SAVING LIVES
CHANGING LIVES

Somali Fill the Nutrient Gap and Cost of the Diet Assessment

Final Report

WFP
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Scaling Up NUTRITION
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October 2020

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

wfp.org/fillthenutrientgap

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Foreword

It is a great pleasure to share the findings and recommendations of the Fill the Nutrient Gap (FNG) analysis for Somalia and the specific recommendations as formulated by the government stakeholders. Good nutrition throughout life is essential for human capital as it allows achievement of full physical and cognitive development and good health. However, with current high levels of malnutrition, impact on children's physical and cognitive development and their cumulative effects on educational attainment and economic potential for current and future generations are quite evident.

Malnutrition is a serious public health problem in Somalia disproportionately affecting women and children, with stunting estimated at 28 percent and wasting at 11 percent. The hidden hunger of micronutrient deficiency is a universal concern and Somalia suffers from high prevalence of deficiencies of vitamin A and iron both in young children and women of reproductive age. As a key objective, the Fill the Nutrient Gap (FNG) analysis has been carried out to gain better understanding of the effects of buying power, availability and affordability of nutritious foods that in turn impacts nutritional status in Somalia.

The FNG process in Somalia has elucidated how the food system shapes food access and food choices, and how each sector in the public and private sectors must contribute in a harmonised and coordinated manner to create a food environment that supports people to access diverse, safe, and nutritious foods. Furthermore, it has highlighted vulnerabilities and practices that disadvantage specific groups, such as girls and young women, putting not only their nutrition and health but also that of tomorrow's generation at risk. The result of this process are recommendations for improvements across sectors based on thoroughly scrutinized findings.

Somalia, since joining the SUN Movement, has endeavored to create an enabling environment for improving nutrition situation and the cost of the diet analysis is an effort to create evidence for achieving this outcome. At a time when the Federal Government of Somalia is set to attain the overarching goal of the NDP II on poverty reduction, the current levels of undernutrition are unacceptable and need to be addressed urgently but jointly. In line with the plan, the nutrition milestones lay emphasis on policy and programmatic actions in addressing the multisectoral and multidimensional issues of nutrition.

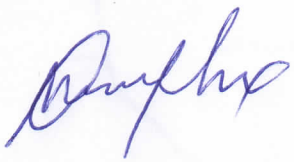
In line with NDP II nutrition agenda, SUN movement is in the process of developing the Food Security and Nutrition Act and implementing key existing national policies and strategies which emphasis on cross-cutting and multisectoral approaches to addressing poverty and the interlinked malnutrition such as Common Results Framework (CRF), Social mobilization Advocacy and Communications strategy (SMAC) and the food fortification strategy. This report raises awareness and lays emphasis on the importance of addressing malnutrition in Somalia and provides policy and programmatic interventions targeting individuals and priority groups that can reduce the cost of their nutrient needs using multisectoral approaches. It acknowledges nutrition as a multisectoral problem requiring concerted multisectoral solutions.

Investing in the identified recommendations will have positive impact in the short term, medium term and long term. To ensure efforts are effectively coordinated, we look forward to working together across sectors, such as health, agriculture, livestock, social protection and education, and across partners, including the private sector, to reduce malnutrition in Somalia in a sustainable manner. I suggest planners and project managers across multi-sectoral platforms (MSPs) to read this report in conjunction with the Somali Health and Demographic Survey and Micronutrient Survey, and act upon the results of these reports in a coordinated way.

I would like to thank WFP Somalia and the Fill the Nutrient Gap Team for their financial and technical support to the SUN movement and congratulate them on this achievement.

Mogadishu
October 2020

Dr. Mohamed Abdi Farah



Executive Summary

The Scaling Up Nutrition Secretariat, under the Leadership of the Office of the Prime Minister, with technical support from the World Food Programme conducted a Fill the Nutrient Gap analysis (FNG) from November 2018 to November 2019. The aim of this exercise was to build a deeper understanding of the structural barriers to accessing healthy diets and identify opportunities across the food system to improve nutrition. Using secondary sources, key informants and primary market data collected at 12 locations, reflecting the diverse livelihoods and living situation of the Somali people, the assessment identified the following key barriers and recommendations:

- **Low intake of nutrient-dense foods can explain part of high prevalence of micronutrient deficiencies:** Diets in Somalia are based on staple foods (maize, sorghum, rice, wheat, and pasta), oil, and sugar, with limited consumption of nutritious foods.
- **Meeting nutrient needs for all household members with locally available foods is not possible in some markets.** The availability of nutritious foods in the local markets is limited, especially those accessed by the pastoralist livelihoods.
- **It costs almost four times more to buy a nutritious diet (US$7/hh/day) than one that meets only energy needs (US$1.9/hh/day).**
- **Eight in ten households cannot afford to meet nutrient needs[1], one in ten cannot afford to even meet energy needs with locally available foods.** Only in the south could a larger share of pastoral and urban communities afford a nutritious diet.
- **Staple fortification has unique potential to improve nutrient content of foods widely consumed.** Creating infrastructure for fortification of locally produced grains and introducing legislation for imported foods could reduce daily cost of a nutritious diet to the household by over 10 percent.
- **Vulnerabilities within the household differ and require targeted interventions to address the unique needs of individual members.** To ensure a healthy population it is essential to support adequate micronutrient intake, especially for children during the first 1,000 days and adolescents.
- **The education sector can provide a strong platform for nutrition interventions with school meals** designed to improve nutrition, school attendance, and the ability to learn while at school, and can contribute to developing healthy food habits.

[1] All numbers are average across surveyed markets, see “Limitations” for detailed context on representativeness

Introduction to Fill the Nutrient Gap (FNG)

The Federal Government of Somalia (FGS), under the leadership of the Office of the Prime Minister (OPM) Scaling Up Nutrition (SUN) Movement Focal Point, is seeking long-term strategies to reduce the burden of malnutrition across the country. The Fill the Nutrient Gap analysis (FNG) was conducted from November 2018 to November 2019 to build a deeper understanding of the structural barriers to accessing healthy diets and identify opportunities across the food system to improve nutrition. This contributes to the FGS's efforts to address food insecurity and high rates of acute and chronic malnutrition, and leads the country towards a path of development.

Building consensus for improved nutrition

Nutrition is a pillar in the development of a healthy, productive nation. Good nutrition enhances physical and cognitive development, prevents disease and increases the potential of the workforce and society. Improving the diets of women and young children brings immediate and long-term health, education and economic benefits. The 2013 Lancet series on maternal and child undernutrition identified a variety of nutrition interventions with proven effectiveness. However, successfully improving nutrition outcomes depends on interventions being tailored to context.

Fill the Nutrient Gap (FNG) is an analytical process comprised of a comprehensive literature review of available secondary data sources in combination with linear programming (LP) using the Cost of the Diet (CotD) software. FNG analysis enables understanding of availability, cost and affordability of a nutritious diet. It is dedicated to identifying and promoting scale-up of proven interventions best suited to local context.

This report presents findings from the analysis and a discussion of its process, methodology and limitations. By identifying and contextualizing new findings, the FNG analysis contributes towards building consensus around a vision and a path forward for improved nutrition in Somalia in a sustainable way.

Process and Scope of the Analysis

The OPM led the FNG analysis in Somalia from inception in November 2018 through discussion of results in October 2019, with technical support from the World Food Programme (WFP). The Feasibility Study was completed in April 2019 and findings were presented to stakeholders in a workshop to define the FNG analysis parameters. Primary data collection on food prices and household consumption was conducted in July and August 2019. The analysis was embedded in an extensive stakeholder consultation process involving government ministries (Planning, Investment and Economic Promotion; Health; Education; Agriculture; Livestock, Fisheries and Marine Resources; Trade and Commerce; Labour and Social Affairs; Information; Humanitarian Affairs; Women and Human Rights;

Youth and Sports; Development Partners (Food Security and Nutrition Analysis Unit of the FAO [FSNAU]), Food and Agriculture Organization [FAO], United Nations Children's Fund [UNICEF]); civil society (Building Resilient Communities in Somalia [BRCiS Consortium], REACH Consortium, World Vision International, Mercy Corps, Family Empowerment and Relief Organisation [FERO], Concern Worldwide, The International Rescue Committee [IRC]); academia (Somali National University, Hormund University]); and the private sector (Somalia Chamber of Commerce, Somali Medical Association, Somali Industries Association).

Feasibility Study

The OPM undertook the Feasibility Study to identify (1) how FNG analysis could contribute to current policy and programme work in Somalia; (2) whether the necessary data sources were available to conduct the analysis and to determine the quality of these data sources, and; (3) set out the scope of the analysis in the Somali context. The basis of the final report was formed by insights from a desk review of background documents, qualitative interviews, stakeholder consultations and spot market assessments.

The Feasibility Study recognized Somalia's vulnerability to food insecurity, which is exacerbated when annual rainfall is lower than expected. Persistently high global acute malnutrition (GAM) rates and widespread micronutrient deficiencies indicate that undernutrition, including stunting and its consequences for child development, is widespread. Data were often inconsistent and/or limited in scope, so estimates have limited reliability.

The Feasibility Study identified livelihood systems as an important dimension to understanding malnutrition in Somalia as they strongly impact access, availability, preferences of food as well as income. The study recommended the disaggregation of the analysis into four broad livelihoods: pastoral, agro pastoral, riverine and urban. This enabled better understanding of dietary habits, challenges in food access, the price disparities of foods, and the overall determinants of malnutrition. The study highlighted the importance of pastoral livelihoods for the Somali economy as well as riverine agriculture for the domestic production of cereals, fruit and vegetables. It also identified seasonal fluctuations in food production and availability which impact on accessibility of food.

The study concluded that FNG analysis in Somalia was feasible and would greatly contribute to Somalia's ability to identify how to address malnutrition despite limited data availability. The study recommended the disaggregation of FNG analysis by livelihood system, with special emphasis on the summer season (June to September) due to low availability of foods and high food prices during this time.

Scope and Focus of the FNG analysis

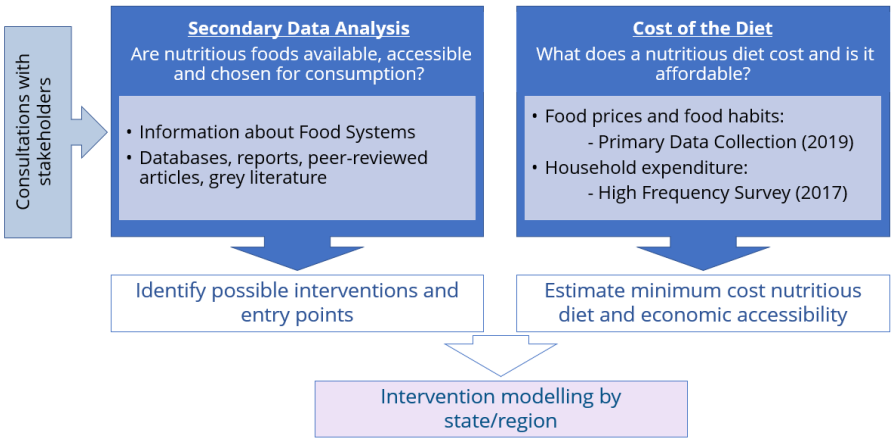
FNG analysis follows the recommendations from the Feasibility Study. In discussions with stakeholders, the following parameters for the analysis were decided:

- **Level of analysis**: disaggregation into six livelihood systems, four recommended by the Feasibility Study (pastoral, agropastoral, riverine, and urban), plus two considered as also important by stakeholders (internally displaced people -IDP, and fisheries), and; reflection of administrative boundaries and geographic differences to ensure the results are usable for policy and programme decisions.
- **Data sources for CotD analysis**: High Frequency Survey (HFS) 2017 data as a source for food expenditure, and; primary food price data collection during summer for food prices and availability.
- **Modelled household**: five-person household to reflect different stages of nutritional vulnerability across the lifecycle, comprising a breastfed child under 2 years of age, a school-aged child, an adolescent girl, a breastfeeding mother, and an adult man.

Methodology

The FNG analysis (Appendix A) is composed of a secondary literature review of the food system, social protection and health sector-based nutrition interventions, and a CotD analysis (Appendix B). The latter allows a more detailed look at availability and affordability of nutritious diets through linear optimization (Figure 1).

Figure 1: FNG components framework.



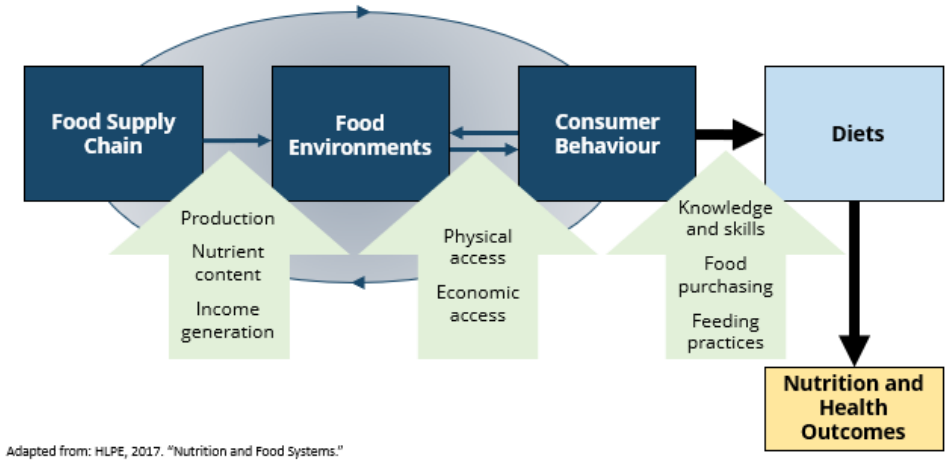
Secondary Data Analysis

FNG secondary data analysis is focused on identifying barriers to accessing and consuming nutritious foods, nutritionally vulnerable groups of the population, and opportunities for policy and programme interventions to improve nutrition through the food, health and

social protection systems. Long-term solutions to malnutrition require transformation of the food system along food supply chains, in food environments and across consumer behavior patterns to facilitate healthier diet choices (Figure 2).

Sources for secondary data analysis include raw data analysis of the HFS 2017 to quantify current dietary intake, expenditure patterns and drivers of vulnerability; policy documents; national surveys and; livelihood-specific information. Over 100 documents were reviewed including academic studies, non-academic analyses and policy and programme documents.

Figure 2: Food systems for diets and nutrition and health outcomes framework



Adapted from: HLPE, 2017. "Nutrition and Food Systems."

The High Frequency Survey (HFS), undertaken in collaboration between the Ministry of Planning (MoP) of the FGS and the World Bank, is a household survey to monitor the population's economic conditions, education, employment, access to services, security, perceptions and details before displacement for displaced households. It also includes comprehensive information on assets and consumption, including household food consumption as self-reported of the last 7 days prior to the survey. Data collection covered all 17 pre-war regions accessible at the time of data collection, including Somaliland, which self-declared independence. A total of 6,092 households were surveyed, including 4,011 urban households, 1,106 rural households, 468 households in Internally Displaced People (IDP) settlements and 507 nomadic households. The HFS employed a multi-stage stratified random sample, stratifying the sample along two dimensions - administrative location and population type. The complete dataset and documentation are available online[2]. At the time of analysis, the HFS was the only available country-wide survey that captured household food consumption.

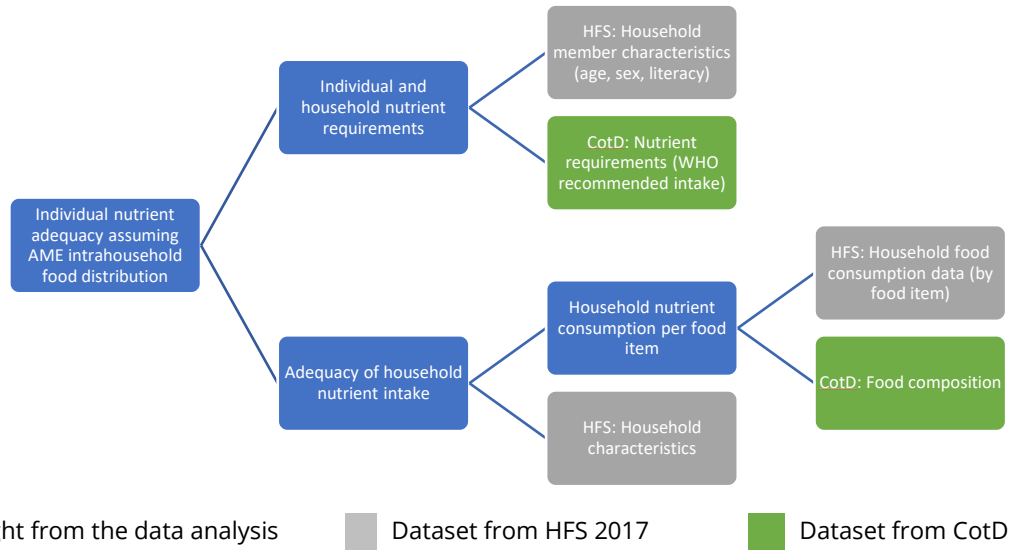
The survey was analyzed as part of the FNG analysis to get a better understanding of the Somali diets, differences in dietary patterns across geographic areas and livelihood

[2] https://microdata.worldbank.org/index.php/catalog/3181

systems, nutritional vulnerabilities and dietary preferences. For this purpose, the HFS food consumption data was merged with the CotD food composition data to allow the computation of household nutrient intake from each food item and the total of household nutrient intake from all food items.

Next, the dataset with details about each family member was merged with each individual's nutrient requirement (energy, protein, fat, vitamins and minerals) based on WHO specifications (see Tables A1 and A2 in the Appendix)[3]. Adding up individual nutrient requirements by household, the household nutrient requirement was computed. For the analysis, the total household nutrient intake was compared to its total requirement. To break this analysis further down to an individual level, intra-household food distribution according to each individual's energy requirements was assumed. From this, individual nutrient adequacy was computed comparing individual nutrient intake[4] with individual nutrient requirement. Figure 3 illustrated how datasets are combined to analyze the nutrient adequacy of diets. The analysis was conducted using Stata 15.

Figure 3: The process of data merging to generate insights about diets and nutrient adequacy from the HFS 2017



Cost of the Diet (CotD)

The CotD analysis estimates the minimum cost of purchasing a nutritious diet with locally available foods. A nutritious diet is one that meets - but does not exceed - the individual's energy and fat requirements while meeting requirements for all other nutrients, including

[3] Individuals' nutrient requirements were identified based on their age (in completed years) and sex as reported in the HFS. Assumptions were made about the individuals' body weight and physical activity, factors influencing energy requirements. No information about pregnancy and/or lactation of women was available in the HFS, so nutrient requirements are likely to be low for women who are pregnant and/or lactating. Hence, the adequacy of nutrient intake women is a conservative estimate.
[4] Assuming distribution of food within the household according to adult male equivalent (AME) energy requirements. Considering men and children often eat first and best, the nutrient intake of women and girls might be overestimated and real deficits in nutrient intake might be higher.

protein, vitamins and minerals. By contrast, an energy only diet is one that meets only energy requirements. CotD identifies the cheapest combination of foods to compose a nutritious diet. The analysis was conducted by market and later aggregated into averages.

To ensure this optimized nutritious diet takes into account basic dietary preferences, it was restricted to include at least two portions of the preferred staple food, which vary according to geographic location and livelihood system. Based on focus group discussions during primary data collection, the following staples were selected for each region and livelihood systems:

Table 1: Staple preferences by market and livelihood system (CotD 2019)

Market	Staple				
	Maize	Sorghum	Rice	Wheat	Pasta
AP – agro pastoral; P – pastoral; F – Fisheries, R – riverine; U – urban; IDP - IDP					
Baidoa	AP, IDP	AP, IDP, U		U	
Belet Weyne	AP, P IDP, U, R	AP, P IDP, U, R			
Cabudwaq		P, IDP	IDP	P	
Cadado		P			
Doolow	P, IDP, U	P, IDP, U, AP, R			
Eyl			P, F	P, F	
Jowhar	AP, P, U, R				
Luuq	AP, P, IDP, R	AP, P, IDP, R			
Mogadishu			F, P, IDP, U		F, P, IDP, U
Qardho			P	P	
Hargeisa	AP, U, IDP	AP, U, IDP	P	P	
Berbera			U, IDP, P, F	U, IDP, P, F	

Next, the cost of the diet is compared with the current household food expenditure. If a household spends less on food than the cost of the diet, the household is considered unable to afford a nutritious diet. This assumes no elasticity of household food expenditure. The estimate of non-affordability is an estimate of the share of households unable to afford a nutritious diet. It is conservative because it assumes optimized choices of nutritious foods; actual non-affordability is likely to be higher.

Household food expenditure as reported in the HFS is disaggregated by urban, rural, nomadic and IDP populations, and along the boundaries of the pre-war regions. This does not closely match the disaggregation recommended by the Feasibility Study. Hence, for the non-affordability analysis, markets were grouped into six analytical zones: 1) Hargeisa and Berbera, 2) Qardho and Eyl, 3) Cadado, Cabudwaq, Belet Weyne and Johwar, 4) Mogadishu, 5) Baidoa, and 6) Doolow and Luuq.

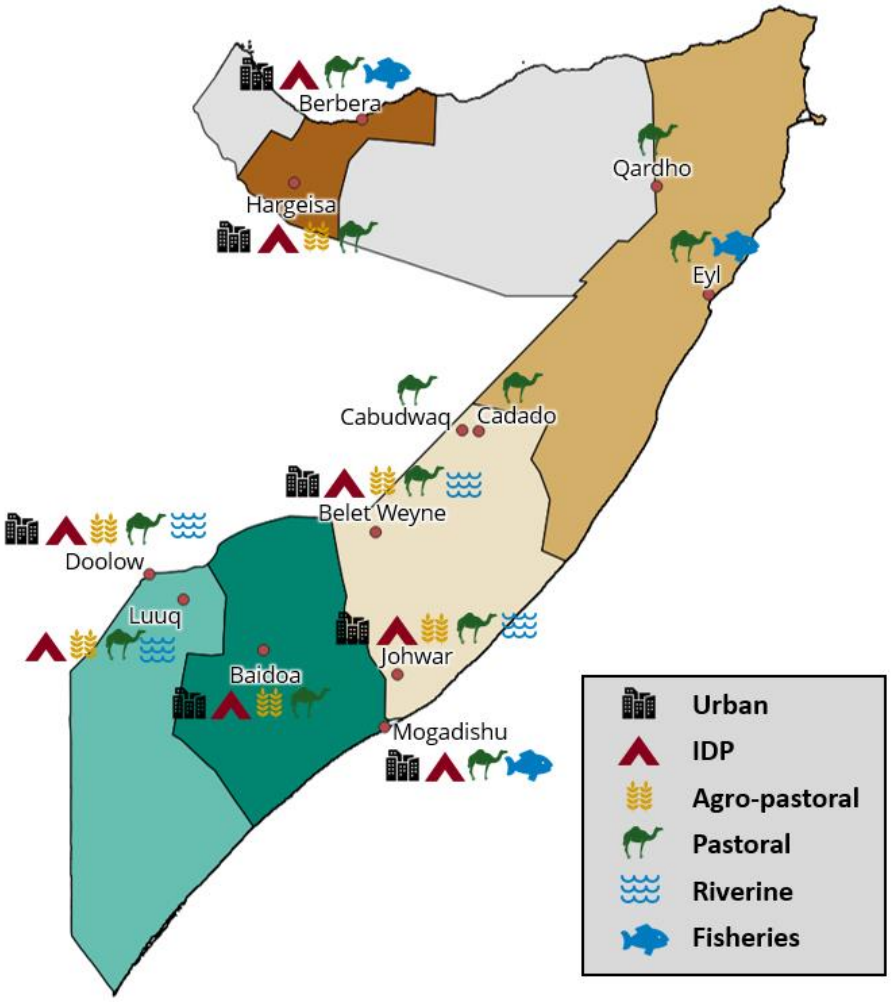
Primary data collection

Primary data collection was led by the OPM and consisted of food price data from local markets, focus group discussions, and household surveys for data on food consumption. Data were collected from 4 to 28 July, 2019, in the following locations: Luuq, Doolow, Baidoa, Mogadishu, Johwar, Belet Weyne, Cabudwaq, Cadado, Eyl and Qardho; and from 6 to 14 August, 2019, in Hargeisa and Berbera (Figure 4). At each site, local enumerators visited markets and recorded the prices of all foods available. Where possible, four samples of each commodity were recorded at each market.

Recognizing that most markets in Somalia are accessed by members of more than one livelihood system, the team used purposeful sampling to identify 13 markets, two in each federal state, and developed a matrix that indicates which market is accessed by households of different livelihood systems. The sampled markets were selected to ensure that a sufficient spread of markets per livelihood system were included with a wide geographic range (see Figure 4). The sample was restricted by security concerns and accessibility to the area, particularly in rural areas in the south of the country. The limitations of this purposeful sampling technique are discussed in the next section.

Enumerators conducted focus group discussions across the country. Two locations per livelihood were chosen and groups were split by very poor/poor and middle/better-off households, as identified by local authorities. The team also conducted household surveys. These discussions and surveys covered community and household food habits, meal frequency, food taboos and intra-household food allocation.

Figure 4: Markets where primary food price data was collected, and the livelihoods they serve.



Limitations and Data Gaps

The data presented in this report have limitations. The analysis does not represent the situation in all of Somalia but reflects the situation for the communities served by the specific markets that were surveyed. Food prices and food expenditure data were collected in two different time periods (food prices in July 2019 and food expenditure in December 2017). Expenditure data was adjusted based on the FSNAU Consumer Price Index (CPI) estimates to allow for a comparison with food prices across the two distinct time periods. The CPI captures the change in value of foods consumed and allows a comparison from one point to the other. However, it does not capture household changes in purchasing patterns based on the changes in prices or changes in income for households working in agriculture.

Based on these limitations, FNG results should be considered as approximations, illustrating the tendencies, trends, vulnerabilities and structural drivers of malnutrition. The results do not fully capture the complexities throughout Somalia, neither can they be

applied to Somalia as a whole. They bring advancement, furthering the knowledge of the current nutrition situation and opportunities for improvement for those specific market dynamics prevalent in the livelihood systems described. To decrease limitations, existing data, notably HFS and FSNAU price information, were used to triangulate and confirm coherence of FNG findings with other national surveys and analysis.

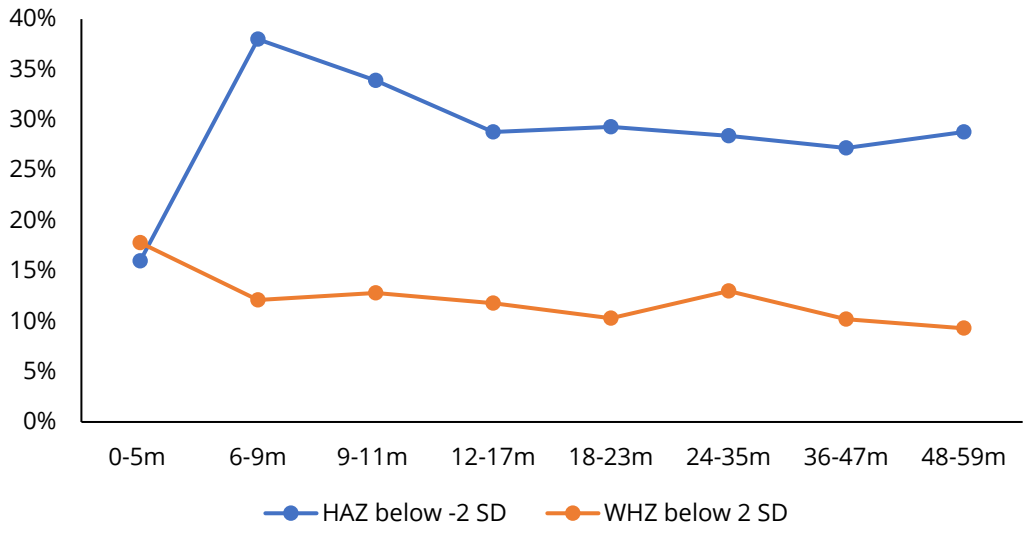
Findings from the Cost of the Diet Assessment and Secondary Data Analysis

Malnutrition Status and Diets in Somalia

Low intake of nutrient-dense foods can partly explain high prevalence of micronutrient deficiencies: One in three children under 5 is deficient in Vitamin A, half of all children under 5 suffer from Anaemia. Estimates of chronic malnutrition range between 17 and 28 percent of all children under 5. Diets in Somalia are based on staple foods (maize, sorghum, rice, wheat, and pasta), oil, and sugar, with limited consumption of nutritious foods.

Although numerous studies have been conducted on the malnutrition situation in Somalia, the available data faces similar challenges to the data of other sectors, particularly affecting estimates of chronic malnutrition (stunting). Access to several regions has been, and remains, challenging, posing a barrier to consistent collection of anthropometric data. Data from the most recent surveys does show a consistent picture for wasting and micronutrient deficiencies (Table 2). However, information on stunting is inconsistent across different data systems and assessments, often with unrealistic changes in between data points. Large-scale anthropometric data collected as part of the 2020 micronutrient survey shows a national stunting rate of 17 percent, ranging between 12 and 38 percent between states (Ministry of Health FGS; FMS, Somaliland, UNICEF, Brandpro, Groundwork 2020). The 2020 Health and Demographic Survey estimates stunting for children under 5 to be at 28 percent nationally and wasting of that same age group to be at 12 percent (Directorate of National Statistics; Federal Government of Somalia 2020).

Figure 5. Malnutrition Characteristics by age in month (SHDS 2020)



Prevalence grouped by month indicates that stunting increases from moderate levels to almost 40 percent around the age of 6 months, slowly reducing to around 30 percent until the age of 5 years. Wasting is generally high, with 18 percent of the age group of 0-5months being wasted, which is above the already very high prevalence of 12 percent on average (Directorate of National Statistics; Federal Government of Somalia 2020).

Nationally consolidated figures for acute malnutrition (wasting) and some micronutrient deficiencies were included in the National Development Plan (NDP) 2017-2019, Somali Health and Demographic Survey 2020 and Somalia Micronutrient Survey 2020. Information on wasting is available and relatively consistent, characterizing the Somali context by high rates of acute malnutrition that fluctuate around 12 percent, between 10 and 15 percent. Vitamin A deficiency affects one third (31 percent) of children 6 to 59 months. Anemia prevalence is very high among children under 5 (43 percent) and pregnant women (47 percent) (Table 2). Anemia is often considered an aggregate indicator for micronutrient deficiency.

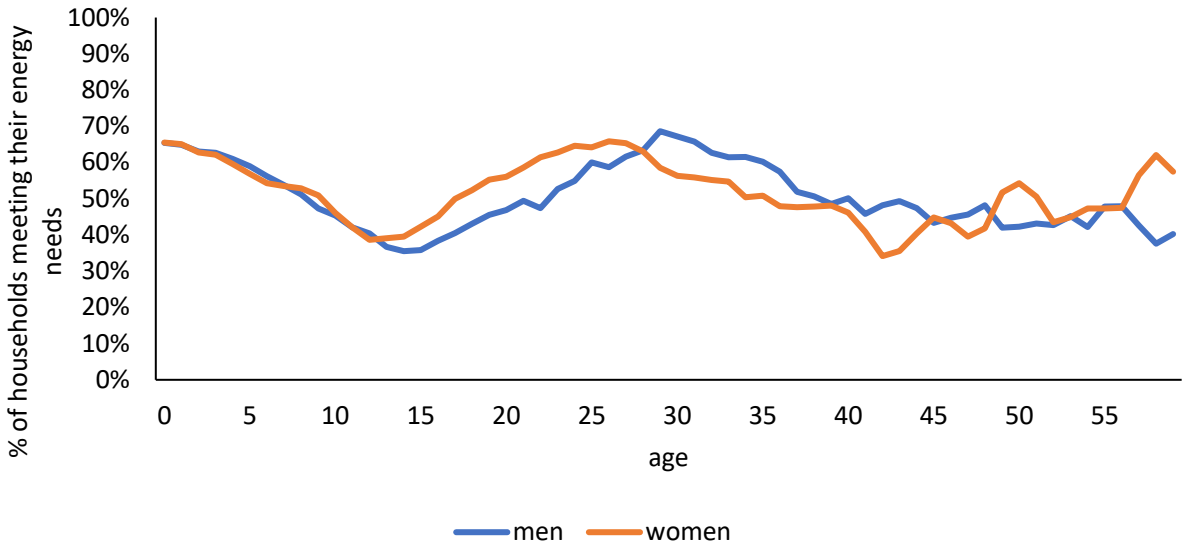
Table 2: Comparison of Nutrition and dietary intake Indicators in NDP 2017-19 and SHDS 2020

	NDP 2017-19 (%)	**SHDS 2020 (%)**	**MICS 2020 (%)**
Wasting in children (0-59m)	12	12	11
Stunting in children (0-59m)	Not reported	28	17.2
Vitamin A deficiency (6-59m)	31	Not reported	34.4
Foods consumed rich in Vit A (6-23m)		33	
Anemia in children (6-59m) *[Iron-deficiency Anemia]*	59		43.4 *[28.6]*
Iron deficiency (6-59 m)			47.2
Food consumed rich in iron (6-23m)		21	
Anemia in pregnant women	49		47.4

Focus Group Discussions carried out as part of the Fill the Nutrient Gap assessment found that the typical diet throughout Somalia is based on staples (mainly rice, pasta, sorghum and maize), oil, and sugar, with some consumption of beans, vegetables, meat, milk, fish

and fruit. Participants generally preferred meat and milk, but many said they could not afford them. Poorer households reported eating one to two meals per day and better-off households reported eating three. Although tea with milk and sugar is not considered a food, the beverage is an important source of dietary energy. Children who are recommended to receive complementary feeding (6-23 months), already show low intake of essential micronutrients: One in five consumed foods that are rich in iron, one in three foods rich in Vitamin A (reported by household).

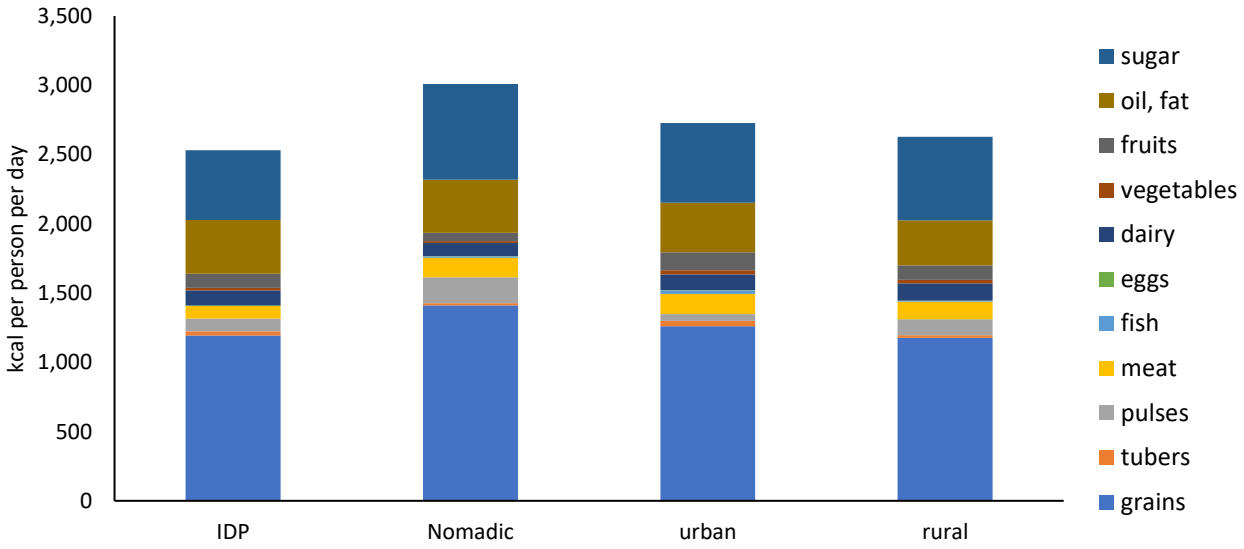
Figure 6. Percentage of people living in households that meet their recommended energy intake, by age of individuals (HFS 2017, own calculation)



To evaluate additional intake data, based on household access and household availability using food from purchase and own-production, an intake estimate was calculated based on the 2017 HFS (see Methodology Section and Appendix). Assuming reliable data, it indicates that 44 percent of households do not meet their energy requirements. In other words, they are below the threshold of what is considered the appropriate level of energy intake (but this number does not take into account how far below the threshold they are). Calculations also reveal a disparity between wealth quintiles when it comes to sufficient energy and micronutrient intake: Between only 33 and 45 percent of poor household meet their energy requirements, while 82 to 90 percent of non-poor households do. This makes poor households twice as likely to be energy deficient than non-poor households. Households in the wealthiest quintile are 16 times more likely to meet their energy requirements than households in the bottom quintile. Adolescents (13-18 years old, both sexes) and older people (50 years+) are more likely than other age groups to live in households that do not meet their energy needs (59 and 54 percent, respectively) (Figure 6). This indicates that households with adolescents and elderly members particularly struggle to access enough food to meet everyone's requirements.

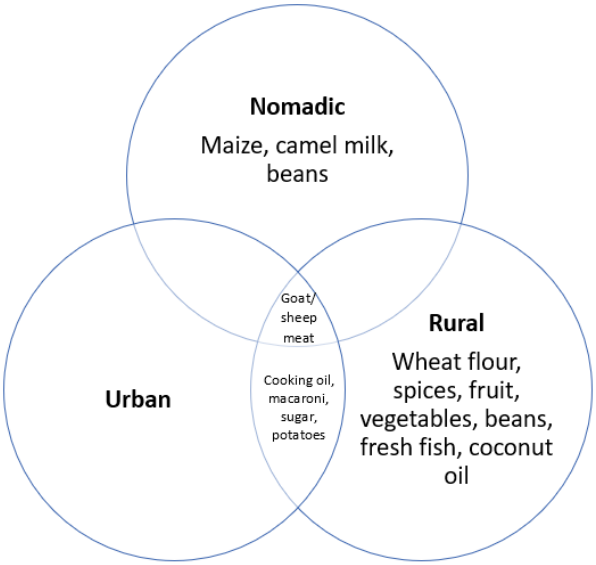
Somalis derive their dietary energy mainly from staples (46 percent), oil (14 percent) and sugar (19 percent) and some from nutritious foods (20 percent), these being meat (5 percent), milk (4 percent), fruit (4 percent) and pulses (3 percent). Nomadic populations have an overall higher energy consumption, mainly from more grain and sugar consumption. Disaggregating the daily consumption estimate gives an indication of how far below recommended intake of energy different livelihoods are. Figure 7 demonstrates that IDPs are on average 500kcal below the threshold of what is considered acceptable for an Adult Male Equivalent energy intake, with the urban and rural areas also below that threshold. While the kcal consumed is different between livelihood systems, overall dietary patterns do not vary substantially between rural, pastoral, urban and IDP. (Figure 7). Fat intake is generally within the recommended boundaries of 15 to 30 percent of dietary energy intake for adults, mainly sourced from vegetable cooking oil.

Figure 7: Daily Consumption (in kcal) by food group and livelihood system, AME standardized (HFS 2017, own calculations, 1 AME is equal to 3060 kcal)



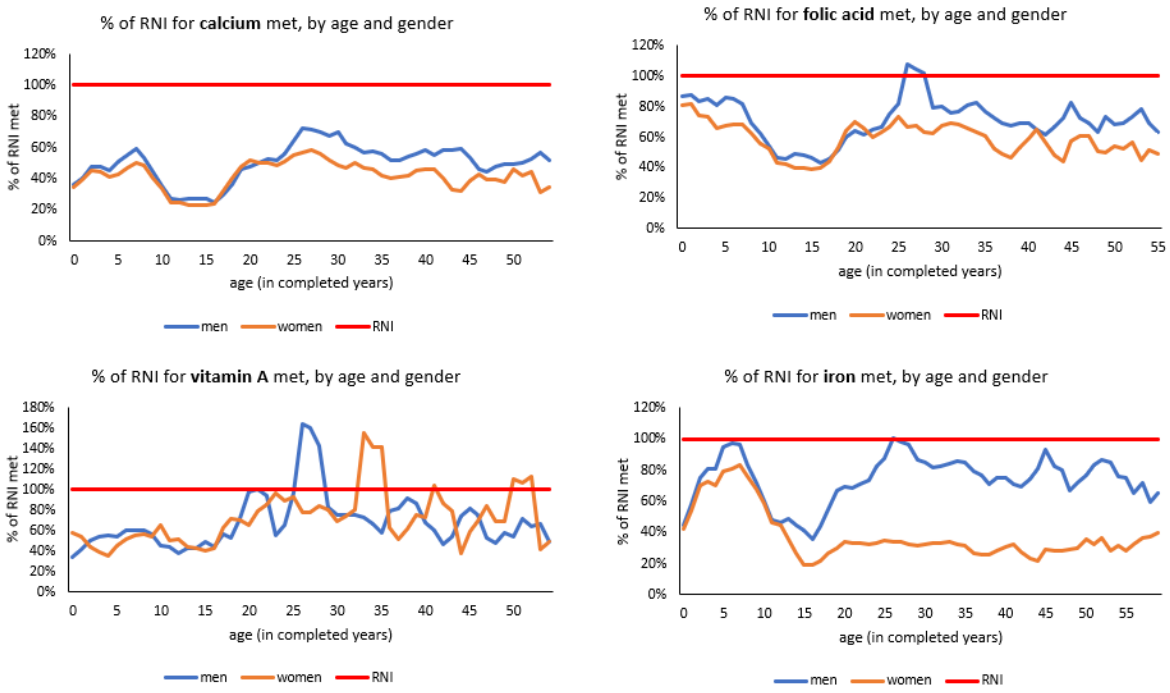
Dietary patterns do not vary significantly across poor and non-poor households. Non-poor households tend to show a similar distribution of calorie intake across food groups despite their overall higher calorie intake. With increasing income, all households tend to consume more sheep and goat meat. Nomadic households diversify their diets by including more maize, camel milk and beans. Rural and urban tend to consume more cooking oil, pasta, sugar and potatoes, compared to IDPs and Nomadic households. In addition, rural populations also consume more wheat flour, spices, fruit, vegetables, beans, fresh fish and coconut oil (Figure 8). In other words, nomadic and rural populations expand their food basket to include more nutritious foods with increasing income, while urban population increase their consumption of mainly energy-dense foods and meat.

Figure 8: Food items household consume more (in terms of dietary energy) if income increases (HFS 2017, own calculation)



Overall, micronutrient intake is inadequate throughout the country for most households. Most of the micronutrients absorbed come from staple foods, which include rice, maize, millet, sorghum, wheat and pasta, but intake from staples alone is not enough to meet nutrient needs. Dietary intake of zinc, vitamin B12, B2 and C are adequate, but calcium, vitamin A, folic acid and iron intake is low. Calcium intake from dietary sources is lower than recommended throughout the lifecycle, but particularly low during early adolescence when boys and girls meet only about 20 percent of their recommended calcium intake. Vitamin A intake is low for children and adolescents (both sexes). Folic acid intake is low in early adolescence when children meet only about 40 percent of their recommended folic acid intake but is low for all individuals throughout the lifecycle. Iron intake is inadequate for young children (6 months -3 years) as well as for adolescent (both sexes). After the age of 25, men meet about 80 to 100 of their recommended iron intake from food while women only meet between 20 and 40 percent of their iron requirements as their needs are much higher.

Figure 9: Percentage of recommended nutrient intake (RNI) of calcium, vitamin A, folic acid and iron met, by age and sex (HFS 2017, own calculations) NOTE: estimates are rolling averages across three years of age.



Iron intake is lower among urban populations than among rural and nomadic populations. Main driver of this difference is their choice of grains. Nomadic and rural populations consume more grains high in iron (≥0.2mg per 100g) such as sorghum and millet while urban populations consume a greater amount of grains low in iron (≤0.1mg per 100g) such as rice and pasta.

Snacking, the consumption of soft drinks and eating out, behaviors associated with rising levels of overweight and obesity, are not widespread in Somalia. Only two percent of households consumed canned/ bottled juices, coffee, soft drinks respectively and ten percent consumed Vimto (squash), four in five (79 percent) households consumed tea the week prior to data collection of the HFS. Likewise, only ten percent of households had biscuits in the week prior to the interview, but 95 percent consumed sugar. Only less than two percent of households ate a meal or drank a beverage out of home.

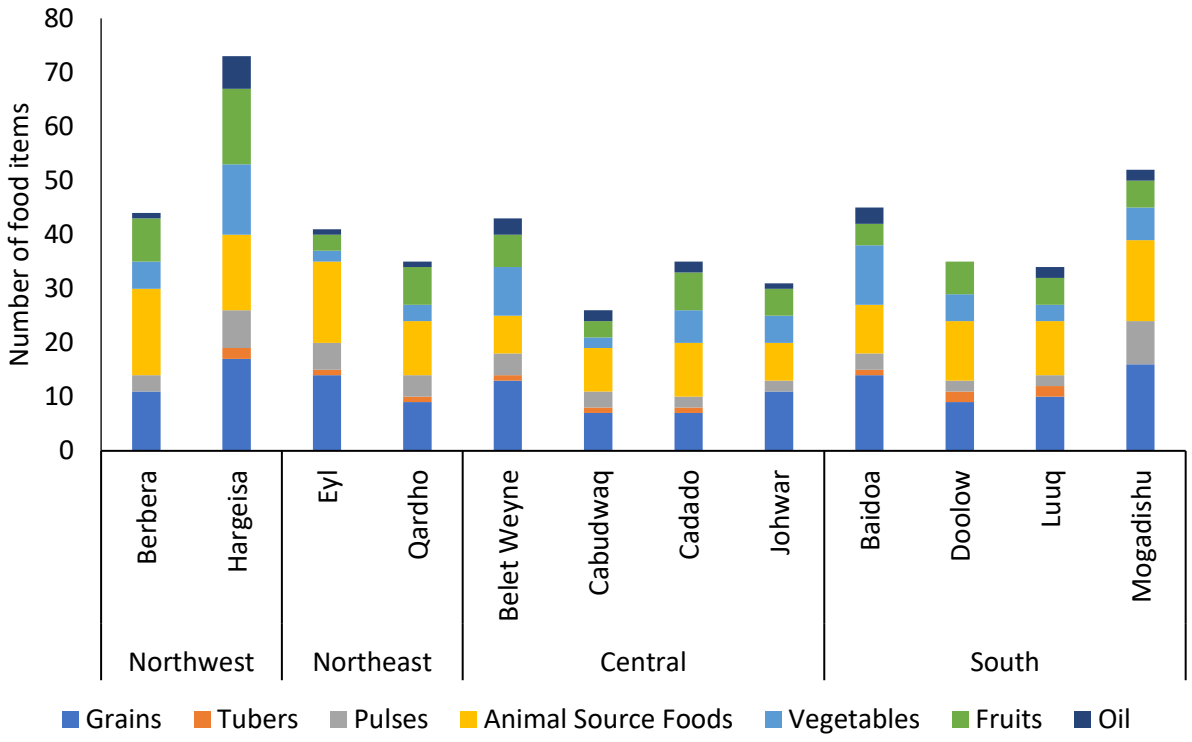
On average, 62 to 82 percent of total household expenditure is on food, considered very high and indicative of high levels of poverty.

Findings from Cost of the Diet: Availability and Accessibility of Nutritious Foods

Meeting nutrient needs for all household members with locally available foods is not possible in some markets. The availability of nutritious foods in the local markets is limited, especially those accessed by the pastoralist livelihoods. Energy-dense foods such as grains, oil and sugar are cheaper per calorie than nutrient-dense foods.

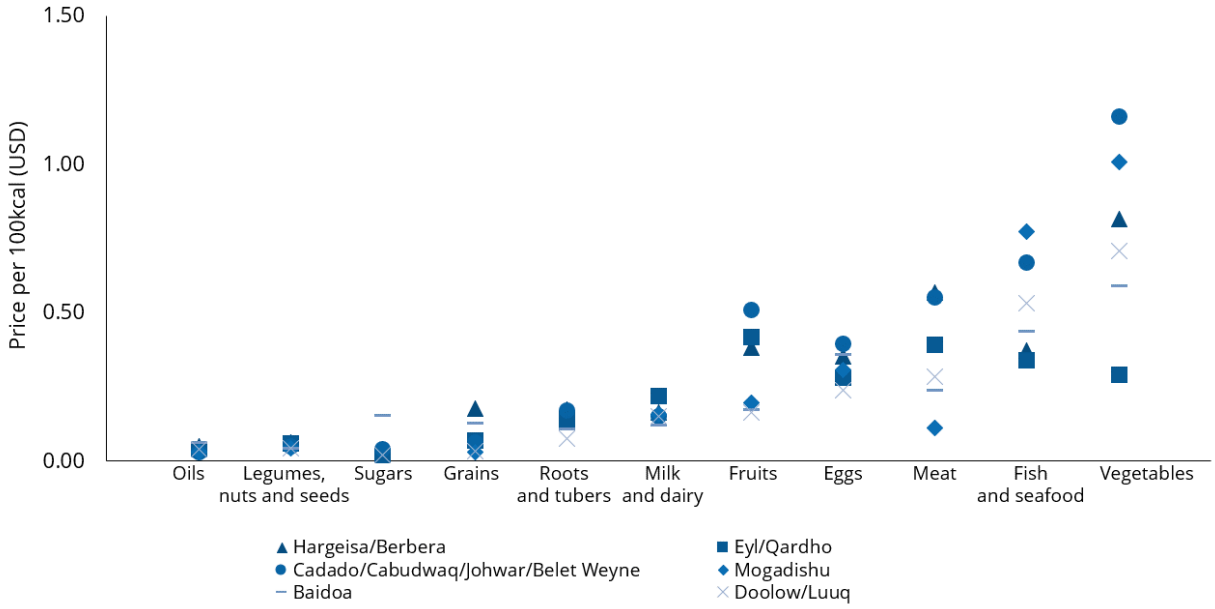
The availability of nutritious food varies substantially across markets. On average, markets in Somaliland (Hargeisa, Berbera, in Northwest Somalia) offered a total of 42 different food items compared to an average of 23 food items in markets in Hirshabelle, the autonomous region in South Central Somalia (Cadado, Cabudwaq, Johwar, Belet Weyne). Availability of vegetables is particularly low in Eyl, Qardho, Doolow and Luuq.

Figure 10: Number of foods available by food group where food price data were collected



Vegetables, fruit and animal source foods were most expensive per calorie (Figure 11) and their prices varied widely across the country. On average, energy-dense foods such as grains, oil and sugar cost $0.04 (oil, sugar) and $0.08 (grains) per 100 calories, while nutrient-dense foods cost $0.32 (eggs) and $0.52 (vegetables) per 100 calories. Meeting energy needs is cheapest with commodities low in other essential nutrients, including protein, vitamins and minerals.

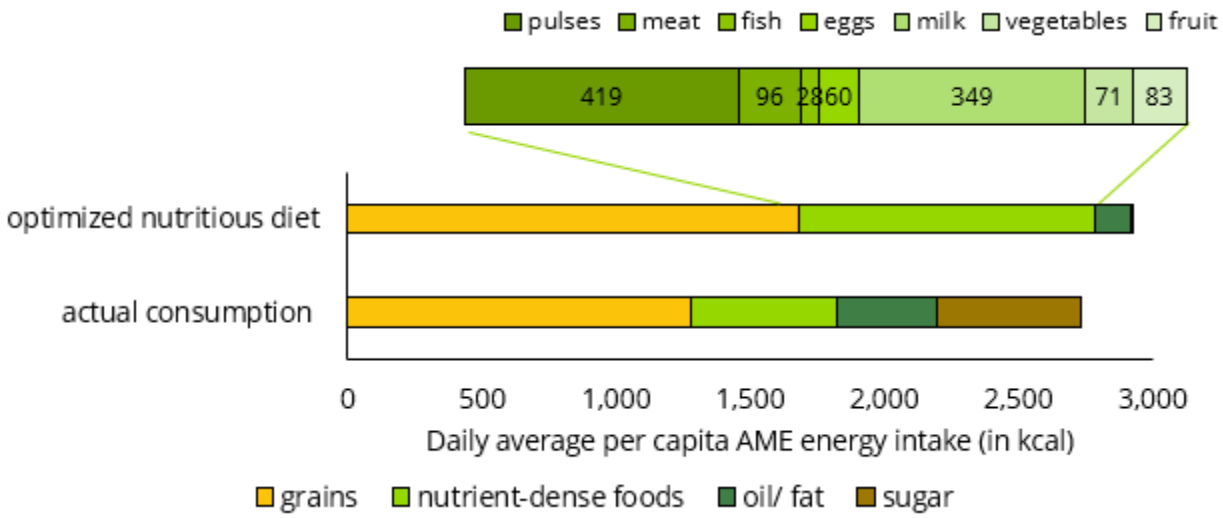
Figure 11: Food prices per 100kcal ($) (Primary data collection).



The availability of fresh nutritious foods, specifically green leafy vegetables, greatly impacts the quality of diets that can be sourced from markets. For Johwar and Qardho, where the number of foods was low compared to other markets and no green leafy vegetables were available, it was impossible to meet nutrient requirements with the foods available. Green leafy vegetables are particularly nutritious, because they provide a wide range of micronutrients (e.g. iron, vitamin A, calcium, B-vitamins, vitamin C) while having a very low caloric content.

Unpacking what micronutrients specifically drive high cost shows that calcium, iron and folic acid are the most expensive micronutrients to supply with what is available in the local markets. These were also the micronutrients undersupplied by the current diet, indicating that households might face financial barriers to accessing food sources that supply these nutrients.

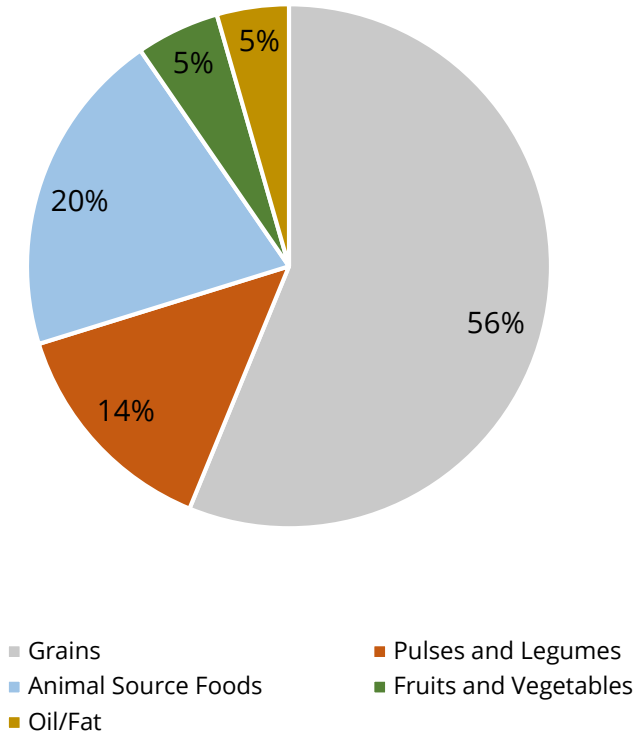
Figure 12: Daily average per capita (Adult Male Equivalent) energy intake for optimized nutritious diet compared to actual consumption (HFS 2017, own calculation).



Proportionally, a diet optimized by the Cost of the Diet software consists of much more nutrient dense foods, compared to actual consumption. The average nutritious diet has roughly 40 percent of energy from nutrient-dense foods, compared to less than 25 percent in the actual consumption. Notably, household's actual diet includes a larger portion of energy from sugar than an optimized diet would include.

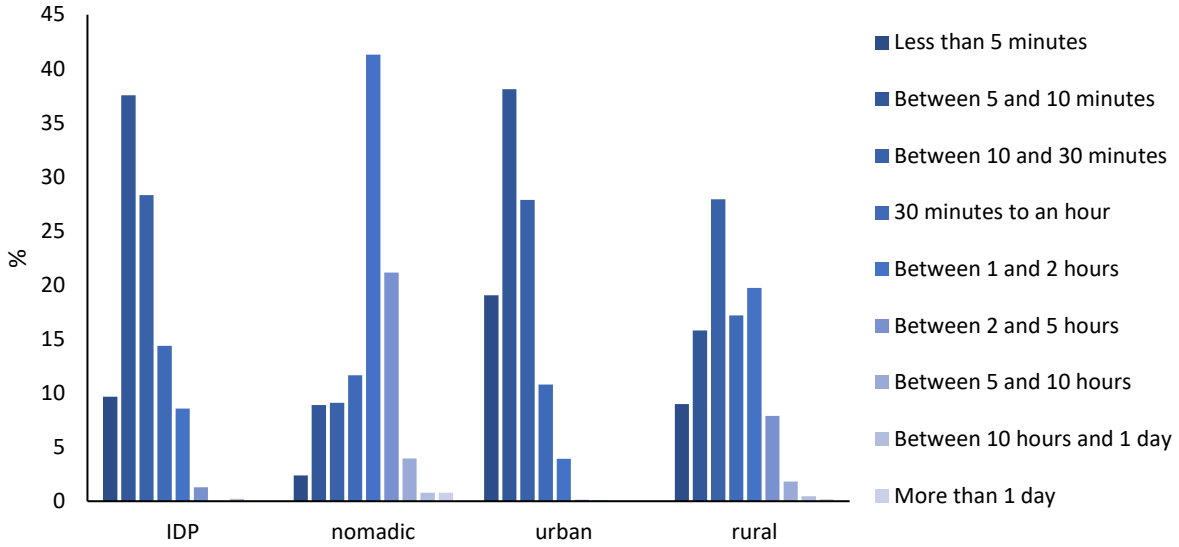
In terms of content by weight and food group, an average optimized diet would be composed of around 56% of daily energy from staple grains, It is noteworthy that large parts of Somalia still consume comparably nutritious staples, such as millet, sorghum and maize, which may explain why staples make up more than 50 percent of dietary energy. The rest of the optimized diet is split between pulses (high in protein), animal source foods (providing several micronutrients, especially of the B-Vitamin variety and essential minerals), fresh fruits and vegetables (particularly important for adequate Vitamin A and C intake) and Vitamin A-fortified Oil. For a full breakdown of diet composition by market and livelihood, please refer to the tables in Appendix B.

Figure 13: Average composition of a nutritious diet by food group in percentage of daily energy. (CotD 2019)



In addition to facing lower availability at some markets, geographic access varies between livelihood zones. While the majority of sedentary rural, urban and IDP population report a maximum travel time of 1 hour to the nearest market, the nomadic population largely faces up to 5 hours per trip to the market (see Figure 14). The combination of finding less fresh foods at the markets and a longer travel time can also act as a negative multiplier, making it more likely that the nomadic population will focus on staple and dried foods for their market purchases. Fresh foods that would perish quicker and may require cold chain are likely undesirable for long transport routes.

Figure 14: Average travel time to the market (HFS 2017).



This assumption is substantiated by Figure 15, showing that all households depend on markets for some part of their dietary energy. Pastoralist households in particular rely on markets for a large share of their dietary energy. Figure 15 also shows that even the poor households in pastoralists source around 10 percent of dietary energy from their own milk and meat – going up to 20 percent for the better-off households. The largest source of foods – consistent at around 40 percent of energy requirement across all wealth groups in that livelihood zone – are staple purchases, followed by other food purchases. While the other livelihood groups have a less consistent pattern in consumption, they mainly consume energy from their own crops.

Milk and meat commodities have less energy and more protein and micronutrients than crops. The relatively high consumption of own milk and meat, and other food purchases of the poor households in pastoral zones compared to other zones may indicate a potential benefit of the pastoralist livelihood, by providing them comparatively better access to nutrient-dense foods. Further research is needed to fully understand these dynamics, especially in light of trade vulnerabilities of producing a highly perishable commodity.

Since the overview shows the breakdown by dietary energy, this does not allow us to draw conclusions on how lucrative these interactions are financially. However, sales and expenditure trends in the pastoralist livelihood show that the predominant source of cash for all wealth groups is the sale of livestock and that about one third of expenditure goes to staple food and non-staple food, each.(Food Security and Nutrition Analysis Unit (FSNAU) and Famine Early Warning Systems Network (FEWS NET) 2016)

Figure 15: Main sources of food (in percentage of average energy requirement) by livelihood and wealth (FSNAU and FEWS NET 2016)

Figure 6: Sources of food

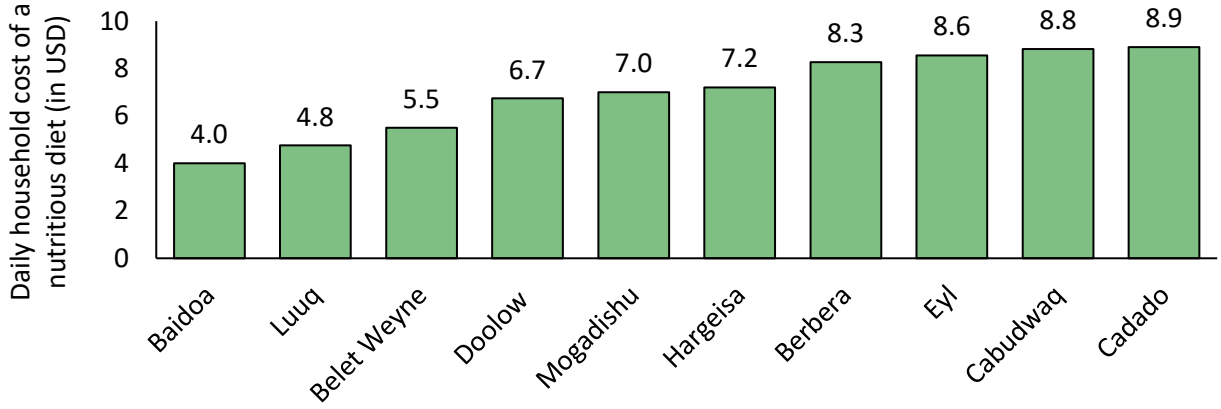
Findings from the Cost of the Diet: Affordability of nutritious foods

One in ten households cannot afford to meet energy needs with locally available foods; eight in ten cannot afford to meet nutrient needs. Only in the south can a larger share of pastoral and urban communities afford a nutritious diet.

Consuming a nutritious diet ($6.96) is almost four times more expensive than a diet that meets energy needs only ($1.85) (Figure 17). Compared to current diets, the optimized nutritious diet contains much greater quantities of nutritious food and much lower quantities of oil and sugar (Figure 12). To optimize their nutrient intake, households would need to eat more pulses, milk, meat, fruit and vegetables. Taking into consideration local food habits, it is much more expensive or not possible to meet nutrient requirements with the foods available in the markets, particularly for nutritionally vulnerable individuals.

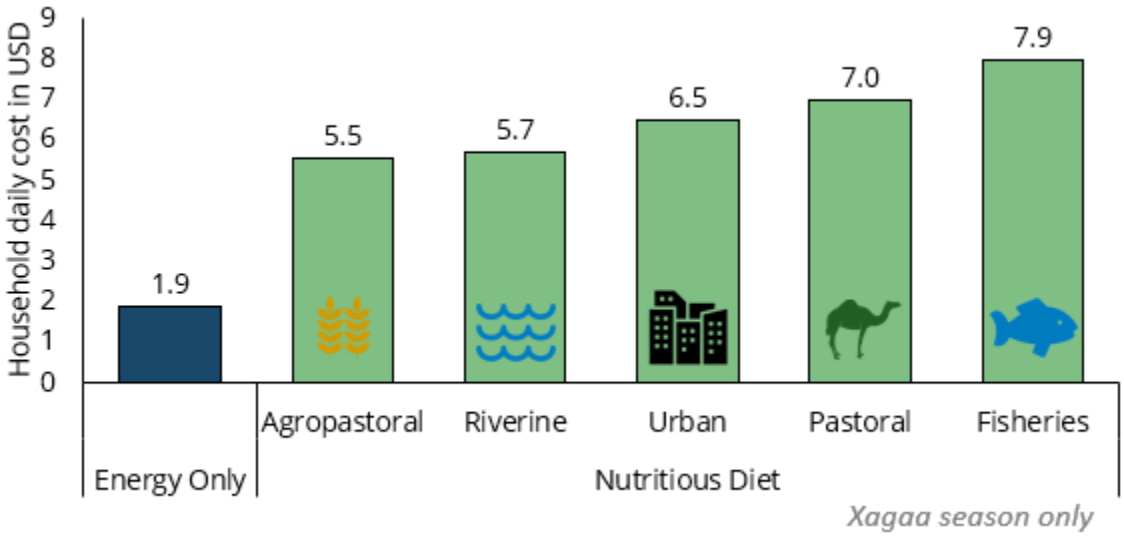
Location is also key when it comes to cost of the diet: The daily cost of a nutritious diet for a modelled household varies considerably across markets, from $4.0 per day in Baidoa to $8.9 in Cadado.

Figure 16: Average daily cost of the diet for a household by market of assessment (CotD 2019)



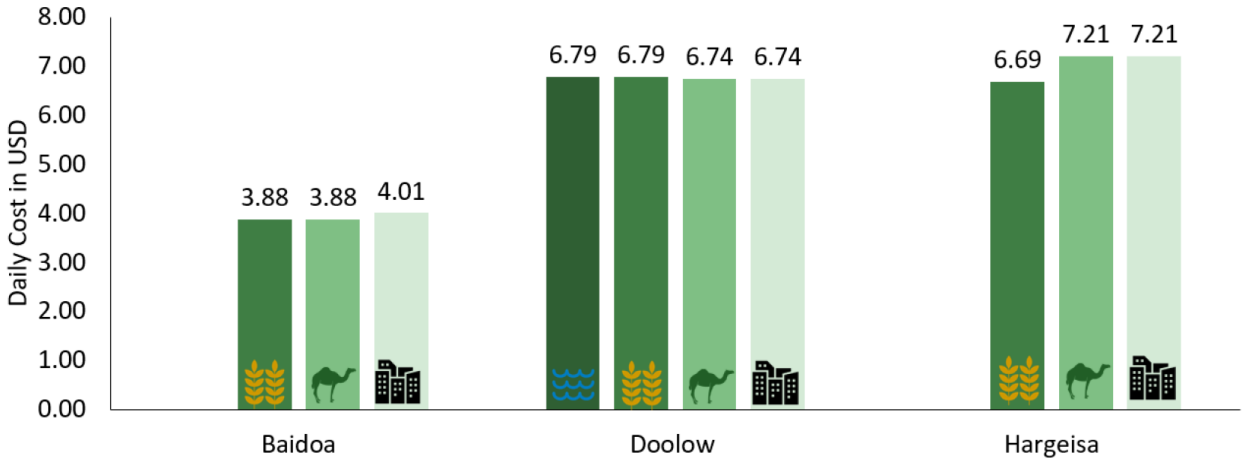
By livelihood system, markets accessed by fisheries and pastoral households have the highest cost of a nutritious diet ($7.9 and $7.0 respectively), followed by urban households ($6.5), riverine households ($5.7) and agro pastoral households ($5.5) (Figure 17). Although staple preferences can influence the cost of the nutritious diet, differences in the cost of a nutritious diet by livelihood are driven more by food availability and prices in the markets serving these livelihoods, than by their food preferences. Consuming more nutritious staples (e.g. maize, millet, sorghum) translates into a less expensive nutritious diet overall, although the staple itself is more expensive.

Figure 17: Daily cost of a nutritious diet for a modelled household by livelihood zone ($).



Comparing the cost of markets that serve several livelihood zones, it becomes clear that what drives cost is often the geographic location, rather than actual food habits. Comparing the cost for the agropastoral, urban and pastoral livelihoods from three markets that serve all three shows that the cost of the diet within a market is relatively homogenous.

Figure 18: Average daily cost of a diet for households of different livelihoods at similar markets (CotD 2019).

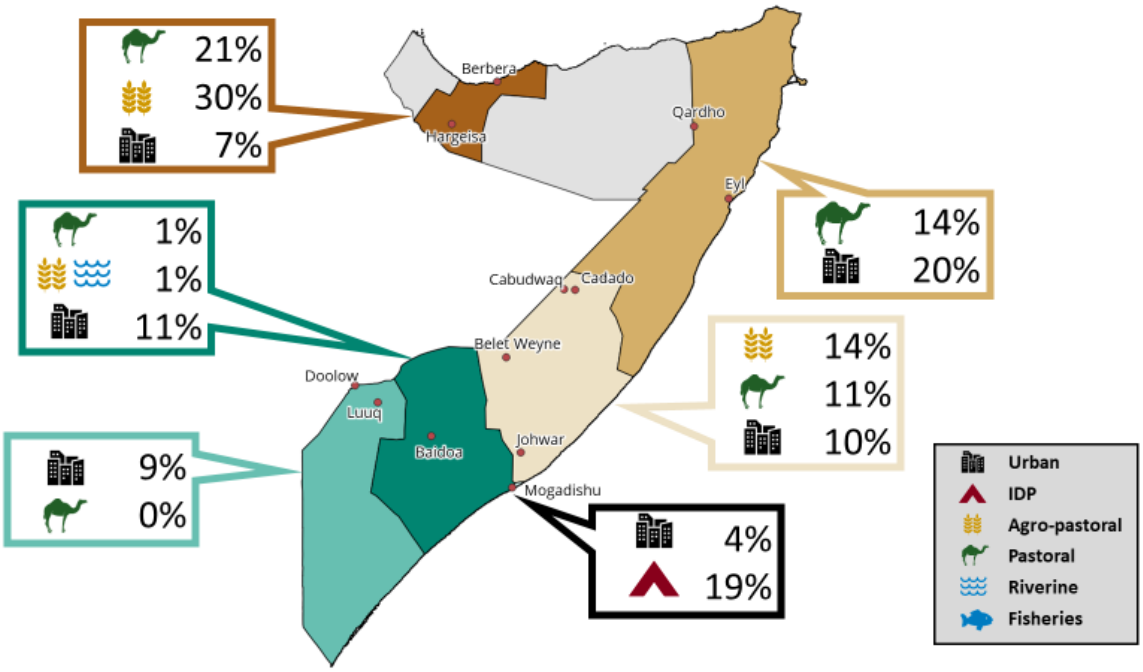


Comparing average cost by market only (Figure 16) with those of livelihood zone (Figure 17), shows that the relatively high cost of the pastoralists is driven by high cost in regions that are predominantly pastoralist, such as Eyl, Cabudwag or Cadado. In other words, pastoralist diets are not expensive due to a certain lifestyle of staple preference, but because they – unlike other livelihoods – buy foods where prices are above average and availability is low. The combination of these factors means that there is a higher cost burden on pastoralist households.

Non-affordability of the energy-only diet ranged from 0 percent (meaning all households could afford it) for households from the pastoral communities accessing the Doolow/Luuq markets, to 30 percent for households from the agropastoral communities accessing markets in Hargeisa and Berbera (Figure 19). Non-affordability of the nutritious diet ranged from 30 percent for pastoral households accessing markets in Doolow/Luuq, to more than 90 percent for urban and IDP households accessing markets in Mogadishu, pastoral and

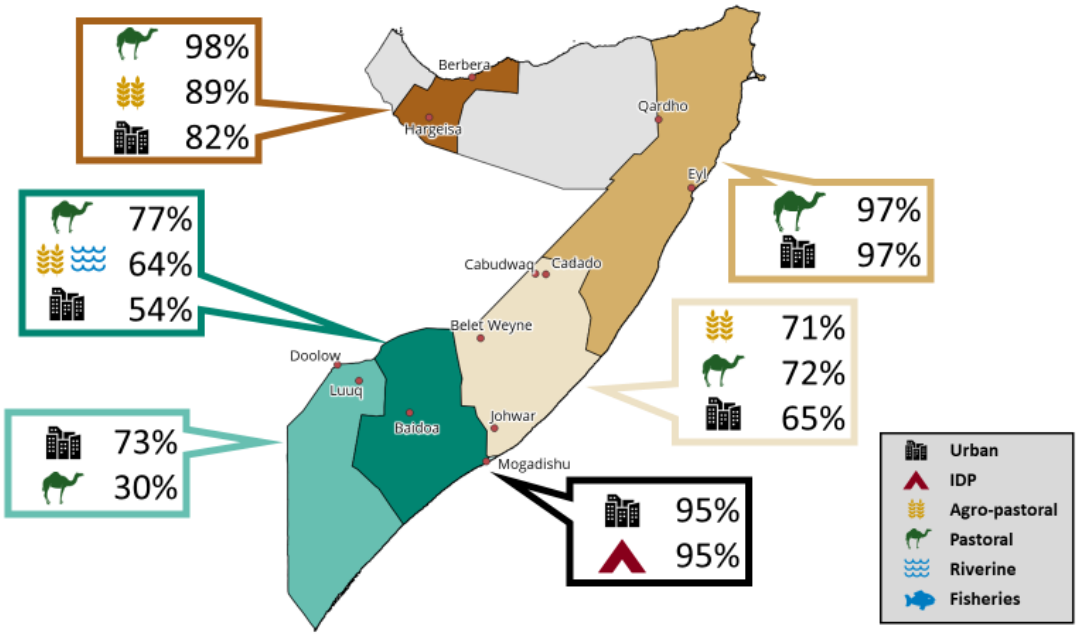
urban households accessing markets in Qardho and Eyl, and pastoral households accessing markets in Hargeisa and Berbera (Figure 20 and Figure 21).[5]

Figure 19: Average non-affordability of an energy-only diet by livelihood within each analytical zone.



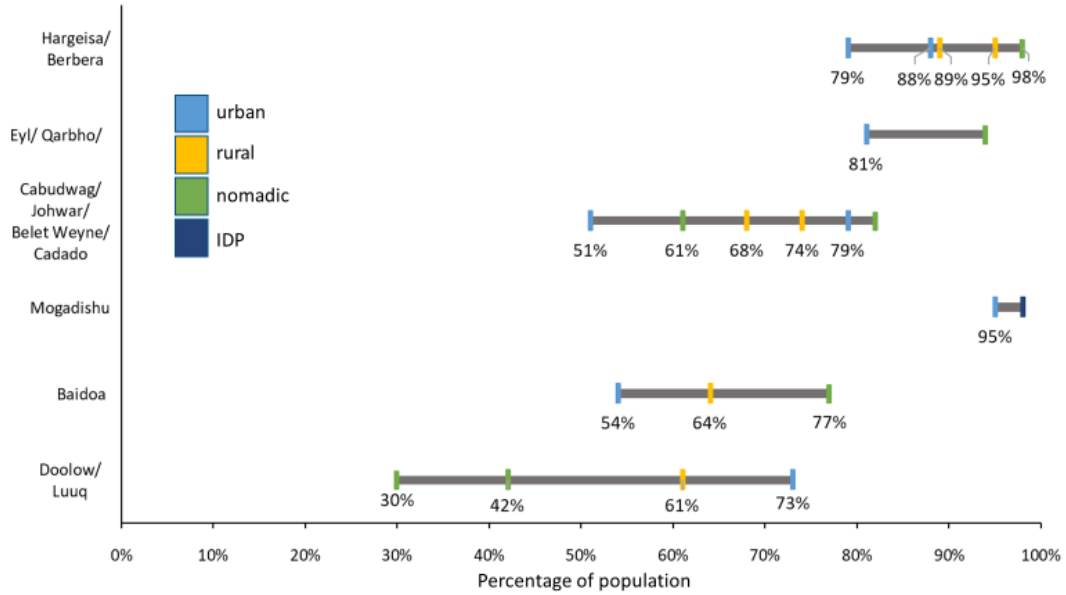
[5] A flat food expenditure curve for Mogadishu and Hargeisa, combined with prices and availability specific to the summer, led to high non-affordability in these areas. Due to the absence of more granular and detailed information on economic status of households, they may benefit from re-evaluation of non-affordability findings should better food expenditure data become available.

Figure 20: Average non-affordability of a nutritious diet by livelihood within each analytical zone.



As markets are accessed by a wide range of different livelihood groups, their non-affordability variations can be high. As Figure 21 shows, it can range from 50 to 80 percent within one market. It is therefore essential to understand the specific dynamics around the markets to describe economic access.

Figure 21: Range of non-affordability estimates for all livelihoods within analytical zones (markets).



Food Environment: Seasonal and year-by-year fluctuations in food prices

During years of crisis, high food prices coincide with low prices for livestock, putting pastoralists at extreme risk. Year-on-year fluctuations in food prices appear to be more significant than seasonal fluctuations. Better data is needed to understand the variation of availability and prices of fruit and vegetables across seasons, and drivers of variation in food prices.

Seasonal and year-on-year fluctuations in the food supply impact food availability in markets. This analysis considered a range of data sources to determine trends of food price fluctuations and their impact, including focus group discussions, FSNAU and WFP food price monitoring, and seasonal GAM rates.

Focus group participants identified a diverse range of drivers for fluctuations: seasonal changes in ocean currents affecting food imports and fishing activities; difficulty growing fruit and vegetables during the dry season; depletion of natural resources limiting access to foraged foods and game; and conflict and insecurity limiting the distribution of fresh foods and access to markets.

To estimate systematic food price fluctuations across months and years, FNG averaged the cost of a minimum food basket (CMB) as calculated by FSNAU[6] across (1) months (i.e. averages of CMB in the same month of different years); and (2) years (i.e. average of all 12

[6] For a brief overview of the methodology of the CMB, please refer to the Appendix.

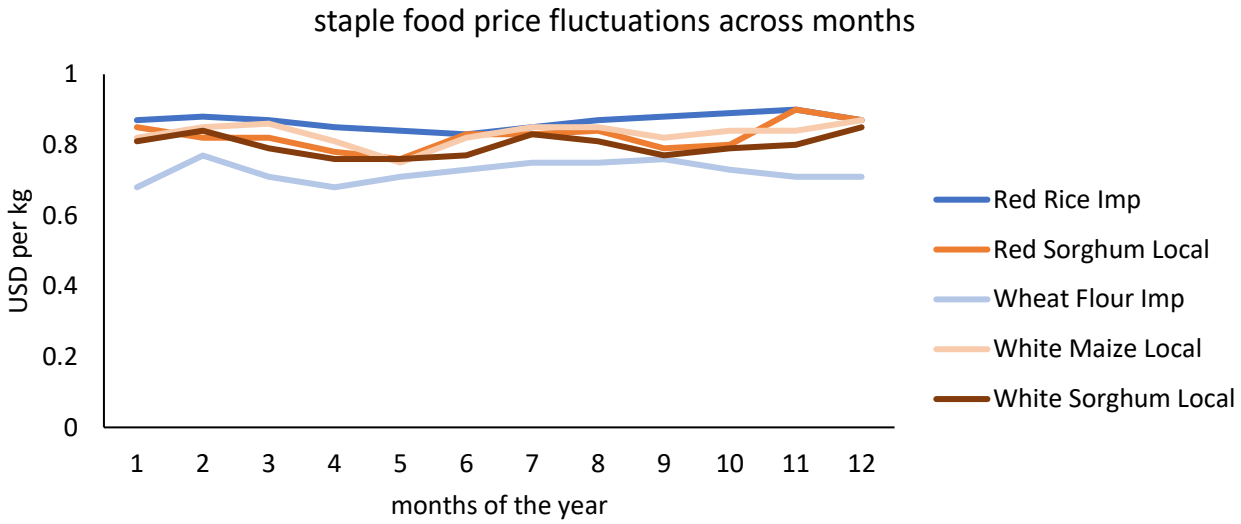
months of the year). An analysis suggests that across commodities the former (month-by-month fluctuations in CMB) might be less pronounced than the latter (year-by-year fluctuations). Prices spike particularly in years of below-average rains and drought-related harvest losses.

Yet, qualitative analysis shows that drivers of the fluctuations of food availability and prices might vary by food item, so that the average appears constant, but individual food prices vary substantially. For example, during the rainy seasons when crops are planted and grow on the fields, staple prices might be high, but the price of fresh fruits and vegetables might be low.

Food price data by individual commodity is collected and reported on a monthly basis by FSNAU and WFP, but is generally limited to staple foods, meat and milk and of poor quality. Numerous outliers suggest inaccuracy in data collection which was confirmed by people overseeing the data collections. No data exists on food prices of fruit and vegetables beyond onions, tomatoes and bananas.

Although no systematic fluctuations could be observed across the country and the total food basket, WFP market data collected from 2013 to 2019 suggests staples such as rice and wheat (also wheat products), which are largely imported by Somalia, show less seasonal fluctuation, as their price is less dependent on Somali environmental factors. However, Sorghum and Maize, which are commodities widely grown in Somalia, shows seasonal trends around harvesting time.

Figure 22: staple food price fluctuations across months (WFP 2013-19)



During 2014 and 2017 the percentage of children with acute malnutrition among pastoral households increased sharply. In comparison, riverine and IDP livelihoods record rather

small, seasonal fluctuations with small spikes during spring, the season of heaviest rains. This highlights the need to tailor interventions to increase resilience to shocks to livelihood system-specific drivers of fluctuations.

2011, 2014 and 2017 were considered crisis years due to widespread harvest losses. The prices of locally-grown staple foods showed high volatility and were an average 14 percent higher than non-crisis years. The local price for livestock was an average 18 percent lower than non-crisis years. The combination of increased staple food prices and decreased income from selling livestock put stress on households. This particularly applies to pastoral households because of their high dependence on markets to source their foods, and on selling one commodity (livestock) to generate income. Pastoralists source between 5 and 35 percent of their calorie intake from own production. This share is significantly higher among agro-pastoralists (40 to 80 percent) and riverine agriculture communities (60 to 80 percent).

Food supply chains: Cost of the Diet models and interventions

Staple fortification has unique potential to improve nutrient content of foods widely consumed. Creating infrastructure for fortification of locally produced grains and introducing legislation for imported foods could reduce cost to the household by over 10 percent. As nutritious food supply is heavily dependent on imports, focusing on diversified domestic agricultural production, reduced post-harvest losses, improved value chains and expanded fisheries is promising for nutritious, fresh foods.

Availability of foods, particularly nutrient-dense foods such as green leafy vegetables and animal source foods, is a major bottleneck for accessing a nutritious diet in many parts of Somalia. There are three mutually complementary ways to increase the availability of foods: increase their availability at the market; increase homestead production; and/or increase the nutritional value of existing foods in the market.

Increasing the Availability of Foods in the Market

Limited market availability impacts negatively on nutrition, especially for pastoralists. The impact of improved availability has been well-documented, but several interventions across the agricultural value chain are needed to make vegetable production an attractive and profitable livelihood. These include improved agricultural inputs (seeds, fertilizers), appropriate irrigation mechanisms, connectivity to markets, and finance products such as crop insurance for smallholder farmers to enable them to take risks and transition to production of more nutritious crops.

Opportunities exist for Somalia to expand domestic food supply and modernize the agricultural sector. Although estimations may be limited by informal transactions, roughly 75 percent of GDP is said to be from agriculture. However, since 1989 cereal production

has declined by 60 percent, showing that current production is well below its potential. 93 percent of all exports are from agricultural products, roughly $634m in 2015. Within that, by far the largest share take livestock at 84 percent of total exports (see Figure 23), which is 5 times higher now than it was pre-war. Food imports on the other hand are 18 times higher now. Decreasing cereal yields and little vegetable and fruit production have therefore manifested Somalia's position as a net importer of food. It is worthwhile to highlight that the value of imported cereals, vegetables and fruits (over $800m) exceeds the value of all agricultural exports (Figure 24).

Figure 23. Value of agricultural exports by commodities over time (IBRD/WB and FAO, 2018)

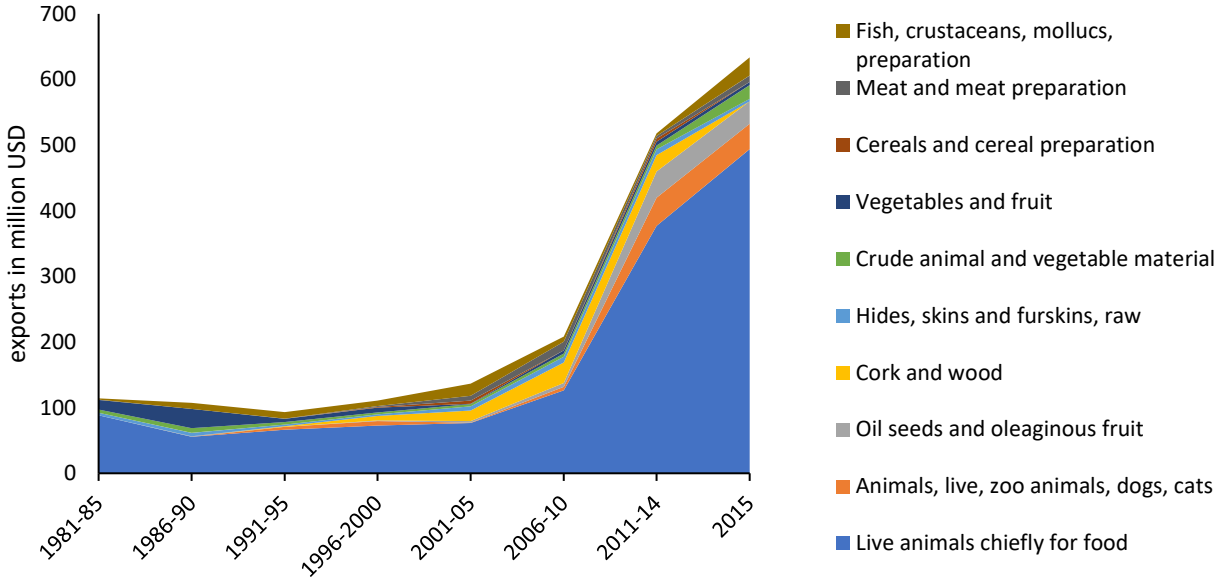
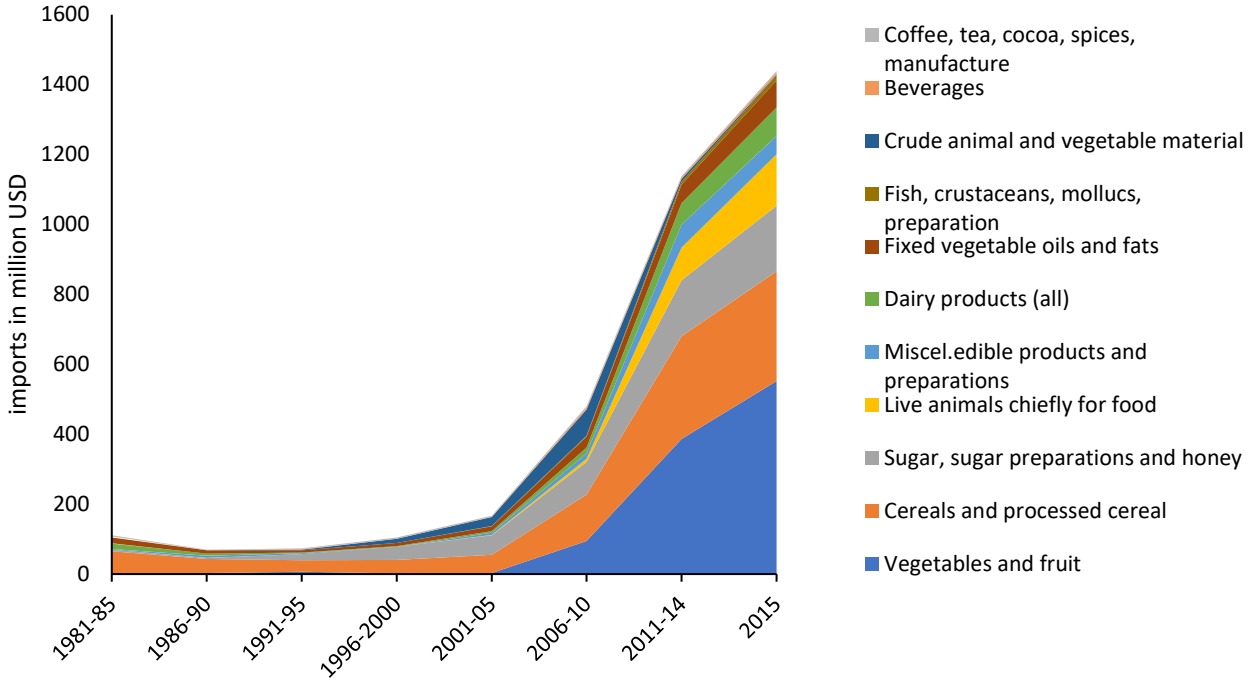


Figure 24: Value of top agricultural imports by commodities over time (IBRD/WB and FAO, 2018)



It is obvious that changing and scaling up a country's agricultural production system will take time. Still, secondary literature and operational research highlights three major opportunities for quick first initiatives that stand out in their improvement on production: Reducing post-harvest losses, modernizing the value chain of raw (animal) products and expanding the fisheries sector.

Post-harvest losses for fruit and vegetables are 20-50 percent of total production and 26 percent for cereals across Somalia. The biggest post-harvest loss for the three main cereals (sorghum, maize, rice) occurs during the harvest and field drying, closely followed by losses during the processing (threshing, shelling or winnowing – a method of separating grain from straw) of the crops.

Just in southern Somalia alone, the annual losses for dried and fresh commodities are estimated to be between 50,000-80,000 tons – a value of $15-20 million (FAO and World Bank 2018). The majority of losses occur due to traditional underground storage (40 percent of losses) and transportation and drying processes (20 percent).

While there are no major studies looking at the causal links in post-harvest losses for specific value chains for Somalia, studies from Ethiopia and Kenya may prove to be a first reference point. A study looking at quality deterioration of horticultural crops in Ethiopia's Dire Daua region, identified that between 20-50 percent of horticultural crops are lost,

ranging from 45 percent for tomatoes and 16 percent for coffee. In addition to pointing out environmental factors, which are very similar to Somalia, this study highlighted the need to bring in better quality equipment during harvesting, packaging, storage and transportation (Kasso and Bekele 2018). A different study on risk factors contributing to camel milk quality losses along the milk value chain in Kenya highlighted hygiene, water access and cold chain issues as specific issues for this commodity. Researchers identified that higher microbial contaminations might contribute to quicker deterioration, with key reasons being lack of handwashing, bulking together milk from sick and healthy camels and time spans between milking and cooling ranging up to 30 hours (Odongo et al. 2016).

Several studies have shown the potential to modernize across value chains to add value to raw products, such as chilled meat, honey and milk (as opposed to live animal exports). Research carried out by the International Lifestock Research Institute (ILRI) has highlighted three main recommendations to tap into the potential of value chain of raw products: improved information sharing on what constitutes value addition, the building of product identity (i.e. specifically Somali products) and coordination to re-distribute who bears the cost of production (Negassa et al. 2012). Concretely, improved use and consumption of byproducts (skins, hides for sale and offal or other meats for food) and a focus on value addition at the origin were identified as opportunities to optimize use of resources.

Profit margins are relatively low for small traders (3-12 percent), but they are higher for the exporters (11-24 percent) as margins are largely driven by number of animals sold. However, the study suggests that since small traders have access to shorter supply chains, they may be able to sell meat competitively. Additionally, slaughterhouses are operating below their capacity, meaning that they are able to also increase their production and potentially also produce more for the domestic market, if demand goes up.

A big constraint in scaling up the meat market are that incentives to participate are unknown and little investment funding is available, which hinders growth. There seems to be high seasonal fluctuation in both the supply and demand of meat as well as fluctuation in processing cost (freight and logistics). Often stocks appear to be purchased in high season and are slaughtered in lean season, creating fluctuation in supply. Demand is predominantly driven by important Muslim festivals such as Ramadan, Haji and Maulid. As the religious and the seasonal calendar do not always overlap this can mean that peak times in supply and demand do not always match, creating both undersupply and waste (Negassa et al. 2012).

Another opportunity is expanding the fisheries sector to take advantage of Somalia's coast, an abundant natural resource. Currently, large amounts of this resource are being captured through Illegal, Unreported and Unregulated (IUU) fishing. Commercializing and regulating the fisheries sector could come with benefits not just for the economy, but also food system. The National Development Plan identified the goal to increase value of catch

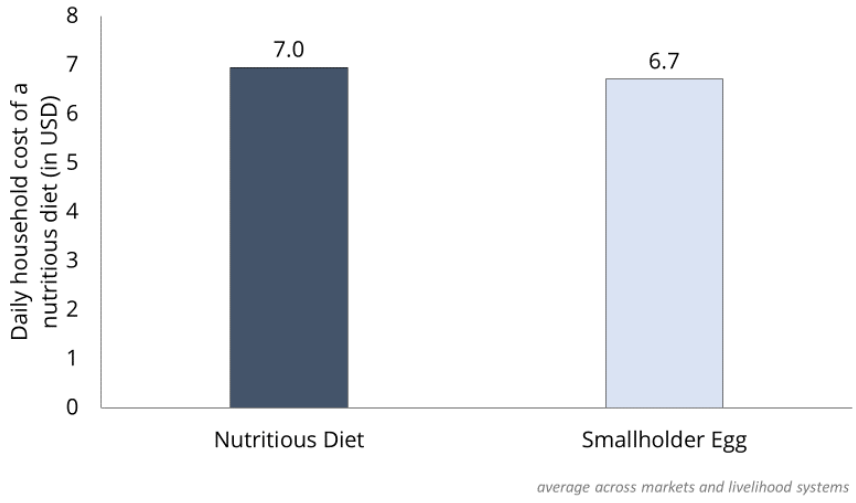
to USD 65m by 2019, although it is not clear whether this has been achieved. Making fish, either fresh, dried or – if appropriate cold chains are available – frozen, available throughout the country would improve access to animal source protein and essential micronutrients such as calcium and B vitamins.

In Johwar and Quardho, the two markets where a diet meeting all nutrient requirements could not be calculated, modelling the availability of spinach at average market price made a nutritious diet possible for all individuals, at $5.5 and $7.2 per day respectively. Increasing availability of foods in the market can improve the likelihood of all household members accessing a healthy diet.

Increasing Homestead Food Production

Homestead food production can be complementary to what is available at the market. Models on homestead production focused on sources of micronutrients that were lacking or very expensive (e.g. calcium) from animal source foods (eggs and goat milk) and vegetables. One potential intervention is to increase the household supply of eggs with small-scale home production. A weekly production and consumption of 20 eggs would reduce the daily cost of a nutritious diet from $7.0 per day for the modelled household to $6.7 per day (Figure 25).

Figure 25: Daily household cost of a nutritious diet with smallholder egg production.

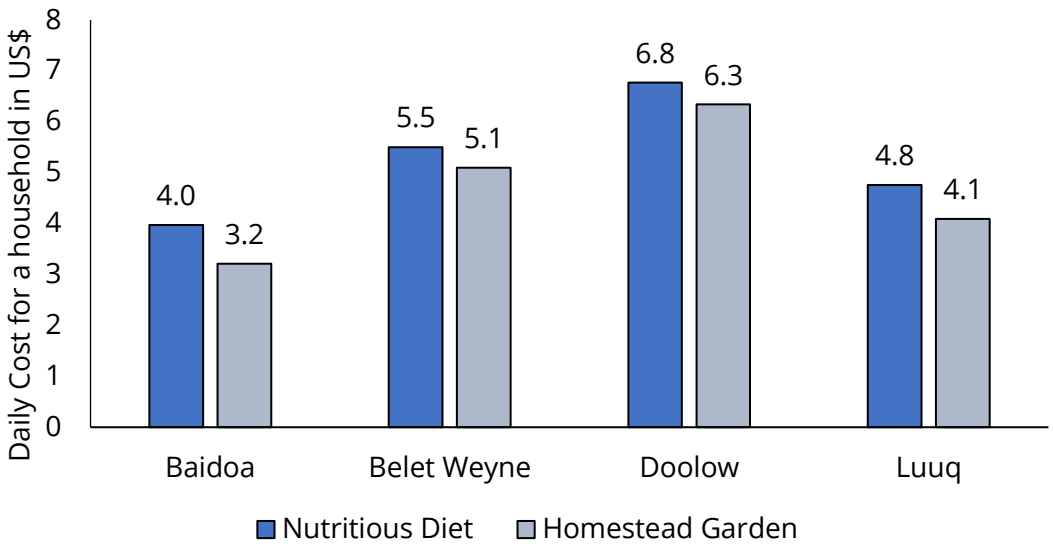


Similarly, having access to goat's milk from own production shows great impact on household daily nutrition cost, which is partly driven by the high cost of meeting calcium requirements. Having access to 500ml of goat's milk per day reduces the cost of the nutritious diet to the household by an average 10 percent from $7.0 to $6.3.

Although much of the current agricultural crop and vegetable production is dominated by maize and sorghum, some studies point out that many vegetables and fruits used to be grown in Somalia, especially in the Juba and Shabelle areas. FNG analysis modelled

interventions that include production of such vegetables. For this model, spinach (2kg), okra (1.1kg), pumpkin (900g), carrot (1kg) and cabbage (1.1kg) were included in the weekly diet to estimate the potential impact of small-scale production. Initially, this was only applied to agropastoral households in the Southwest, but similar effects are expected with the scale-up of agriculture production for other livelihoods. The findings show that such homestead gardens would reduce cost by 10 percent on average.

Figure 26: Daily household cost for agro-pastoralist households in selected market regions.



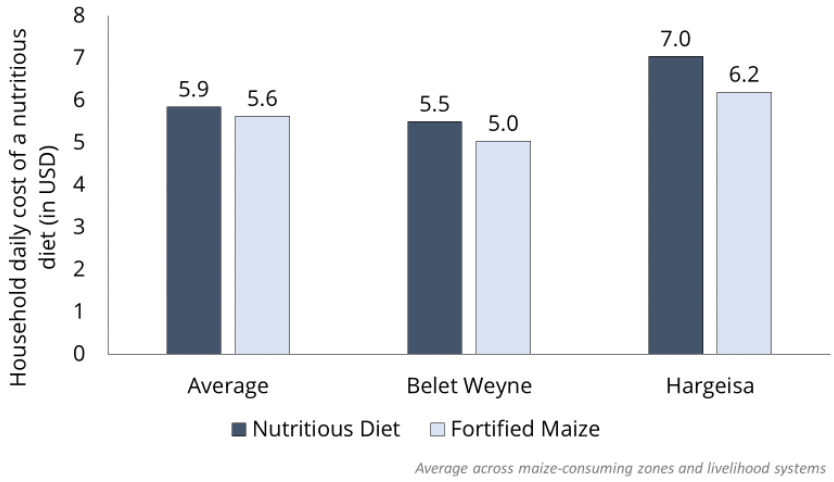
Homestead food production can increase micronutrient intake and reduce cost, reducing the risk of micronutrient deficiencies among the most vulnerable.

Increasing Nutrient Content of Foods in the Market

A third way to increase availability of nutrients at household level is fortification of staple foods. Seventy percent of total grain consumed is imported. The bulk of maize and sorghum consumed is produced domestically, but virtually all rice and wheat is imported. In maize-consuming zones and livelihood systems, the daily cost of a nutritious diet decreased with modelling maize fortification (centrally processed) from $5.9 to $5.6, with larger reductions in Belet Weyne and Hargeisa (Figure 27)[7].

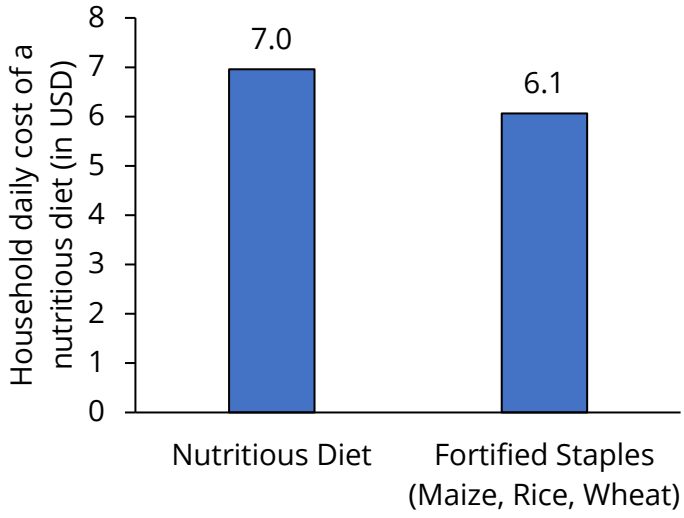
[7] Fortifying maize increases its price in the market, estimated at 2 percent. Despite the increase in price, the cost of a nutritious diet would decrease.

Figure 27: Daily cost of a nutritious diet in maize-consuming zones and livelihood systems with fortified maize flour (CotD 2019)



Access to fortified products would increase drastically if domestic fortification of maize (and sorghum, once appropriate technology becomes available) were combined with legislation for cereals that are imported to Somalia (rice and wheat). As staple preferences are heterogenous and based on geographic and livelihood systems, choosing several vehicles for fortification would ensure coverage across the population. A combination of domestic fortification and regulatory mechanisms for maize, rice and wheat has the potential to reduce average daily cost from $7.0 per day to $6.1, the equivalent of 13 percent reduction (Figure 28).

Figure 28: Average daily cost for a household with and without fortified staples (CotD 2019)



Vulnerable individuals: Cost of the Diet models and interventions

Vulnerabilities within the household differ and require targeted interventions to address the unique needs of individual members. To ensure a healthy population it is essential to support children during the first 1,000 days and adolescents. To reach young children and adolescents, education platform has strong potential to be leveraged for their improved nutrition.

The average household size is 5.9, which varies by region and livelihood. The lifecycle approach taken by the FNG reflects those individual that are consistently present throughout different Somali families: A child under two, a school aged child, an adolescent girl, a breastfeeding mother and the adult man (see annex for exact composition and nutrient needs by individual).

This household composition reflects the FNG approach and highlights the need to protect individual members when at their most vulnerable. This includes, but is not limited to, children under two years of age, pregnant and breastfeeding women as well as adolescents, particularly girls. They are in biological stages of their live where adequate nutrition lays the foundations for further development, either of themselves, someone else – when pregnant or breastfeeding – or a combination of the two. Addressing their unique needs will reap short- and long-term benefits as investing in their nutrient intake is demonstrated to show impact on health, education and overall productivity. While this is true globally, it is particularly the case in Somalia, where 46 percent of the population are under the age of 15 years (UNFPA 2016b, 2014).

Such a young population can bring its own challenges – only half of the population are of working age, creating large dependencies on social protection and welfare – this also provides unique opportunities to reach them: It means that schools, for example, can be an excellent platform to reach almost half of the population with health, nutrition and education programmes, if kids are enrolled and regularly attending. A UNFPA census has concluded that currently the education system cannot accommodate all students, imposing a threat to create a lost generation. Furthermore, it remains critical to address the underlying factors for low educational attainment (UNFPA 2016a) (also see section X of this report).

There are slightly more men in the Somali population (50.7 percent) compared to women (49.3). This pattern remains true for both nomadic and rural livelihoods (52.2 and 51.3 percent men, respectively), however is reversed in urban contexts. Here, men make up 49.8 percent of the population, with women being slightly in the majority (50.2 percent) (UNFPA 2016b). It is noteworthy that despite having a very young population and an almost equal balance between the sexes, there is little participation, involvement in decision-making or representation by younger adults in the political system (FGS 2017).

First 1,000 days (children under two), pregnant women and breastfeeding mothers

Breastfeeding rates are low and a lack of good complementary feeding practices jeopardizes child development. Women's needs for reproductive health and birth spacing are largely unmet. Data gaps exist on maternal nutrition, as do barriers to breastfeeding and complementary feeding.

Policies and programmes supporting nutrition globally recognize the importance of improving maternal and child nutrition during the first 1,000 days, the period from conception to the child's second birthday. When children suffer nutrient deficiencies during this critical period, catching up on unattained development and growth is very difficult and they will likely suffer the consequences throughout their lives.

In Somalia breastfeeding rates are low, although exclusive breastfeeding (EBF) during the first five months did improve from 5 percent in 2009 to 33 percent in 2016 (FSNAU 2017). Exclusive breastfeeding rates are lowest in the southern part of the country (21 percent), among IDP populations (24 percent) and among single, divorced and widowed mothers (15 percent); and highest in Somaliland (56 percent), among urban mothers (40 percent) and mothers with primary (42 percent) or secondary (47 percent) education.

Continued breastfeeding at one year (46 percent) and two years (15 percent) is low. Half of the children 12 to 15 months (46 percent) are continuously breastfed as recommended by WHO. This rate is lowest among younger mothers (24 percent), IDP populations (28 percent) and single, divorced and widowed mothers (27 percent). Half of all children under two are bottle-fed which is a challenge in contexts where hygiene is not adequate and children are bottle-fed foods of inferior nutritional content. Additionally, when wrong perceptions about the benefit of infant foods put additional constraint on household budgets, this might use up scarce financial resources that could otherwise be dedicated to fresh, nutritious foods.

Inadequate breastfeeding practices during the complementary feeding period increase the cost of a nutritious diet for a child aged 12-23 months from $0.37 per day to $0.46 (24 percent) if half the recommended breastmilk is given, and $0.55 (49 percent) if no breastmilk is given. Improving breastfeeding practices depends on mothers understanding when and how to breastfeed, and on them having adequate nutrition, support from other household members and time to breastfeed.

Complementary feeding practices are suboptimal. Only 9 percent of children consume a minimum acceptable diet (MAD) with even lower rates among non-breastfed children (5 percent), in Somaliland (6 percent) and Puntland (7 percent), in rural areas (6 percent), and among single, divorced and widowed mothers (5 percent). Children who are breastfed (13

percent), live in urban areas (12 percent), are born to young mothers (17 percent) and mothers with secondary education (20 percent) are more likely to receive a MAD.

Low rates of MAD are driven by a lack of minimum dietary diversity (MDD). Only 15 percent of children are receiving foods from at least four out of seven food groups on a typical day with lower rates in Somaliland (7 percent) and Puntland (9 percent), among rural populations (10 percent) and primigravidas who are not breastfeeding (7 percent). Yet, while breastfeeding rates were lowest in the south, the dietary diversity is highest in the south of the country (21 percent). Also, children living in urban areas (21 percent), IDP populations (22 percent), children of young mothers (22 percent) and mothers with secondary school education (32 percent) have more dietary diversity. In general, breastfed children receive more diverse diets (32 percent).

In sum, children of single, divorced or widowed mothers are most vulnerable to poor breastfeeding and complementary feeding practices, while children of mothers with better education and living in urban areas generally receive a higher quality diet. No data is available on seasonal fluctuations of breastfeeding and complementary feeding rates and no disaggregated data by livelihoods in available. Also, it is likely that the significant improvements in EBF and other IYCF indicators are partially driven by social desirability bias as the survey was preceded by a large-scale IYCF campaign by UNICEF and greatest change in IYCF indicators was recorded in areas with strongest program activities.

Low rates of both exclusive and complementary breastfeeding may be explained by several barriers surrounding breastfeeding: starting from maternal concerns about physical appearance, the widely held belief that breastfeeding makes “breasts fall down”, maternal and childhood sickness, maternal workload, separation between mother and child or a next pregnancy during the breastfeeding period (FSNAU 2017). The IYCN assessment also identified barriers explicitly concerning exclusive breastfeeding. Amongst these are the belief that breastmilk is insufficient for the child and needs to be supplemented with other foods as well as illiteracy and through that heightened susceptibility to adverts of infant feeds and bottle feeding (as opposed to written information).

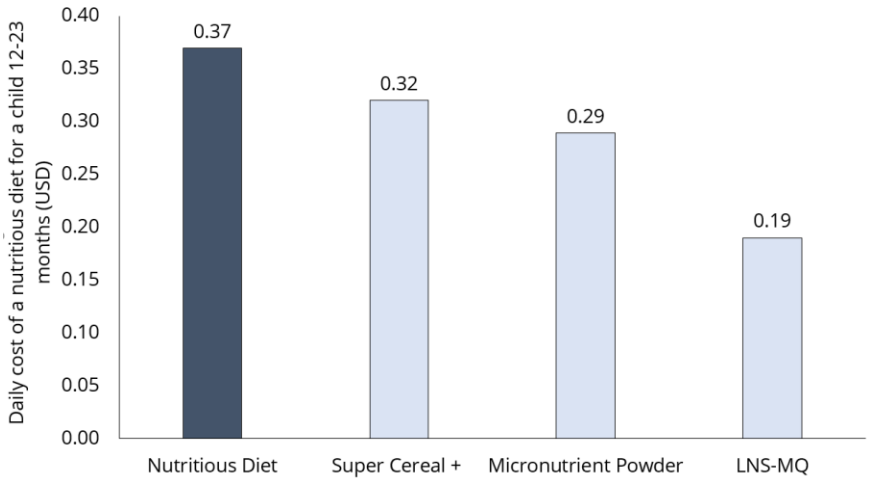
Women’s reproductive health needs are largely unmet, resulting in short birth spacing and impeding their ability to regain physical and nutritional status before the next pregnancy. Their traditional roles are largely still in place and revolve around child bearing, rearing and housekeeping (Ministry of Planning and National Development 2017). Not only do these roles often clash with each other, for example when the heavy workload conflicts with appropriate child care, but they also come at the expense of women’s health and care. Somalia holds the 6th lowest place in the world as a country where women face highly discriminatory family values and laws, very high levels of restricted physical integrity and very high level of restricted resources and assets. This means that the prioritization of their

and their children's health and nutrition is often not up to them and they may not allocate funds appropriately.

Improving complementary feeding through foods available at the market may not be possible in a short time frame, which is why it is important to consider the role of specialized foods: To increase nutrient intake for children aged 6-23 months in the short-term and prevent life-long negative consequences, Specialized Nutritious Foods (SNFs) can provide nutritious complementary diets. The in-kind provision of either Super Cereal Plus (100g), a micronutrient powder, or a Lipid-based Nutrient Supplement Medium Quantity (LNS-MQ), could reduce the daily cost of providing a nutritious diet to a child aged 12-23 months by 14 percent, 22 percent and 49 percent respectively (Figure 29), providing for a minimum level of micronutrient intake. At the same time complementary feeding needs to be continued to be promoted and combined with approaches that provide support for the mother to actually have the time and resources available to breastfeed.

Similarly, providing Super Cereal Plus (200g), iron and folic acid (IFA) tablets, and Multiple Micronutrient Tablets (MMT) for free to pregnant and breastfeeding women could reduce the cost of a nutritious diet ($1.73) by 19 percent, 23 percent and 34 percent respectively ($1.40, $1.33, $1.09). This reduction in cost is indicating that the household will be more likely to meet nutrient needs of the individual.

Figure 29: Daily cost of a nutritious diet for a child 12-23 months old with specialized nutritious foods (CotD 2019).



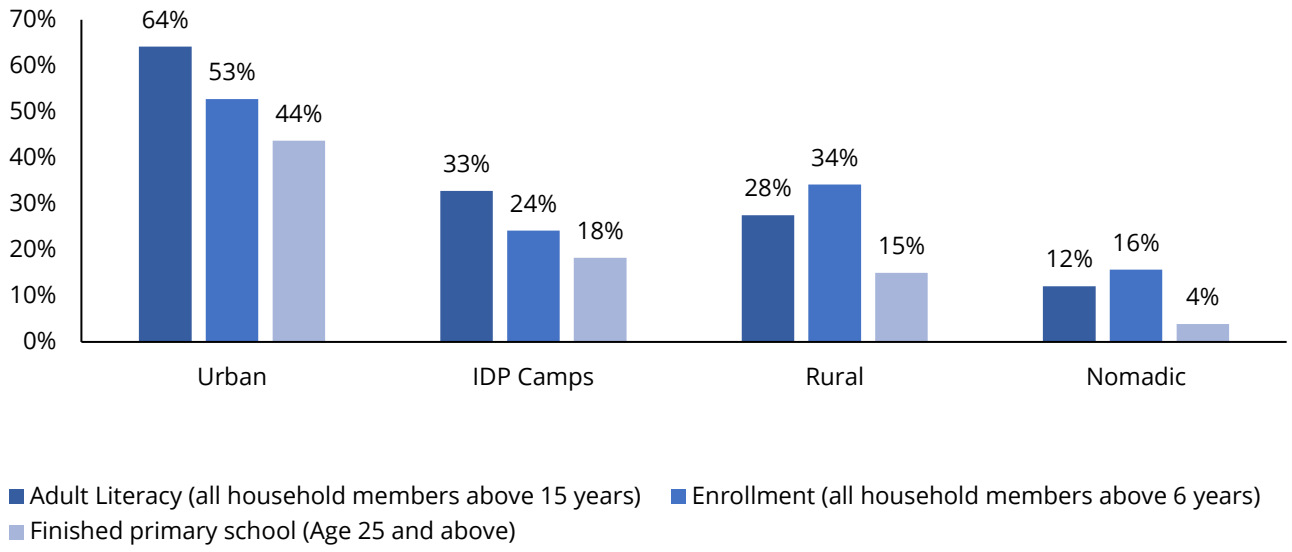
School-Aged Children

The education sector can provide a strong platform for nutrition interventions with school meals designed to improve nutrition, school attendance, and the ability to learn while at school, and can contribute to developing healthy food habits.

The current education infrastructure cannot accommodate all students, which imposes a threat of creating a lost generation. It is therefore critical to address underlying factors of low educational performance, such as gender parity, educational attainment and school enrollment, to create a lasting change. At the same time quality of education needs to be addressed jointly with increasing coverage. The National Development Plan 2017-2019 highlighted targets to improve on key indicators, but progress cannot yet be measured due to lack of updated data. The newly released National Development Plan 2020-2024 highlights Education as a key element in their Strategy 3 section. Recognizing Education's unique contribution to Human Capital Development the following priorities are highlighted: encouraging more girls to enroll, and stay in school; improving survival rates of boys and girls to Grade 5/6 and providing increased skills training to youth through TVET (Ministry of Planning, Federal Government of Somalia 2020).

Adult literacy is highly varied across the country: Across different livelihood zones, it varies from 64 percent in the urban settings to 12 percent in the nomadic population (Figure 30). It is the highest among 15-19 year olds (52 percent) and in the richest quintile (64 percent), which indicates that socio-economic factors are essential in driving the transition to a literate population (UNFPA 2016a). Enrollment for any type of education across all household members, including adults, is at 37 percent, with large discrepancies between livelihood systems, as seen in Figure 30.

Figure 30: Literacy, Enrollment and Attainment by type of residence (UNFPA 2016a)



School enrollment among 6-13-year-old children is relatively homogenous across boys and girls, with only 3 out of 5 children of that age range attending school (58.8 percent for girls and 59.7 percent for boys). Similarly to literacy indicators, there is a disparity between livelihoods, with only 16 percent of all nomadic children enrolled in school and 53 percent

of all children in urban settings. As with literacy whether or not a child attends school is strongly correlated with its family's wealth and other socio-economic factors such as residence.

Educational attainment, tracking the highest degree an individual has completed, is also low in Somalia: Only 4 percent of the Nomadic population finish primary school, compared to 44 percent in urban settings, 15 percent of the rural population and 18 percent in IDP camps. Finishing primary school is also more dependent on sex than other educational indicators: 28 percent of men have finished at least primary school, compared to only 20 percent of women. This low educational attainment for women, in combination with a relatively comparable enrollment up until the age of 13 years, indicates that enrollment for adolescent girls may reduce relative to boys after that age, that actual attendance of girls is already low before adolescence or a combination of both.

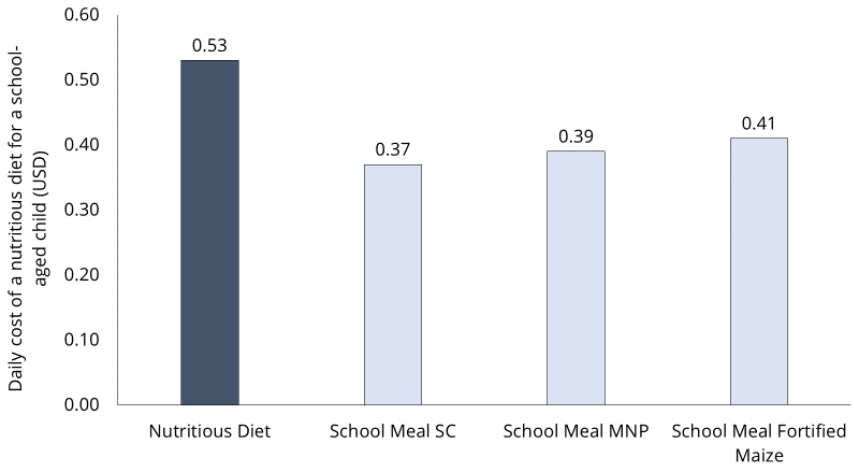
Although the exact push- and pull-factors for low educational enrollment, varied attendance and attainment are underexplored, the data that does exist shows strong dependencies on wealth, livelihood and socio-economic status. This suggests that incentivizing school attendance and attainment for all age groups and sexes, but in particular for adolescent girls, is a promising strategy. The Somali National Development Plan has several targets to improve quality and frequency of education for all children and coordinated efforts between policy and programme can help leverage joint efforts to maximum outcomes.

To estimate the potential impact on household cost and individual nutrient intake, different variations of a school meal were modelled as part of this assessments: A portion based on super cereal, a portion including a multiple micronutrient powder and a portion using fortified staples (Table 3). These school meals could reduce the cost of a nutritious diet by 30 percent, 26 percent and 23 percent, respectively (Figure 31).

Table 3: Foods included in school feeding models (breakfast and lunch).

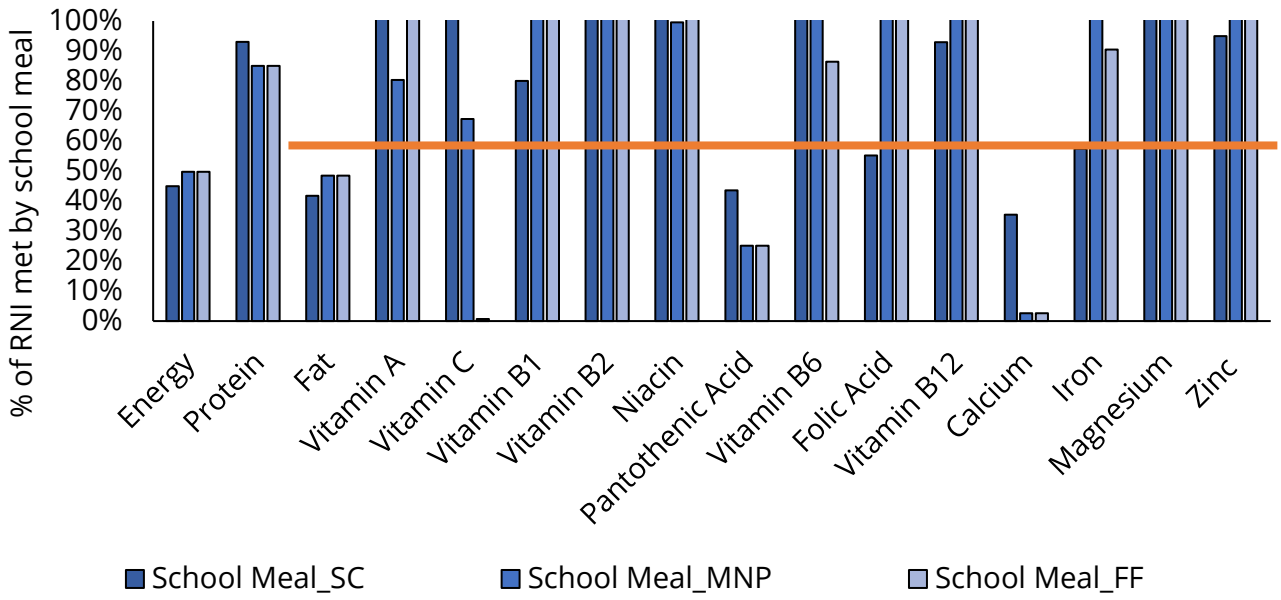
Super Cereal
150g Maize Meal
30g Pulses
25g Oil
80g Super Cereal
MNP
230g Maize Meal
30g Pulses
25g Oil
1 Sachet MNP (0.4g)
Fortified
230 g Fortified Maize Meal
30g Pulses
25g Oil

Figure 31: Daily cost to the household of a nutritious diet for a school-aged child with different school meals (CotD 2019).



School meals currently include a breakfast portion and a lunch, covering a substantial amount of the overall foods eaten per school day. School meals should be as dense in micronutrients as possible to counteract staple dominated, micronutrient poor habits inside households. For a primary school child aged 6-7, the school meals provide many micronutrients in sufficient levels, but lack calcium and pantothenic acid, which are difficult to meet through foods available in markets.

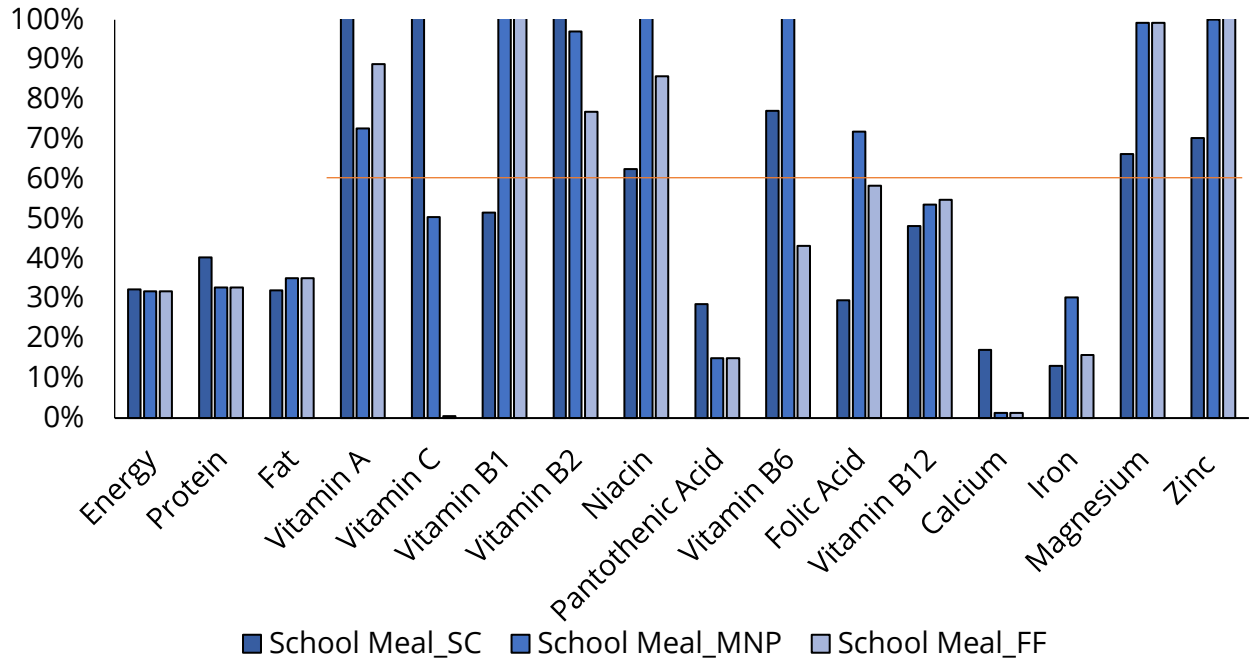
Figure 32: Percentage of macro and micronutrients provided through different forms of school meals for a child 6-7 years old. Orange line indicates minimum target of micronutrients for 2 school meals per day during a 5-day school week (CotD 2019).



A similar school meal given to an adolescent girl[8] does not provide sufficient micronutrients (Figure 33). For school meal programming to fulfill a nutrition objective for this target group, adjustment would be needed such as the introduction of SNF to meet the needs of the upper end of the age range.

[8] Although current school meal programmes target primary schools, there is anecdotal evidence that school children up to grade 8 are recipients of this safety net.

Figure 33: Percentage of macro and micronutrients provided through different forms of school meals for the adolescent girl. Orange line indicates minimum target of micronutrients for 2 school meals per day during a 5-day school week (CotD 2019).

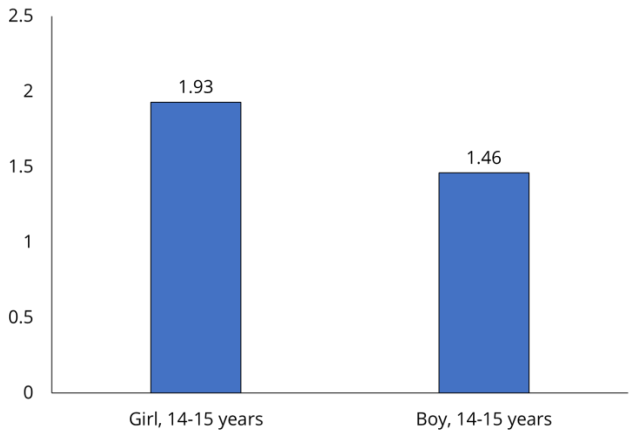


Adolescent girls

A nutritious diet for an adolescent girl is the most expensive in the household due to her nutrient density requirements. Her nutritional vulnerability is compounded by socio-economic vulnerabilities. In some areas, her nutrient needs cannot be met with locally available foods.

Adolescence is a critical time for nutrition. When boys and girls are experiencing body growth, their nutrition needs are different and may be exacerbated or alleviated differently by environmental factors. The adolescent boy needs larger quantities of energy (2,990 kcal) to support his growth and he needs higher levels of micronutrients. The adolescent girl has comparatively lower energy requirements (2,490 kcal) but a highly elevated need for iron to support her body through menstruation. For every 1,000kcal adolescent girls need to consume more micronutrients, while boys need larger portions of food. In Belet Weyne the minimum cost for a nutritious diet for the adolescent boy is $1.46 while an adolescent girl requires $1.93 to meet her full needs.

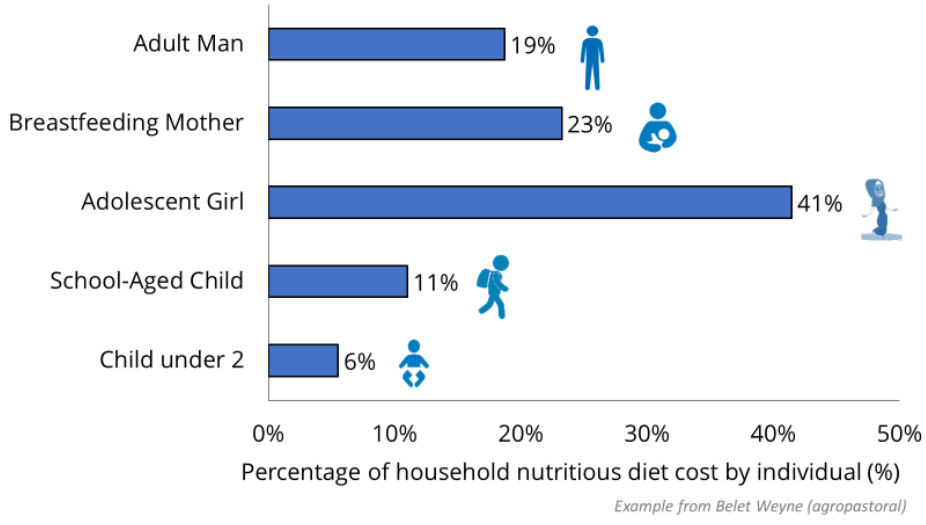
Figure 34: Cost comparison between an adolescent girl and boy in Belet Weyne (CotD 2019).



In all modelled diets the adolescent girl had the highest diet cost. Among pastoral households in Belet Weyne adolescent girls comprised 41 percent of the household nutritious diet cost (Figure 34). In locations where the availability of nutritious foods is limited, adolescent girls are most vulnerable to the lack of a nutritious diet based on locally available foods.

To meet nutrient requirements adolescent girls needs to eat greater quantities of more expensive nutrient-dense foods than other members of the household. The allocation of the share in nutritious foods is unlikely to match the distribution reflected in the optimized nutritious diet and household distribution. FGDs found that men and small children eat first in many households, putting women and adolescent girls at greater risk of nutrient deficiencies. This illustrates that the nutritional vulnerability of adolescent girls is compounded by socio-economic vulnerability.

Figure 35: Percentage of household nutritious diet cost by individual; example from agropastoral livelihood in Belet Weyne (CotD 2019).

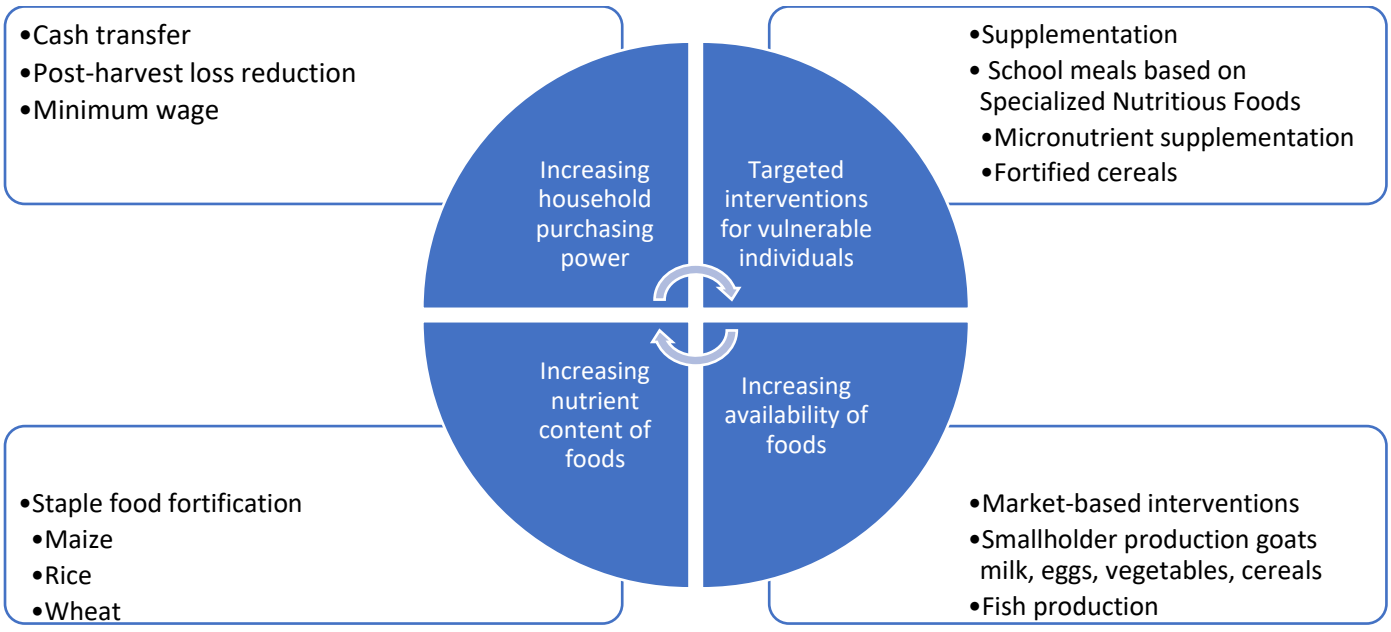


SNFs and supplements could play a role in meeting the elevated nutrient needs of adolescent girls. Providing Super Cereal Plus (200g), IFA tablets or an MMT, could reduce the daily cost of their nutritious diet ($2.51) by 3 percent, 31 percent and 51 percent respectively ($2.38, $1.73, $1.23).

Multisectoral Action: Cost of the Diet models and Interventions

Nutrition is complex, requiring a combination of different interventions to enable households and individuals to access nutritious diets and meet nutrient needs. Interventions can reduce non-affordability through combining any of the following: targeted interventions for vulnerable individuals (supplementation, school meals); increasing the availability of nutritious foods (market-based interventions, smallholder production, reducing post-harvest losses, development of fisheries); increasing nutrient content of foods (staple food fortification), and; increasing household purchasing power (cash transfers, reducing post-harvest losses to raise income, minimum wage raises) (Figure 36).

Figure 36: Improving the non-affordability of a nutritious diet can be achieved by any combination of the following: targeted interventions for vulnerable individuals; increasing availability of nutritious foods; increasing household purchasing power (increasing income and lowering prices).



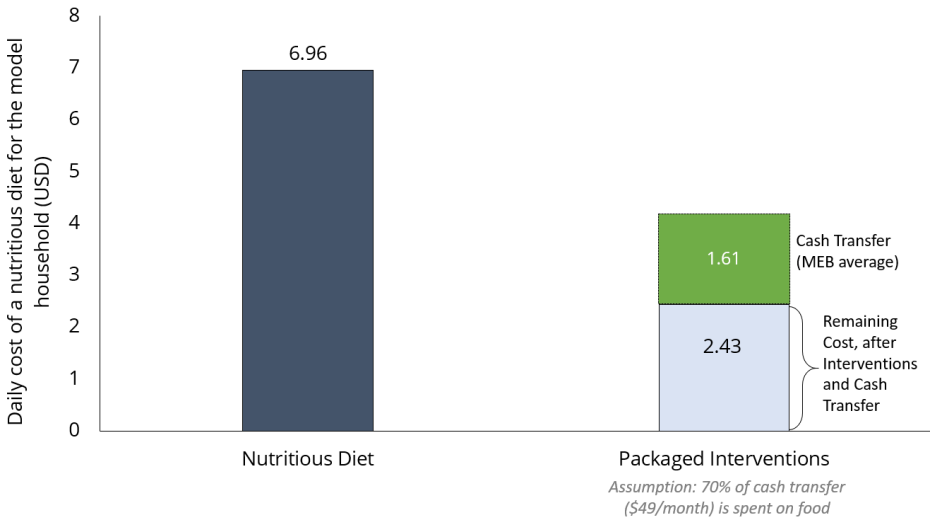
The FNG analysis estimated the daily cost of a nutritious diet with the following intervention package: LNS-MQ for a child 12-23 months; school meals for a school-aged child and adolescent girl, MMT for the breastfeeding mother, homestead production of goat's milk for the household and a cash transfer of $70 per month (with 70 percent of the transfer spent on food) (Table 4). Delivery of this package of interventions would reduce

the daily cost of the nutritious diet for the modelled household from $6.96 to $4.04 (Figure 37). The interventions would reduce the cost by $2.92 per day and the cash transfer would provide $1.61 per day, leaving the household with a remaining cost of $2.43, affordable for most households.

Table 4: List of interventions in household package.

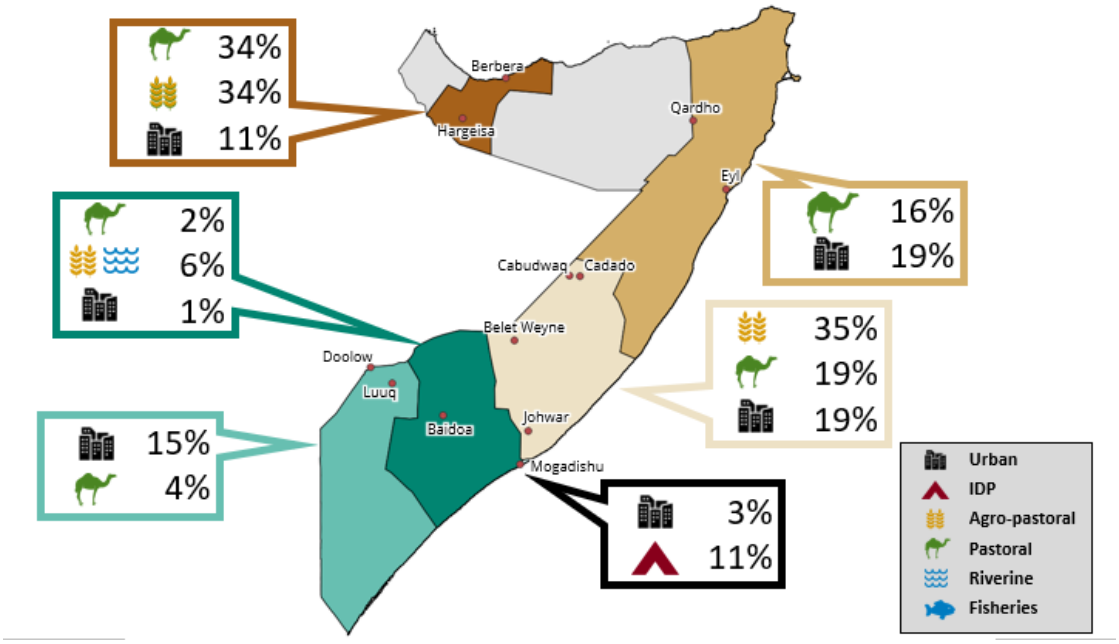
Target Group	Intervention
Child 12-23 months	LNS-MQ
School Aged Child & Adolescent Girl	School Meals with SC
Breastfeeding Woman	Multiple Micronutrient Tablet
Household	Own Production Goat Milk
Household	Cash Transfer (70 US$ - MEB)

Figure 37: Daily cost of a nutritious diet for a modelled household with package of interventions (CotD 2019).



The estimated potential impact of the household package on non-affordability of a nutritious diet is substantial. Figure 38 shows the reduced non-affordability estimates (average for each livelihood within each analytical zone), to be compared with Figure 20. To achieve this impact, interventions must be delivered effectively and consistently, with delivery specific to the local context and livelihood.

Figure 38: Average non-affordability of a nutritious diet by livelihood within each analytical zone with intervention package (CotD 2019).



Addressing the drivers of malnutrition requires concerted efforts through all sectors and entry points. Line ministries, humanitarian actors and development partners must consider scaling-up short- and long-term nutrition interventions. FNG analysis documents that by combining incremental efforts through targeted and coordinated action, the vision of a healthy, nutritious diet being available, accessible and affordable to all Somali households is achievable.

Conclusions and Recommendations

During the validation workshop on 27 Oct 2019, participants developed recommendations based on the FNG findings. Participants were split into three groups representing three different entry points for multisectoral nutrition programming: increasing availability of nutritious foods; increasing household purchasing power; and decreasing nutritional vulnerabilities. The participants were prompted to consider the following dimensions of programming for their recommendations: timeframe (short-term/ long-term), target group(s), livelihood systems, channels to reach households and individuals, data needed to understand the problem and design solutions. Based on these considerations, participants identified and prioritized the following recommendations to translate the Fill the Nutrient Gap findings into action.

Table 5: Recommendations by stakeholder group as developed in FNG workshop October 2019

Short-term (0-3 years)	**Long-term (3-10 years)**
Increasing Household Purchasing Power (Group 5)	

• Social safety nets for PLW and households with PLW for prevention of malnutrition and breaking the inter-generational cycle of poverty and malnutrition
  ○ Target mothers and children under 5
  ○ Combining cash and education (BCC)
• School feeding
  ○ Combine rations with IFA/ MMT and deworming
• Income generation programs
  ○ Cash for work
  ○ Cash for training/ vocational training
  ○ General food distribution
• Legislation to limit distribution and/or advertising of Breastmilk Substitutes and other unhealthy imported foods
• CMAM programs
• For IDPs: interim system of community governance and provision of social services (police,
	• for IDPs: long-term relocation to their origin
	• resilience programming
	  ○ environmental-sensitive programming, including drought-resistant seeds, water-sensitive catchments, boreholes, water harvesting and irrigation systems (e.g. drip irrigation)
	• infrastructure investments into
	  ○ roads
	  ○ small-scale industries, particularly in food processing and preservation, agricultural services, cooperatives
	  ○ water storage, rain water catchment and retention
	• improved community management of resources among pastoralists, e.g. boreholes
	• organize fisheries communities, train and increase their capacity
	• school meals for children

health care, schools) • Kitchen gardens, food fortification and MMT supplements to increase cognitive capacity	• education to enable households to diversify their livelihoods and innovate production • micro-financing opportunities and strengthening of community-based financing mechanisms (RSCA) to finance investments and buffer against shocks
Increasing Household Purchasing Power (Group 2)	
• subsidize farm inputs i.e. seeds (certified) and farming technological skills – high production decreasing market prices • organization into cooperatives to improve economies of scale • cash transfers linked to IGAs • improve poultry breeds to improve egg production beyond subsistant consumption (six chicken per hh) • creation of jobs from government and private sector • decision-making power promoted for women in food purchases	• improving post-production handling of fish and investing in sensitization of fish consumption • legislating/ policy regulation of food commodities and prices • skills and vocational training to improve production of small livestock • SBCC linked to purchase of locally available foods that are nutrient-dense
Reducing Vulnerabilities (Group 4)	

• In-kind nutrient supplements (SNF, MNPs, IFAS and MMTs) for PLW and child under 2 continued
• In-kind MMT supplementation for adolescent girls introduced
• Linking farmer cooperatives to pastoralist markets to increase the availability of nutritious foods
• Social and behavior change communication to improve diets and IYCF
• Data gaps:
  ○ maternal and reproductive health;
  ○ adolescent marriages and pregnancies;
  ○ seasonal availabilities of fresh foods at pastoralist markets;
  ○ barriers to adequate IYCF
	• social and behavior change communication to improve diets and IYCF
	• shift to market-based approach for supplementation (PLW, child under 2, adolescents)
	• roll out food fortification for domestically grown and imported staples
	• Explore possibility for bio-fortified local crops
	• Improve infrastructure to markets only accessed by pastoralists to enhance food availability
	• Improve food processing and preservation techniques to enhance food quality and availability across seasons

○ challenge of women's workload and its impact on IYCF and maternal health ○ impact of clan dynamics on vulnerabilities ○ nutritional status of PLW, WRA, adolescent girls and children under 5 ○ women decision-making power and control over resources ○ bottlenecks and use of ANC	
Reducing Vulnerabilities (Group 1)	
• interventions ○ family planning (create awareness on child spacing among men) ○ create awareness on importance of breastfeeding ○ increase school feeding ○ income generating activities (employment, vocational training) ○ boost IYCF programs and coverage ○ immunization ○ VA supplementation ○ ANC and PNC • Important target groups ○ School-aged children ○ Adolescent girls ○ Adult male/ female ○ Child under 2 ○ Pregnant and lactating women • Channels ○ Through sensitization of community workers ○ BCC messages ○ Mass media • Target groups ○ All livelihood systems would benefit from investment in	• Policies that favor/ allow women to choose child birth spacing • Invest in girl child education • Stop early marriages • Scaling-up of school-feeding programs to increase enrollment, attendance and performance at school with long-term economic benefit • Adding nutrition education to the curriculum at primary and secondary level • Sequencing nutrition specific and nutrition sensitive programs • Data gaps ○ Comprehensive household data collection that is representative in all livelihoods ○ Health facility service data ○ Dietary diversity for women

education and increased purchasing power	
Increasing availability of fresh nutritious foods (Group 3)	
• Establishment of kitchen gardens (all livelihoods) • Poultry rearing per household to increase access to eggs • Provision of fishing equipment (fisheries livelihoods) • Establishment of water catchment (boreholes, dams) • Training on innovative farming methods (e.g. green houses) • Provision of nutritious seeds and seedlings	• Investment in building and maintaining infrastructure • Development of industries to process food and value additions • Food fortification (legislation and policies)
Increasing availability of fresh nutritious foods (Group 6)	
• Stimulate demand and scale up behavior change messaging throughout all interventions, for both short and long term interventions. Begin with communication of health benefits of those foods that household's can potentially improve themselves by own production.	
• Professionalizing fisheries and associated supply chain, making fresh fish available also in the non-coastal areas. Promoting fresh fish as healthy foods to stimulate demand for it. • Kitchen gardens for smallholder farmers, promoting spinach and other nutritious vegetables for household consumption. Teaching households on the benefits of vegetables to increase awareness of a healthy diet (connecting this awareness to the market in the medium to long term). • Local purchases to support local production. For humanitarian and development partners that do have in-kind provision to prioritize local purchases of cereals that are available. Avoid undermining local supply with centrally or	• Integrate education on nutrition and healthy eating in school curriculum • Promote food waste and loss reduction at household and production level through improved cold chain and market infrastructure • Establish fortification production (for major and centralized maize mills) and legislation (for the import of nutritious foods) • Building space for private sector engagement in lines of market availability of nutritious foods • Investigate the feasibility of biofortified crops for specific smallholder and resilience projects • Ensure that with general improvement of the security situation access to markets for farmers is improved, to transfer diversity on production level to diversity at the market

internationally procured commodities. • Teaching farmers on techniques and strategies to produce high-value nutritious crops. Including farming techniques but also financial literacy for those smallholder farmers who are active just above subsistence level. • Work with private sector and government outlets to promote agricultural inputs such as seeds and fertilizers and establish sustainable structures for them to be available through private-sector agents. • Reduce postharvest losses through improved storage and supply chain solutions. • Microfinance, such as Village Savings and Loan Associations and self-help groups to allow farmers to take out credit and insurance making investments in nutritious crops easier. • Use social safety nets in combination with education on nutritious foods to improve purchasing power directed at nutritious diets. • Identify what irrigation sources and mechanisms can work best for different livelihoods (borehole, dams, rain water harvesting, drip irrigation, etc) and promote them. • Work on road rehabilitation to improve access for farmers to markets to sell their products.	

Appendix A – Assumptions and Background Information

A) FILL THE NUTRIENT GAP: SITUATION ANALYSIS FOR MULTI-SECTORAL DECISION-MAKING ON THE PREVENTION OF MALNUTRITION[9]

Malnutrition has two direct causes: inadequate nutrient intake and disease. As its name specifies, the Fill the Nutrient Gap (FNG) assessment focuses on gaps in nutrient intake to inform a country's national policies on actions that can be taken to improve nutrition among their population, with a focus on the most vulnerable.

The FNG assesses the extent to which people have choices. It considers the availability, physical access and affordability of nutritious foods required for adequate nutrient intake. It seeks to understand why people make the food choices they do. Finally, it identifies context-appropriate interventions that can be implemented by different sectors to fill nutrient gaps.

The assessment comprises two components:

1. A country-specific review of secondary data and information on factors that reflect or affect dietary intake. This includes malnutrition trends over time, characteristics of the food system and food environment, and population behaviour related to food and feeding.
2. An assessment of the extent to which economic barriers prevent adequate nutrient intake. This uses the Cost of the Diet linear programming software developed by Save the Children (UK), and includes modelling of the economic impact of possible interventions to increase nutrient intake.

Malnutrition cannot be addressed by one sector alone. FNG is designed to inform multisectoral decision-making and therefore engages stakeholders from all sectors including food, health, agriculture, education, and social protection systems throughout the assessment.

It is the stakeholders who define the scope and focus of the assessment. They contribute data and sources of information for identification of context-specific barriers and entry points and develop a shared understanding of the issues and possible solutions. They then identify appropriate nutrition-specific and nutrition-sensitive interventions that can be implemented by different sectors using their existing delivery platforms. These could be

[9] For more information on the concept and the method of the analysis, see Bose I, Baldi G, Kiess L, de Pee S. The 'Fill the Nutrient Gap' Analysis: An approach to strengthen nutrition situation analysis and decision-making toward multisectoral policies and systems change. Matern Child Nutr 2019: DOI: 10.1111/mcn.12793.

social safety nets, food processing and markets, antenatal care, school feeding programmes and others.

The FNG assessment has been developed by the WFP with technical support from: The University of California Davis; the International Food Policy Research Institute (IFPRI, Washington DC); Epicentre (Paris); Harvard University (Boston); Mahidol University (Bangkok); Save the Children (UK); and UNICEF.

As of October 2020, the FNG has been completed in 28 countries and is ongoing in another 10.

B) COST OF THE DIET (CotD) ANALYSIS

CotD software uses linear programming to understand the extent to which poverty, food availability and prices may affect the ability of people to meet their nutrient needs. Using price data collected from markets or from secondary sources, the software calculates the amount, combination and cost of local food that is required to provide individuals or households with their average needs for energy and their recommended intakes of protein, fat and micronutrients[10]. These diets are calculated within defined constraints to prevent the inclusion of unrealistic types or amounts of food and the provision of excessive amounts of nutrients.

The FNG approach defines the Staple Adjusted Nutritious Diet: the lowest cost nutritious diet that includes the typical staple food and excludes food that is considered taboo[11]. This diet is referred to as the nutritious diet throughout this report. Population expenditure data is compared to the cost of the nutritious diet and is used to estimate the proportion of the population that would not be able to afford it. This non-affordability can be estimated and compared across different regions, seasons or countries.

As part of the FNG process, CotD analysis was undertaken for the six livelihoods purchasing food from 12 markets in all regions of Somalia. Primary data collection was conducted to provide food price data and food habits data. The 2017 High Frequency Survey provided data on household food expenditure, including monetised consumption of self-produced food.

The lowest cost of a nutritious diet was estimated for a modelled household of five members, which included a breastfed child of 12–23 months, a child of 6–7 years, an adolescent girl of 14–15 years, a breastfeeding mother and an adult man. Two meals based on preferred staple foods were included per day to account for approximately 50 percent

[10] As defined by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). The need for 9 vitamins and 4 minerals is included.

[6] 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.

of dietary energy. This was done for all household members except the child aged 12–23 months, who received one portion per day. Additional servings of rice could be selected by the software.

CotD software was used to model interventions proposed by stakeholders with the objective of improving the affordability of a nutritious diet for individuals and/or households.

The selection of potential interventions for modelling was informed by secondary data review and stakeholder consultations. It included:

- increased availability of local nutritious food;
- complementary food or specialized nutritious foods (SNF) made available through the market and/or social safety nets;
- micronutrient supplementation;
- fortification of staple food and;
- conditional cash transfers for vulnerable households.

Modelled interventions are theoretical and would need to be accompanied by complementary behaviour change interventions to promote nutritious choices by consumers.

LIST OF ACRONYMS

AME	-	Adult Male Equivalent
BRCiS Consortium	-	Building resilient Communities in Somalia
CotD	-	Cost of the Diet
CPI	-	Consumer Price Index
FAO	-	Food and Agriculture Organization
FERO	-	Family Empowerment and Relief Organization
FNG	-	Fill the Nutrient Gap
FSNAU	-	Food Security and Analysis Unit of the FAO
GAM	-	Global acute malnutrition
HFS	-	High Frequency Survey
IFA	-	Iron and folic acid
IRC	-	The International Rescue Committee
LNS-MQ	-	Lipid-based Nutrient Supplement Medium Quantity

LP	-	Linear programming
MMT	-	Multi-micronutrient tablet
MNP	-	Multiple micronutrient powder
NMS	-	National Micronutrient Survey
OPM	-	Office of the Prime Minister
SDHS	-	Somali Demographic and Health Survey
SNF	-	Specialized nutritious foods
UNICEF	-	United Nations Children's Fund
WFP	-	World Food Programme

Table A1: Nutrient requirements for women of different age groups (WHO/FAO 2001, 2004, 2007)

Female

Cost of the Diet individual ID	Age (in years)	Energy (kcal)	Protein (g)	Minimum fat (g)	Maximum fat (g)	Magnesium (mg)	Vitamin B1 (mg)	Vitamin B2 (mg)	Niacin (mg)	Vitamin B6 (mg)	Pantothenic Acid (mg)	Folate (µg)	Vitamin B12 (µg)	Vitamin C (mg)	Vitamin A	Calcium	Iron (mg)	Zinc (mg)	Adult Male
31	0.5-1	662	10	27	39	54	0.3	0.4	4	0.3	1.8	80	0.7	30	400	400	0.93	4	0.2
32	1-2	865	11	29	38	60	0.5	0.5	6	0.5	2.0	150	0.9	30	400	500	0.58	4	0.2
33	2-3	1,047	10	29	41	60	0.5	0.5	6	0.5	2.0	150	0.9	30	400	500	0.58	4	0.3
34	3-4	1,156	11	32	45	60	0.5	0.5	6	0.5	2.0	150	0.9	30	400	500	0.58	4	0.3
35	4-5	1,241	13	34	48	76	0.6	0.6	8	0.6	3.0	200	1.2	30	450	600	0.63	5	0.3
36	5-6	1,330	14	37	52	76	0.6	0.6	8	0.6	3.0	200	1.2	30	450	600	0.63	5	0.3
37	6-7	1,428	15	40	56	76	0.6	0.6	8	0.6	3.0	200	1.2	30	450	600	0.63	5	0.6
38	7-8	1,554	17	43	60	100	0.9	0.9	12	1.0	4.0	300	1.8	35	500	700	0.89	6	0.6
39	8-9	1,698	19	47	66	100	0.9	0.9	12	1.0	4.0	300	1.8	35	500	700	0.89	6	0.6
40	9-10	1,854	21	52	72	100	0.9	0.9	12	1.0	4.0	300	1.8	35	500	700	0.89	6	0.6
41	10-11	2,006	26	56	78	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	1.40	7	0.6
42	11-12	2,149	29	60	84	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	1.40	7	0.6
43	12-13	2,276	32	63	89	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	1.40	7	0.6
44	13-14	2,379	36	66	93	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	1.40	7	0.6
45	14-15	2,449	39	68	95	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	3.10	7	0.6
46	15-16	2,491	38	69	97	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	3.10	7	0.6
47	16-17	2,503	39	70	97	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	3.10	7	0.6
48	17-18	2,503	39	70	97	220	1.1	1.0	16	1.2	5.0	400	2.4	40	600	1,300	3.10	7	0.6
74	18-29	2,200	30	49	86	220	1.1	1.1	14	1.3	5.0	400	2.4	45	500	1,000	2.94	5	0.8
101	30-59	2,300	30	51	89	220	1.1	1.1	14	1.3	5.0	400	2.4	45	500	1,000	2.94	5	0.8
128	>60	2,050	30	46	80	190	1.1	1.1	14	1.5	5.0	400	2.4	45	600	1,300	1.13	5	0.6

Assumption for women 18 years and above: 45kg of body weight; moderately active

Table A2: Nutrient requirements for men of different age groups (WHO/FAO 2001, 2004, 2007)

Male

Cost of the Diet individual ID	Age (in years)	Energy (kcal)	Protein (g)	Minimum fat (g)	Maximum fat (g)	Magnesium (mg)	Vitamin B1 (mg)	Vitamin B2 (mg)	Niacin (mg)	Vitamin B6 (mg)	Pantothenic Acid (mg)	Folate (µg)	Vitamin B12 (µg)	Vitamin C (mg)	Vitamin A	Calcium	Iron (mg)	Zinc (mg)	Adult Male
55	0.5-1	716	10	29	42	54	0.3	0.4	4	0.3	1.8	80	0.7	30	400	400	0.93	4	0.
56	1-2	948	12	32	42	60	0.5	0.5	6	0.5	2.0	150	0.9	30	400	500	0.58	4	0.
57	2-3	1,129	10	31	44	60	0.5	0.5	6	0.5	2.0	150	0.9	30	400	500	0.58	4	0.
58	3-4	1,252	11	35	49	60	0.5	0.5	6	0.5	2.0	150	0.9	30	400	500	0.58	4	0.
59	4-5	1,360	13	38	53	76	0.6	0.6	8	0.6	3.0	200	1.2	30	450	600	0.63	5	0.
60	5-6	1,467	13	41	57	76	0.6	0.6	8	0.6	3.0	200	1.2	30	450	600	0.63	5	0.
61	6-7	1,573	15	44	61	76	0.6	0.6	8	0.6	3.0	200	1.2	30	450	600	0.63	5	0.
62	7-8	1,692	17	47	66	100	0.9	0.9	12	1.0	4.0	300	1.8	35	500	700	0.89	6	0.
63	8-9	1,830	18	51	71	100	0.9	0.9	12	1.0	4.0	300	1.8	35	500	700	0.89	6	0.
64	9-10	1,978	20	55	77	100	0.9	0.9	12	1.0	4.0	300	1.8	35	500	700	0.89	6	0.
65	10-11	2,150	25	60	84	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.46	9	0.
66	11-12	2,341	28	65	91	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.46	9	0.
67	12-13	2,548	32	71	99	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.46	9	0.
68	13-14	2,770	36	77	108	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.46	9	0.
69	14-15	2,990	40	83	116	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.46	9	0.
70	15-16	3,178	42	88	124	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.88	9	0.
71	16-17	3,322	46	92	129	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.88	9	0.
72	17-18	3,410	48	95	133	230	1.2	1.3	16	1.3	5.0	400	2.4	40	600	1,300	1.88	9	0.
155	18-29	2,750	33	61	107	260	1.2	1.3	16	1.3	5.0	400	2.4	45	600	1,000	1.37	7	0.
182	30-59	2,750	33	61	107	260	1.2	1.3	16	1.3	5.0	400	2.4	45	600	1,000	1.37	7	0.
209	>60	2,250	33	50	88	224	1.2	1.3	16	1.7	5.0	400	2.4	45	600	1,300	1.37	7	0.

Assumption for men 18 years and above: 50kg of body weight; moderately act

Appendix B: Detailed Cost of the Diet Results

Cost of the Diet results by individual, market and livelihood

Table 6: Cost of a Nutritious Diet results by market, livelihood and individual.

Market	Livelihood	Diet Type	Individual	Cost (in US$)
Baidoa	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.27
Baidoa	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.55
Baidoa	Pastoral	Nutritious Diet	Girl, 14-15 years of age	1.2
Baidoa	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.95
Baidoa	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.04
Baidoa	Pastoral	Nutritious Diet	Household	4.01
Baidoa	Urban	Nutritious Diet	Child, 12-23 months of Age	0.27
Baidoa	Urban	Nutritious Diet	Child, 6-7 years of age	0.55
Baidoa	Urban	Nutritious Diet	Girl, 14-15 years of age	1.2
Baidoa	Urban	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.95
Baidoa	Urban	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.04
Baidoa	Urban	Nutritious Diet	Household	4.01
Baidoa	Agropastoral	Nutritious Diet	Child, 12-23 months of Age	0.27
Baidoa	Agropastoral	Nutritious Diet	Child, 6-7 years of age	0.53
Baidoa	Agropastoral	Nutritious Diet	Girl, 14-15 years of age	1.18
Baidoa	Agropastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.91
Baidoa	Agropastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1
Baidoa	Agropastoral	Nutritious Diet	Household	3.88
Belet Weyne	Urban	Nutritious Diet	Child, 12-23 months of Age	0.34
Belet Weyne	Urban	Nutritious Diet	Child, 6-7 years of age	0.69
Belet Weyne	Urban	Nutritious Diet	Girl, 14-15 years of age	1.93
Belet Weyne	Urban	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.17
Belet Weyne	Urban	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.39
Belet Weyne	Urban	Nutritious Diet	Household	5.5
Belet Weyne	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.34
Belet Weyne	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.69
Belet Weyne	Pastoral	Nutritious Diet	Girl, 14-15 years of age	1.93
Belet Weyne	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.17
Belet Weyne	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.39
Belet Weyne	Pastoral	Nutritious Diet	Household	5.5
Belet Weyne	Agropastoral	Nutritious Diet	Child, 12-23 months of Age	0.34
Belet Weyne	Agropastoral	Nutritious Diet	Child, 6-7 years of age	0.69
Belet Weyne	Agropastoral	Nutritious Diet	Girl, 14-15 years of age	1.93
Belet Weyne	Agropastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.17

Belet Weyne	Agropastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.39
Belet Weyne	Agropastoral	Nutritious Diet	Household	5.5
Belet Weyne	Riverine	Nutritious Diet	Child, 12-23 months of Age	0.34
Belet Weyne	Riverine	Nutritious Diet	Child, 6-7 years of age	0.69
Belet Weyne	Riverine	Nutritious Diet	Girl, 14-15 years of age	1.93
Belet Weyne	Riverine	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.17
Belet Weyne	Riverine	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.39
Belet Weyne	Riverine	Nutritious Diet	Household	5.5
Berbera	Urban	Nutritious Diet	Child, 12-23 months of Age	0.51
Berbera	Urban	Nutritious Diet	Child, 6-7 years of age	0.82
Berbera	Urban	Nutritious Diet	Girl, 14-15 years of age	3.07
Berbera	Urban	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.48
Berbera	Urban	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	2.39
Berbera	Urban	Nutritious Diet	Household	8.27
Berbera	Fisheries	Nutritious Diet	Child, 12-23 months of Age	0.51
Berbera	Fisheries	Nutritious Diet	Child, 6-7 years of age	0.82
Berbera	Fisheries	Nutritious Diet	Girl, 14-15 years of age	3.07
Berbera	Fisheries	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.48
Berbera	Fisheries	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	2.39
Berbera	Fisheries	Nutritious Diet	Household	8.27
Berbera	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.51
Berbera	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.82
Berbera	Pastoral	Nutritious Diet	Girl, 14-15 years of age	3.07
Berbera	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.48
Berbera	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	2.39
Berbera	Pastoral	Nutritious Diet	Household	8.27
Cabudwaq	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.52
Cabudwaq	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.89
Cabudwaq	Pastoral	Nutritious Diet	Girl, 14-15 years of age	3.59
Cabudwaq	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.53
Cabudwaq	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	2.29
Cabudwaq	Pastoral	Nutritious Diet	Household	8.82
Cadado	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.46
Cadado	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.98
Cadado	Pastoral	Nutritious Diet	Girl, 14-15 years of age	3.41
Cadado	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.75
Cadado	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	2.29
Cadado	Pastoral	Nutritious Diet	Household	8.9

Doolow	Urban	Nutritious Diet	Child, 12-23 months of Age	0.39
Doolow	Urban	Nutritious Diet	Child, 6-7 years of age	0.85
Doolow	Urban	Nutritious Diet	Girl, 14-15 years of age	2.28
Doolow	Urban	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.38
Doolow	Urban	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.83
Doolow	Urban	Nutritious Diet	Household	6.74
Doolow	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.39
Doolow	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.85
Doolow	Pastoral	Nutritious Diet	Girl, 14-15 years of age	2.28
Doolow	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.38
Doolow	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.83
Doolow	Pastoral	Nutritious Diet	Household	6.74
Doolow	Agropastoral	Nutritious Diet	Child, 12-23 months of Age	0.39
Doolow	Agropastoral	Nutritious Diet	Child, 6-7 years of age	0.87
Doolow	Agropastoral	Nutritious Diet	Girl, 14-15 years of age	2.26
Doolow	Agropastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.42
Doolow	Agropastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.85
Doolow	Agropastoral	Nutritious Diet	Household	6.79
Doolow	Riverine	Nutritious Diet	Child, 12-23 months of Age	0.39
Doolow	Riverine	Nutritious Diet	Child, 6-7 years of age	0.87
Doolow	Riverine	Nutritious Diet	Girl, 14-15 years of age	2.26
Doolow	Riverine	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.42
Doolow	Riverine	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.85
Doolow	Riverine	Nutritious Diet	Household	6.79
Eyl	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.46
Eyl	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.88
Eyl	Pastoral	Nutritious Diet	Girl, 14-15 years of age	3.76
Eyl	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.51
Eyl	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.95
Eyl	Pastoral	Nutritious Diet	Household	8.56
Eyl	Fisheries	Nutritious Diet	Child, 12-23 months of Age	0.46
Eyl	Fisheries	Nutritious Diet	Child, 6-7 years of age	0.88
Eyl	Fisheries	Nutritious Diet	Girl, 14-15 years of age	3.75
Eyl	Fisheries	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.51
Eyl	Fisheries	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.95
Eyl	Fisheries	Nutritious Diet	Household	8.55
Hargeisa	Urban	Nutritious Diet	Child, 12-23 months of Age	0.39
Hargeisa	Urban	Nutritious Diet	Child, 6-7 years of age	0.65
Hargeisa	Urban	Nutritious Diet	Girl, 14-15 years of age	3.07

Hargeisa	Urban	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.22
Hargeisa	Urban	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.88
Hargeisa	Urban	Nutritious Diet	Household	7.21
Hargeisa	Agropastoral	Nutritious Diet	Child, 12-23 months of Age	0.41
Hargeisa	Agropastoral	Nutritious Diet	Child, 6-7 years of age	0.7
Hargeisa	Agropastoral	Nutritious Diet	Girl, 14-15 years of age	2.41
Hargeisa	Agropastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.27
Hargeisa	Agropastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.9
Hargeisa	Agropastoral	Nutritious Diet	Household	6.69
Hargeisa	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.39
Hargeisa	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.65
Hargeisa	Pastoral	Nutritious Diet	Girl, 14-15 years of age	3.07
Hargeisa	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.22
Hargeisa	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.88
Hargeisa	Pastoral	Nutritious Diet	Household	7.21
Johwar	Urban	Nutritious Diet	Child, 12-23 months of Age	not met
Johwar	Urban	Nutritious Diet	Child, 6-7 years of age	0.53
Johwar	Urban	Nutritious Diet	Girl, 14-15 years of age	not met
Johwar	Urban	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.85
Johwar	Urban	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	not met
Johwar	Urban	Nutritious Diet	Household	not met
Johwar	Pastoral	Nutritious Diet	Child, 12-23 months of Age	not met
Johwar	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.53
Johwar	Pastoral	Nutritious Diet	Girl, 14-15 years of age	not met
Johwar	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.85
Johwar	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	not met
Johwar	Pastoral	Nutritious Diet	Household	not met
Johwar	Agropastoral	Nutritious Diet	Child, 12-23 months of Age	not met
Johwar	Agropastoral	Nutritious Diet	Child, 6-7 years of age	0.53
Johwar	Agropastoral	Nutritious Diet	Girl, 14-15 years of age	not met
Johwar	Agropastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.85
Johwar	Agropastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	not met
Johwar	Agropastoral	Nutritious Diet	Household	not met
Johwar	Riverine	Nutritious Diet	Child, 12-23 months of Age	not met
Johwar	Riverine	Nutritious Diet	Child, 6-7 years of age	0.53
Johwar	Riverine	Nutritious Diet	Girl, 14-15 years of age	not met
Johwar	Riverine	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.85
Johwar	Riverine	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	not met

Johwar	Riverine	Nutritious Diet	Household	not met
Luuq	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.3
Luuq	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.53
Luuq	Pastoral	Nutritious Diet	Girl, 14-15 years of age	1.66
Luuq	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.93
Luuq	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.34
Luuq	Pastoral	Nutritious Diet	Household	4.76
Luuq	Agropastoral	Nutritious Diet	Child, 12-23 months of Age	0.3
Luuq	Agropastoral	Nutritious Diet	Child, 6-7 years of age	0.53
Luuq	Agropastoral	Nutritious Diet	Girl, 14-15 years of age	1.66
Luuq	Agropastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.93
Luuq	Agropastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.34
Luuq	Agropastoral	Nutritious Diet	Household	4.76
Luuq	Riverine	Nutritious Diet	Child, 12-23 months of Age	0.3
Luuq	Riverine	Nutritious Diet	Child, 6-7 years of age	0.53
Luuq	Riverine	Nutritious Diet	Girl, 14-15 years of age	1.66
Luuq	Riverine	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.93
Luuq	Riverine	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.34
Luuq	Riverine	Nutritious Diet	Household	4.76
Mogadishu	Urban	Nutritious Diet	Child, 12-23 months of Age	0.29
Mogadishu	Urban	Nutritious Diet	Child, 6-7 years of age	0.49
Mogadishu	Urban	Nutritious Diet	Girl, 14-15 years of age	3.57
Mogadishu	Urban	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.89
Mogadishu	Urban	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.76
Mogadishu	Urban	Nutritious Diet	Household	7
Mogadishu	Pastoral	Nutritious Diet	Child, 12-23 months of Age	0.29
Mogadishu	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.49
Mogadishu	Pastoral	Nutritious Diet	Girl, 14-15 years of age	3.57
Mogadishu	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.89
Mogadishu	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.76
Mogadishu	Pastoral	Nutritious Diet	Household	7
Mogadishu	Fisheries	Nutritious Diet	Child, 12-23 months of Age	0.29
Mogadishu	Fisheries	Nutritious Diet	Child, 6-7 years of age	0.49
Mogadishu	Fisheries	Nutritious Diet	Girl, 14-15 years of age	3.57
Mogadishu	Fisheries	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	0.89
Mogadishu	Fisheries	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	1.76
Mogadishu	Fisheries	Nutritious Diet	Household	7
Qarbho	Pastoral	Nutritious Diet	Child, 12-23 months of Age	not met
Qarbho	Pastoral	Nutritious Diet	Child, 6-7 years of age	0.62

Qarbho	Pastoral	Nutritious Diet	Girl, 14-15 years of age	not met
Qarbho	Pastoral	Nutritious Diet	Man, 30-59 years, 50kg, moderately active	1.05
Qarbho	Pastoral	Nutritious Diet	Woman, 30-59 years, 45kg, moderately active, average breastfeeding requirement	not met
Qarbho	Pastoral	Nutritious Diet	Household	not met

Cost of the Diet models by Individual and Market

Figure 39: Modelling results for a child, 12-23 months of age. Cost are in USD per day (CotD 2019).

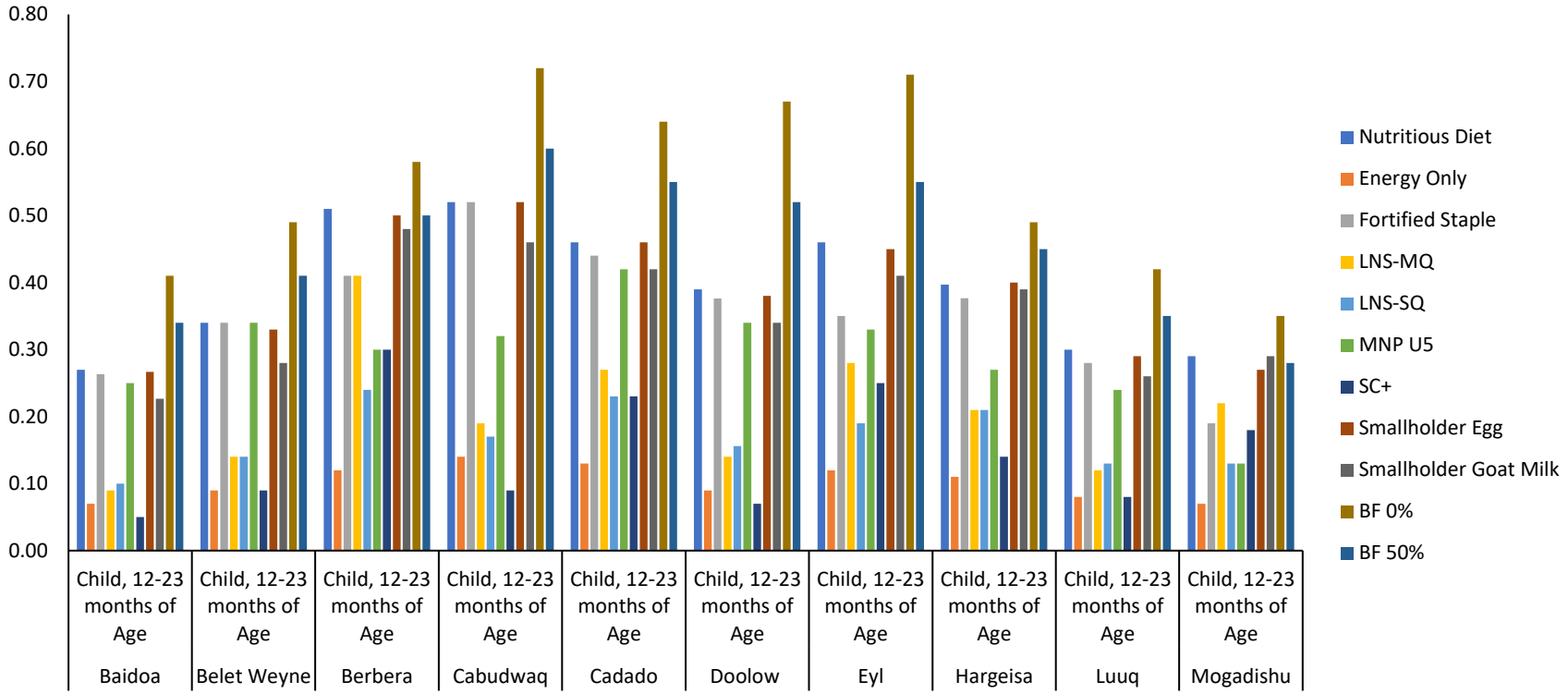


Figure 40: Modelling results for a child, 6-7 years of age. Cost are in USD per day (CotD 2019).

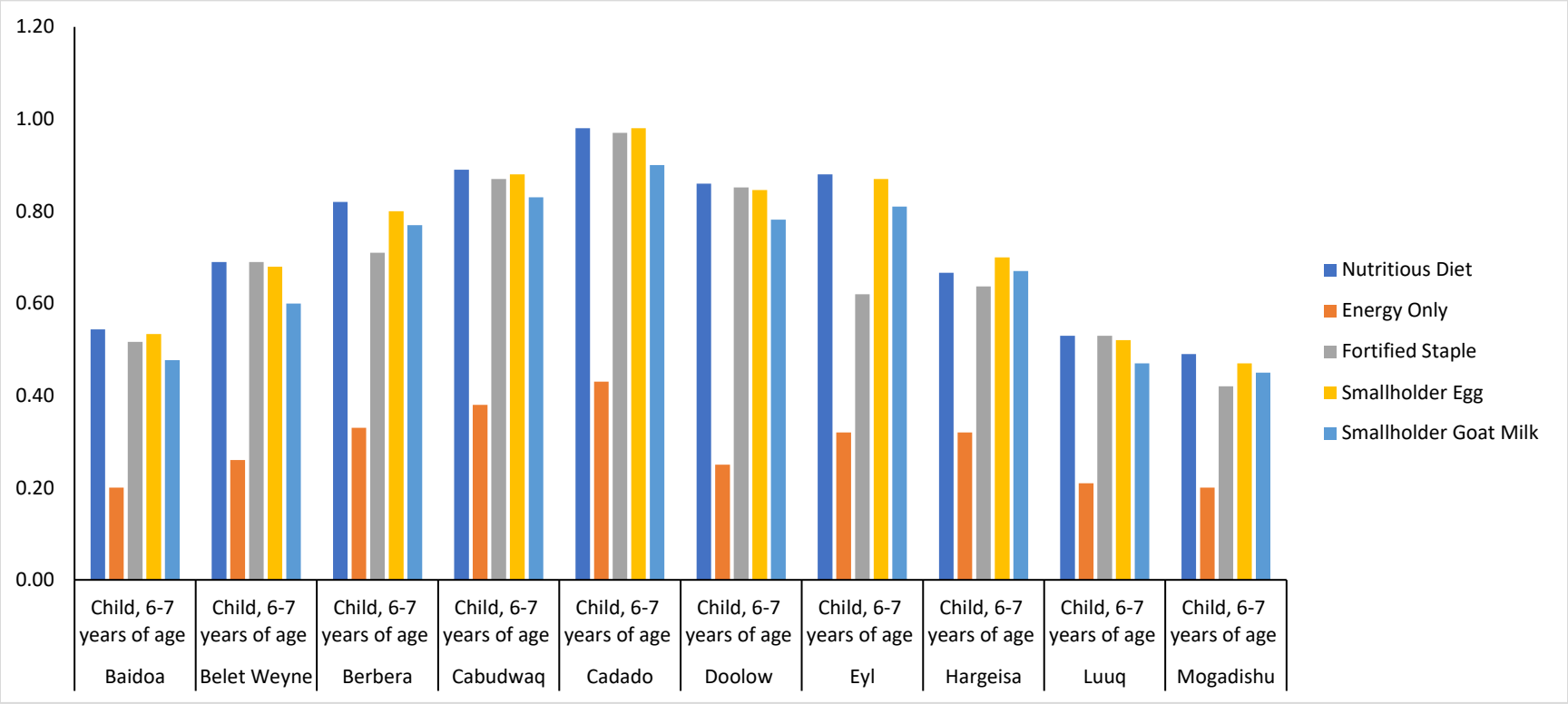


Figure 41: Modelling results for a Girl, 14-15 years of age. Cost are in USD per day (CotD 2019).

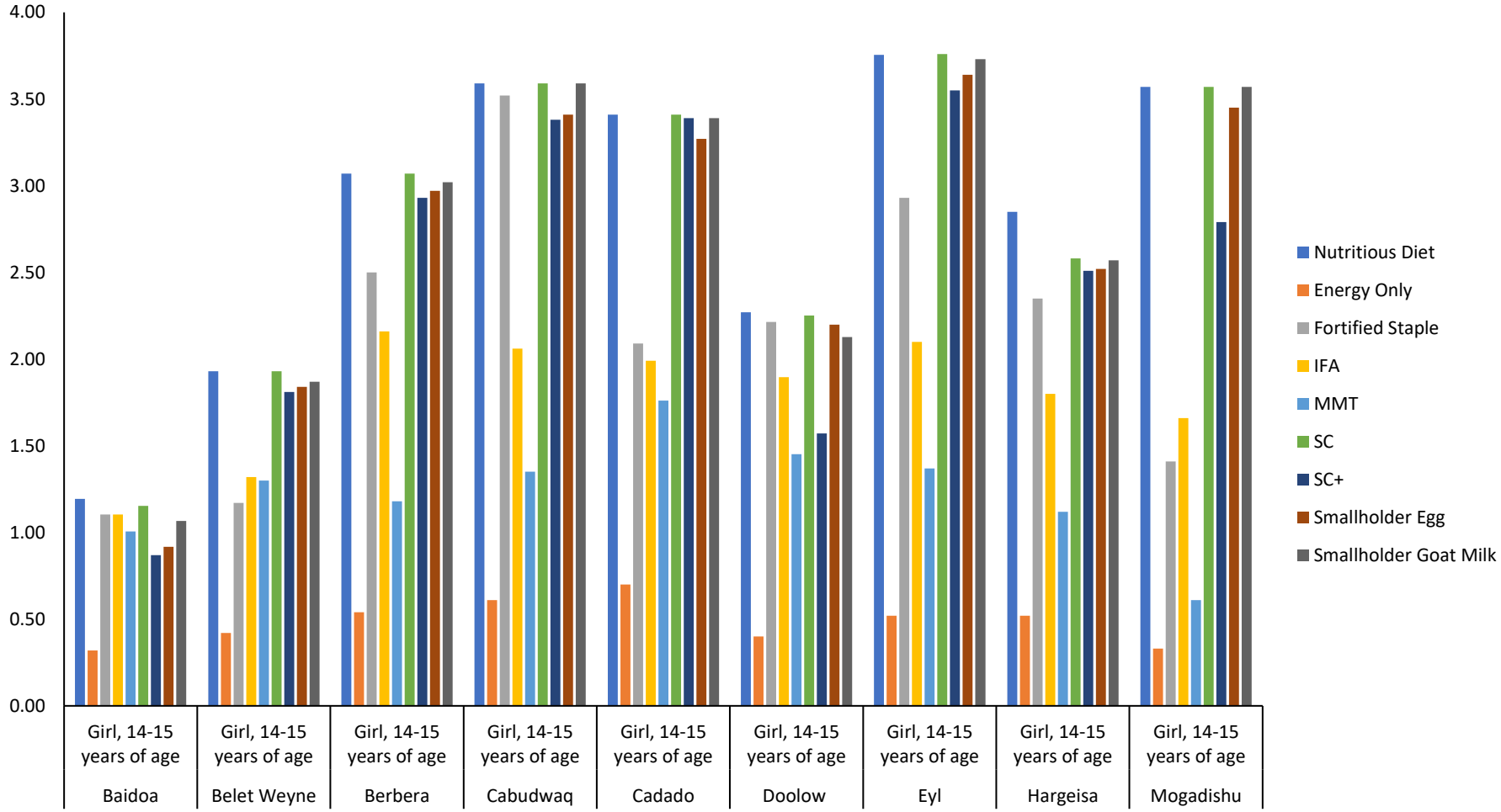


Figure 42: Modelling results for a woman, 30-59 years of age, breastfeeding. Cost are in USD per day (CotD 2019).

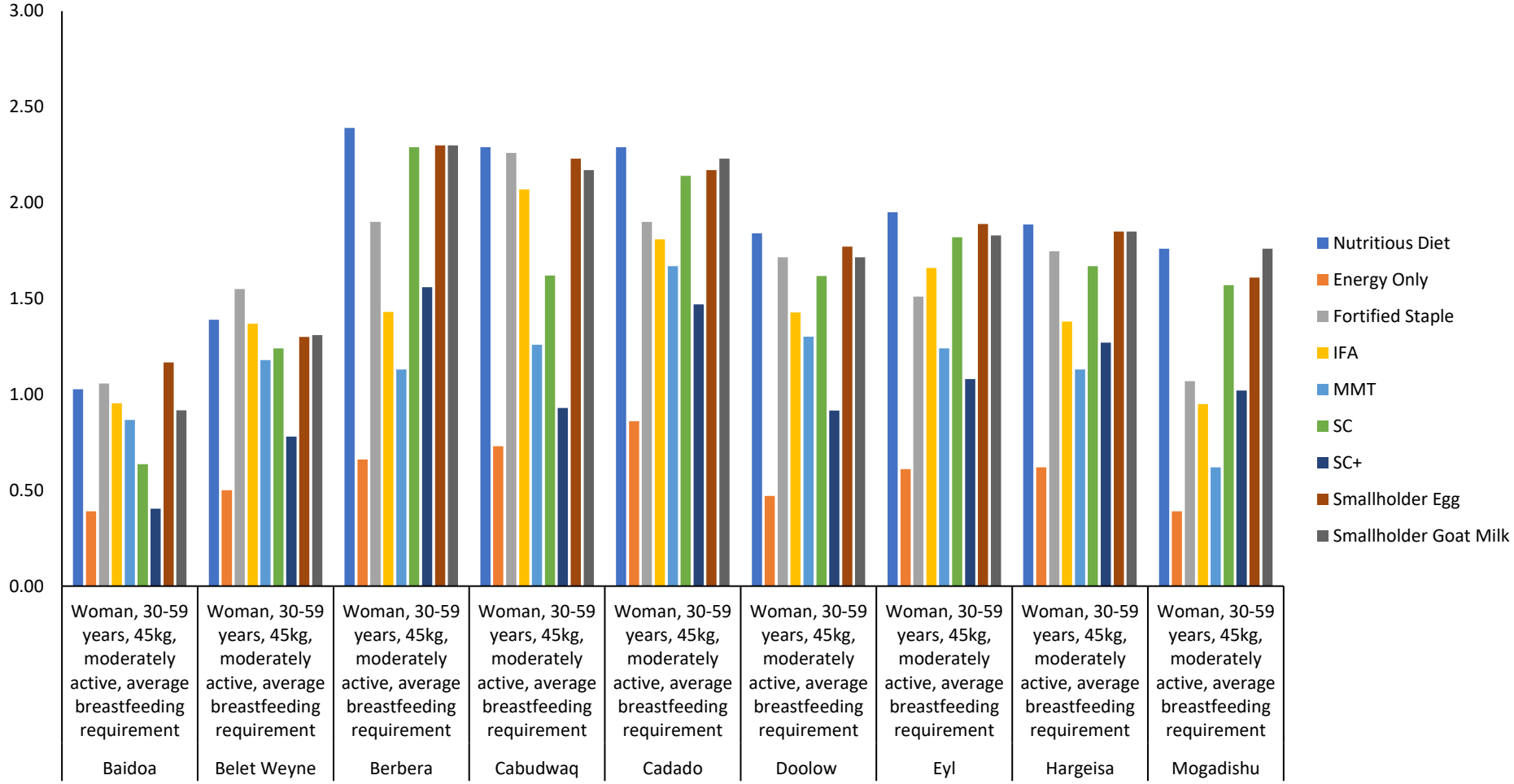


Figure 43: Modelling results for a man, 30-59 years of age. Costs are in USD per day (CotD 2019).

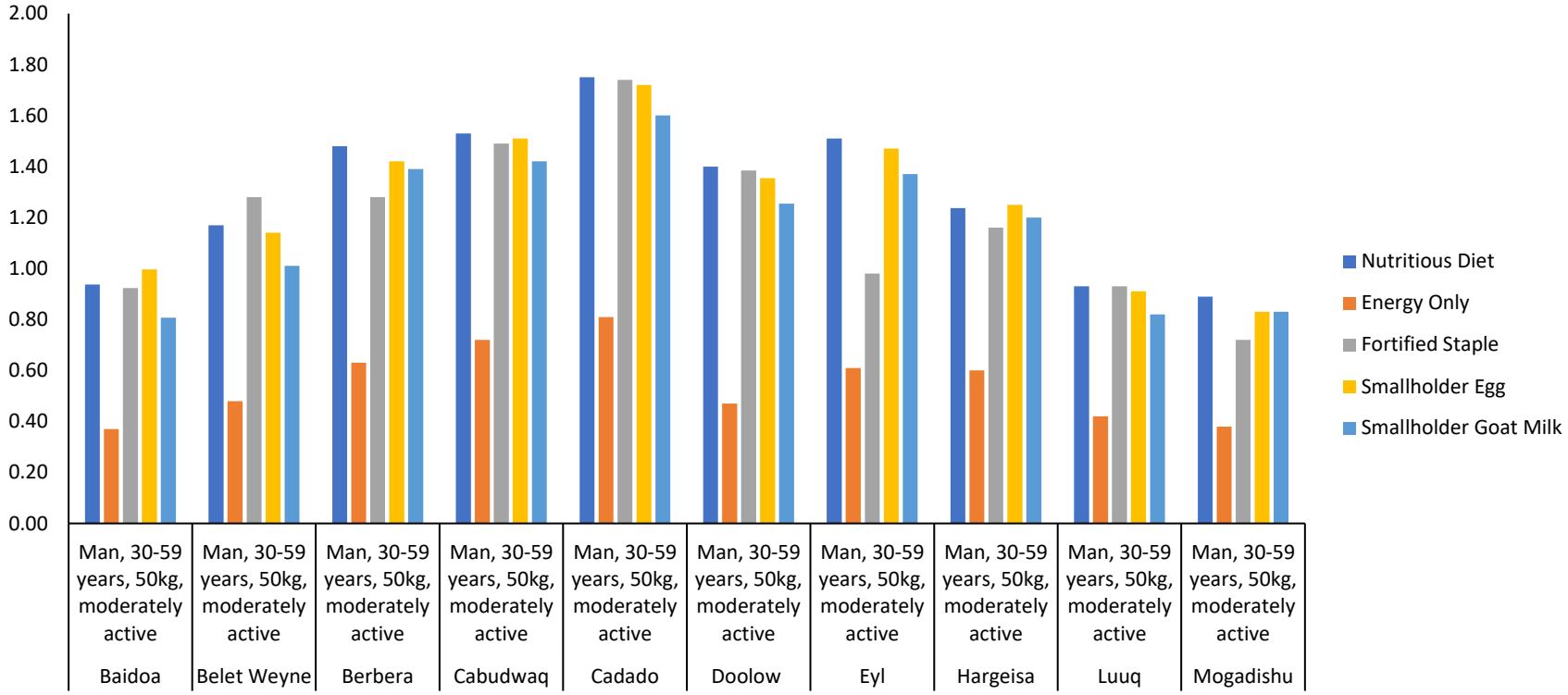
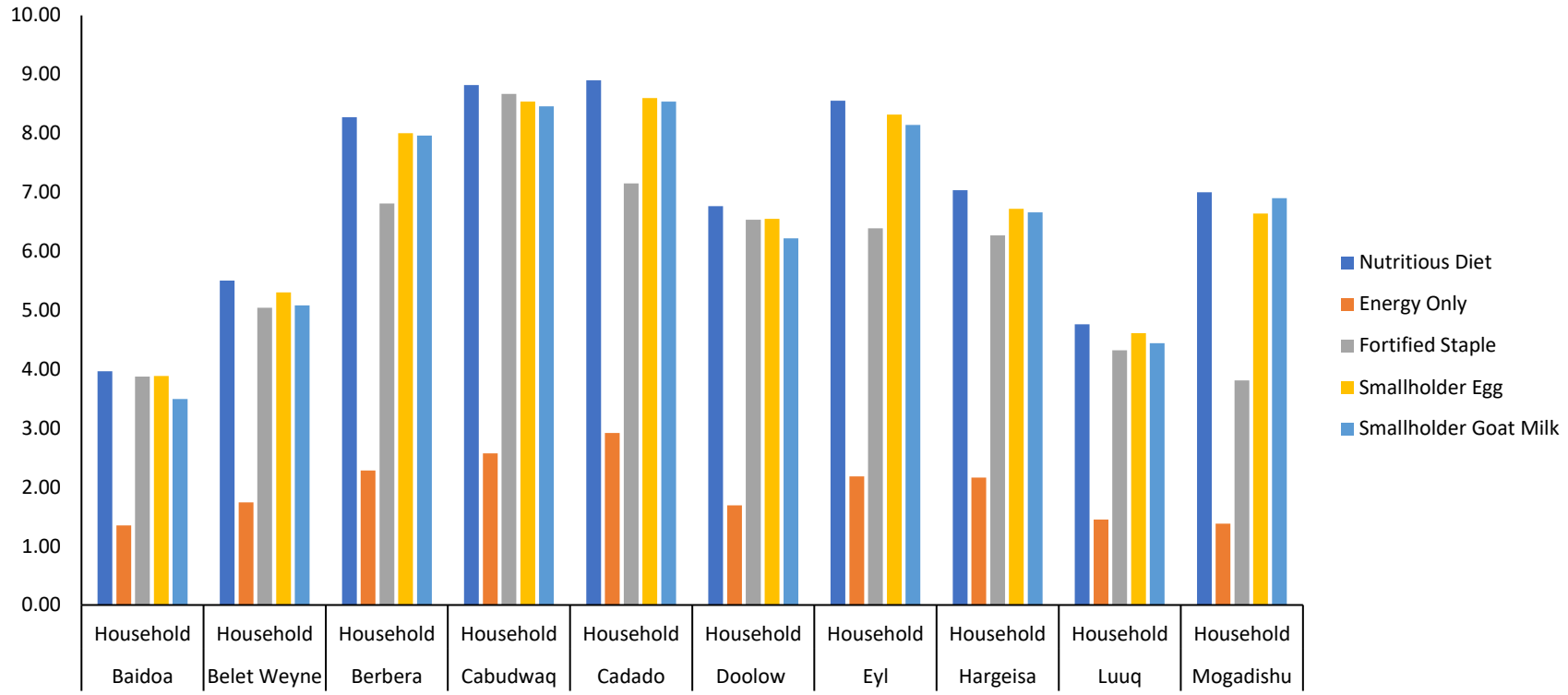


Figure 44: Modelling results for household-level interventions. Cost are in USD per day (CotD 2019).



Cost of a Nutritious Diet Composition by Market, Livelihood and Individual (in g per week).

Table 7: Baidoa – Urban and Pastoral

		(Millet, grain or flour, CotD)	(Sorghum, grain or flour, CotD)	(Wheat, grain or flour, CotD)	(Lentil, whole)	(Pea, dry)	(Goat, raw)	(Lamb, liver, raw)	(Cheese, hard, CotD)	(Milk, cow, powdered,	(Pepper, sweet, red, raw)	(Spinach)	(Coconut, meat)	(Cumin, seeds)	(Parsley leaf, raw)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months		422	341	125	0	0	0	0	0	131	0	955	0	8	0	3,724	5,705
1 x Child (either sex) 6-7 years		0	1,737	413	0	0	0	0	0	334	72	691	418	13	0	0	3,678
1 x Man, 30-59y, 55 kg, moderately active		0	3,760	785	0	0	0	3	0	489	86	1,515	552	25	0	0	7,216
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)		164	3,786	661	0	0	0	129	0	87	45	4,711	853	21	0	0	10,457
1 x Female 14-15 years		0	1,839	660	966	82	65	63	151	0	0	6,115	980	22	65	0	11,009
Total edible weight		586	11,463	2,644	966	82	65	194	151	1,041	203	13,988	2,804	89	65	3,724	38,065
Total weight		586	11,463	2,644	966	82	88	194	151	1,041	245	17,485	3,594	89	69	3,724	42,421

Table 8: Baidoa – Agropastoral and IDP

	(Maize, green,	(Millet, grain	(Sorghum, grain	(Lentil, whole)	(Pea, dry)	(Lamb, liver	(Liver)	(Cheese	(Milk, cow,	(Pepper	(Spinach)	(Coconut,	(Cumin	(Parsley, leaf	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	148	454	341	0	0	0	0	0	131	0	977	0	8	0	3,724	5,782
1 x Child (either sex) 6-7 years	488	0	1,871	0	0	0	1	0	381	49	413	355	13	0	0	3,572
1 x Man, 30-59y, 55 kg, moderately active	928	0	4,017	0	0	0	0	0	577	42	996	435	25	0	0	7,019
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)	781	2,013	2,180	0	0	39	0	0	83	0	4,549	707	21	0	0	10,373
1 x Female 14-15 years	797	0	1,700	966	394	62	0	4	122	0	6,115	1,021	22	65	0	11,268
Total edible weight	3,142	2,466	10,109	966	394	101	1	4	1,293	91	13,051	2,518	89	65	3,724	38,014
Total weight	3,142	2,466	10,109	966	394	101	1	4	1,293	109	16,313	3,229	89	69	3,724	42,009

Table 9: Belet Weyne – All Livelihoods

	(Maize, green, raw)	(Maize, white, grain or flour, [illegible])	(Sorghum, grain or flour, CotD)	(Bean, kidney, red, mature, raw)	(Bean, white)	(Lentil, whole)	(Goat, raw)	(Lamb, head meat)	(Lamb, liver, raw)	(Milk, camel, raw)	(Spinach)	(Oil, CotD)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	0	369	136	403	0	0	0	0	3	415	1,505	30	3,724	6,585
1 x Child (either sex) 6-7 years	0	1,221	451	540	0	0	0	0	9	1,220	2,060	190	0	5,691
1 x Man, 30-59y, 55 kg, moderately active	0	2,319	856	1,483	0	0	0	0	19	32	5,135	311	0	10,154
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)	62	1,953	721	1,074	0	947	0	0	56	308	4,734	312	0	10,168
1 x Female 14-15 years	0	1,700	680	0	55	966	113	1,609	74	1,585	6,115	231	0	13,127
Total edible weight	62	7,562	2,845	3,500	55	1,913	113	1,609	161	3,560	19,550	1,073	3,724	45,726
Total weight	62	7,562	2,845	3,500	55	1,913	153	1,609	161	3,560	24,437	1,073	3,724	50,653

Table 10: Berbera – All Livelihoods

		(Rice, raw)	(Wheat, grain or flour, CotD)	(Bean, white)	(Lentil, whole)	(Beef, meat, raw)	(Camel, raw, meat)	(Lamb, liver, raw)	(Milk, cow, powdered,	(Yogurt)	(Cabbage, raw)	(Oil, CotD)	(Pepper, red, hot)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months		340	125	128	242	0	0	273	13	766	0	0	14	3,724	5,625
1 x Child (either sex) 6-7 years		1,127	413	456	0	0	0	152	406	0	576	151	40	0	3,320
1 x Man, 30-59y, 55 kg, moderately active		2,141	785	1,287	0	0	0	259	636	0	662	210	76	0	6,056
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)		1,803	661	705	947	440	0	1,248	604	0	1,413	131	63	0	8,015
1 x Female 14-15 years		1,400	560	0	884	966	466	1,312	32	2,898	646	5	0	0	9,169
Total edible weight		6,812	2,544	2,576	2,073	1,406	466	3,244	1,691	3,664	3,297	496	192	3,724	32,184
Total weight		6,812	2,544	2,576	2,073	2,038	676	1,081	1,691	3,664	3,924	496	235	3,724	31,533

Table 11: Cabudwaq – All Livelihoods

	(Maize, white, grain or flour,	(Millet, grain or flour, CotD)	(Wheat, flour, all purpose, 72%	(Potato, white)	(Bean, kidney, dried, raw)	(Bean, kidney, red, mature, raw)	(Lamb, liver, raw)	(Liver)	(Egg, chicken, CotD)	(Milk, camel, raw)	(Milk, cow, powdered	(Grapefruit)	(Oil, CotD)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	0	250	170	95	0	355	70	0	0	1,504	34	0	0	3,724	6,200
1 x Child (either sex) 6-7 years	402	723	657	0	268	0	0	19	0	3,069	0	412	140	0	5,690
1 x Man, 30-59y, 55 kg, moderately active	1,136	1,373	1,249	0	536	0	0	25	0	4,971	0	586	168	0	10,045
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)	0	1,293	1,051	0	1,262	724	338	0	0	4,050	0	957	212	0	9,887
1 x Female 14-15 years	0	1,120	1,073	0	719	0	413	0	1,382	6,244	0	358	55	0	11,364
Total edible weight	1,538	4,759	4,201	95	2,784	1,079	821	44	1,382	19,839	34	2,313	575	3,724	43,186
Total weight	1,538	4,759	4,201	113	2,784	1,079	821	44	1,535	19,839	34	3,004	575	3,724	44,048

Table 12: Cadado – All Livelihoods

		(Millet, grain or flour, CotD)	(Rice, raw)	(Bean, kidney, dried, raw)	(Bean, kidney, red, mature, raw)	(Lamb, liver, raw)	(Egg, chicken, CotD)	(Milk, camel, raw)	(Milk, cow, powdered, whole)	(Pepper, sweet, red, raw)	(Spinach)	(Oil, olive)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months		187	272	430	0	0	0	0	96	0	1,170	20	3,724	5,900
1 x Child (either sex) 6-7 years		723	789	248	0	0	0	0	378	88	431	256	0	2,913
1 x Man, 30-59y, 55 kg, moderately active		1,373	1,499	857	0	0	0	0	622	133	402	407	0	5,292
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)		1,156	1,262	1,262	794	22	0	1,117	0	0	5,731	312	0	11,656
1 x Female 14-15 years		1,120	1,190	920	0	10	1,738	505	0	0	6,115	198	0	11,796
Total edible weight		4,560	5,012	3,718	794	31	1,738	1,622	1,096	220	13,848	1,193	3,724	37,557
Total weight		4,560	5,012	3,718	794	31	1,931	1,622	1,096	266	17,310	1,193	3,724	41,257

Table 13: Doolow – Pastoral and IDP

	(Maize, white, grain or flour,	(Sorghum, grain or flour, CotD)	(Bean, kidney, red, mature, raw)	(Groundnut, shelled, dried,	(Beef, intestines and stomach	(Lamb, head meat)	(Lamb, liver, raw)	(Liver)	(Milk, cow, powdered,	(Pepper, sweet, red, raw)	(Spinach)	(Avocado)	(Fenugreek, seeds)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	148	341	380	0	0	0	18	0	155	0	672	0	23	3,724	5,460
1 x Child (either sex) 6-7 years	774	1,127	131	197	0	0	0	7	438	100	0	113	0	0	2,889
1 x Man, 30-59y, 55 kg, moderately active	1,829	2,141	363	246	0	0	0	6	715	154	0	0	0	0	5,454
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)	1,303	1,803	1,262	315	0	0	131	0	111	0	3,991	991	63	0	9,969
1 x Female 14-15 years	797	1,700	606	321	414	1,609	60	0	169	0	6,115	353	65	0	12,209
Total edible weight	4,851	7,112	2,742	1,080	414	1,609	209	13	1,588	254	10,777	1,457	151	3,724	35,980
Total weight	4,851	7,112	2,742	1,080	414	1,609	209	13	1,588	306	13,472	1,969	151	3,724	39,239

Table 14: Doolow – Agropastoral and Riverine

		(Maize, white, grain or flour,	(Sorghum, grain or flour, CotD)	(Bean, kidney, red, mature, raw)	(Groundnut, shelled, dried,	(Beef, intestines and stomach	(Lamb, head meat)	(Lamb, liver, raw)	(Liver)	(Milk, cow, powdered,	(Pepper, sweet, red, raw)	(Spinach)	(Avocado)	(Fenugreek, seeds)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months		0	477	398	0	0	0	19	0	161	0	593	0	23	3,724	5,395
1 x Child (either sex) 6-7 years		345	1,578	137	197	0	0	0	8	431	98	0	156	0	0	2,949
1 x Man, 30-59y, 55 kg, moderately active		996	2,997	385	274	0	0	0	6	700	154	0	0	0	0	5,512
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)		626	2,524	1,262	315	0	0	122	0	108	0	3,931	1,044	63	0	9,995
1 x Female 14-15 years		0	2,380	813	321	95	1,609	63	0	135	0	6,115	761	65	0	12,357
Total edible weight		1,967	9,956	2,994	1,108	95	1,609	204	14	1,535	251	10,639	1,962	151	3,724	36,209
Total weight		1,967	9,956	2,994	1,108	95	1,609	204	14	1,535	303	13,298	2,651	151	3,724	39,610

Table 15: Eyl – Pastoral and Fisheries

	(Millet, flour)	(Rice, raw)	(Wheat, grain or flour, CotD)	(Green gram, whole, dried,	(Lentil, whole)	(Goat, intestines and stomach,	(Lamb, liver, raw)	(Liver)	(Fish, raw)	(Egg, chicken, CotD)	(Milk, camel, raw)	(Milk, cow, powdered,	(Tomato)	(Oil, sesame)	(Sugar)	(Tomato, paste)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	0	272	187	149	162	0	86	0	0	0	690	145	0	0	0	120	3,724	5,536
1 x Child (either sex) 6-7 years	0	789	723	0	445	0	0	7	0	0	0	420	636	145	43	197	0	3,404
1 x Man, 30-59y, 55 kg, moderately active	157	1,499	1,373	0	1,124	0	0	6	0	0	0	664	721	196	130	374	0	6,244
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12)	0	1,262	1,156	911	947	0	410	0	0	0	466	472	1,752	219	0	315	0	7,910
1 x Female 14-15 years	0	1,155	1,071	0	216	1,609	425	0	702	784	6,439	19	323	0	0	321	0	13,064
Total edible weight	157	4,977	4,511	1,060	2,894	1,609	922	13	702	784	7,594	1,720	3,432	559	173	1,327	3,724	36,158
Total weight	157	4,977	4,511	1,060	2,894	1,609	922	13	1,151	871	7,594	1,720	3,613	559	173	1,327	3,724	36,875

Table 16: Luuq – All Livelihoods

	(Maize, white, grain or flour,	(Sorghum, grain or flour, CotD)	(Bean, kidney, red, mature, raw)	(Groundnut, shelled, dried	(Goat, intestines and stomach,	(Lamb, head meat)	(Lamb, liver, raw)	(Liver)	(Milk, camel, raw)	(Milk, goat)	(Spinach)	(Muskmelon)	(Oil, olive)	(Parsley leaf, raw)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	369	136	376	41	0	0	3	0	0	593	1,182	0	0	23	3,724	6,446
1 x Child (either sex) 6-7 years	1,434	451	208	27	0	0	3	4	0	2,799	0	680	98	40	0	5,745
1 x Man, 30-59y, 55 kg, moderately active	3,103	856	430	0	0	0	15	0	0	4,582	0	969	115	76	0	10,147
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)	1,953	1,188	1,262	315	0	0	202	0	1,265	0	3,661	393	132	63	0	10,435
1 x Female 14-15 years	1,700	680	663	321	1,609	622	72	0	1,344	0	6,115	0	27	65	0	13,219
Total edible weight	8,560	3,311	2,939	705	1,609	622	295	4	2,609	7,974	10,958	2,042	372	267	3,724	45,991
Total weight	8,560	3,311	2,939	705	1,609	622	295	4	2,609	7,974	13,698	3,294	372	281	3,724	49,997

Table 17: Mogadishu – All Livelihoods

	(Macaroni)	(Rice, raw)	(Sorghum, grain or flour, CotD)	(Lentil, whole)	(Pea, dry)	(Sesame, seed)	(Beef, innards)	(Camel, raw, meat)	(Fish, raw)	(Egg, chicken, CotD)	(Milk, cow, whole)	(Spinach)	(Grapefruit)	(Oil, vegetable)	(Salt)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	272	204	0	357	0	101	0	0	0	0	448	1,073	0	0	0	3,724	6,179
1 x Child (either sex) 6-7 years	789	789	423	0	0	175	353	0	0	0	1,106	814	373	90	0	0	4,912
1 x Man, 30-59y, 55 kg, moderately active	1,499	1,499	647	0	471	303	1,319	0	0	0	1,701	1,052	556	0	0	0	9,046
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)	1,262	1,262	0	947	307	630	0	0	426	0	2,486	5,993	0	0	0	0	13,314
1 x Female 14-15 years	1,287	1,190	0	0	0	300	0	671	1,134	1,788	0	6,115	0	0	32	0	12,517
Total edible weight	5,109	4,944	1,070	1,304	778	1,510	1,672	671	1,560	1,788	5,741	15,047	929	90	32	3,724	45,968
Total weight	5,109	4,944	1,070	1,304	778	1,510	1,672	972	2,557	1,987	5,741	18,809	1,206	90	32	3,724	51,505

Table 18: Hargeisa – Agropastoral, urban and IDP

		(Bread, white, toasted)	(Maize, white, grain or flour,	(Sorghum, grain or flour, CotD)	(Lentil, whole)	(Beef, meat, raw)	(Lamb, liver, raw)	(Liver)	(Yogurt)	(Pepper, sweet, red, raw)	(Spinach)	(Oil, CotD)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months		5	295	204	357	0	62	0	824	10	0	0	3,724	5,482
1 x Child (either sex) 6-7 years		715	855	789	22	0	0	15	1,170	107	0	136	0	3,809
1 x Female 14-15 years		0	1,260	1,120	833	711	404	0	2,898	58	515	64	0	7,862
1 x Man, 30-59y, 55 kg, moderately active		1,847	1,623	1,499	0	0	0	20	1,651	163	0	188	0	6,991
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)		1,292	1,367	1,262	947	0	409	0	1,721	232	0	171	0	7,402
Total edible weight		3,860	5,400	4,874	2,159	711	874	35	8,264	571	515	559	3,724	31,547
Total weight		3,860	5,400	4,874	2,159	1,031	874	35	8,264	688	643	559	3,724	32,112

Table 19: Hargeisa – Pastoral

	(Bread, white, toasted)	(Rice, raw)	(Wheat, grain or flour, CotD)	(Bean, kidney, dried, raw)	(Lentil, whole)	(Beef, meat, raw)	(Goat, raw)	(Lamb, liver, raw)	(Yogurt)	(Pepper, sweet, red, raw)	(Spinach)	(Oil, CotD)	Breast milk	Total Food Weight
1 x Child (either sex) 12-23 months	71	204	250	0	357	0	0	77	778	10	0	0	3,724	5,471
1 x Child (either sex) 6-7 years	681	789	723	0	85	0	0	48	1,131	105	0	170	0	3,732
1 x Female 14-15 years	0	1,190	1,190	0	515	966	673	306	2,206	0	2,198	30	0	9,274
1 x Man, 30-59y, 55 kg, moderately active	1,241	1,499	1,373	0	628	0	0	62	1,722	142	0	238	0	6,905
1 x Woman, 30-59y, 50 kg, moderately active (1 x Lactation, 7-12 months)	158	1,262	1,156	942	947	0	0	442	1,907	211	0	243	0	7,267
Total edible weight	2,151	4,944	4,692	942	2,531	966	673	935	7,744	469	2,198	680	3,724	32,650
Total weight	2,151	4,944	4,692	942	2,531	1,400	910	935	7,744	565	2,748	680	3,724	33,966

Cost of the minimum food basket (CMB) methodology

In absence of a centralized system to estimate food price fluctuations, the Food Security and Nutrition Analysis Unit (FSNAU) led by FAO provides nationwide price estimates for key commodities and computes the cost of a minimum expenditure basked (CMB) for food and non-food items. The composition of the food part of the CMB is shown below (Table A3). The CMB estimates are used by humanitarian actors as a basis to determine the value of cash-based transfers. The CMB was adjusted in 2017 by reducing the amount of food items and including the cheapest locally available staple instead of sorghum. Sorghum is grown only in the south and is much more expensive in the south. Hence, the estimates of the CMB for the north (Puntland, Somaliland) are significantly higher than those for the south. While the humanitarian response bases their cash transfer value on the updated CMB, the former CMB is still computed for research and price monitoring purposes. The calculations in this report are based on the former CMB.

Table A3: Composition of the food part of the CMB is shown below (Table A3)

	south		**north/ central**	
	urban	**rural**	**urban**	**rural**
Red sorghum	95kg	95kg	95kg	95kg
Wheat flour	3.75kg	3.75kg	3.75kg	3.75kg
Sugar	5kg	5kg	5kg	5kg
Vegetable oil	4lt	3lt	4lt	3lt
Milk	15lt		20lt	
Meat	4kg	2kg	10kg	5kg
Tea leaves	0.5kg	0.5kg	0.5kg	0.5kg
Salt	1.5kg	1.5kg	1.5kg	1.5kg
Cowpeas	6kg		4kg	

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