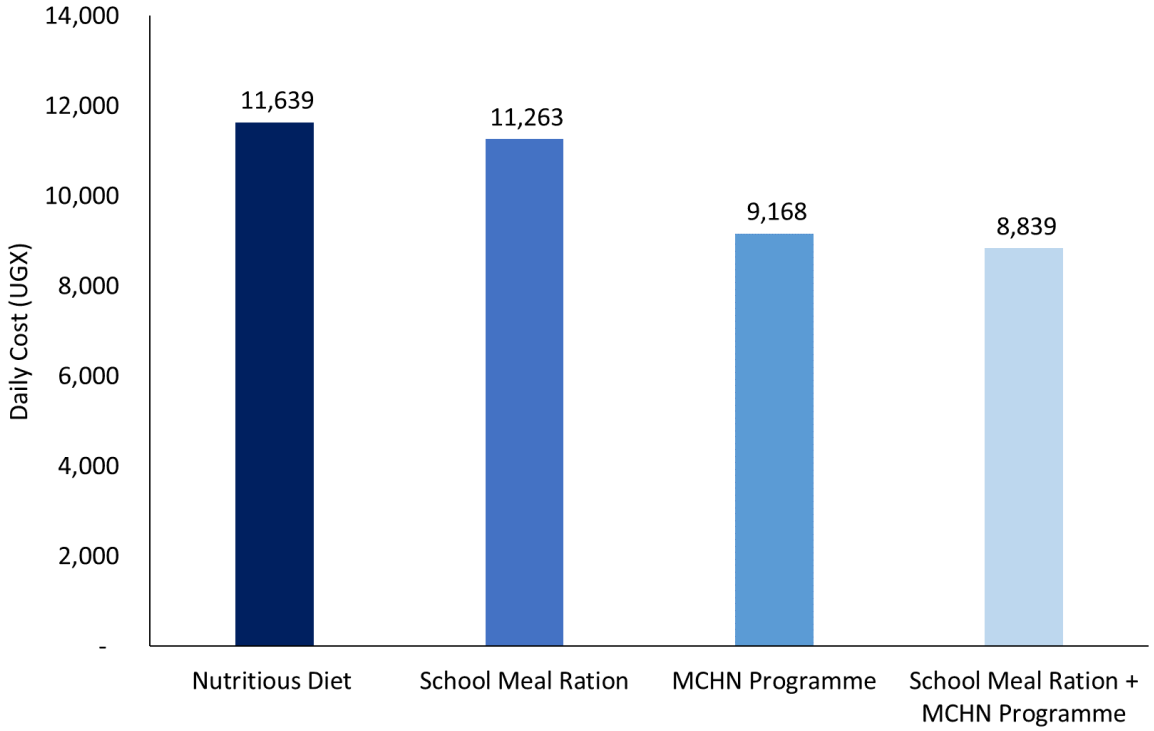
The CotD analysis was first used to assess the potential contribution of the current or proposed WFP programme interventions included as part of the Karamoja Nutrition Programme. Based on this first assessment, potential improvements and adjustments were proposed with support from various stakeholders. Additional interventions were also modelled and the potential impact on cost and affordability of a nutritious diet was assessed. These findings were then discussed with all local stakeholders, to identify and prioritize recommendations by sector which could inform the DFID-funded WFP - UNICEF joint programme.

The proposed package of WFP programmes to be implemented as part of the Karamoja Nutrition Programme to impact the nutritional status of key target groups are as follows:

- A school meal ration of maize, beans and fortified oil.
- A Maternal Child Health and Nutrition programme (MCHN), where pregnant and lactating mothers receive a take home ration of SuperCereal, oil and sugar and child aged 6-23 months receive a take home ration of SuperCereal plus to supplement their daily nutrient intake.
- In districts where a cash transfer is feasible, WFP is exploring the potential of replacing the above mentioned targeted assistance with a daily MCHN cash transfer of USD 0.49 per mother or child for 360 days, which equates to 54,190 UGX per month for a household.
- A Food for Assets cash transfer equivalent of USD 0.09 per person per day for 135 days of work in a year. For a household of five this equates to 49,500 UGX a month on average throughout the year.

Figure 57 shows that the current nutrition programming undertaken by WFP[18] could reduce the cost of a nutritious diet for the household by almost a quarter (24 percent).

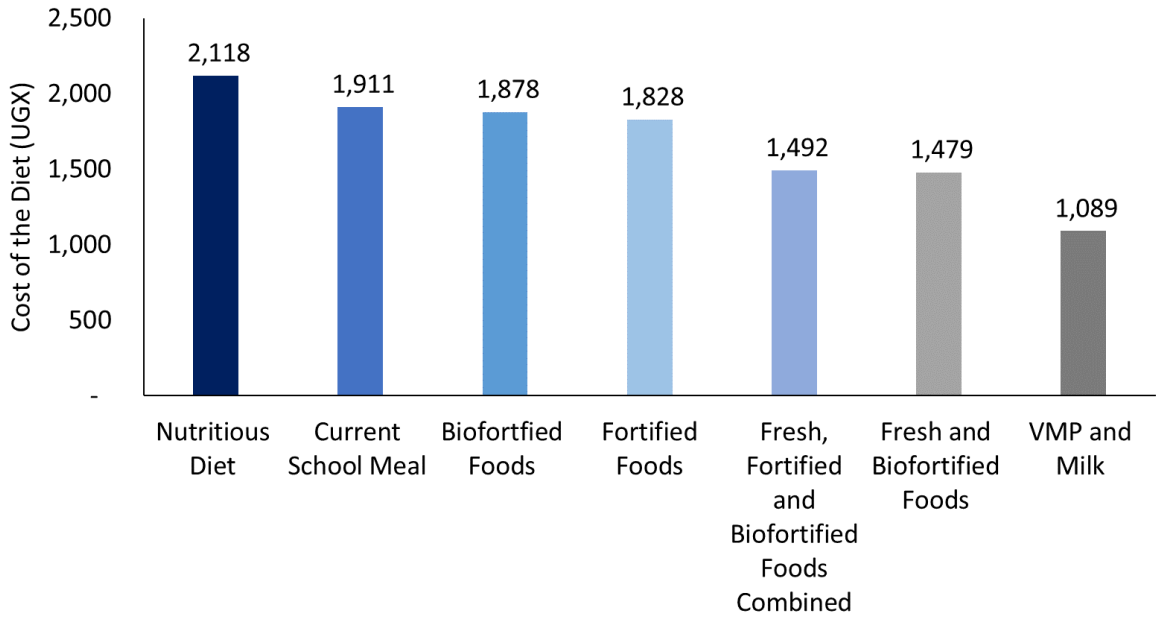
Figure 57. The impact of the current WFP nutrition programmes on the cost of a nutritious diet for a household of five people (WFP 2018).



Although the nutritional impact of the school feeding programme is a secondary objective, this analysis found that current ration is low in essential micronutrients such as vitamin B12, iron and calcium, and would need to be improved for a greater impact on nutrition outcomes. Figure 58 shows the potential impact that adding additional fresh, fortified and biofortified foods to the standard school meal ration could have on improving access to nutrients for a school aged child. Biofortified foods included vitamin A rich sweet potato and high iron beans (which replaced the unfortified beans in the current ration), whilst fortified foods included fortified maize flour, which replaced maize grain in the current ration. The fresh foods included green leafy vegetables, eggs and milk. A combination of the current school meal, milk and a Vitamin and Mineral Powder (VMP) results in the greatest reduction in the cost of a nutritious diet, although a combination of fresh and biofortified foods also has great potential. School meals could also be a used as a platform to stimulate demand for the local production of nutritious, fresh foods in the region.

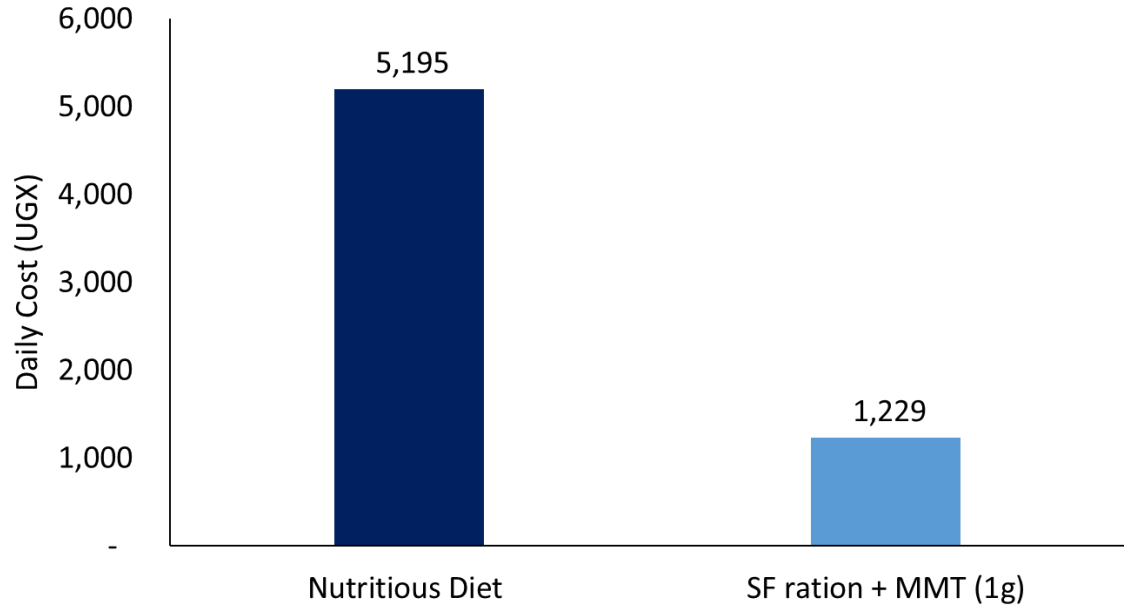
[18] Note the MCHN programme modelled in Figure 58 refers to the food-based intervention. The results of the cash based intervention are presented in Figure 60.

Figure 58. The impact of adding nutritious fresh, fortified and biofortified foods to the WFP school meal ration in reducing the cost of a nutritious diet for a school aged child (3-15 years).



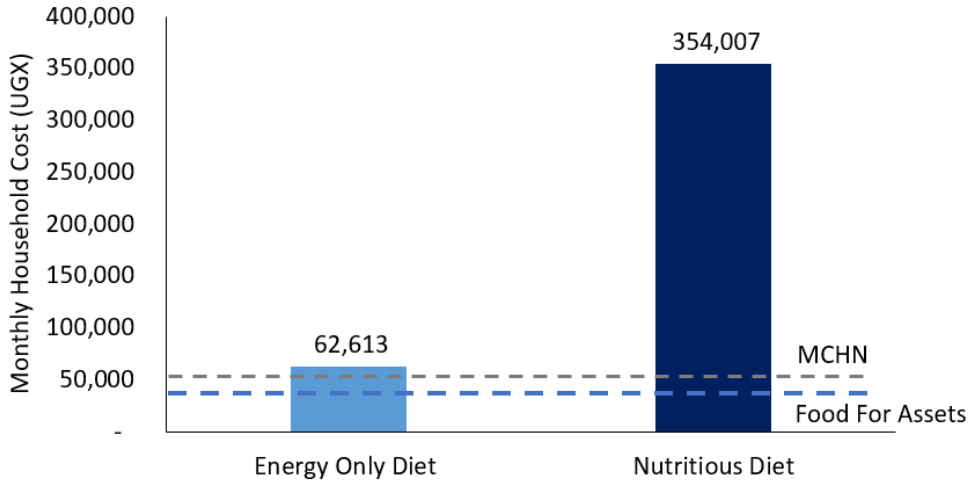
Schools could also provide a platform to link adolescent girls with health interventions which aim to improve their nutritional status. Figure 59 shows the potential reduction in the cost of a nutritious diet for the adolescent girl if the current school feeding ration and a daily MMT were provided. This equates to a 76 percent cost reduction for that individual.

Figure 59. The impact of providing a daily MMT with the current WFP school meal ration in reducing the cost of a nutritious diet for an adolescent girl.



When compared to the cost of an energy only diet and a nutritious diet, Figure 60 shows that the current value of the MCHN and Food for Assets cash transfers would enable households to purchase almost all of an energy only diet, but only a small proportion of the nutritious diet[19]. If these transfers are to have an impact on nutrition outcomes, beyond providing kilocalorie requirements, their value would need to be increased to provide a greater proportion of the cost of a nutritious diet.

Figure 60. A comparison of the current monthly WFP cash transfer values, of MCHN and Food for Asset programs, with the monthly cost of an energy only and nutritious diet (WFP 2018).



If the cash transfers are to have a greater impact on nutrition outcomes, the following must be in place:

- A functioning market that is easily reached and that sells a variety of fresh, nutritious foods
- A cash transfer value that is large enough to purchase the nutritious foods
- Social Behaviour Change Communication messages that inform nutritious foods purchasing choices and encourage feasible and child-appropriate preparation methods and feeding practices

Possible Interventions

Additional interventions, targeting individuals and the household, could reduce the cost of meeting nutrient needs for key target groups.

A range of interventions, outside of what the WFP are currently implementing, were modelled using the CotD software for vulnerable target groups and the household. The decision of what interventions would be modelled were informed by the secondary data analysis and requested by stakeholders as part of their consultation process.

The aim of the intervention modelling is to stimulate stakeholders' discussion around the importance of programmes that apply a lifecycle approach, are implemented across

[19] This model assumes that all of the cash transfer would be spent on food and that food choices would be nutritionally optimal.

multiple entry points and that aim to improve the access to nutritious foods. The results below summarise the interventions that reduced the cost of a nutritious diet the most for the nutritionally vulnerable groups and the household. When purchasing power is too low, nutrient needs cannot be met and nutrition will not improve. This analysis shows what it may take to improve nutrition and can enable a prioritization of efforts. Refer to Annex 4 for the specific results by target group and household.

- The WFP MCHN programme was the most effective at reducing the household cost of meeting nutrient needs for children aged 6-23 months, although the provision of a VMP would also make an important contribution.
- A combination of the current school feeding ration, a VMP and 200ml of cow's milk a day would be the most effective ration for reducing the cost to the household of meeting micronutrient needs for school aged children.
- A multiple micronutrient tablet would be the most effective in reducing the household cost of a nutritious diet for adolescent girls and pregnant and lactating women.
- Making biofortified high iron beans available in the market for households to buy would be the most effective way of reducing the cost of meeting nutrient needs for the household.

Packaged Interventions

A package of interventions implemented across multiple entry points offers promising benefits for households.

The most effective interventions for reducing the cost of a nutritious diet for the vulnerable target groups were combined with the most effective household interventions to form a package as shown in Table X. This analysis not only indicates the foods (fresh, fortified or biofortified) and supplements that are the most effective at reducing the cost of a nutritious diet, but also those that should be made available for purchase. In the absence of data on price points[20], these interventions were modelled as provided in-kind but stakeholder discussions emphasised the need to move away from in-kind distribution as a way to tackle aid dependency in the region. Food price monitoring on fresh commodities is essential to ensure that voucher or cash levels are set so they are affordable for poor households.

Table X. The most effective interventions in reducing the household cost of a nutrition diet, as indicated by the CotD analysis.

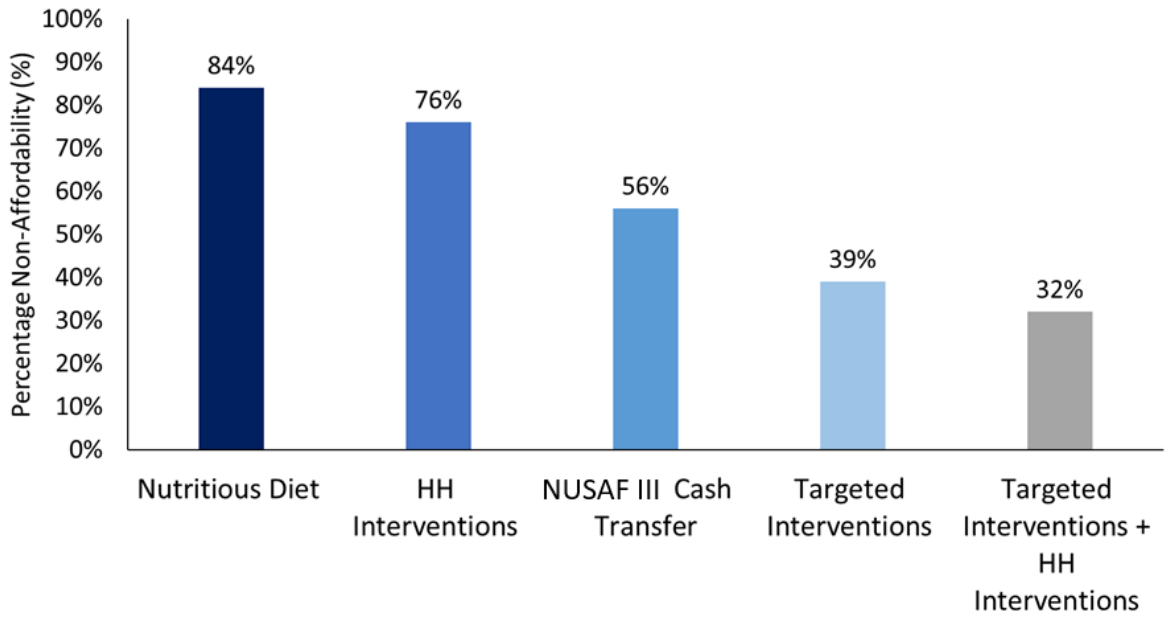
[20] Apart from the biofortified beans which were modelled at the same market price as their unfortified counterparts.

Target Group	Intervention
Child 6-23 months	WFP MCHN Programme (SuperCereal Plus)
School Aged Child (6-19 years)	Basic School Feeding Ration with VMP and Milk added
Adolescent Girl Pregnant and Lactating Woman	Multiple Micronutrient Tablet (MMT)
Household	Biofortified High Iron Beans (through markets, for sale)
Cash Transfer	NUSAF III

Figure 61 summarizes the impact of these packages separately and in combination on the affordability of a nutritious diet. The impact of the NUSAF III cash transfer was also modelled separately and it was assumed that all the money would be spent on food.

These results demonstrate the possible benefits that could be gained by increasing household nutrient access via a package of interventions across multiple entry points and sectors. An important pre-requisite is that adequate demand creation strategies are in place to ensure that any cash transfers or vouchers provided would be spent on nutritious food and that gender aspects are considered in the intervention design to enhance women's empowerment and control of resources.

Figure 61. The impact that a package of a range of both targeted and household level interventions and a cash transfer could have on improving the affordability of a nutritious diet (WFP 2018).



*HH = Households

FNG in Karamoja: Recommendations

During the KNP workshop, the main findings of the FNG analysis were shared and discussed. Participants then formed five work groups, each comprised of different complementary entry points for policy and programmatic strategies - food security and livelihoods (agriculture and pastoralism); health and nutrition; water, sanitation and hygiene (WASH); early childhood development and education; and social protection and safety nets. Each group developed a prioritised set of recommendations which, based on the findings, could contribute to improving the dietary intake of key target groups.

Food Security & Livelihood (agriculture and pastoralism)

It was recommended that the promotion and production of nutritious and indigenous crops along the green belt area of Karamoja be prioritised. It was emphasised that women's empowerment and workload, seasonality and water access should be considered within any programme design. The group also identified that improving preservation and post-harvest techniques during production, handling and storage was key. Linkages with partners such as GIZ and the Water 4 Production programme, as well as with NUSAF III, IGAD and IDDRS to support agriculture infrastructure and income generating activities were suggested.

A representative from Harvest Plus, recommended that agricultural inputs such as vines should no longer be distributed for free but should be sold at a subsidised price. The justification being, that paying for inputs attaches a higher value to them and thus results in greater incentive to use and cultivate them appropriately. Similar findings were presented by Mercy Corps, emphasizing the need to push for diverse livelihood portfolios. There was agreement that using a private sector approach for agricultural inputs, rather than a free distribution through an organization, is best and that there is willingness and capability to pay for seeds, etc.

With regards to pastoralism, the group prioritised the need for better rangeland management, that would enable pastoralists to move more freely around Karamoja. It was recognised that this needs to be coupled with investment in water for livestock, access to pasture or fodder production, animal health initiatives, value added enterprises, cold chain management, and market infrastructure development and improved trade links. Stakeholders also recommended behaviour change communication messaging that encourages livestock to be kept closer to home, when appropriate, so that household have improved access to milk and for pastoralists to think more commercially about their animals. Lastly, studies looking at the impact of changes in livelihood on women's empowerment are recommended to better understand the relationship between the two.

Health and Nutrition

Three main programming areas were prioritised: integration of nutrition into basic health services; more explicitly adolescent friendly health and nutrition services and; conditional cash transfers for MCHN attendance. The promotion of optimal infant and young child feeding practices, health seeking behaviours and adequate childcare practices for mothers together with routine growth monitoring and treatment of severe acute malnutrition for children were considered essential. It was recommended that those activities could be linked with agriculture through nutrition sensitive kitchen gardens, education and WASH services, but that a functional health service needed to be in place for interventions to be successful. Although similar programmes were existent in the past, lessons learned from implementing partners showed that mother care groups can work even with minimal inputs and by being better aligned with the government system.

With regards to adolescent friendly nutrition and health services, the group prioritised health promotion; sexual and reproductive health education; hepatitis vaccinations; nutrition services; and vocational skills training. It was suggested that programmes be linked with existing platforms that engage adolescents supported by Mercy Corps and other agencies, to avoid overflow of programmes for adolescent girls and improve coordination amongst partners.

It was recommended that MCHN cash transfers should be conditional on antenatal care attendance and include nutrition education and financial planning activities. Linkages should also be made with projects working on market system strengthening for nutritious fresh and biofortified foods as well as Village Savings and Loan Associations (VSLAs).

WASH

Hand washing with soap was the main intervention prioritised by this stakeholder group. Activities to be considered included constructing, cleaning and maintaining boreholes to improve community's access to safe and clean water; locally constructed tippy taps; distribution of soap; and education regarding appropriate hand washing practices. WASH approaches that have shown success in the past, such as borehole rehabilitation and maintenance for consistent access to safe water in combination with community-led total sanitation, will be continued, with the emphasis on improved coordination among efforts.

The need for these facilities to be in schools was stressed and it was acknowledged that these programmes could also link with other health and nutrition interventions as well as livelihood and income generating interventions during the borehole construction and monitoring process. Sustainability of initiatives was considered to be vital and ideas included exploring if soap could be made locally by women as a source of income, the importance of the location of boreholes, and sustainability of borehole maintenance. There was evidence that communities are willing to pay for WASH services, also pointing

toward the feasibility of services becoming the basis for a sustainable income. There is an opportunity to using WASH trainings as trainings for WASH service providers and coordination of services.

Early Child Development and Education

The institutionalisation of early child development centres was recommended and the following activities were listed: empowerment of child caretakers; empowerment of mothers to make children's toys; and sensitisation of mothers regarding nutrition and early childhood development activities. It was also noted that there was an opportunity to link early childhood development centres to health interventions such as child health days, regular growth monitoring and the distribution of nutritional supplements and mother's nutrition education.

Activities related to preconception nutrition education for adolescent girls were considered to also be important. It was recommended that messages related to delaying pregnancy; consuming a nutritious diet before, during and after pregnancy; and reducing alcohol intake should be prioritised. In addition, there was a need for interventions to support schools in providing nutritious school meals, establishing and maintaining school gardens and running nutrition clubs. Programme interventions could also be linked to livelihood, WASH and health interventions.

To improve nutrition of adolescent girls, education is a key, and often the only, entry point. A multi-facetted approach is most appropriate, consisting of, but not limited to:

- incentivising enrolment and attendance through school meals, conditional cash transfers or take-home rations to reduce the economic burden on the family (of foregoing the contribution to family income / livelihood from the adolescent girl when she goes to school)
- sexual and reproductive health education explicitly tailored to the needs of adolescent girls
- locally and sustainably sourced school meal programmes that account for the elevated nutritious needs (short term supplementation, medium term food fortification and diversification)
- offering viable training and education alternatives, such as accelerated learning platforms or technical and vocational training offers to reach those girls that have dropped out
- male engagement in norm change, communication and women's empowerment using a male activist approach

Social Protection and Safety Nets

Multiple opportunities for the use of social protection and social safety nets to support households and vulnerable target groups in Karamoja were recommended. A strategic grain reserve that provides maize grains during the lean season was considered to be the top priority. Conditional cash transfers for mothers linked to the attendance of antenatal care, infant and young child feeding education sessions and routine child health appointments (for growth monitoring and vaccination) were also considered to be key. Other suggestions included a cash transfer for households conditional to a child under the age of 18 attending school and cash and food for work programmes, aimed at men. It was recongnised that these interventions could be linked with livelihood, health, nutrition and education programmes.

Home-Grown School Feeding

A home-grown school feeding model has great potential to strengthen livelihoods and improve the nutrient content of the current school feeding ration.

Multiple analyses were run using the CotD software to determine an optimized school meals ration based on current opportunities in the region. School meals offer a promising platform to create a market for pastoralists and farmers to supply produce to schools, with milk, biofortified beans and green leafy vegetables being the most micronutrient dense options identified. To link the demand and supply from schools to farmers, post-harvest loss reduction mechanisms, a scale-up of fresh produce through consistent demand, introduction of bio fortified varieties such as iron-fortified beans or orange flesh sweet potatoes, and education on healthy eating habits can be utilized.

It is therefore recommended to start implementing school feeding programmes that utilize local production to provide nutritious meals to students. This will have a direct impact on the students attending the schools and may even carry spill over effects to nutrition of the household, through nutrition education or take-home rations. As building the demand and supply necessary for this model will take time, and given the levels of child undernutrition, school children in the immediate future require a nutritious school meal. It is therefore recommended that VMPs are used in the short term to improve the micronutrient content of the ration while exploring the feasibility of establishing a home-grown school meals programme based on locally available nutritious foods.

Data Gaps

The following data and analysis gaps were identified during the FNG analysis:

- Anaemia prevalence for women and children by wealth quintile.
- Anaemia prevalence of children by mother's education and nutritional status.
- Disaggregation of the prevalence of stunting, wasting and anaemia by child's age in categories of 3 months.

- The availability and price of common fresh foods on the market (beyond staples, pulses and oil).
- The ability of the market to respond to an increased demand for fresh foods, through cash transfers or restricted./ commodity-specific vouchers.
- Explore the potential of using FSNA and market monitoring assessments to fill current data gaps.

It is recommended that the possibility of this information being collected, analysed and reported in the ongoing food security, nutrition and market assessments that WFP and UNICEF undertake in the region is explored. To understand seasonal food availability at markets, it might be necessary to undertake a separate assessment, but fresh foods should be embedded within routine market monitoring.

Recommended Focus for Proposal (April, 2018)

Findings from the Analysis and Recommendations phase of the Fill the Nutrient Gap process are also being used to inform the Karamoja Nutrition Plan Proposal that is developed jointly by UNICEF and WFP.

The opportunities for nutrition-sensitive programming that have been identified will partially be built on previous experience and will need to be realized through better coordinated multi-sector programming. In previous years, issues with coordination were mainly centred around poor referral mechanisms and weak flow of information. The joint proposal will focus on coordination from the outset, starting with impact pathway thinking to identify the activities from different sectors and partners and joint preparation of the implementation plan.

Another key recommendation that feeds into the joint proposal is the development of integrated packages to target sustained change and make sure that there is co-location of efforts to reach the same individuals/households or communities with interventions that cover livelihoods, health, WASH, ECD and social protection to impact nutrition.

In terms of increasing scope of existing programmes, it was highlighted, also based on recent evidence that came out of formative research on adolescents done by Anthrologica in partnership with WFP, to prioritize reaching adolescent girls through coordination of existing efforts and platforms, that each reach different groups of adolescents, e.g. in and out of school, already having children, etc.

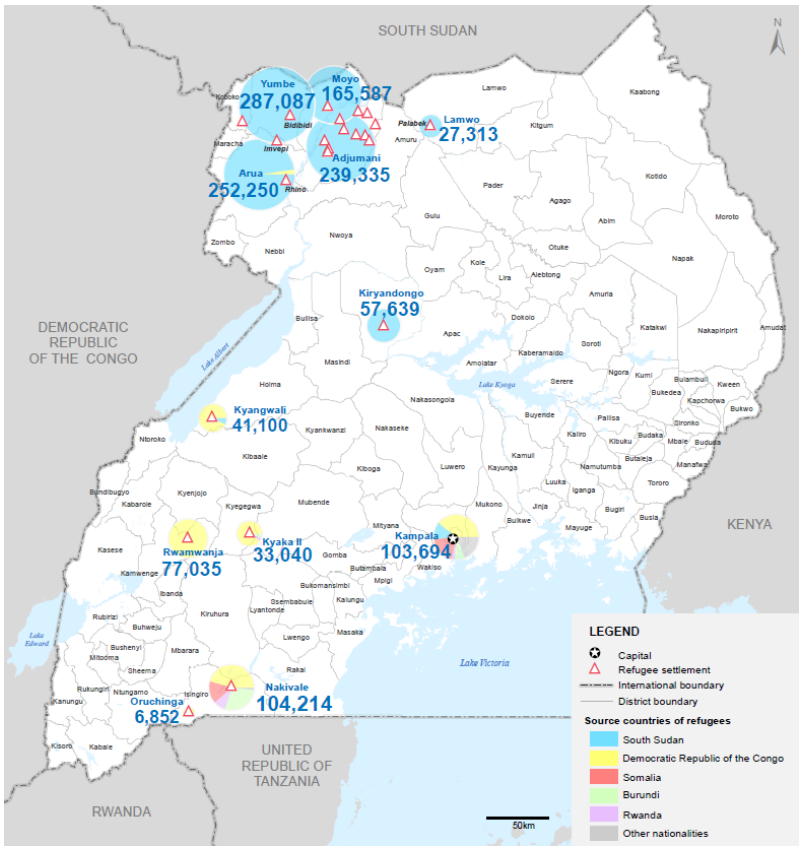
Special Focus II: Refugee Hosting Areas

Situation description

Note: UNHCR data collection had been compromised previous to April 2018, leading to a recalculation of numbers, with new caseloads and prevalence of malnutrition being published in October 2018, past dissemination of the FNG findings. Where possible, we have updated the references to the most up to date numbers. However, in some cases no new numbers where released. Therefore, some data points may be outdated and refer to reports or findings from FSNAs that are based on outdated caseloads. These will be referenced accordingly, with the redacted reports remaining as the main source.

As of February 2018, Uganda hosts a total of 1.4 million refugees. One million of these are South Sudanese and the remaining are from the Democratic Republic of Congo, Burundi, Somalia and Rwanda. The majority (61 percent) of refugees are children under the age of 18, whilst 52 percent are women and girls. Seventy percent of refugees, which almost exclusively are South Sudanese, reside in the North East of the country in the regions of West Nile and Acholi. The remaining refugees reside in the South West of the country, in the regions of Bunyoro, Ankole and Tooro as shown in Figure 62.

Figure 62. Location, size and origin of refugee settlements in Uganda (UNHCR 2018)



Refugee settlements are spread across five regions: Acholi, West Nile, Bunyoro, Tooro, Ankole. Table X, below illustrates what type of modality of food assistance is received by which settlements.

Table 3. Refugee settlements and modality received per region.

Region	Refugee Settlements	Modality received
Acholi	Palabek	Food
West Nile	Adjumani	Food & Cash (Hybrid)
	Palorinya	Food
	Bidibidi	Food
	Lobule	Cash
	Rhino Camp	Food & Cash
	Imvepi	Food
Bunyoro	Kiryandongo	Food & Cash
	Kyangwali	Food & Cash
Tooro	Kyaka II	Food & Cash
	Rwamwamja	Food & Cash
Ankole	Nakivale	Food
	Oruchinga	Food

Uganda has one of the most favourable and progressive refugee assistance programs in the world, with freedom of movement, work rights, and land officially set aside for refugees to farm. Furthermore, the country demonstrates how a progressive refugee policy is economically and socially advantageous for both refugees and their host communities. As a guiding principle, approximately 30 percent of the resources of the response is also aimed at benefiting host communities.

Despite this, malnutrition is widespread across both the refugee settlements and their hosting districts. Wasting and stunting are as high as 8 percent and 20 percent, respectively, in the refugee settlements and 8 percent and 26 percent, respectively, in the host population. The high prevalence of stunting is compromising children's opportunity to reach their full cognitive and physical potential. The burden of malnutrition varies across the settlements and host communities, with a difference in patterns between the West-Nile and South West areas. Poor land and food availability, a lack of livelihood investment outside of agriculture and unaffordability of nutritious foods are common factors and contributors in both.

Addressing malnutrition in a sustainable manner in those areas must take a lifecycle approach with a special focus on children under 2 years of age, adolescent girls and pregnant and lactating women. It must include a range of context-specific, targeted interventions that engage stakeholders across multiple sectors.

FNG in Refugee Settlements: Findings

Malnutrition Characteristics

Undernutrition varies between the West Nile and South West settlements and is influenced by caseload and possibly the refugee's country of origin.

Figure 63, Figure 64 and Figure 65 show that child undernutrition in the settlements varies geographically. Stunting is higher in the South West whilst wasting and anaemia are higher in the West Nile. This is influenced by the type of refugees that the settlements host, with South Sudanese, who are residing in the West Nile, tending to be more wasted than stunted. The reverse is seen among the refugees from Rwanda, Burundi and the Democratic Republic of Congo, who reside in the South West.

Figure 63. The prevalence of stunting for children under 5 years of age in the refugee settlements and host population. Triangle indicates refugee settlements (WFP and UNHCR, 2017).

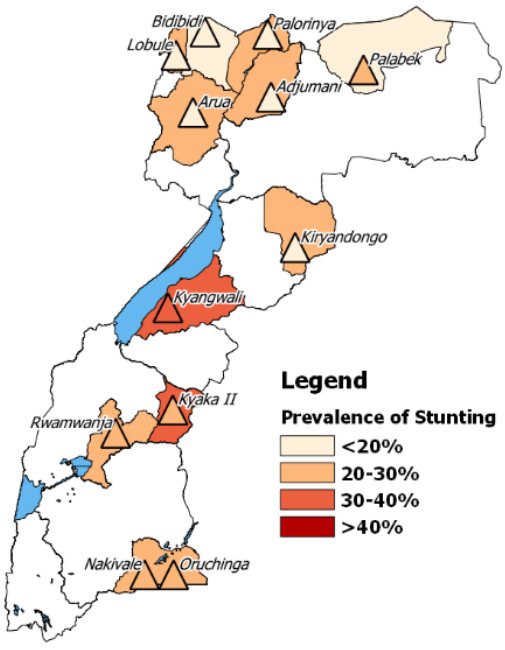


Figure 64. The prevalence of wasting for children under 5 years of age in the refugee settlements and host population. Triangle indicates refugee settlements (WFP and UNHCR, 2017).

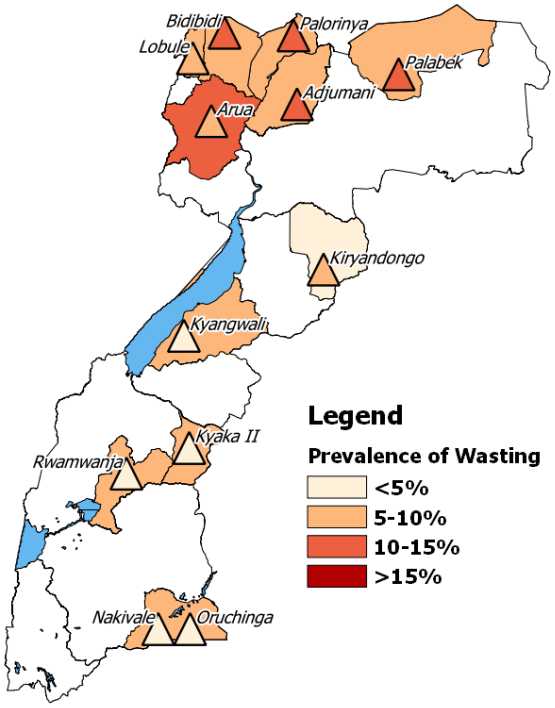
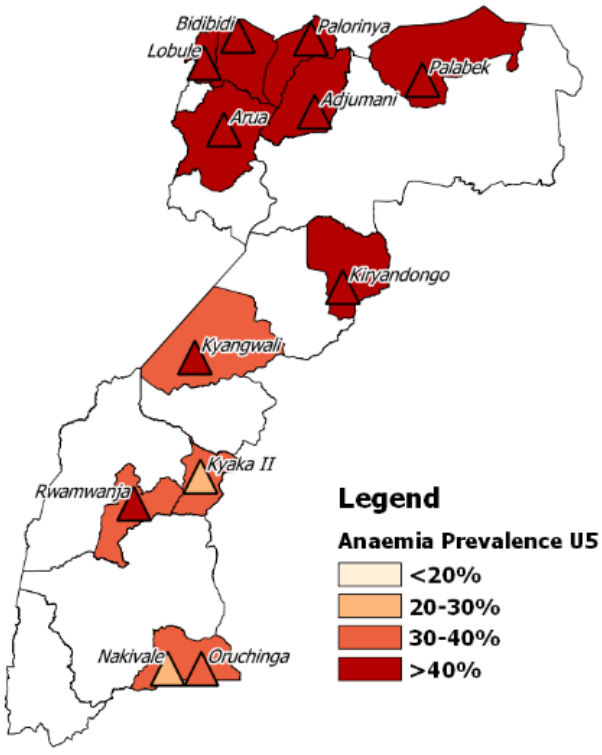
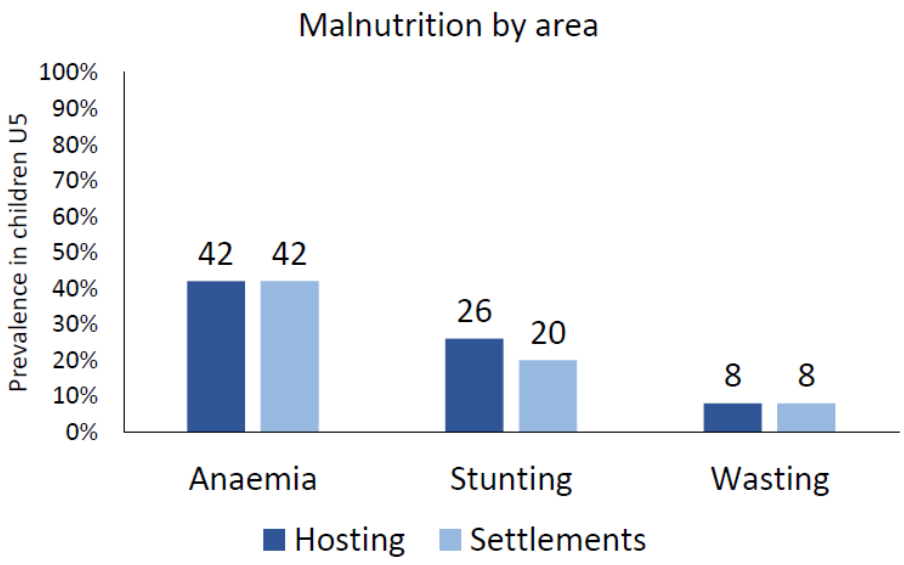


Figure 65. The prevalence of anaemia for children under 5 years of age in the refugee settlements and host population. Triangle indicates refugee settlements (WFP and UNHCR, 2017).



The host communities tend to have higher or the same rates of stunting compared to the refugees throughout the country and higher rates of anaemia and wasting in the South West. This could be indicative of access to MCHN services, which may be better for the refugee settlements. However, the host communities have lower levels of wasting in West Nile and anaemia in South West, which may be indicative of better access to nutritious foods through markets or own production. Anaemia in children under 5 years is high throughout regions, but particularly high - exceeding 40 percent, in the West Nile region, both in host communities and settlements. Anaemia prevalence for women of reproductive age (15-49 years) varies across the regions, with the majority being in the 20-30 percent range. When these data are aggregated across the country however, very little difference exists between the host and refugee populations (Figure 66).

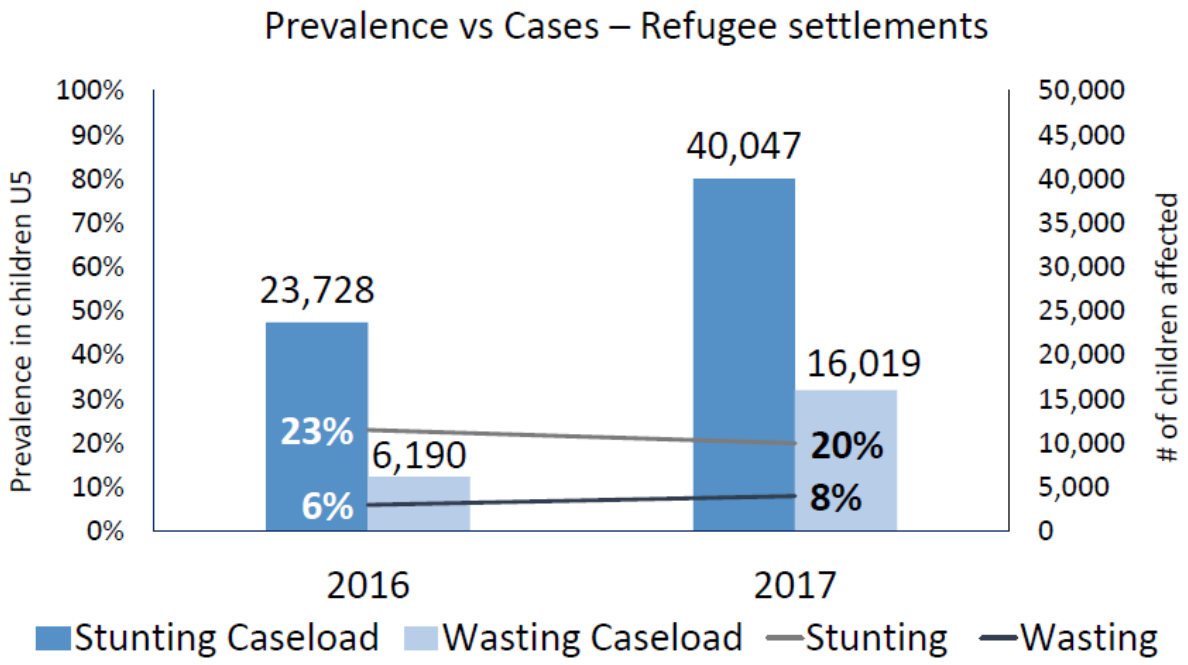
Figure 66. Malnutrition prevalence by hosting and refugee settlement area (FSNA 2017)



A progressive resettlement strategy and substantial donor and Government investment has benefitted infant and young child nutrition in the refugee settlement areas. Overall, stunting and wasting are of medium public health significance at 20 percent and 8 percent respectively. Anaemia, however, remains a severe public health concern at 42 percent. As Figure 67 shows, generally some progress in the reduction of stunting prevalence has been made within refugee settings (a similar statistic is not available for host communities). However, due to a high influx of refugees, especially South Sudanese, actual caseloads have increased: a near doubling of stunting cases and more than twice as many wasting cases from 2016 to 2017. It is therefore worth noting that a decrease in prevalence does not go hand in hand with a decrease of the number of

children affected and that using prevalence in an ever-changing environment may mask the severity of the situation and does not predict caseload.

Figure 67. The caseload and prevalence of stunting and wasting in refugee settlements across Uganda in 2016 and 2017.



The data shows that there are few clear patterns across a hosting/settlement divide that can easily explain existing prevalence. To better understand the context specific drivers of malnutrition, research on the following data gaps would be needed:

- The type of anaemia prevalent in Uganda and its causes (i.e. micronutrient deficiencies, malaria, worms or haemoglobin disorders).
- Women's Body Mass Index
- Undernutrition by a refugee's country of origin

Although there is little difference in malnutrition rates between refugees and host population, this data is essential to understand the drivers of malnutrition in the specific contexts and to identify the respective barriers.

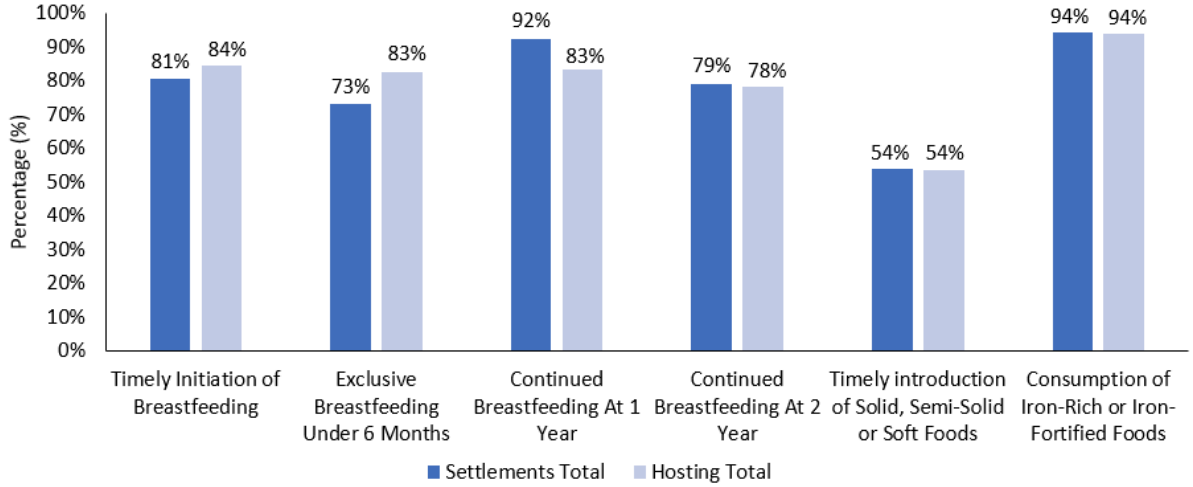
Dietary Intake

Breastfeeding practices are similar in the refugee settlements and hosting districts. Minimum Acceptable Diet (MAD) for children in refugee settlements has

not been collected since 2015. No data could be found on adolescent girls' and women's diets.

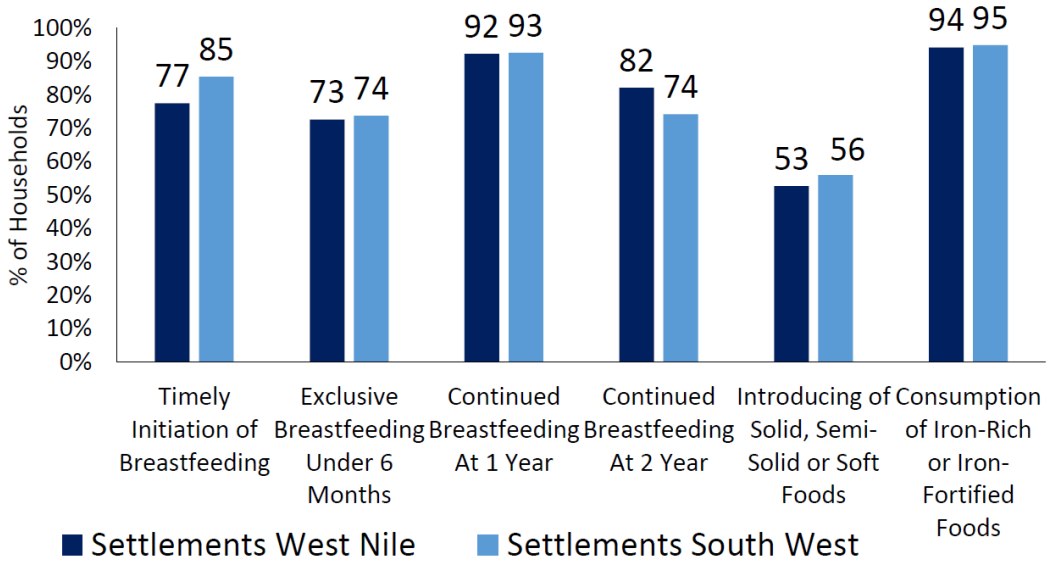
Data from the 2017 FSNA conducted by WFP and UNHCR, suggests that breastfeeding practices are adequate in both the refugee settlements and host communities, as shown in Figure 68. Timely initiation and exclusive breastfeeding are higher in the host communities whilst continued breastfeeding at two years is virtually the same. Generally, IYCF practices are relatively good, although timely introduction of solid, semi-solid or soft foods is low.

Figure 68. The IYCF practices of children in the refugee settlements and host communities (WFP and UNHCR 2017)



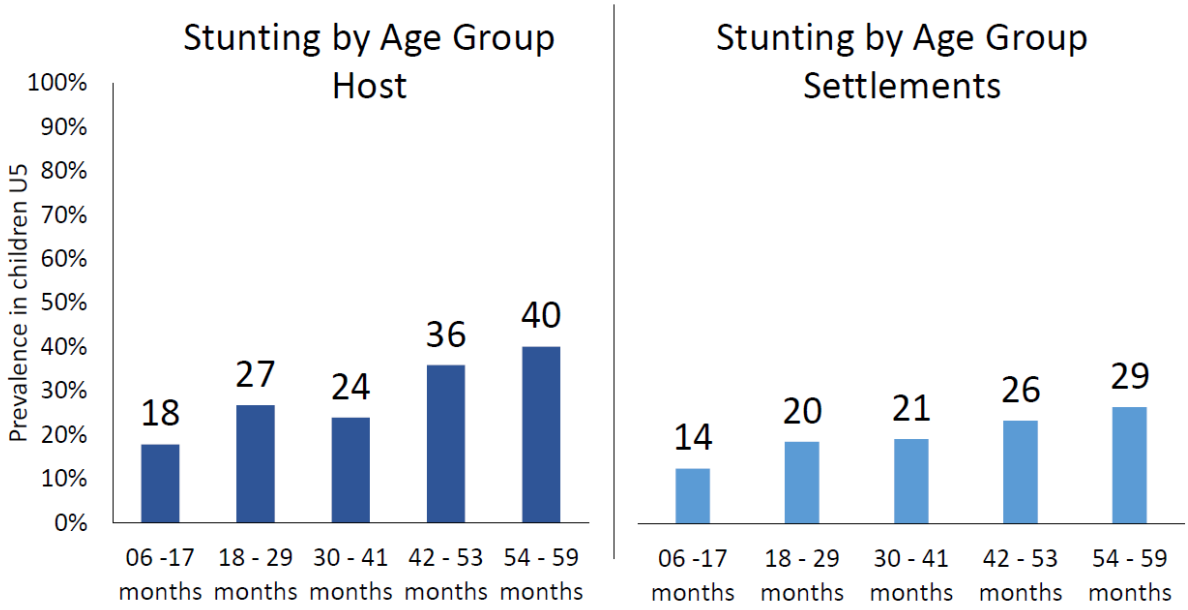
IYCF practices were similar between the West Nile and South West settlements as shown in Figure 69. IYCF practices are comparable between both the different refugee settlements and between host and refugee settlements generally. This indicates that the specific vulnerabilities for IYCF practices are likely to be independent of refugee status and that differences in malnutrition characteristics are not explained by difference in the IYCF indicators.

Figure 69. IYCF practices of refugee children in West Nile and South West settlements (FSNA 2017)



Notably, stunting prevalence by child's age is higher in host than in refugee communities, as shown in Figure 70, with the level at 54-59 months being the highest in the host group (40 percent) and the settlements (29 percent). As with the overall stunting prevalence, this may in part be explained by ethnicity of the underlying population (i.e. Ugandan vs South Sudanese). It is also important to note that, because of the recent influx, the age range in months refers to different cohorts, not stunting over time within the same population.

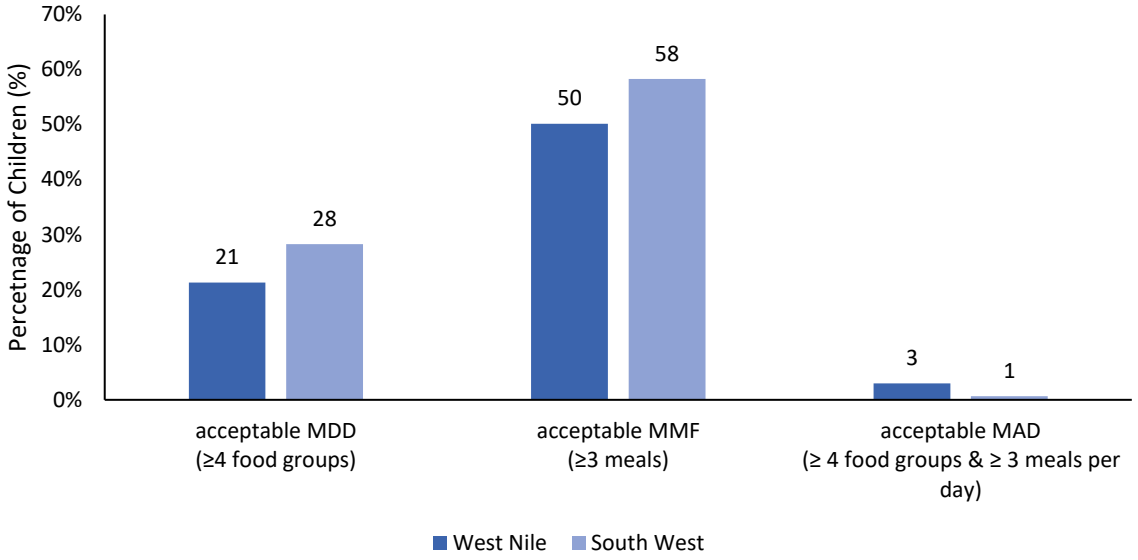
Figure 70. Stunting prevalence by age in months in the host and refugee settlement populations (FSNA 2017)



The timely introduction of complementary foods is low at 54 percent for both the settlement and host communities, although data does suggest that children are being fed some high iron foods (FSNA 2017). Data on MAD, which gives an indication of both

meal frequency and dietary diversity for children under the age of two years, has not been collected within the FSNA in settlements since 2015. Other sources of this data could not be found. The 2015 results indicate that refugee children's diets are poor with only 3 percent in the West Nile and 1 percent in the South West achieving MAD (Figure 71).

Figure 71. Prevalence of children achieving minimum meal frequency, diversity and acceptable diet in refugee settlements (UNHCR 2017).



Achieving MDD is a greater barrier than achieving MMF, but both indicators are low. In West Nile 50 percent of children achieved MMF whilst 21 percent achieved MDD.[21] For South West these figures were 58 percent and 28 percent for MMF and MDD, respectively. It is vital that these data continue to be collected in conjunction with formative research to better understand the barriers to adequately feeding children in the refugee settlements.

Consumption of nutritious foods seems to be low in the refugee settlements and host areas, but data is inconsistent. It is influenced by both availability and price.

The 2016 FSNA found that the majority (76 percent in West Nile and 81 percent in South West) of refugee households had an acceptable food consumption score (Figure 72). However, other reports suggest that dietary diversity is low with only 18 percent and 13 percent of households achieving a High Dietary Diversity Score in West Nile and South West, respectively (Figure 73). The discrepancy between data may be explained by different focus of the indicators: While food consumption score results in an aggregate

[21] Minimum Dietary Diversity does not capture the consumption of SC+ in terms of its high nutritional value, when it is classified as a grain food.

score that can be classified according to ranges, household dietary diversity measures the number of different food groups consumed by the household.

Figure 72. Food Consumption Score by refugee settlements (FSNA 2016)

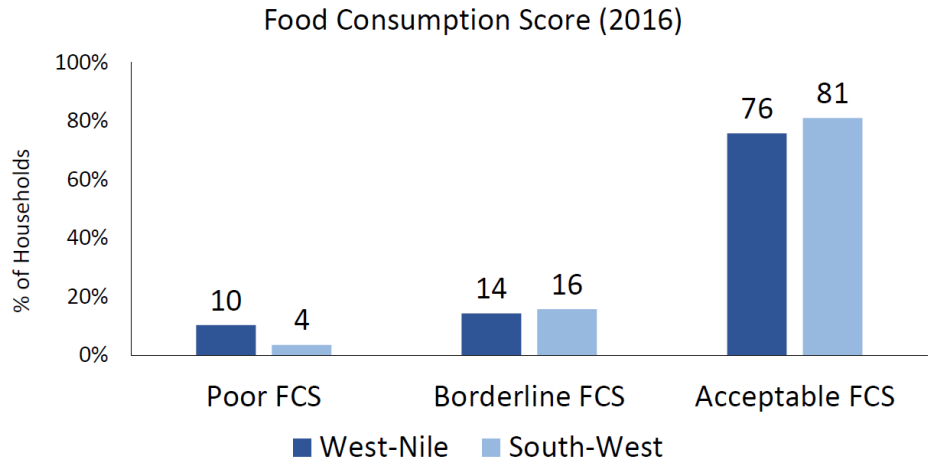
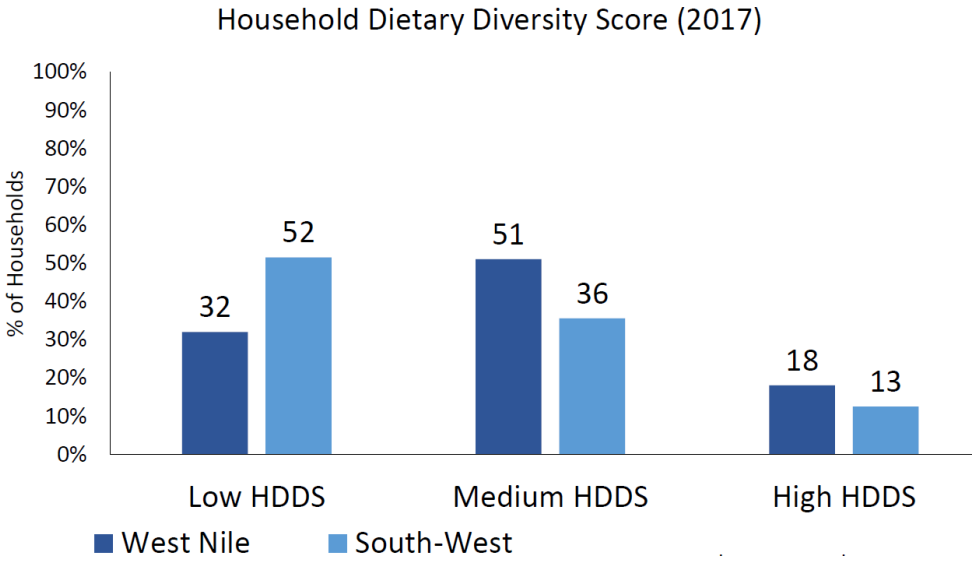
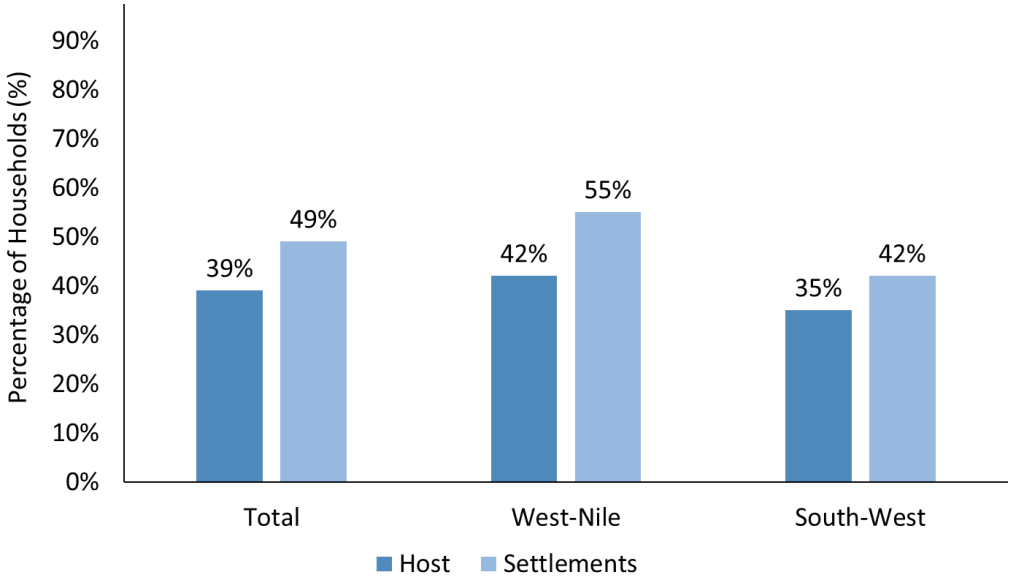


Figure 73. Household Dietary Diversity Score (Development Pathways 2017)



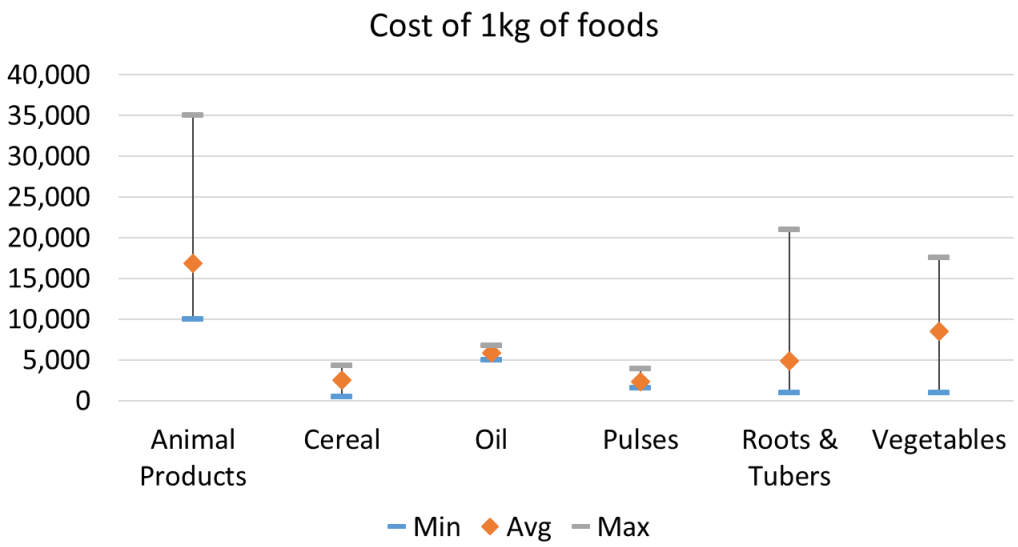
Evidence for insufficient consumption of a variety of fresh foods is further supported by UN programme data: Figure 74 shows that a high percentage of households in both the host and refugee populations (although higher for refugees) do not consume vegetables, fruit, meat, eggs, fish and milk in the last seven days. These foods were identified by the CotD analysis as important to meet essential micronutrient needs such as vitamin A, vitamin B12, iron and calcium.

Figure 74. The percentage of households that do not consume fresh foods (vegetables, fruit, meat, eggs, fish and milk) in the host and refugee settlement populations (WFP and UNHCR, 2017).



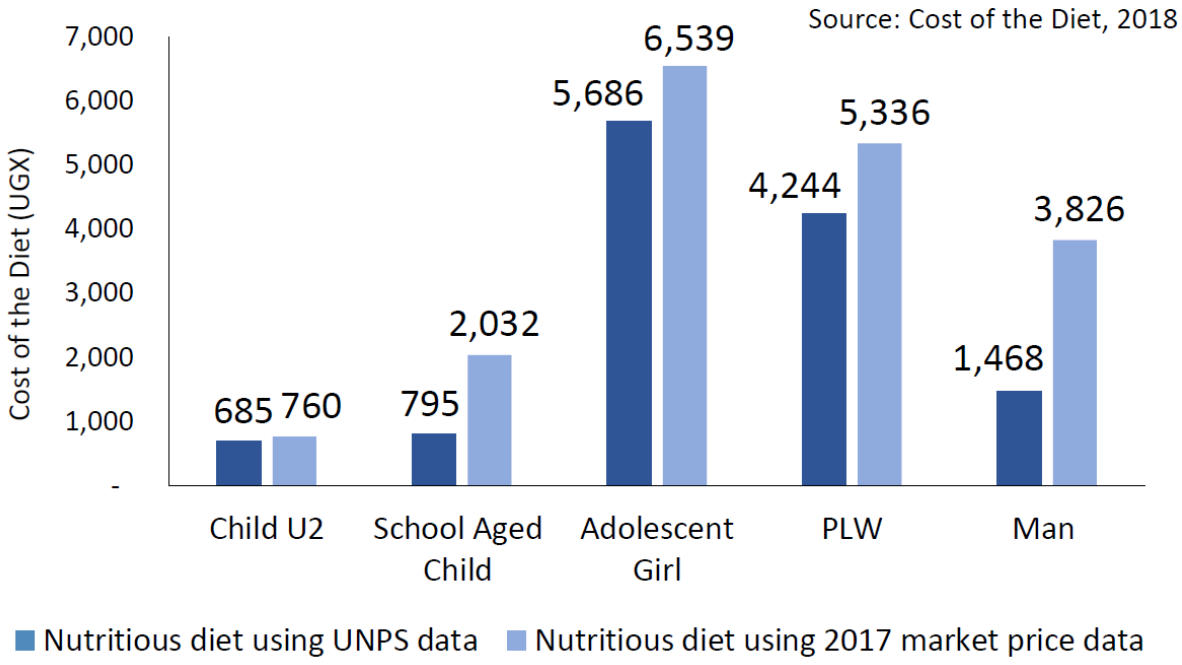
Little data exists on the availability, seasonality and price of nutritious foods in refugee settlements, but what does, suggests that there is great variability between the settlements with animal products being the least available and most expensive. This is in line with an analysis (Mercy Corps and ECHO 2017) that found 42 percent of households in settlements did not have access to meat and over 20 percent did not have access to milk or eggs. Figure 75 shows that animal products are much more expensive than other commodities. The reported accessibility of vegetables and tomatoes is also highly variable, and the range in their price per 1kg reflects this. In addition to the more nutritious foods showing higher variability in price, suggesting higher economic barriers,

Figure 75. The price per 1kg of foods found in refugee settlements (WFP 2018).



To estimate the differences between refugee settlements and the subregions more specifically, price monitoring data from settlement areas was used to estimate what a nutritious diet would cost in the settlements to contrast with results from the UNPS dataset. However, as the number of food items was more limited (n < 25) than the UNPS dataset, a nutritious diet could only be calculated for households in Kyaka II settlement. It was noteworthy that the cost per individual was higher across all five household members as shown in Figure 76.

Figure 76. Comparison of Cost of the Diet for Kyaka II settlement using UNPS price data and WFP price monitoring (WFP 2018)



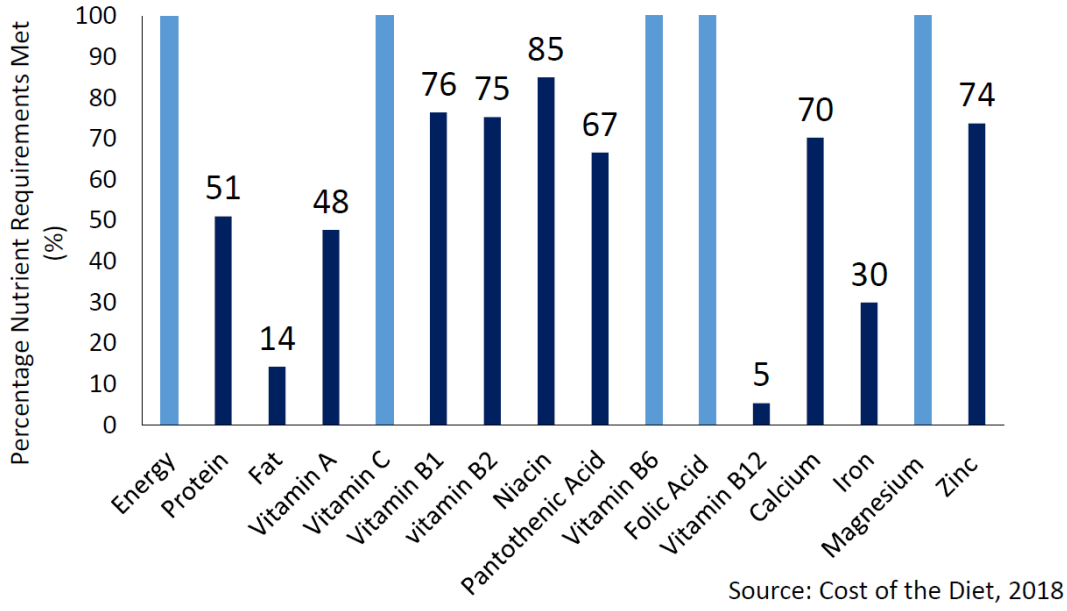
Limited insight can be drawn from this, as data was collected at different times and both the number of commodities and reliability of data collection has not been validated and may not be representative of the actual circumstances in the settlements.

Despite those limitations the lack of some commodities such as vegetables, fish or chicken in some settlements could be an indication that access to fresh, nutritious foods is low in settlements. However, to understand whether this is driven by demand, for example when those foods are accessible but sourced from own production/ are not affordable, or supply, for example that those foods cannot be delivered to those regions (or only at prohibitive cost), additional analysis and more extensive data collection needs to be carried out.

Assuming that the price data in the settlements is adequate, i.e. more nutritious foods are not available, requirements for vitamin B12 and iron for the adolescent girl, the PLW and the man could not be met by the CotD software using foods available in the settlement markets. This indicates that either the price data collection isn't comprehensive enough and therefore does not represent the actual availability of foods or that actual availability of nutritious foods is very low and it is difficult to meet nutrient requirements of individuals. It is therefore crucial that both scope and coverage of data collection is increased, to adequately represent the situation in the settlements.

Using the price data that is available showed that Nakivale, Oruchinga and Rwamwanja settlements had very little nutritious, fresh foods available in the market. This lack of nutritious foods is represented by the nutrient intake that could be modelled for a five person household. Using Cost of the Diet we found that almost all micro-nutrients cannot be met based on foods available on the market, with Vitamin B12, Iron and Vitamin A being below 50 percent of requirements.

Figure 77. Percent of nutrient requirement met by a diet based on price data available in settlements.



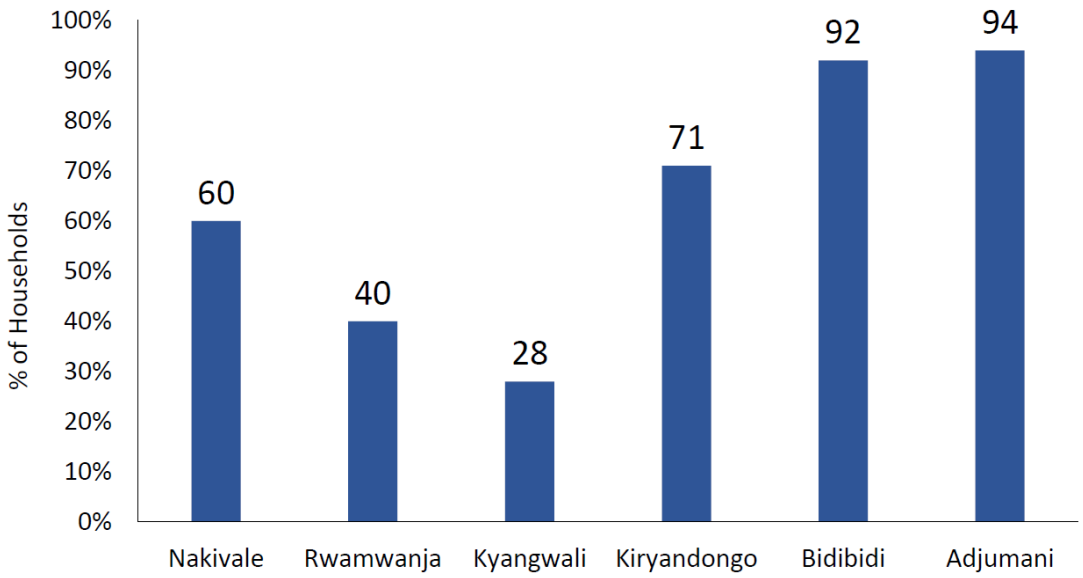
While emerging evidence indicates that dietary diversity and access to nutritious foods is a major barrier to achieving a balanced, healthy diet, further research and data collection needs to be carried out to understand the vulnerabilities in the food environment specific to refugee settlements.

Livelihoods

Integrating refugees into agriculture through land provision is progressive but may not be sustainable in years to come. Expanding livelihood opportunities is critical

Uganda has one of the most progressive refugee policies in place, providing refugees with access to land for their homestead as well as for agricultural production, when requested. However, over the last few years the land size granted to refugees to live on has reduced from on average 100x100m to 30x30m. Additionally, many refugee households report not having access to land for production beyond their homestead. This is particularly high in Bidibidi and Adjumani settlements, where 92 percent and 94 percent of households reported having no productive land, i.e. land that can be used for agricultural purposes (Figure 78).

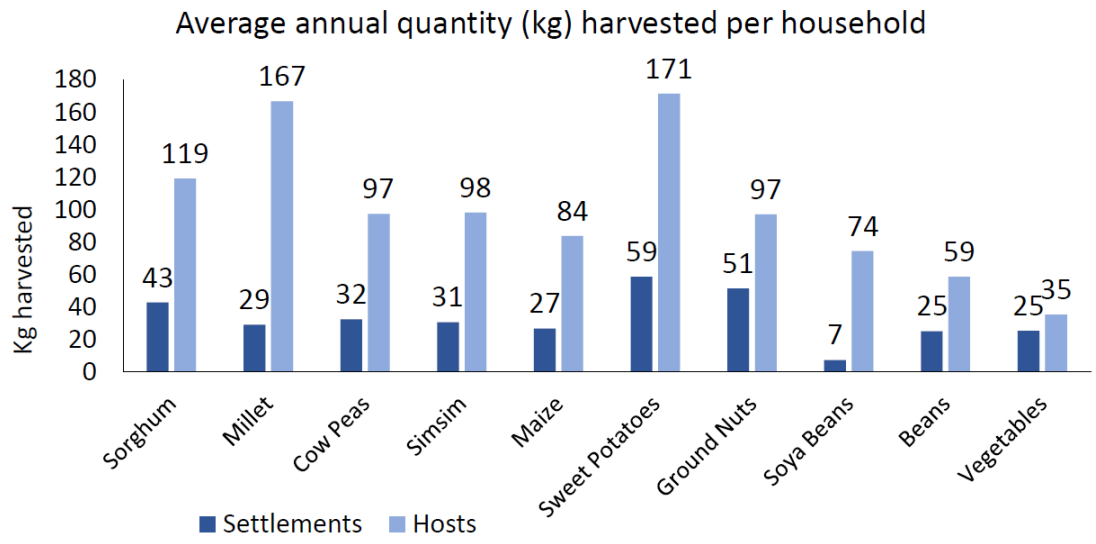
Figure 78. Percentage of households that reported not having land access for production beyond their homestead (Development Pathways 2017).



Those that do have land, grow staple foods such as sorghum, maize, millet and sweet potatoes, as well as nutritious, fresh foods such as vegetables, beans and cowpeas (Mercy Corps and ECHO 2017). However, total quantities harvested are low, especially when compared to harvest in host districts (Figure 79), the difference may be largely due to difference in area harvested. Additionally, the supply chain that links these foods to markets, which is required to make agricultural activities a viable livelihood

opportunity, is weak. To make the most of Uganda's progressive policies, there are several entry points to improve agricultural practices within refugee settlements, starting with improved land access. However, it should also be noted that there may be a bias in self-reporting annual quantities of production, as the exaggeration of vulnerabilities may be incentivized by the prospect of increased external aid.

Figure 79. Average annual quantity of food harvested per household (Mercy Corps and ECHO 2017).



Consequently, only 12 percent of households in settlements report food crop production and sales as their main livelihood (compared to 36 percent in host communities) (VAM 2017). A similar percentage of households in settlements reported livestock production (13 percent), gifts or begging (13 percent) and small business (14 percent) as their main livelihood. Sales of food assistance was reported by 30 percent of households as their main livelihood (ibid.). There may be quick efficiency wins by linking smallholder refugee households with existing post-harvest loss reduction schemes and local smallholder cooperatives. Connecting those cooperatives with post-harvest loss technology will ensure durability and quality of stored items. For WFP as a large procurer of grains, there is also an opportunity to channel the demand they are creating to decentralized units to make even a small agricultural livelihood more viable.

Other opportunities for improvement highlighted in secondary literature are strengthening of capacity across the whole retail value chain, for example around food processing, packaging and distribution (Mercy Corps and ECHO 2017). There are further opportunities to improve livelihood opportunities for both host and settlement population by providing access to life skills or technical and vocational training, which require access to education infrastructure.

Education

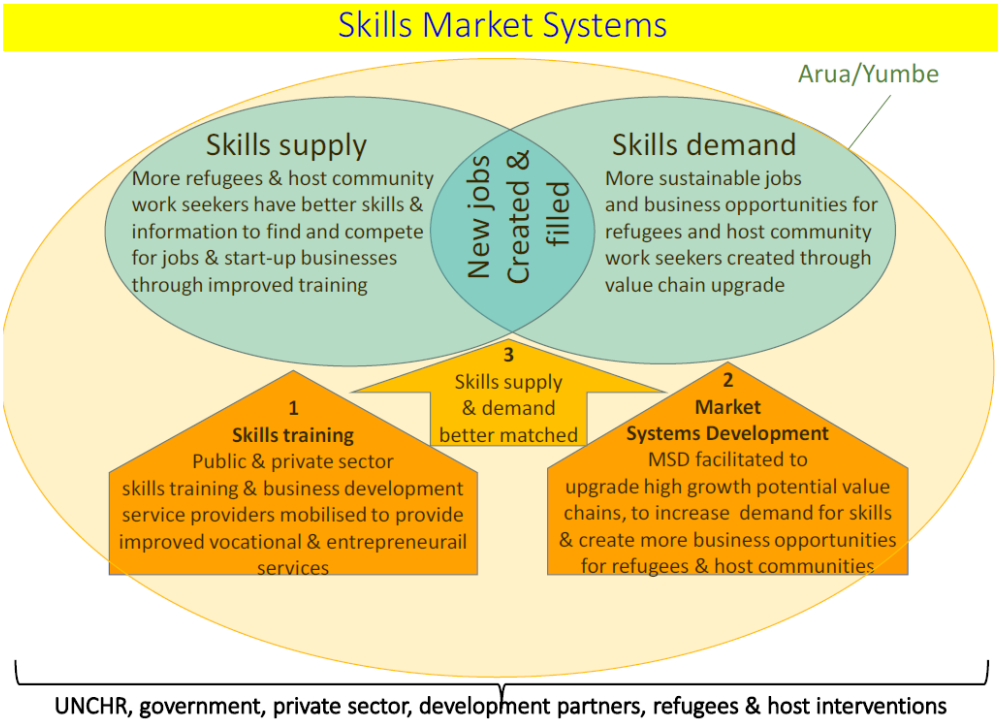
Less than 60 percent of students aged 9-17 years are enrolled in formal education. Given the young age of the refugee population alternative education platforms are an essential entry point to engage the youth with nutrition awareness and livelihood skills training.

Sixty-two percent of refugees are under the age of 18 years and should therefore be in school. Under the education policy, all school aged children in Uganda are entitled to free education, including refugee children. While recognizing the essential need to provide the generation that has arrived in Uganda with skills beyond the most basic labour skills, many schools struggle with the increased strain on education infrastructure because of the refugee intake. Of the refugee population, less than 60 percent of students aged 9-17 years are enrolled in formal education (Mercy Corps and ECHO 2017). Information on the specific push- and pull-factors that lead to interruption of formal education are scarce, but may be governed by similar patterns as with the native Ugandan population (see Education section of national report). Still, there are data gaps around the dynamics, timing and reasons for drop-outs and potentially irregular attendance for different age groups.

Given such a young population, protection measures may have to be scaled up to ensure that they can realize their right to education. Hybrid models targeting protection of refugees while also building life and employment skills were highlighted as promising (UNHCR 2018). Skills that have been identified as needed range from technical labour to tasks around the household. Overall it is estimated that 56 percent of children in settlements aged 9-17 years are enrolled in formal education, with 7 percent not in school and 36 percent in accelerated learning programmes (ALP) (Mercy Corps and ECHO 2017). Attendance of ALP seems consistent and would therefore provide an easy first platform to start training and education on nutrition, technical and vocational skills (ibid).

A Skills Market Systems analysis (Figure 80) of the settlements has shown that a better match of skill supply and demand could lead to an increase in jobs and filling of existing gaps (UNHCR 2018). There are multiple additional livelihood solutions that refugees, as well as host district members, could pursue such as tailoring, hairdressing, soap making and poultry and livestock rearing (Mercy Corps and ECHO 2017). These have been identified as needed by stakeholders from different sectors. For those to become viable, investment in skill-based or technical trainings is needed. These activities could also be linked to more efficient and diversified food assistance options.

Figure 80. A skills market systems analysis for the refugee settlements in Uganda (UNHCR 2018).



Source: Adapted from UNHCR/ILO (2017), p.5, Figure 2.

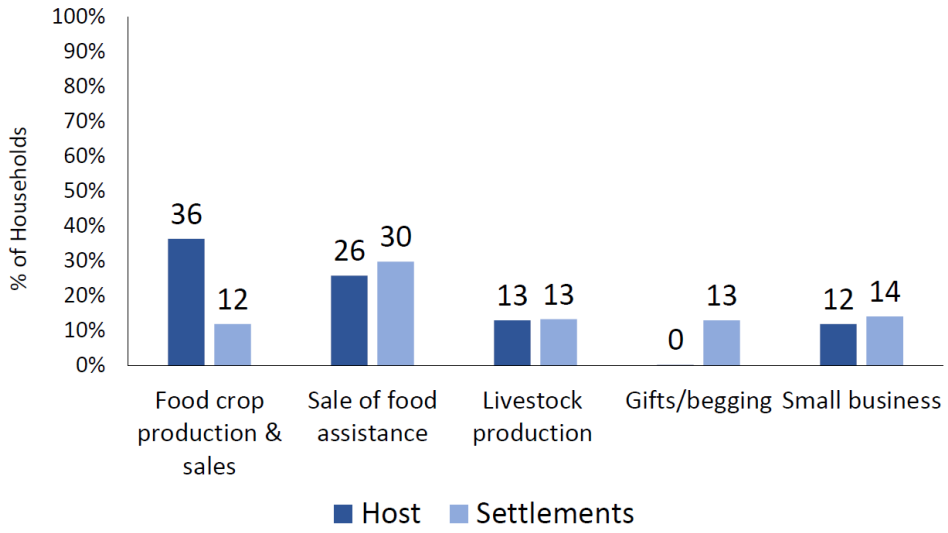
Refugee Programming

Refugees are selling up to a third of their food assistance. There is a need to rethink the food assistance approach to ensure access to a diverse diet. Cash is only promising if: nutritious foods are available; transfer values are adequate; and nutrition sensitive SBCC is implemented.

Households reportedly sell up to one third of their food assistance rations (normally the maize grains) at the market as a major source of income (Figure 81). Details of the food assistance are found in Annex 3. This money is then used by households to buy alternative food items, mill grains and purchase non-food items. 42 percent of

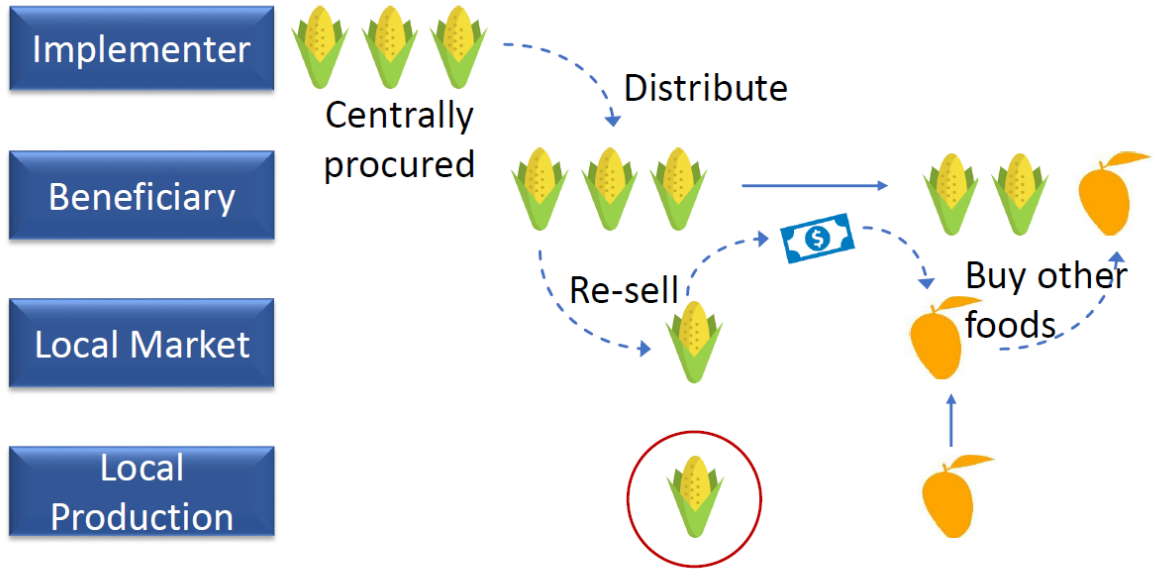
households in the West Nile use the cash to buy alternate foods (19 percent in the South West), whereas 46 percent of households in the South West report using the money for milling (11 percent in West Nile).

Figure 81. Main livelihood as reported by households (FSNA 2017)



In addition to indicating an inefficient use of resources, there is also the worry that this selling undermines local production and local farmer's connection to markets (Figure 82). As at least some demand for grains is filled by grains that are externally brought into the market through General Food Assistance (GFA), actual demand may not be sufficiently connected to local supply. This may undercut the livelihood of farmers, if they are unable to sell their grains as markets are flooded with cheap external grains. It may also de-incentivize moving into or sustaining an agricultural livelihood. Lastly, households that sell part of their ration may not be in a good enough bargaining position to reap competitive prices for their grains and are potentially underselling their product. The quality of the grains they sell may also be lower due to a reported decrease in quality over time of distribution or inadequate storage at home. Although little evidence exists of the extent to which these drivers impact actual agricultural activity, the value loss of the provided commodity in itself is sufficient ground to re-think assistance models.

Figure 82. General Food Assistance and its impact on local supply.

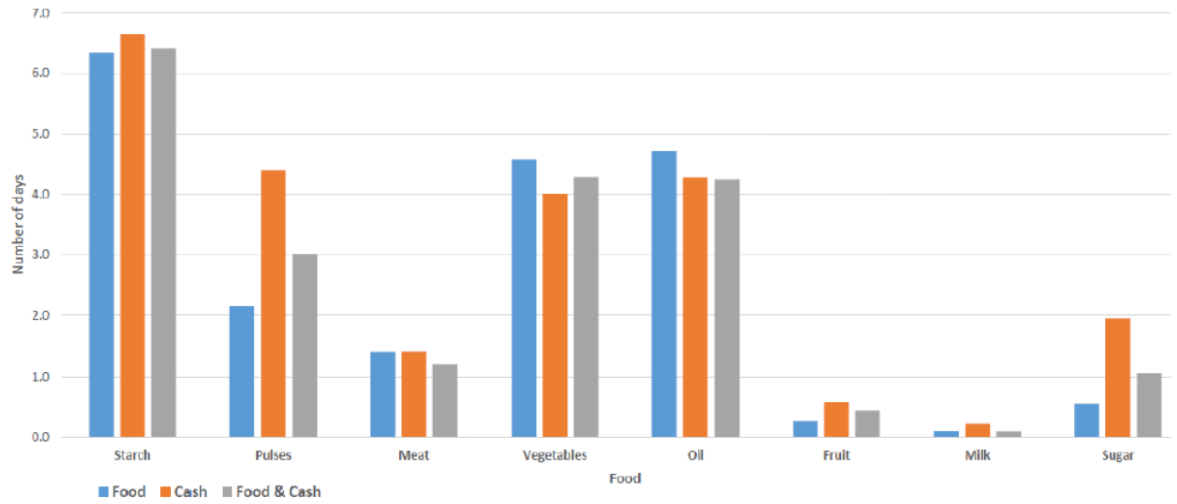


Source: adapted from VAM, 2017; UNHCR, 2018

Selling a third of the food ration is equivalent to 4 out of 12kgs, which is valued at 2,500 UGX per kg, earning an estimated 10,000 UGX per month (WFP PDM 2017). This cash could be used at the market to purchase, and hence create demand, for nutritious foods, for example 10,00 UGX could buy 6.5kg of green leafy vegetables, 1.4kg of eggs, 1.3kg of dried fish or 9 litres of milk (CotD 2018). This shows that there are opportunities within existing assistance to distribute resources more effectively from a nutrition perspective. Such a model assumes that individuals decide to and make more nutritious food purchases, which often may be hindered by availability. Given that households already transfer parts of their ration into cash may also be an argument to give at least parts of the assistance in cash directly.

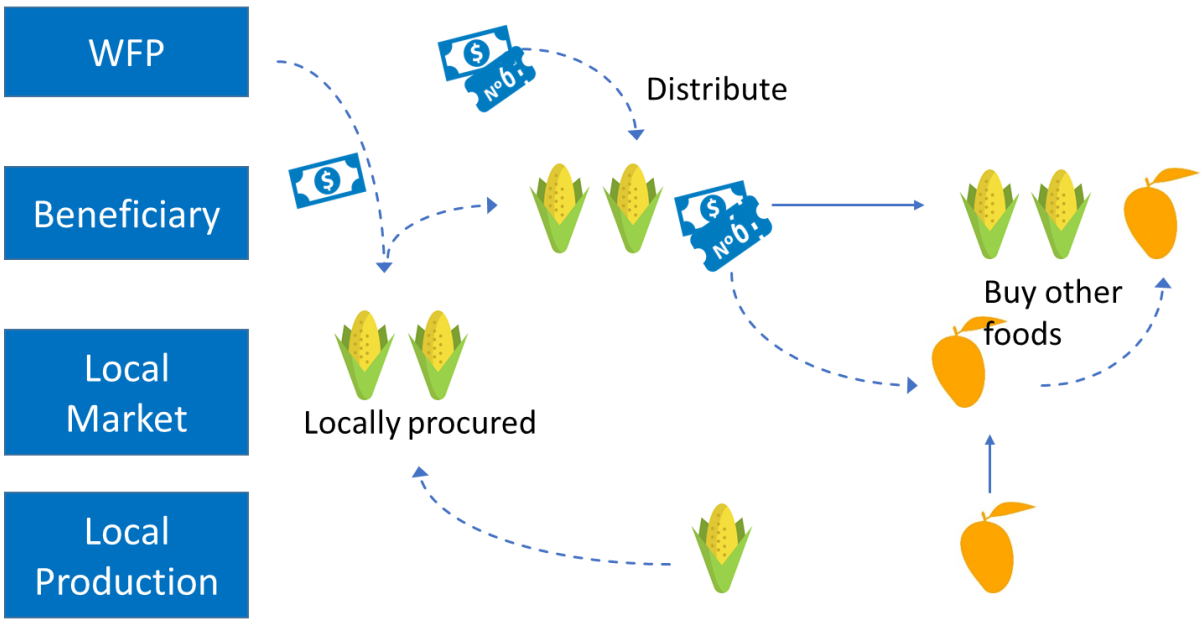
However, there is emerging evidence that provision of cash needs to be carefully combined with SBCC interventions that promote healthy purchasing choices. A cash utilisation analysis that was done as part of Post Distribution Monitoring (PDM), showed that while cash only households consumed pulses and fruits more frequently, the frequency with which they consumed sugar also doubled (Figure 83). Programming should therefore take into consideration that households may also make less healthy choices when given just cash and foresee unintended consequences such as increased purchase of processed foods and unhealthy snacks.

Figure 83. Consumption of food group per week by modality (VAM PDM 2017)



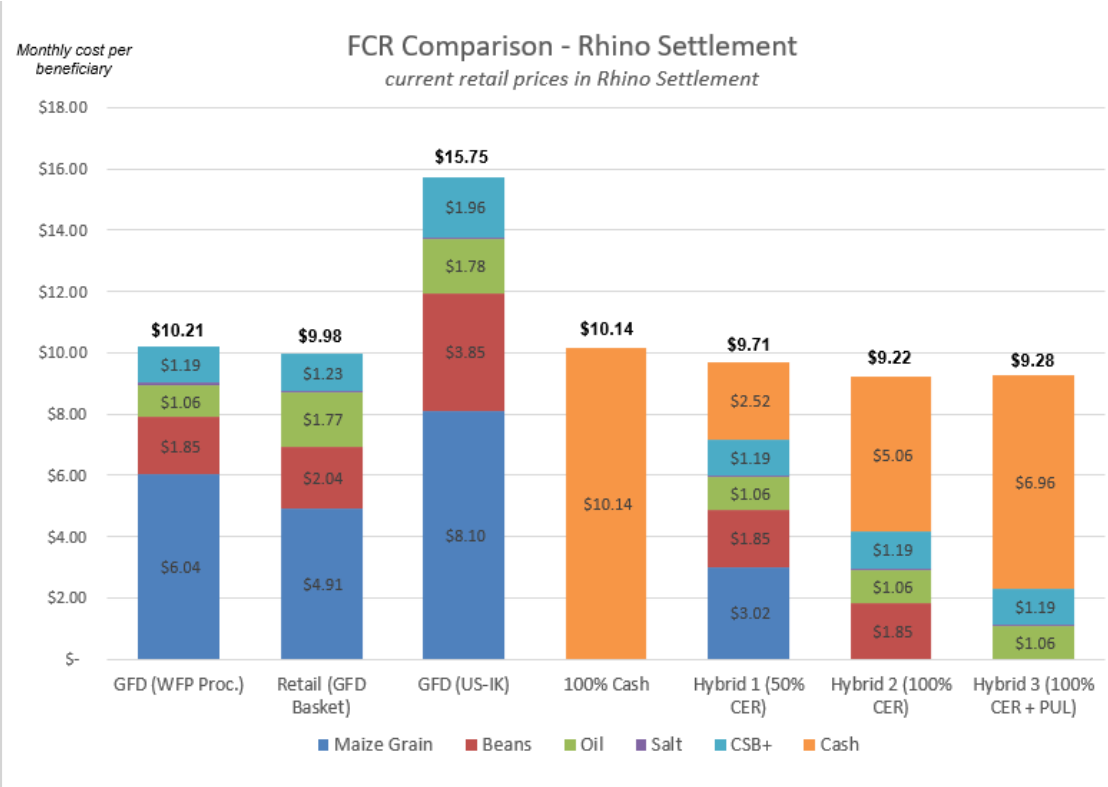
In addition to re-thinking demand around staple supply, a mixed modality approach with both an in-kind (food) part that is procured locally, and a cash element can be used to channel existing purchasing dynamics (i.e. selling staples to buy other foods) toward nutritious foods. Giving a portion of cash directly or using restricted vouchers for nutritious foods can be a first step in creating demand around nutritious foods. The advantage of a mixed modality model is that it protects recipients from market volatilities for staple supply (i.e. sharp increases in crop prices) while at the same time giving them choices for consumption of other items.

Figure 84. Mixed modality model with WFP supporting locally procured staples for in-kind provision and cash/voucher schemes to improve demand for nutritious foods.



An analysis carried out by WFP supply chain unit also found out that hybrid baskets have similar – and in some instances lower – costs as compared to in-kind or voucher assistance (Figure 85). However, as findings are extremely sensitive to retail prices, variation in the findings may occur, this is to be taken as a point-in-time analysis, rather than general advocacy.

Figure 85. Cost per beneficiary according to different transfer types (WFP Supply Chain 2018)



Mixed modality models, however, require functioning markets, both in terms of supply and demand. Market reliance in the refugee settlements is high with 80 percent and 88 percent of households in West Nile and South West using them to purchase their food, respectively. The PDM data shows that for households that receive cash transfers around 73 percent - 76 percent of the transfer is spend on food depending on the location of the settlement. This indicates that demand for foods is mainly directed to the markets. For WFP and partner programming this market demand provides an opportunity to support sustainable market infrastructure while scaling up demand for nutritious foods. As 80 percent of refugees are currently receiving in-kind provision of food, channelling at least some demand for staples to local farmer cooperatives is a promising stable income for those farmers.

More specific market dynamics are less widely understood. This is particularly true for: availability of fresh foods, their prices and variation over time, purchasing patterns by the local community and commodity trade flows. A 10 percent reduction in food prices – estimated as the result of more efficient retail structures – is estimated to reduce non-

affordability of a nutritious diet between 2 percent and 8 percent points. This shows that efficiency gains directly translate into households that are able to afford a nutritious diet.

Understanding market dynamics around ways to create demand for nutritious foods, the timing of purchase and consumption as well as information on knowledge, attitude and practices can inform solutions and opportunities, such as: using digital technology to create exchange around prices, information about market gaps; improved supply chain for fresh foods; SBCC around healthy purchasing and eating habits, and good practices around storing and selling grains.

Targeting of refugees is currently done by status and duration of stay. Those categories do not necessarily reflect vulnerabilities.

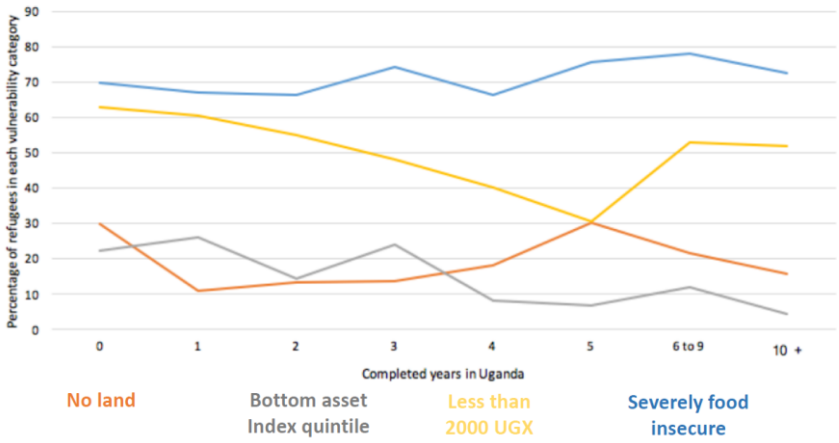
Until now, refugees have been categorized into one of three statuses: Extremely Vulnerable Household (EVH), New Arrival and Old Arrival. Table X shows the in-kind food and cash entitlements by refugee status.

Table 4. Refugee status and general food assistance entitlements (WFP Programme Data)

	Ration	Cash
Extremely Vulnerable Households	100% Food Ration	45,000 UGX
New Arrivals	100% Food Ration	31,000 UGX
Old Arrivals (>3 years)	50% Food Ration	17,0000 UGX

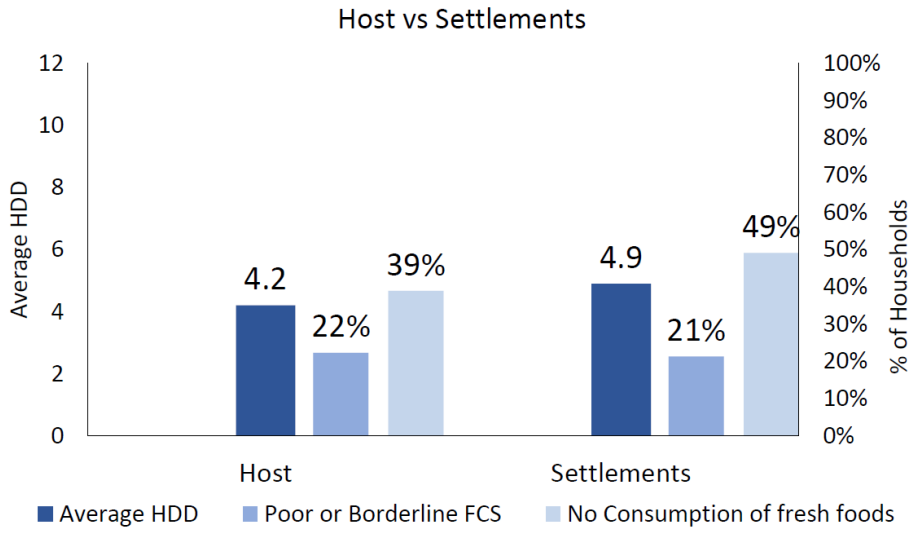
EVHs are granted slightly more cash, whereas Old Arrivals are given only 50 percent of the food or cash ration of New Arrivals. The assumption behind this was that a small proportion of households would be chronically vulnerable and would need more assistance while most households would be most vulnerable just upon arrival. It was also assumed that the longer refugee households would be in Uganda, the more integrated, more settled into productive livelihoods and less vulnerable they would become. The results of vulnerability indicators over time rejects this assumption (Development Pathways, 2017; cf. Figure 86). Indicators such as food insecurity, land access and asset index show little to no change over a period of 10 years, thus there is no indication of improving vulnerability with years spent in country.

Figure 86. Development of vulnerability indicators over time (Development Pathways 2017)



Additionally, there are only minor differences regarding vulnerabilities and food consumption between host communities and refugees in settlements (Figure 87). This suggests that there are patterns of insecurity and vulnerability that are similar between these two groups, making the status of being a refugee less relevant than other factors. Given similar patterns of vulnerability, malnutrition (see key message 1 in this section) and food insecurity between host and refugee population, as well as no visible difference in vulnerability based on years spent in country, integrating refugee population into existing social safety nets may be a more efficient and sustainable solution.

Figure 87. Differences in food consumption (diversity, fresh foods) between hosts and settlements (FSNA 2016, FSNA 2017)



GFA in the form of food or cash has the potential to provide some essential micronutrients for refugees. If GFA is to have an impact on nutrition outcomes

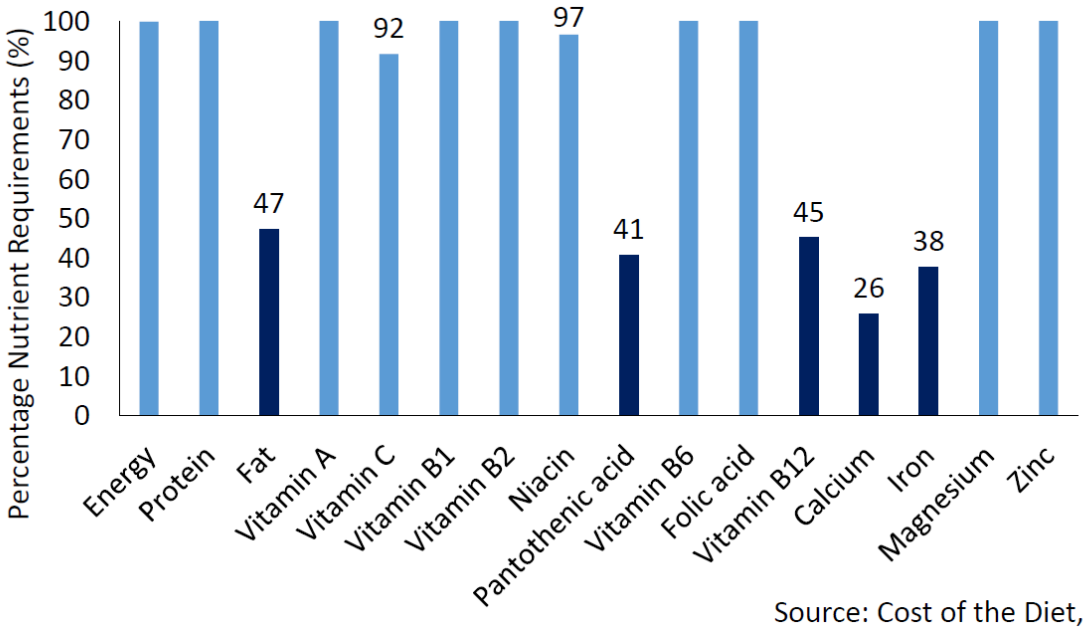
the food ration should meet nutrient needs beyond only macronutrients and the cash transfer must be large enough for households to purchase nutritious foods.

The following GFA modalities are currently provided to refugees (see Annex 3 for specific values)[22]:

- Food distribution of maize, beans, iodised salt, fortified oil and SuperCereal. Three ration types are provided depending on the status of the refugee: Extremely Vulnerable Household (EVH), Refugee 100 percent (New Arrival), Refugee 50 percent (Old Arrival).
- Cash transfers valued at the same cost of purchasing the three food ration types from the market.

When the nutrient content of the in-kind food ration is analysed using the CotD software, it provides the majority of macronutrient requirements for the household. However, it is low in essential micronutrients and only provides 45 percent, 26 percent and 38 percent of vitamin B12, calcium and iron requirements for the households, respectively as shown in Figure 88. This pattern may be even worse for the adolescent girl or the PLW, as these individuals have disproportionally high micronutrient needs.

Figure 88. The average percentage of the FNG household's daily recommended requirements met for macro- and micronutrients provided by the in-kind food assistance.



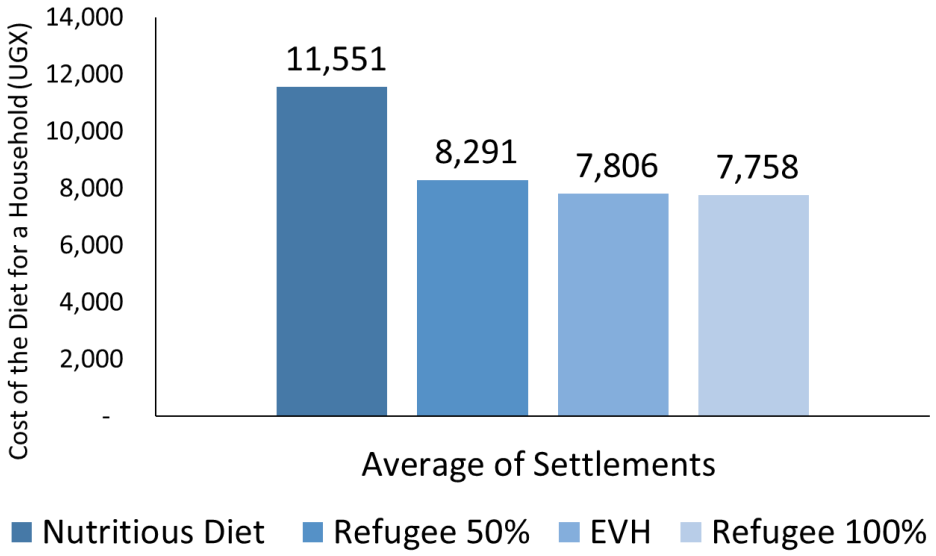
Source: Cost of the Diet, 2018

Figure 89 shows that the ration, while covering energy needs, would only cover approximately 32 percent of the cost of a nutritious diet for a household with between 7,758 – 8,291 UGX per day being required in addition to purchase their remaining micronutrient needs. Based upon the CotD analysis the types of foods they would need

[22] The two modalities were modelled for the settlements WFP is currently operating in

to purchase would be eggs, green leafy vegetables, milk, groundnuts, avocados and dried fish.

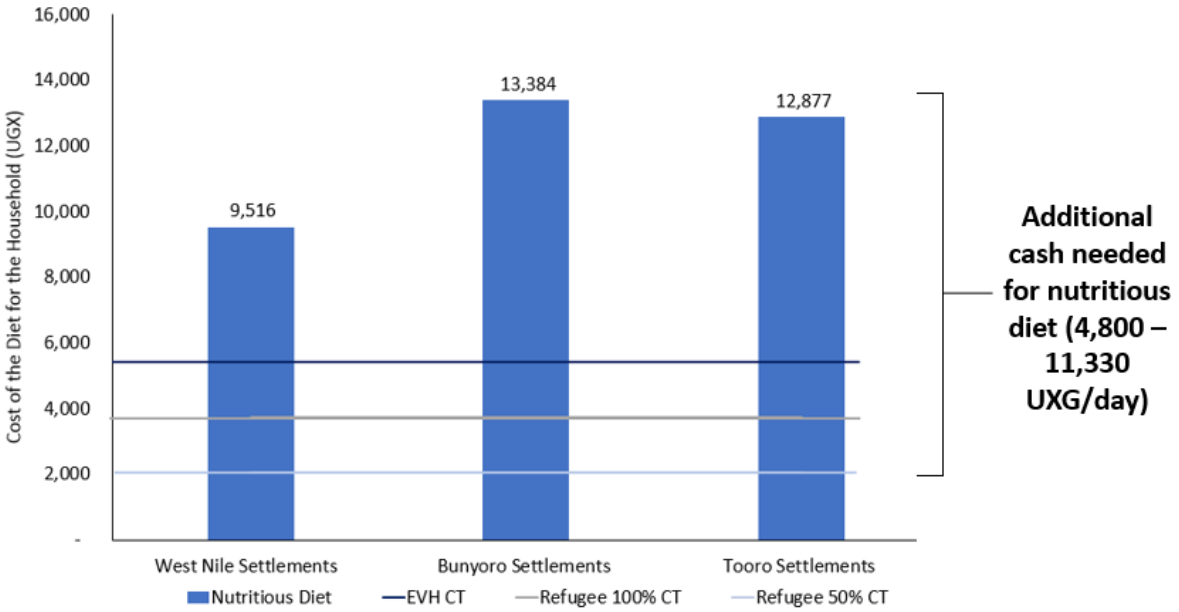
Figure 89. The cost of a nutritious diet with and without the in-kind food provision for a refugee household of five people, averaged across the settlements that receive the food modality (WFP 2018).



For the in-kind cash modality, Figure 90 shows that the EVH transfer value has the greatest potential to enable households to purchase a nutritious diet, assuming that 76 percent[23] of the cash value would be optimally spent on nutritious foods. Depending on the location of the settlement and the vulnerability status of the household, an additional 4,800 – 11,330 UGX day per household would be required to be able to purchase the remainder of their nutrient needs. All transfer values were enough to purchase an energy only diet.

[23] As indicated by the most recent PDM July 2017

Figure 90. The cost of a nutritious diet for the three settlement areas that implement the in-kind cash modality. The three lines represent the cash value of the three transfer options provided based upon refugee status.



*CT = Cash Transfer

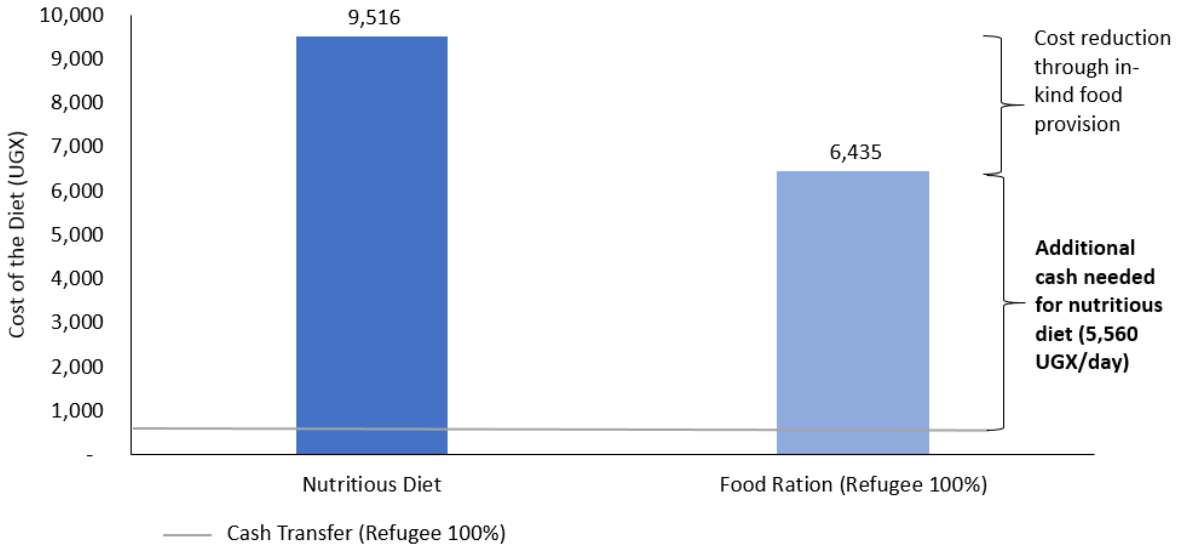
If the general food assistance is to have a nutrition outcome the in-kind food ration must provide more than only macronutrient requirements and the value of the cash transfer must be high enough to purchase nutritious foods. SBCC is also required to ensure that cash is spent optimally for nutrition.

A mixed modality of food and cash would provide households with the greatest flexibility in making nutritious food choices.

Given that a third of the in-kind food ration is currently sold by refugees to pay for other foods or non-food needs, a mixed modality of both cash and food could offer households more flexibility in making nutritious food choices, while retaining a basic level of food security. Figure 91 shows the potential impact of the Refugee 100 percent mixed modality model based upon what was previously implemented in the West Nile[24]. The results show that the cash value (which is based upon meeting 2,100 kilocalorie requirements) is insufficient and households would need approximately 5,560 UGX a day more to be able to purchase their nutrient needs. The amount needed by the household could be reduced if more iron-dense foods are available at the market, which would make it cheaper to meet nutrient requirements.

[24] Households received the standard food ration but with half the quantity of maize. The other half of the staple was given as a cash equivalent. See Annex 3 for more information.

Figure 91. The impact that a mixed modality ration could have in reducing the cost of a nutritious diet in the refugee settlements areas. The line represents the cash transfer value given as part of the mixed modality (WFP 2018).



*CT = Cash Transfer

For a mixed modality to successfully impact nutrition outcomes at a minimum the following must be in place:

- Functioning markets that sell a variety of fresh, nutritious food across seasons
- A cash transfer value that is large enough to purchase the nutritious foods. This could either be met through cash and SBCC but also restricted vouchers for nutritious foods.
- Social Behaviour Change Communication to create demand for nutritious foods and to encourage healthy purchasing choices.

The combination of the targeted WFP nutrition programme and the GFA (cash and food) can further contribute to reducing the cost of meeting nutrient needs for key target groups

CotD modelling was undertaken to better understand the combined impact of current WFP programming in the refugee settlements that targets the household with GFA and complements the diets of children under 2 years and PLW with the MCHN programme (see specific details in Annex 3).

Figure 92 and Figure 93 shows that when combined the WFP programmes have the potential to cover 48 percent of the cost of a nutritious diet for a household of five people. Households would require approximately 6,500 UGX a day more in order to purchase their remaining nutrient needs.

Figure 92. The daily cost of a nutritious diet for a household of five people with WFP combined programming in the settlements provided with GFA food assistance (WFP 2018).

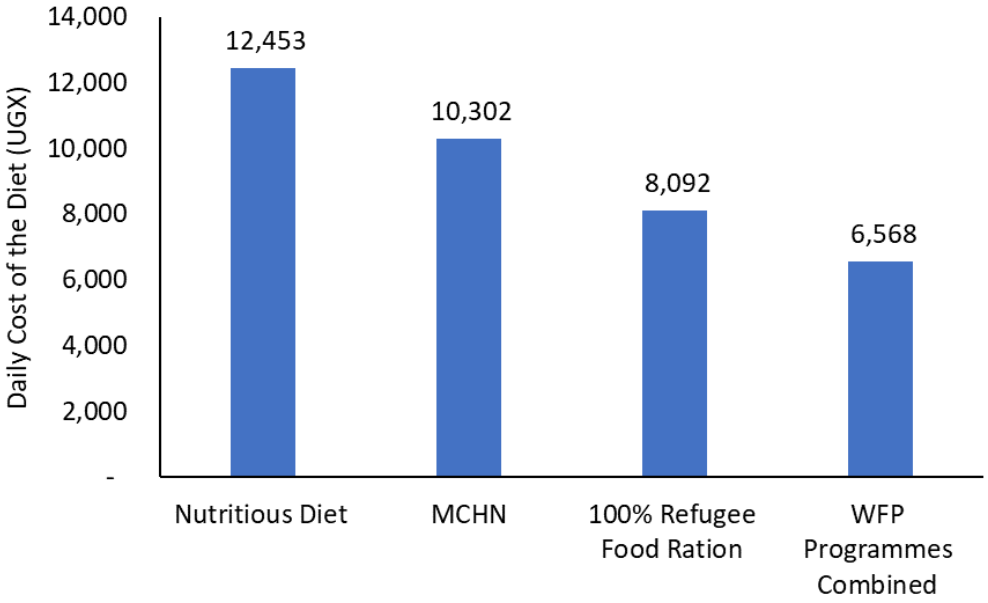
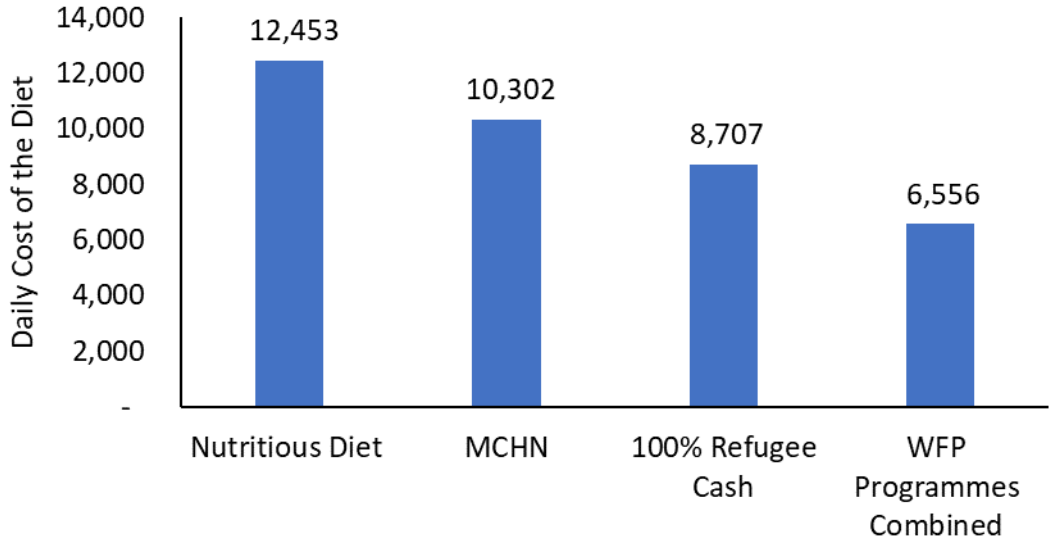


Figure 93. The daily cost of a nutritious diet for a household of five people with WFP combined programming in the settlements provided with GFA cash assistance (WFP 2018).



Modelling Dietary Improvement

Context specific integrated packages of targeted and household interventions have the greatest potential to improve affordability of a nutritious diet.

A range of interventions, outside of what the WFP are currently implementing, were modelled using the CotD software for vulnerable target groups and the household. The decision of what interventions would be modelled were informed by the secondary data analysis and requested by stakeholders as part of their consultation process.

The aim of the intervention modelling is to stimulate stakeholder discussion around the importance of programmes that apply a lifecycle approach, are implemented across multiple entry points and that aim to improve the access to nutritious foods. The results below summarise the interventions that reduced the cost of a nutritious diet the most for the nutritionally vulnerable groups and the household. When purchasing power is too low, nutrient needs cannot be met and nutrition will not improve. This analysis shows what it may take to improve nutrition and can enable a prioritization of efforts. Refer to Annex 3 for the modelling plan and assumptions and Annex 4 for the specific results by target group and household. The locations of the refugee settlements fall within five of these regions: Acholi, West Nile, Bunyoro, Tooro and Ankole.

- For a child aged 6-23 months, WFP's MCHN programme has the greatest impact in reducing the cost of meeting nutrient needs, doing so by up to 65 percent.
- For the adolescent girl, a MMT was the most effective at reducing the cost of a nutritious diet, doing so by 71 percent.
- A MMT and an iron and folic acid tablet had a similar impact in reducing the cost of meeting nutrient needs for a pregnant and lactating woman, doing so by 67 percent.
- For the household, a nutrition sensitive kitchen garden, Action Against Hunger's Fresh Food Vouchers and making biofortified high iron beans available in the market had a similar impact in reducing the cost of meeting nutrient needs, doing so by 12-17 percent.

A package of interventions implemented across multiple sector(s) entry points could greatly improve household's capacity to access a nutritious diet.

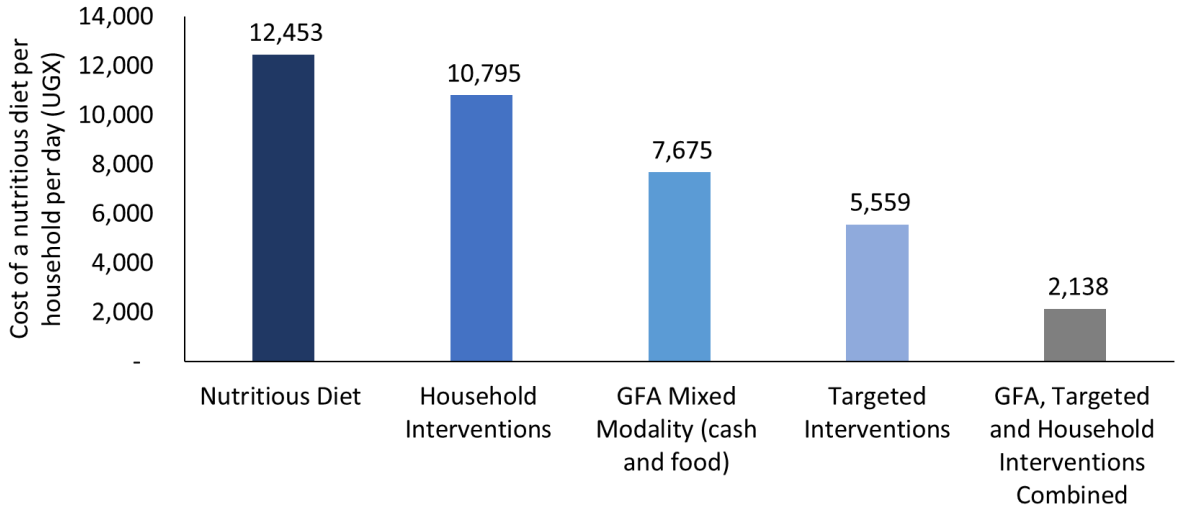
The most effective interventions for reducing the cost of a nutritious diet for the vulnerable target groups were combined with the most effective household interventions to form a package as shown in Table X. This analysis not only indicates the foods (fresh, fortified or biofortified) and supplements that are the most effective at reducing the cost of a nutritious diet, but also those that should be made available for purchase.

Table 5. The most effective interventions in reducing the cost of a nutritious diet, as indicated by the CotD analysis.

Target Group	Intervention
Child 6-23 months	Maternal and Child Health and Nutrition Programme (SuperCereal Plus)
Adolescent Girl Pregnant and Lactating Woman	Multiple Micronutrient Tablet
Household	Nutrition Sensitive Agriculture
	Refugee 100 percent Mixed Modality GFA

Figure 94 summarizes the impact of these packages on reducing the cost of a nutritious diet. These results demonstrate the possible benefits that could be gained by increasing refugee's nutrient access via a package of interventions across multiple entry points and sectors (see bullet points in previous paragraph for details). The underlying assumption for such an intervention is that adequate demand creation strategies are in place to ensure that any cash transfers or vouchers provided would be spent on nutritious food.

Figure 94. The potential impact that a package of a range of both targeted and household level interventions and a cash transfer could have on improving the affordability of a nutritious diet (WFP 2018).



FNG in Refugee Settlements: Recommendations

During the recommendations workshop, the main findings of the FNG analysis were shared and discussed with the wider stakeholder group. Participants then formed five work groups, each comprised of different complementary entry points for policy and programmatic strategies - health and nutrition; agriculture and markets; social protection and general assistance; education; and other livelihoods. Each group were asked to brainstorm interventions which, based on the findings could contribute to improving the dietary intake of key target groups and well as the overall refugee and host populations. They were then asked to prioritise one intervention, for which they identified target groups and objectives and set short-term, medium and long-term activities.

Health and Nutrition

During the brainstorming session the group discussed the need to implement and scale up the ten high impact interventions for nutrition as detailed in the Lancet Maternal and Child Health series in both the refugee settlements and host communities. Beyond these interventions they also discussed enhancing the micronutrient intake vulnerable groups by providing vitamin and mineral powders to children aged 6-23 months and iron and folic acid tablets to adolescent girls and pregnant and lactating women.

The intervention that was prioritised was the promotion of Infant and Young Child Feeding Practices with the aim of improving infant and young child nutrition and reducing the rates of stunting, wasting and anaemia. The specific behaviours that were identified as needing tailored messaging were the duration of exclusive breastfeeding, timely introduction and appropriate complementary feeding and hygiene and sanitation practices. The group proposed that SBCC would be targeted at mothers, fathers, community health workers and frontline health workers with engagement from the health, nutrition and WASH sectors.

In the short term, as well as the proposed SBCC activities, it was recommended that micronutrient supplements and specialised nutritious foods are also provided to children aged 6-23 months as a preventative measure for growth failure. Longer term activities included capacity building of partners as well as monitoring and evaluating of the impact of the messages. The group acknowledged that additional research was needed to better understand the availability and cost of nutritious foods in the refugee settlements and host areas as well as food preferences and taboos.

Agriculture and Markets

Nutrition sensitive agriculture was the intervention prioritised by this group with the aim of improving the availability and access of nutritious foods for both the refugee and host communities. Activities considered for this section were particularly focussed on the scale up from backyard garden (short-term) to farming field schools (medium-term) and ultimately sustainable agriculture (long-term). All these actions were to be implemented alongside social behaviour change communication to ensure appropriate practices. For more short-term interventions, the recommendation was to focus on agricultural inputs, demonstrations on the usage of these and coordination through agricultural extension workers. Medium-term interventions highlighted the need for effective post-harvest management and scaling agriculture up to small animal rearing. Access to marketing structures for better sales and credit for investment and bridging lean seasons were also highlighted. Access to credit and investments was also prioritized within long-term activities as was the creation of linkages to government programmes.

It was evident that the challenges for agriculture and the inclusion of refugees into agriculture are numerous, with access to land for agriculture/ the reduction of land access through increased influx being a major first constraint. Additionally, it was pointed out that there are limited resources to get initiatives off the ground and that there are few policies targeting agricultural extension work. Lastly, water management was mentioned to constrain production. Given these barriers, there was agreement that agriculture is best engaged cross-sectorally, beginning with Ministries such as Agriculture and Water and Environment, as well as several UN-Agencies such as FAO, UNHCR, IFAD, WFP; the Office of the Prime Minister and NGOs active in agriculture and nutrition.

Social Protection and General Assistance

The group discussed the need for more nutrition sensitive social protection schemes for both the refugees and host communities during their brainstorming session. A cash transfer for households aimed at the first 1,000 days from conception to a child's second birthday was highly recommended, as was a cash incentive for households based upon adolescent girl's attendance in school.

A mixed general food assistance model whereby refugee households receive their current in-kind food ration with an additional cash top-up for nutritious foods and other non-food needs was prioritised. It was recommended that part of the cash component should be a voucher for certain nutritious commodities such as vegetables and animal products to ensure an impact on nutrition outcomes. Although primarily aimed at refugee households, the host community could also benefit from this adaptation of the current GFA model as the voucher could be reimbursed in their market stalls.

Before such an intervention can be implemented research is needed regarding the availability of nutritious commodities in markets in and around the refugee settlement areas and whether the supply of these foods could respond to an increase in demand. These data would also help to determine the cash value of the voucher. Food preferences, prohibitions and purchasing habits would also need to be known. SBCC messages would also need to be developed in the short term that encourage the appropriate use of the vouchers and unrestricted cash and WASH practices. These data would be collected in the short term whilst the current GFA programme continues to be implemented.

In the longer term, the group recommended setting up a Village Savings and Loans Association or integrating refugees into an existing scheme within the host community. The associations would encourage refugees to invest some of the unrestricted cash into the scheme to invest in education or livelihood activities. The following sectors would need to be engaged: Agriculture, Health, Nutrition and WASH.

Education

The main focus of this group was a) to discuss incentives to increase enrolment and attendance and b) to provide vocational training for out-of-school adolescents. The objectives for the first are to increase enrolment, attendance and nutritional knowledge and practice, for the second to enable income generation and skills building around nutrition knowledge.

Short term activities that were thought to enable incentives included in-kind provision of nutritious foods at school, inclusion of nutrition education in curriculum, iron supplementation for adolescent girls combined with the SBCC on the importance of education and good nutrition. These activities are mainly meant to bridge the nutrition gap during the time that more sustainable, medium- and long-term activities, need to be taken off the ground. Medium term activities focus on creating the knowledge

around nutrition and eating habits and centred around demo gardens at school that could display the type of diversity that is possible in school gardens. Lastly, for long-term activities related to school meals, the group focussed on the school being able to source its food locally and without creating large dependencies on either private sector products or in-kind food distribution. Examples that came to mind were sourcing through school gardens, linking up to local production and post-harvest loss cooperatives.

Within these programmes the main challenges and outstanding gaps that were addressed are the overload of the school system, the lack of adequate iron supplementation stocks and resistance of some parents to be involved in the gardening activities. Particularly the first point highlights the need for multi-sectoral engagement, ensuring that incentives to attend school in one region do not create a pull-factor for students in other regions. Sectors that were therefore mentioned to be engaged include Education, Health, Community Development, Gender, Production, Agriculture, Finance and Water.

Short-term activities that focussed on creating platforms for vocational trainings included sensitization of the use of vocational training and the expansion of the scope around ALP. Towards the medium-term this group envisaged a more institutionalized approach of vocational training institutes that are able to provide technical vocation and educational training in the long-term. Challenges that were foreseen by this group were mainly related to the financing of alternative education platforms as well as the coordination efforts to ensure access for everyone in the target group. The main stakeholders to engage in this were UNICEF, UNHCR, Ministry of Education, Ministry of Labour and the Ministry of Development.

Other Livelihoods

During the development of recommendations, the group working on other livelihoods (other referring to outside of agriculture and agriculture-based markets) prioritized interventions on strengthening of human capital & capacity building for youth and adolescent girls. The specific objectives around this intervention are to increase skills development, particularly for entrepreneurship, different types of work across the value chain of foods (processing, delivery, cold-chain) and service-related activities. With this the vision is to increase income to bridge existing nutrition gap by improving access and affordability of nutritious foods.

Short-term activities designed to kick-off these processes were a rapid assessment of capacity gaps and skills needed in specific areas to account for the variety of needs across the region. An in-depth knowledge, attitude and practices (KAP) survey to understand behavioural patterns associated with livelihoods and lastly the identification and engagement of the desired audience to be able to strategically mobilize individuals. Based on the outcome of the assessments, training can commence on practical skills, making sure that nutrition, market and financial literacy are included in the trainings.

For medium-term activities the group pointed out that skill building initiatives need to be closely followed by work-placements so as to put learned skills into practice. One way to support placements was to provide advance loans (that need to be paid back), so businesses would not have to bear staff costs straight away and adolescents can afford to spend time in a work placement. It was highlighted that these would need to be continuously accompanied by training, which can expand beyond the actual labour and also focus on nutrition and nutritious eating behaviours.

The main aim of long-term activities was to provide adolescents and young adults with the opportunity and ability to start small businesses on their own. Main projects included a mentoring programme, an information network to create awareness of labour opportunities and labour demand as well as access to credit.

The biggest challenges foreseen were fluctuating markets, in which both employment opportunities and cost to nutrition vary largely across the season, making it hard to earn a steady income and spend money consistently on nutritious foods. Actual access to credit was mentioned as another challenge, and it was pointed out that often the poorest do not have access to sufficient credit, creating a kind of poverty trap. Gender issues were another main talking point, highlighting the importance of SBCC and sensitization of men on nutrition, as currently often money is being handled and spent by men. This may impact the amounts spend on nutritious, fresh foods and create a barrier to nutrition even with improved income. As other livelihoods spread across several sectors, engagement with agriculture, WASH, Education and Social Protection was highlighted to be of importance.

Acknowledgements

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Annex 1: Price Data Sensitivity Analysis

Comparison between UNPS 2016 and UNHS 2017 datasets for Karamoja.

Analysis for the Uganda Fill the Nutrient Gap Study commenced in November 2017. At this time, the stakeholders identified the main data source for Cost of the Diet to be the 2015/2016 fifth wave of the UNPS (Uganda National Panel Survey). The number of households from Karamoja subregion that responded to the food consumption section was 109 in the UNPS data, while it was 611 in the UNHS data, which have only recently become available. The larger number in the UNHS dataset provides representative estimates for poverty indicators for the urban and rural areas of each of the 15 geo-regions, and the country as a whole. As UNHS data became available when the FNG analysis was in its final stages, it was not possible to re-run the analysis. Therefore, we have compared prices and expenditure among the two datasets for Karamoja, the results of which are shown below. Note: "Expenditure" refers to adjusted monthly expenditure of a 5 person household, based on per capita expenditure in the respective datasets.

The data shows that for Karamoja only few commodities have been listed in the UNHS food list that were not listed as consumed in the UNPS list. Prices have not changed substantially beyond inflation. Differences in expenditure are substantial in the top three deciles, but not for the other 70 percent of the households.

Twelve additional commodities were found in the UNHS dataset, of which 7 occurred less than 7 times (i.e. very few households reported consuming them). The other five commodities that were found more than 10 times were pumpkins, pumpkin leaves, mushrooms, cucumber and okra.

Price comparison between different commodities are displayed below (note: list not exhaustive). Changes in average prices of key commodities are generally reflecting the inflation reported in food crop CPI (12.4 percent) by UBOS, with some exceptions.

	price 100g UNPS 2016	price 100g UNHS 2017	percent change
Sorghum (flour)	125	133	7 percent
Beans (dry)	221	265	20 percent
Cooking oil	1232	700	-43 percent
Maize (flour)	156	170	9 percent
Onions	231	200	-14 percent
Beef	665	688	3 percent
Fresh milk	118	109	-7 percent
Rice	318	371	16 percent
Goat meat	771	752	-3 percent
Groundnuts (unshelled)	386	500	30 percent
Cassava (flour)	123	144	17 percent

Beans (fresh)	223	256	15 percent
Irish potatoes	140	138	-2 percent
Bread (loaves)	400	463	16 percent
Simsim	450	540	20 percent
Peas (dry)	140	246	76 percent

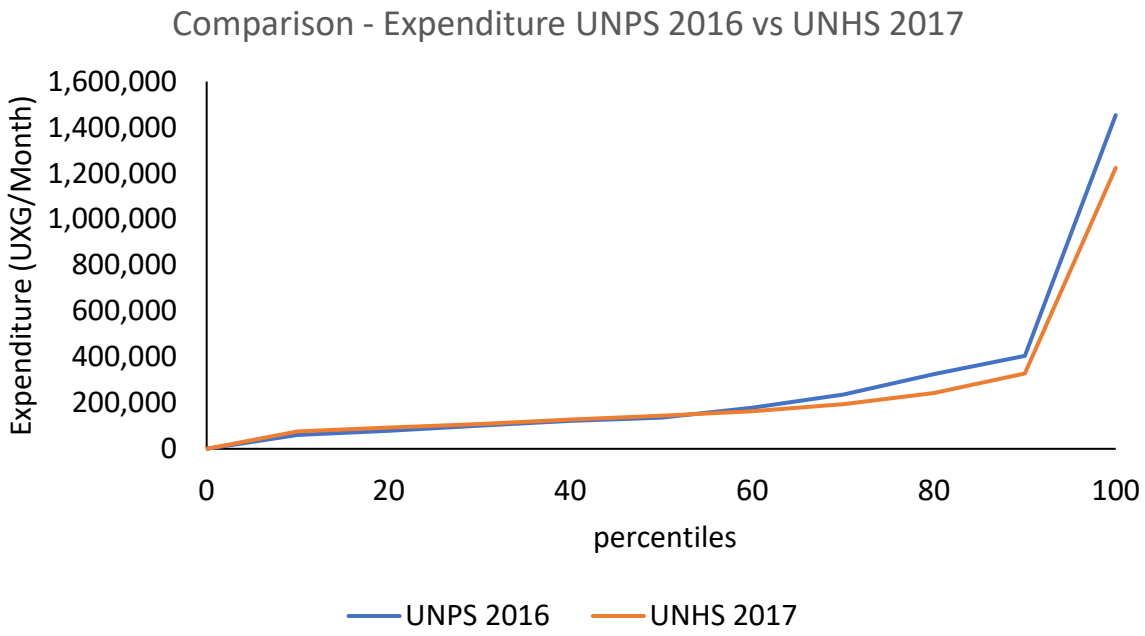
Annex I Table I: price per 100g (in UGX) for selected commodities in Karamoja

The expenditure on food was compared, with the results displayed below. Notably, mean expenditure has decreased over time, as expenditure of higher deciles decreased, but among lower deciles it increased. As we disaggregated the UNPS dataset to sub regional level, sample size became relatively low, and not statistically representative of expenditure. Therefore this finding of lower expenditure in UNHS, especially among higher deciles, compared to UNPS must be interpreted with caution.

If expenditure was indeed lower in 2017 and prices higher (largely due to inflation), unaffordability would be estimated to be higher.

Deciles:	UNPS 2016 (n=109)	UNHS 2017 (n=611)
0	0	0
10	60,953	75,950
20	78,198	91,863
30	101,448	108,319
40	122,334	126,945
50	136,421	143,627
60	179,568	163,835
70	235,662	194,938
80	325,771	242,678
90	405,248	328,755
100	1,453,900	1,223,880
Mean	210,736	188,469
Median	136,421	145,752

Annex I Table II: expenditure (in UGX) deciles for Karamoja subregion



Annex I Graph I: expenditure curve UNPS 2016 and UNHS 2017, Karamoja subregion

Annex 2: Cost of the Diet – Modelling Plan, and Assumptions

National

Intervention	Target Group	Transfer Modality	Entry Point(s)
Vitamin and Mineral Powder (VMP)	Child 6-23 months	In-kind/voucher	Health Social Protection
Fortified Blended Flour (SuperCereal +)			
Small-Quantity Lipid Based Nutrient Supplement			
Home Grown School Feeding Ration	School Aged Child (6-19 years)	In-Kind	Education
Iron and Folic Acid Supplement	Adolescent Pregnant and Lactating Women	In-kind/voucher	Health Social Protection
Multiple Micronutrient Tablet (MMT)			
Fortified Blended Flour (SuperCereal)			
Fortified Blended Flour (SuperCereal+)			
Nutrition Sensitive Agriculture	Household	Own Production	Agriculture Markets
Smallholder Poultry Intervention			
Smallholder Fish Farming			
Fortified Staples (Maize and wheat flour)		Market	Markets
Biofortified Foods (High Iron Beans and Orange Flesh Sweet Potatoes)			
Fresh Food Vouchers[25]		In-kind/voucher	Health Agriculture Markets Social Protection
NUSAF II[26]		Cash Transfer	Social Protection
Senior Citizen's Grant (SCG)[27]	Adults 60+ years		

[25] Based upon Action Against Hunger's programme implemented in refugee settlements in the West Nile, which aimed to improve dietary diversity among the beneficiary clients undergoing treatment for acute malnutrition (both moderate and severe). Each beneficiary was kept on the program for 2 to 3 months, receiving a voucher of 40 000 UGX per month split into four food categories (meat, eggs and milk, fruits and vegetables).

[26] Northern Uganda Social Action Fund is a national cash for work social safety net, provided in 18 districts in the north of Uganda. It is managed by the Government and funded by the World Bank. Participants earned UGX 14,000 (about USD 4) for each day worked and work for 3 days each week, for 6 months. This equates to approximately 182,700 UGX a month.

[27] A Government led cash transfer programme operating in 15 districts of Uganda, targeting elderly (60+ years) beneficiaries. The transfer value is set at UGX 25,000 (US$7.50) per month and is paid every two months.

Karamoja

Intervention	Target Group	Transfer Modality	Entry Point(s)
Vitamin and Mineral Powder (VMP)	Child 6-23 months	In-kind/voucher	Health Social Protection Education
Maternal and Child Health Programme			
Home Grown School Feeding Ration	School Aged Child (3-15 years, including adolescent girls)	In-Kind	Education
Iron and Folic Acid Supplement	Adolescent Pregnant and Lactating Woman	In-kind/voucher	Health Social Protection Education
Multiple Micronutrient Tablet (MMT)			
Maternal and Child Health Programme			
Nutrition Sensitive Agriculture	Household	Own Production	Agriculture Markets
Smallholder Poultry Intervention			
Smallholder Livestock Intervention			
Fortified Maize Flour		Market	Markets
Biofortified Foods (High Iron Beans and Orange Flesh Sweet Potatoes)			
Fresh Food Vouchers[28]		In-kind/voucher	Health Agriculture Markets Social Protection
NUSAF II[29]		Cash Transfer	Social Protection

[28] Based upon Action Against Hunger's programme implemented in refugee settlements in the West Nile, which aimed to improve dietary diversity among the beneficiary clients undergoing treatment for acute malnutrition (both moderate and severe). Each beneficiary was kept on the program for 2 to 3 months, receiving a voucher of 40 000 UGX per month split into four food categories (meat, eggs and milk, fruits and vegetables).

[29] Northern Uganda Social Action Fund is a national cash for work social safety net, provided in 18 districts in the north of Uganda. It is managed by the Government and funded by the World Bank. Participants earned UGX 14,000 (about USD 4) for each day worked and work for 3 days each week, for 6 months. This equates to approximately 182,700 UGX a month.

Refugees

Intervention	Target Group	Transfer Modality	Entry Point(s)
Vitamin and Mineral Powder (VMP)	Child 6-23 months	In-kind/voucher	Health Social Protection
Small-Quantity Lipid Based Nutrition Supplement			
Maternal and Child Health and Nutrition Programme			
Iron and Folic Acid Supplement	Adolescent Pregnant and Lactating Woman	In-kind/voucher	Health Social Protection
Multiple Micronutrient Tablet (MMT)			
Maternal and Child Health and Nutrition Programme			
Early Child Development Feeding Centres			
Nutrition Sensitive Agriculture	Household	Own Production	Agriculture Markets
Smallholder Poultry Intervention			
Smallholder Fish Farming			
Fortified Staples (Maize and wheat flour)		Market	Markets
Biofortified Foods (High Iron Beans and Orange Flesh Sweet Potatoes)			
Fresh Food Vouchers		In-kind/voucher	Health Agriculture Markets Social Protection
General Food Assistance (food or cash)			

Nutrient Composition per 100g of Specialised Nutritious Foods and Supplements

	Nutrient composition per 100g					
	SuperCereal Plus	**SuperCereal**	**Small Quantity LNS**	**Vitamin and Mineral Powders**	**Iron Folic Acid Tablets**	**Multiple Micronutrient Tablets**
Iron absorption factor	0.05	0.05	5 percent	0.07	0.07	0.07
Energy (kcal)	394.5	380	480	0	0	0
Protein (g)	16	14	12	0	0	0
Fats (g)	10.1	6	24	0	0	0
RAE (ug retinol)	1045.2	1039.04	1371	40000	0	80000
Vit C (mg)	91.8	90	90	3000	0	7000
B1 (mg)	0.6	0.2	2	50	0	140
B2 (mg)	1.8	1.4	6	50	0	140
Niacin (mg)	10.6	8	33	600	0	1800
B6 (mg)	1.5	1	5	50	0	190
Folate (mcg)	168.1	110	558	15000	66666.67	66667
B12 (mcg)	2.3	2	5	90	0	260
Pantothenic Acid (mg)	2.3	1.6	10	0	0	0
Calcium (mg)	525.3	362	1278	0	0	0
Copper (mg)	0.5	0		56	0	200
Iron (mg)	11.4	6.5	23	1000	6000	3000
Magnesium (mg)	142.2	0	281	0	0	0
Manganese (mcg)	0.8	0	3	0	0	0
Phosphorous (mg)	434.2	280	1255	0	0	0
Potassium (mg)	772.9	140	1265	0	0	0
Zinc (mg)	7.7	5	26	410	0	0

Nutrient Composition per 100g of Fortified and Biofortified Foods

	Nutrient composition per 100g				
	Wheat Flour	**Maize Flour**	**Oil**	**Orange flesh sweet potatoes**	**High Iron Beans**
Iron absorption factor	0.05	0.05	0.05	0.05	0.05
Energy (kcal)	341	362	884	86	343
Protein (g)	13.42	8.1		1.57	22.7
Fats (g)	1.82	3.6	100	0.05	1.6
RAE (ug retinol)	0	23.5	720.7	709	0
Vit C (mg)	0	0		2.4	1
B1 (mg)	1.32	0.59		0.08	0.47
B2 (mg)	0.84	0.4		0.06	0.15
Niacin (mg)	14.74	6.55		0.56	2.09
B6 (mg)	0.29	0.3		0.21	0.53
Folate (mcg)	30.391	25.085		11	463
B12 (mcg)	0.002	0.00003		0	0
Pantothenic Acid (mg)	0.87	0.43		0.8	0.22
Calcium (mg)	32.4	6		30	134
Iron (mg)	6.68	5	0.03	0.61	8.6
Magnesium (mg)	128.8	127		25	45
Zinc (mg)	8.72	4.8		0.3	3

Underlying Assumptions Made for Dietary Improvement Models

Modality	Intervention	Target Group	Dosage/Portion size (g)	Frequency	Price Modelled (UGX)
Voucher or in-kind	Vitamin and Mineral Powder (VMP)	U2	1	3 times/week	0
	Fortified Blended Flour (SuperCereal +)		60	Daily	0
	Small-Quantity Lipid Based Nutrient Supplement		20	Daily	0
	Iron and Folic Acid Supplement	Adolescent Girl	1	Once a week	0
		PLW	1	Daily	0
	Multiple Micronutrient Tablets	Adolescent Girl and PLW	1	Daily	0
	Fortified Blended Flour (SuperCereal)		120	Daily	0
	Fortified Blended Flour (SuperCereal+)		120	Daily	0
	Fresh Food Voucher	Household	Eggs: 1,356	A month	0 (although monetary equivalent is 40,000 UGX/month
			Dodo Leaves: 6,982		
			Dried Fish: 1,343		
			Milk: 8,764		
Market	Fortified Wheat Flour		Same unfortified/biofortified product as defined by CotD software	Up to 3 times a day	Same unfortified/biofortified product as defined by CotD software
	Fortified Maize Flour				
	Fortified Oil				
	Orange Flesh Sweet Potato				
	High Iron Beans				
Own Production	Home Gardening (Non-Nutritious)		8Kg each of cassava, maize, matoke, white sweet potato and beans	A month	0
	Home Gardening (Nutritious)		8Kg each of dodo, maize, matoke, orange flesh sweet potato and high iron beans	A month	0
	Fish Farming		1kg fish	A month	0
	Poultry Farming		3720 eggs	A month	0

Staple Preferences

Modelling Sub-Region	Current Staples		Staples Previously	
West Nile	Cassava	Sorghum	Millet	Sorghum
Acholi	Sorghum	Cassava	Sorghum	Millet
Karamoja	Sorghum	White Maize	Sorghum	Millet
Teso	Cassava	Sweet Potatoes	Sorghum	Sweet Potatoes
Busoga	Maize	Sweet Potatoes	Sorghum	Sweet Potatoes
Kampala	Matoke	Maize Flour	Matoke	Sorghum
Ankole	Matoke	Maize Flour	Matoke	Millet
Tooro	Matoke	Cassava Flour	Matoke	Millet

Underlying Assumptions Made for School Feeding Models

FNG Analysis	Target Group	School Meal	Food/Supplement	Portion Size (g)	Frequency
National	School aged child	School milk intervention	Milk	1 litre	Once a school week
		Basic ration	Primary staple (sub-region dependant)	150	Every school day
			Beans	30	
			Fortified oil	10	
		Basic ration with biofortified beans	Primary staple (sub-region dependant)	150	Every school day
			Biofortified - beans	30	
			Fortified oil	10	
		Basic ration + orange flesh sweet potato	Primary staple (sub-region dependant)	150	Every school day
			Biofortified - beans	30	
			Orange flesh sweet potato	30	
			Fortified oil	10	
		Basic ration + biofortified foods combined	Primary staple (sub-region dependant)	150	Every school day
			Biofortified beans	30	
			Orange flesh sweet potato	30	
			Fortified oil	10	
		Basic ration + green leafy vegetables	Primary staple (sub-region dependant)	150	Every school day
			Beans	30	
			Green leafy vegetables	60	
			Fortified oil	10	
		Basic ration + eggs	Primary staple (sub-region dependant)	150	Every school day
			Beans	30	
			Eggs	40	
			Fortified oil	10	

		Basic ration + milk	Primary Staple (sub-region dependant)	150	Every school day except milk which is once a week
			Beans	30	
			Milk	500	
			Fortified oil	10	
		Basic ration + dried fish	Primary Staple (sub-region dependant)	150	Every school day
			Beans	30	
			Dried fish	50	
			Fortified oil	10	
		Basic ration + Vitamin and Mineral Powder	Primary Staple (sub-region dependant)	150	Every school day
			Beans	30	
			Fortified oil	10	
			Vitamin and Mineral Powder	0.4	
		Basic ration + green leafy vegetables + dried fish + milk	Primary Staple (sub-region dependant)	150	Every school day except milk which is once a week
			Beans	30	
			Green leafy vegetables	60	
			Dried fish	50	
			Milk	500	
			Fortified oil	10	
		Basic ration + biofortified foods + green leafy vegetables + dried fish	Primary staple (sub-region dependant)	150	Every school day
			Biofortified beans	30	
			Orange flesh sweet potato	30	
			Green leafy vegetables	60	
			Dried fish	50	
			Fortified oil	10	
		Basic ration + Vitamin and Mineral Powder + dried fish + green leafy vegetables	Primary Staple (sub-region dependant)	150	Every school day
			Beans	30	
			Green leafy vegetables	60	
			Dried fish	50	
			Fortified oil	10	
			Vitamin and Mineral Powder	0.4	
	Adolescent girl	Basic ration + Multiple Micronutrient Tablet	Primary Staple (sub-region dependant)	150	Every school day
			Beans	30	
			Fortified oil	10	
			Multiple Micronutrient Tablet	1	
Karamoja	School aged child	Basic ration	Maize Grain	150	Every school day
			Beans	30	
			Fortified oil	10	
		Basic ration with fortified maize flour	Fortified maize flour	150	Every school day
			Beans	30	
			Fortified oil	10	

		Basic ration with SuperCereal mid-morning snack	Maize Grain	150	Every school day
			Beans	30	
			Fortified oil	10	
			SuperCereal	50	
		Basic ration + Vitamin and Mineral Powder	Maize Grain	150	Every school day
			Beans	30	
			Fortified oil	10	
			Vitamin and Mineral Powder	0.4	
		Basic ration with biofortified beans	Maize Grain	150	Every school day
			Biofortified beans	30	
			Fortified oil	10	
		Basic ration + orange flesh sweet potato	Maize Grain	150	Every school day
			Biofortified beans	30	
			Orange flesh sweet potato	30	
			Fortified oil	10	
		Basic ration + biofortified foods combined	Maize Grain	150	Every school day
			Biofortified beans	30	
			Orange flesh sweet potato	30	
			Fortified oil	10	
		Basic ration + green leafy vegetables	Maize Grain	150	Every school day
			Beans	30	
			Green leafy vegetables	60	
			Fortified oil	10	
		Basic ration + eggs	Maize Grain	150	Every school day
			Beans	30	
			Eggs	40	
			Fortified oil	10	
		Basic ration + milk	Maize Grain	150	Every school day except milk which is once a week
			Beans	30	
			Milk	500	
			Fortified oil	10	
		Basic ration with biofortified beans + green leafy vegetables + eggs	Maize Grain	150	Every school day
			Biofortified beans	30	
			Green leafy vegetables	60	
			Eggs	40	
			Fortified oil	10	
		Basic ration with biofortified beans + green leafy vegetables + eggs + milk	Maize Grain	150	Every school day except milk which is once a week
			Biofortified beans	30	
			Green leafy vegetables	60	
			Eggs	40	
			Milk	500	
			Fortified oil	10	
		Basic ration with biofortified foods and SuperCereal mid morning snack	Maize Grain	150	Every school day
			Biofortified beans	30	
			Orange flesh sweet potato	30	
			Fortified oil	10	

			SuperCereal	50	
		Basic ration with biofortified foods and SuperCereal mid morning snack	Maize Grain	150	Every school day
			Biofortified beans	30	
			Orange flesh sweet potato	30	
			Fortified oil	10	
			SuperCereal	50	
		Basic ration with biofortified foods, milk and SuperCereal mid morning snack	Maize Grain	150	Every school day except milk which is once a week
			Biofortified beans	30	
			Orange flesh sweet potato	30	
			Milk	500	
			Fortified oil	10	
			SuperCereal	50	
		Basic ration with fortified maize flour and biofortified beans + eggs + green leafy vegetables	Fortified maize flour	150	Every school day
			Biofortified beans	30	
			Green leafy vegetables	60	
			Eggs	40	
			Fortified oil	10	
			SuperCereal	50	
		Basic ration with fortified maize flour and biofortified beans + milk + green leafy vegetables	Fortified maize flour	150	Every school day except milk which is once a week
			Biofortified beans	30	
			Green leafy vegetables	60	
			Milk	500	
			Fortified oil	10	
			SuperCereal	50	
		Basic ration + milk + Vitamin and Mineral Powder	Maize Grain	150	Every school day except milk which is once a week
			Beans	30	
			Milk	500	
			Vitamin and Mineral Powder	0.4	
			Fortified oil	10	
	Adolescent girl	Basic ration + Multiple Micronutrient Tablet	Maize Grain	150	Every school day
			Beans	30	
			Fortified oil	10	
			Multiple Micronutrient Tablet	1	

Underlying Assumptions Made for Maternal and Child Health Programme Models

Intervention	Individual	Commodity	Portion Size (G)	Frequency
MCHN for children under 2 years	U2	SuperCereal Plus	60	Daily
	School Aged Child		15	
	Adolescent Girl		29	
	PLW		43	
	Man		52	
MCHN for PLW	PLW	SuperCereal	120	
	U2		11	
	School Aged Child		22	
	Adolescent Girl		27	
	Man		49	
	PLW	Oil	8	
	U2		1	
	School Aged Child		3	
	Adolescent Girl		5	
	Man		9	
	PLW	Sugar	5	
	U2		1	
	School Aged Child		2	
	Adolescent Girl		3	
	Man		5	

Underlying Assumptions Made for General Food Assistance Models

In Kind Food Distribution (amounts are grams per week)

	Refugee EVI					Refugee 100 percent					Refugee 50 percent				
	Fortifed Maize Meal	Beans	Vit A fortified oil	Salt	Super Cereal	Maize grain	Beans	Vit A fortified oil	Salt	Super Cereal	Maize grain	Beans	Vit A fortified oil	Salt	Super Cereal
Child under two	683	123	53	9	88	700	140	53	9	88	350	70	18	9	88
School-aged child	1,365	245	105	18	175	1,400	280	105	18	175	700	140	35	18	175
Adolescent girl	2,730	490	210	35	350	2,800	560	210	35	350	1,400	280	70	35	350
Woman	4,095	735	315	53	525	4,200	840	315	53	525	2,100	420	105	53	525
Man	4,778	858	368	61	613	4,900	980	368	61	613	2,450	490	123	61	613
Total	**13,650**	**2,450**	**1,050**	**175**	**1,750**	**14,000**	**2,800**	**1,050**	**175**	**1,750**	**7,000**	**1,400**	**350**	**175**	**1,750**

Cash Transfer Values

Target group	Amount per person per month (UXG)	Amount per family of 5 per month (UXG)	Amount per family of 5 per month assuming 76 percent expenditure for food
Refugee EVI	45,000	225,000	171,000
Refugee 100 percent	31,000	155,000	117,800
Refugee 50 percent	17,000	85,000	64,600

Hybrid Model

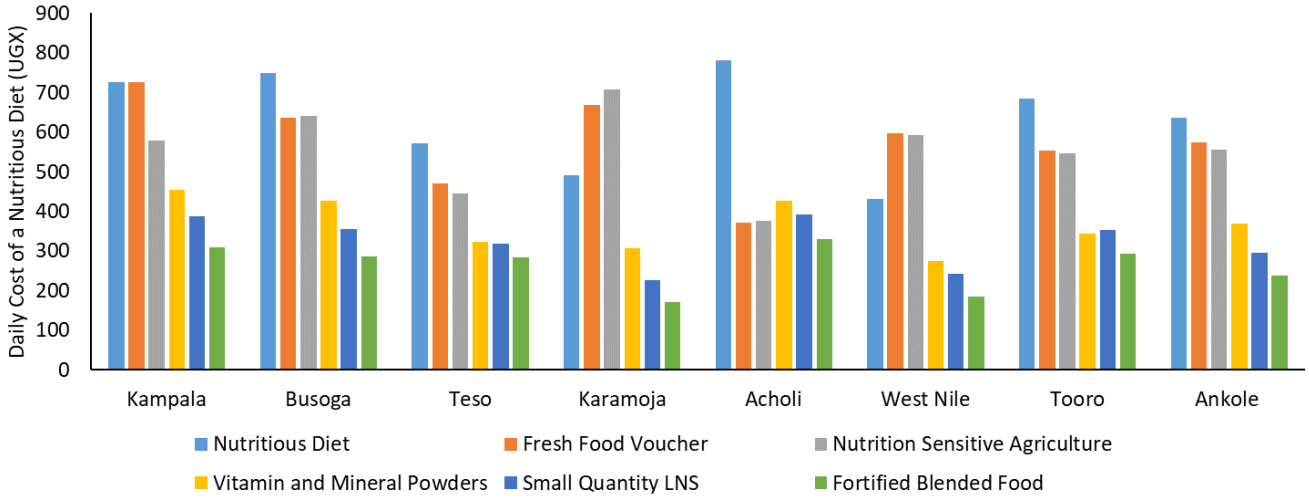
	Food Assistance (g/week)														
	Refugee EVI					Refugee 100 percent					Refugee 50 percent				
	Fortified Maize Meal	Beans	Vit A fortified oil	Salt	Super Cereal	Maize grain	Beans	Vit A fortified oil	Salt	Super Cereal	Maize grain	Beans	Vit A fortified oil	Salt	Super Cereal
Child under two	293	123	53	9	88	300	140	53	9	88	150	70	18	9	88
School-aged child	585	245	105	18	175	600	280	105	18	175	300	140	35	18	175
Adolescent girl	1,170	490	210	35	350	1,200	560	210	35	350	600	280	70	35	350
PLW	1,755	735	315	53	525	1,800	840	315	53	525	900	420	105	53	525
Man	2,048	858	368	61	613	2,100	980	368	61	613	1,050	490	123	61	613
Total	**5,850**	**2,450**	**1,050**	**175**	**1,750**	**6,000**	**2,800**	**1,050**	**175**	**1,750**	**3,000**	**1,400**	**350**	**175**	**1,750**

Cash Assistance			
Target group	Amount per family of 5 per month (UXG)	Amount per family of 5 per month assuming 76 percent expenditure for food	Amount per family of 5 per day assuming 76 percent expenditure for food
Refugee EVI	72,500	55,100	1,812
Refugee 100 percent	35,000	26,600	875
Refugee 50 percent	17,500	13,300	437

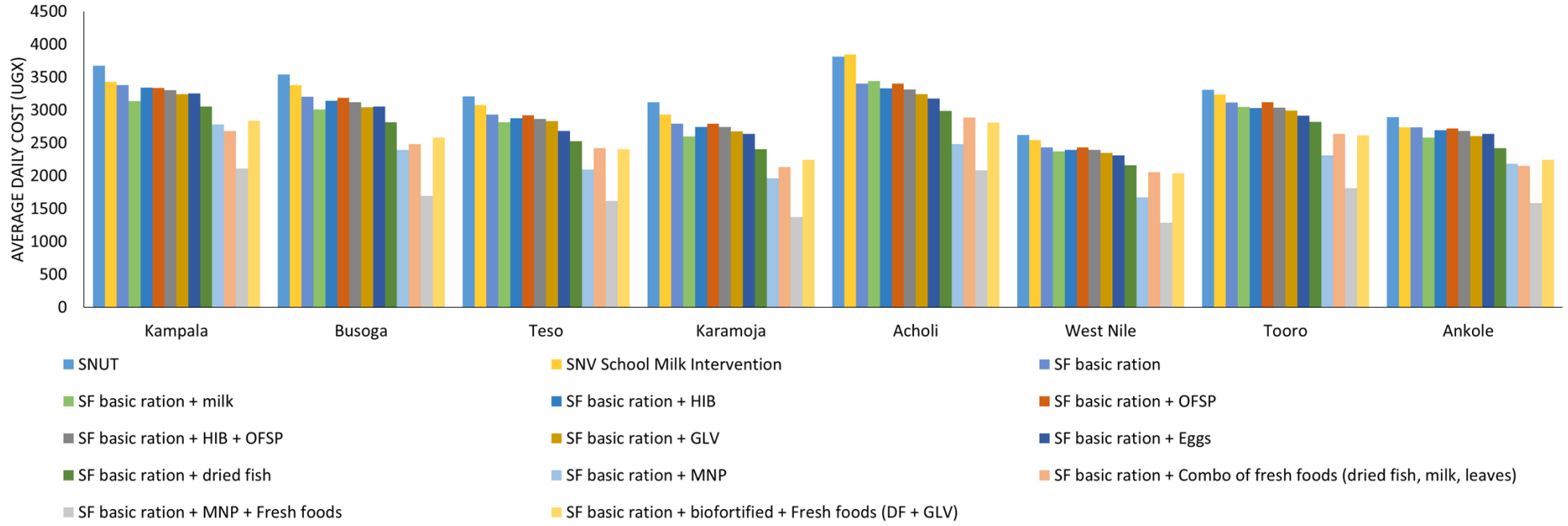
Annex 3: Sub-regional CotD Modelling Results

National

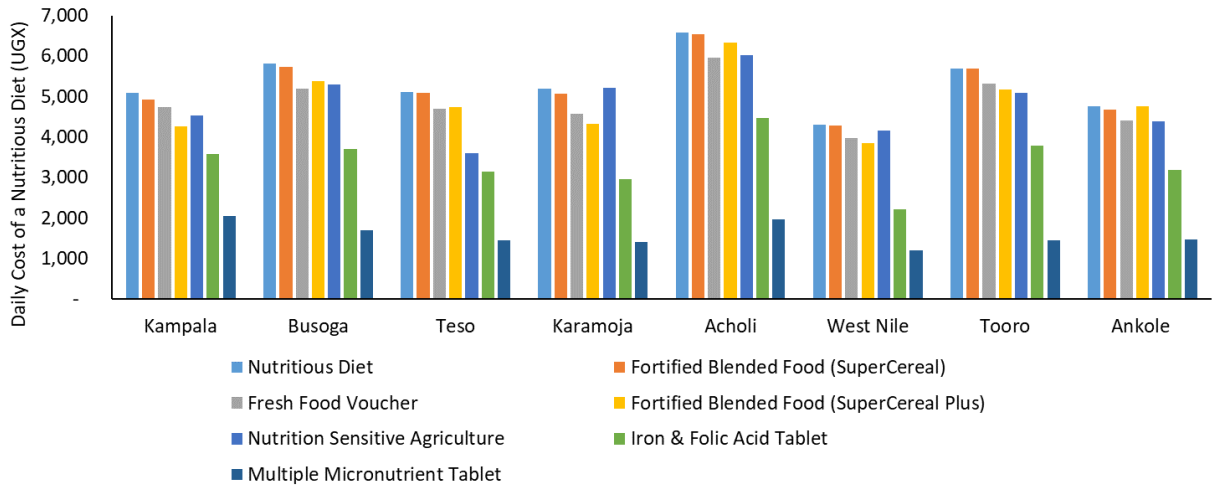
Child aged 6-23 months



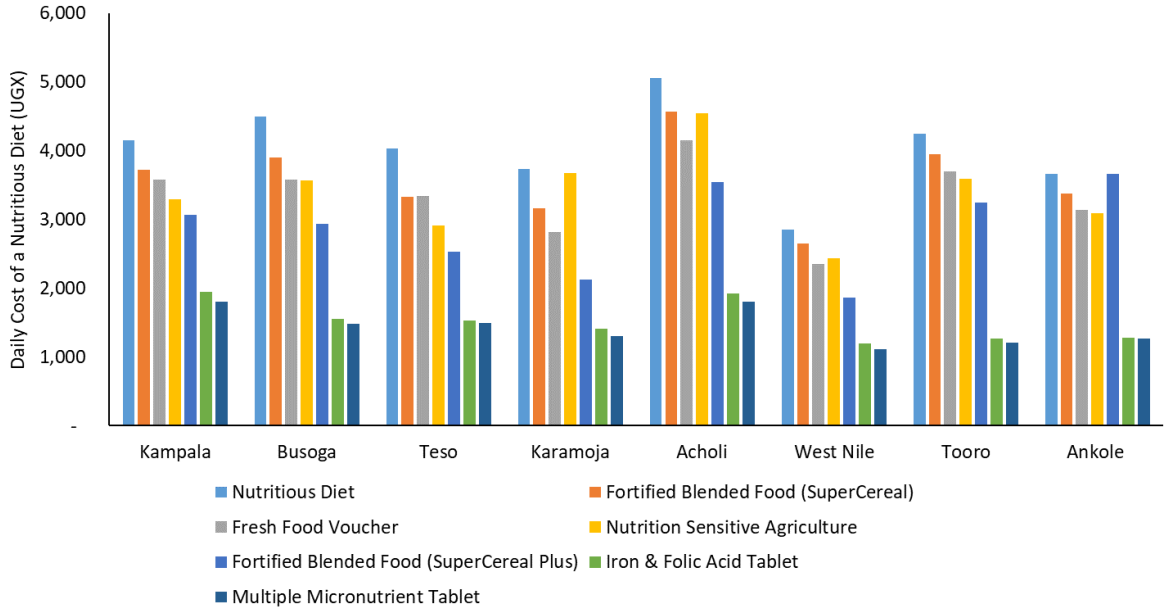
School Aged Child



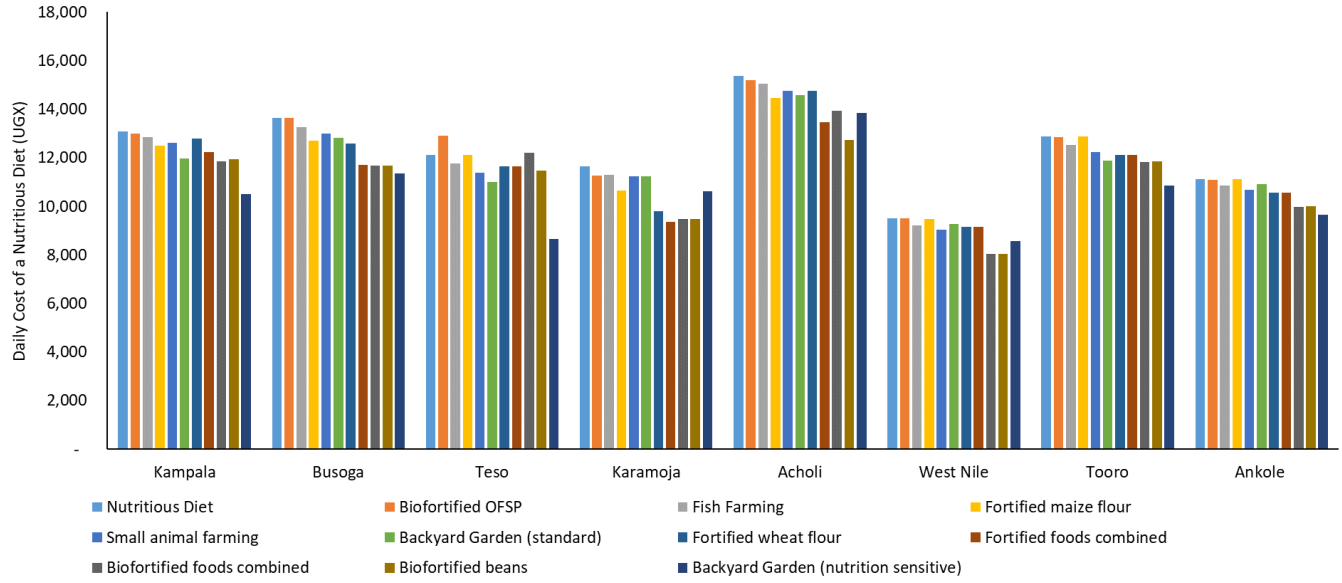
Adolescent Girl



PLW



Household


18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
-
Daily Cost of a Nutritious Diet (UGX)
Kampala
Busoga
Teso
Karamoja
Acholi
West Nile
Tooro
Ankole
Nutritious Diet
Biofortified OFSP
Fish Farming
Fortified maize flour
Small animal farming
Backyard Garden (standard)
Fortified wheat flour
Fortified foods combined
Biofortified foods combined
Biofortified beans
Backyard Garden (nutrition sensitive)

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