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Somali Fill the Nutrient Gap and Cost of the Diet Assessment

SUMMARY REPORT



October 2019

“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. [...]

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.”



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Fill the Nutrient Gap **Somalia** | SUMMARY REPORT

Introduction to Fill the Nutrient Gap

The Federal Government of Somalia (FGS), under the leadership of the Office of the Prime Minister (OPM) Scaling Up Nutrition (SUN) Movement Secretariat is seeking long-term strategies to reduce the burden of malnutrition across the country. The Fill the Nutrient Gap analysis (FNG) was conducted in 2018-19 to build a deeper understanding of the structural barriers to accessing healthy diets and identify opportunities across the food system to improve nutrition. FNG analysis contributes to FGS' efforts to address food insecurity, and high rates of acute and chronic malnutrition, and leads the country towards a path of sustainable 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 the 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 builds an understanding of availability, cost and affordability of a nutritious diet. FNG analysis is dedicated to identifying and promoting scale-up of proven interventions best suited to local context.

This summary report presents findings from the analysis and a discussion of its process, methodology and limitations. By identifying and contextualizing new findings,

FNG analysis builds consensus in Somalia with a vision and path ahead for improved nutrition.

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). A Feasibility Study was completed in April 2019 and findings were presented to stakeholders in a workshop to define 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; Labor and Social Affairs; Information; Humanitarian Affairs; Women and Human Rights; Youth and Sports), Development Partners (FSNAU, FAO, UNICEF), civil society (BRCiS consortium, UNN-REACH, World Vision International, Mercy Corps, FERO, Concern Worldwide, IRC), academia (Somali National University, Hormuud University) and private sector (Somalia Chamber of Commerce, Somali Medical Association, Somali Industries Association).

Feasibility Study

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

The Feasibility Study recognized Somalia's vulnerability to food insecurity, which is exacerbated when rainfall is lower than expected. Persistently high global acute malnutrition (GAM) rates and widespread micronutrient deficiencies indicate undernutrition is widespread, including stunting, with consequences for child development. Data sources were often inconsistent and/or limited in scope, limiting the reliability of estimates. The nationally representative Somali Demographic and Health Survey (SDHS) and National Micronutrient Survey (NMS) were in the process of data collection at the time FNG analysis was conducted and results were not available to inform FNG analysis.

The Feasibility Study identified livelihood systems as an important dimension to be considered in understanding malnutrition in Somalia as they influence access, availability, food preferences and income. The study recommended disaggregation of analysis into four broad livelihoods: pastoral, agropastoral, riverine and urban. Livelihoods should be considered when analysing dietary habits, challenges in food access, food price disparities and determinants of malnutrition. The study highlighted the importance of pastoral livelihoods for the Somali economy and riverine agriculture for domestic production of cereals, fruits and vegetables. The study identified seasonal fluctuations in food production and availability as important factors impacting the availability of food.

The Feasibility Study concluded it would be possible to conduct the FNG analysis in Somalia and the analysis would support Somalia's nutrition actors in identifying how to address malnutrition despite limited data availability. The Feasibility Study recommended the disaggregation of FNG analysis by livelihood system, with special emphasis on Xagaa season (Summer, June to September) due to low availability of foods and high food prices during this time.

Scope and focus of FNG analysis

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

Level of analysis: disaggregation into six livelihood systems, four recommended by the Feasibility Study (pastoral, agropastoral, riverine and urban), plus two considered 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.

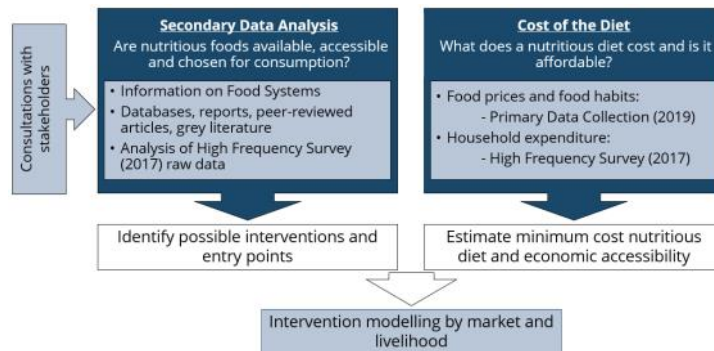
Data sources for CotD analysis: High Frequency Survey (HFS) 2017 as a source for food expenditure, and; primary food price data collection during Xagaa season for food prices and availability.

Model 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

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

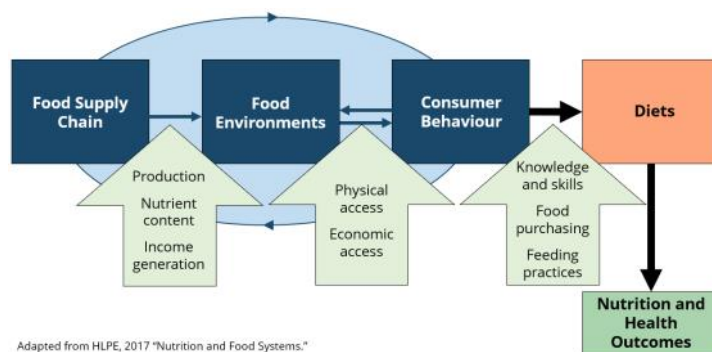
Figure 1: FNG Somalia analytical framework.



Secondary data analysis

FNG secondary data analysis identifies: barriers to accessing nutritious foods, nutritionally vulnerable groups in 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 behaviour patterns to facilitate healthier diet choices (Figure 2).

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



Sources for secondary data analysis include analysis of the HFS 2017 raw data 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.

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 requirements for nutrients, including protein, vitamins and minerals, but does not exceed an individual's energy and fat

requirements. An “energy only” diet meets only energy requirements and does not consider nutrient requirements. CotD identifies the cheapest combination of locally-available foods that can combine to create a nutritious diet. CotD analysis for FNG Somalia was conducted by market and was then aggregated into averages.

To ensure the optimized nutritious diet considers basic dietary preferences, optimization was restricted to include at least two portions of preferred staple foods, 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 (Figure 3):

Figure 3: Staple preferences by market and livelihood.

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	
Johwar	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 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.

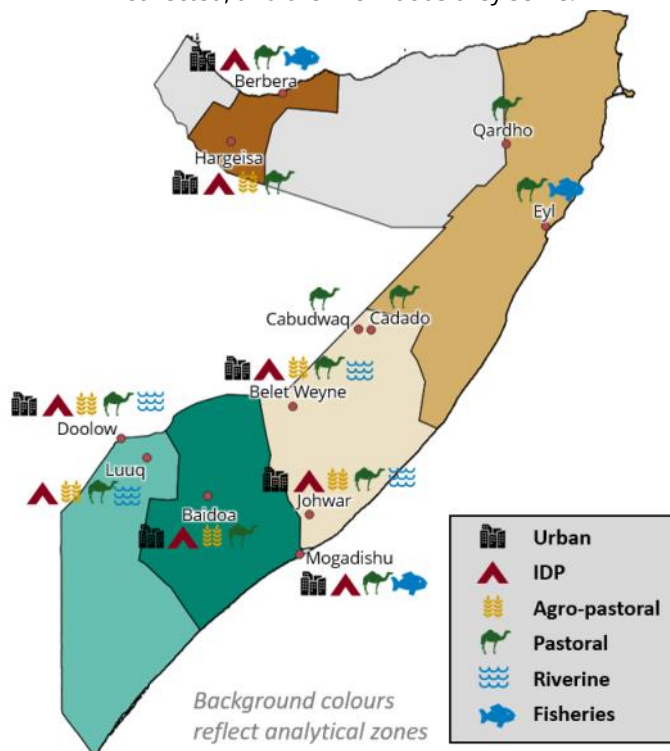
Household food expenditure in the HFS was disaggregated by urban, rural, nomadic and IDP populations, along pre-war regional boundaries. This does not match the disaggregation recommended by the Feasibility Study. For non-affordability estimates, markets were grouped into six analytical zones: 1) Hargeisa 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: 1) collecting food price data from local markets and 2) focus group discussions and household surveys for data on food consumption. Data was collected from 4-28 July, 2019 in Luuq, Doolow, Baidoa, Mogadishu, Johwar, Belet Weyne, Cabudwaq, Cadado, Eyl and Qardho; and from 6 -14 August, 2019 in Hargeisa and Berbera (Figure 4). In each site local enumerators visited markets and recorded prices of all foods available. Where possible, four samples of each food item were recorded in all markets.

Most markets in Somalia are accessed by members of more than one livelihood system. Data collection was based on purposeful sampling of 12 markets, two in each federal state. A matrix was developed indicating the different livelihood systems accessing each market. Sampled markets were selected to ensure at least four markets were surveyed for riverine and fisheries livelihood systems and six markets were surveyed for all other livelihood systems, with a wide geographic range (Figure 4). The sample was restricted by security concerns and limited accessibility, particularly in rural areas in the south of the country. The limitations of this purposeful sampling technique are discussed in the next section.

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



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. Focus group discussions and household surveys covered community and household food habits, meal frequency, food taboos and intra-household food allocation.

FILL THE NUTRIENT GAP: SITUATION ASSESSMENT FOR MULTI-SECTORAL DECISION-MAKING ON THE PREVENTION OF MALNUTRITION¹

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 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.

The FNG has been completed in 20 countries and is ongoing in another 10, as of October 2019.

Limitations and data gaps

The data presented in this summary report has limitations. The analysis does not represent the situation in all of Somalia, but it 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/August 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 do bring advancement, furthering the knowledge of the current nutrition situation and opportunities for improvement under the specific market dynamics prevalent in the livelihood systems described. To decrease limitations, existing data, notably HFS and FSNAU price information, was used to triangulate and confirm coherence of FNG findings with other national surveys and analysis.



¹ 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

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 micronutrients². 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 taboo³. This diet is referred to as the 'nutritious' diet throughout this summary. 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 nutritious diet was estimated for a model household of five members, which included a breastfed child 12–23 months, a child 6–7 years, an adolescent girl 14–15 years, a lactating woman and an adult man. Two meals based on preferred staple foods were included per day to account for approximately 50 percent 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 staples 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;
- 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.



²As defined by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). The need for 9 vitamins and 4 minerals is included.

³This 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.

FNG Somalia Findings⁴

Malnutrition in Somalia

Although numerous studies have been conducted on the malnutrition situation in Somalia, the data faces similar challenges to data from 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. Information on stunting is inconsistent across data systems and assessments, often with unrealistic changes between data points. Large-scale anthropometric data collected as part of the 2009 micronutrient survey, shows a stunting rate of 23 percent, ranging between 16 and 31 percent in different areas of the country. Given the fragility of institutions, ongoing conflict, severity of droughts and lack of development over the past ten years, it is likely these figures are outdated. Information on wasting is available and relatively consistent, with high GAM rates, that fluctuate between 10 and 15 percent.

Diets and the Food Environment: Availability, Accessibility and Affordability of Nutritious Foods

Findings:

- **Diets in Somalia are based on staple foods (maize, sorghum, rice, wheat and pasta), oil and sugar, with limited consumption of nutritious foods.**
- **The availability of nutritious foods in local markets is limited, especially in markets accessed by only one livelihood system.**
- **Energy-dense foods such as grains, oil and sugar are cheaper per calorie than nutrient-dense foods.**

Focus groups 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 fruits. Participants generally preferred meat and milk, but many said they could not afford these foods. Although tea with milk and sugar is not considered a food, the beverage is an important source of dietary energy. Poorer households reported eating one to two meals per day and better-off households reported eating three meals per day.

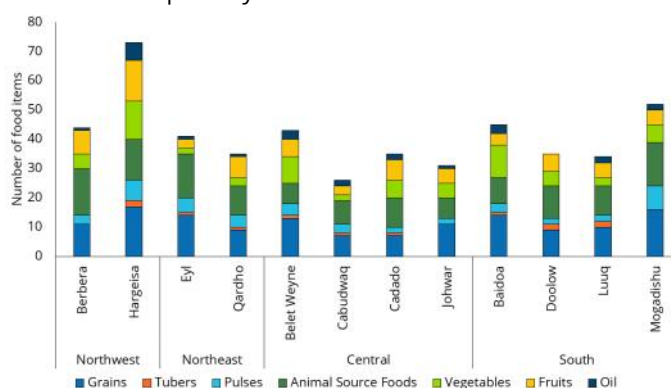
HFS dietary intake data confirms that Somalis derive their dietary energy mainly from staples (46 percent), oil (14 percent) and sugar (19 percent); nutritious foods provide 20 percent of dietary energy, mainly from meat (5 percent), milk (4 percent), fruit (4 percent) and pulses (3 percent). The consumption pattern did not vary substantially across the livelihood systems represented in the HFS (rural, pastoral,

urban and IDP). Staples contribute significantly to micronutrient intake, which is inadequate for average households throughout the country.

Forty-four percent of households do not meet energy requirements, based on analysis of HFS consumption data. Adolescents (13-18 years old, either sex) and older people (50 years and above) are more likely to live in households that do not meet energy needs (59 percent and 54 percent, respectively). Dietary intake of calcium, vitamin A, folic acid (for adolescents) and iron is low. These micronutrients are the most expensive to meet with local foods according to CotD analysis. Most households spend 65-85 percent of total expenditure on food, which is considered very high and indicative of high levels of poverty.

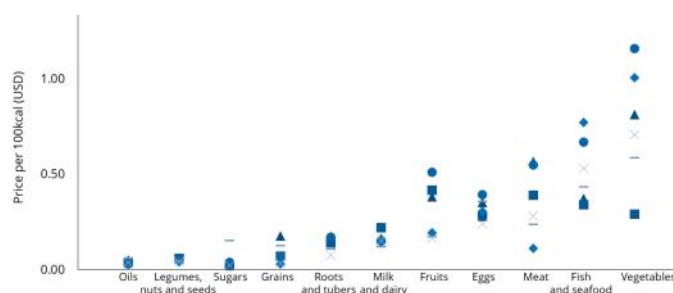
The availability of nutritious food varies substantially across markets. Markets in Somaliland (Hargeisa, Berbera) offered an average of 42 different food items compared to an average of 23 food items in markets in Hirshabelle (Cadado, Cabudwaq, Johwar, Belet Weyne) (Figure 5). Availability of vegetables is particularly low in Eyl, Qardho, Doolow and Luuq.

Figure 5: Number of foods available by food group in primary data collection markets.



Vegetables, fruits and animal-source foods were most expensive per calorie (Figure 6) 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; 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 6: Food prices per 100kcal (USD).



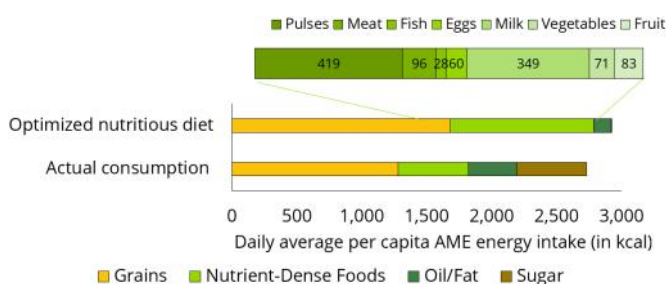
⁴ Complete details of the findings, a full list of data sources used, and references can be found in the full report.

Findings

- **Meeting nutrient needs with locally available foods is very difficult in many markets and not possible in some markets.**
- **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 nearly four times as expensive as a diet that meets energy needs only (\$1.85). Compared to current diets, the optimized nutritious diet contains much greater quantities of nutritious food and much lower quantities of oil and sugar (Figure 7). To optimize 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 foods available in the markets, particularly for nutritionally vulnerable individuals.

Figure 7: Daily average per capita (AME) energy intake for optimized nutritious diet compared to actual consumption (CotD 2019; HFS 2017, own calculation).

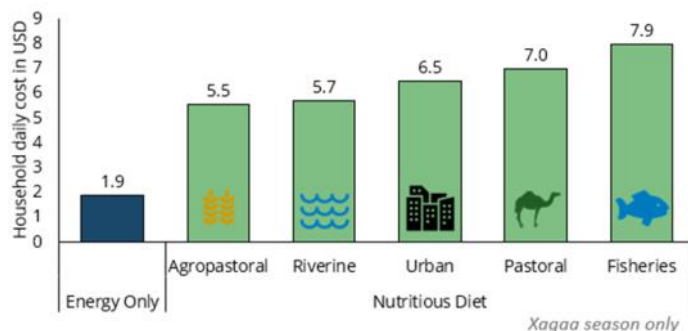


The availability of fresh nutritious foods, specifically green leafy vegetables, greatly impacts the quality of diets that can be sourced from markets. For Johwar and Qardho, where the number of foods available was lower than other markets and no green leafy vegetables were available, it was impossible to meet all individuals' 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.

The daily cost of a nutritious diet for a modelled household varies considerably across markets, from \$4.01 per day in Baidoa to \$8.90 in Cadado. 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 agropastoral households (\$5.5) (Figure 8). 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,

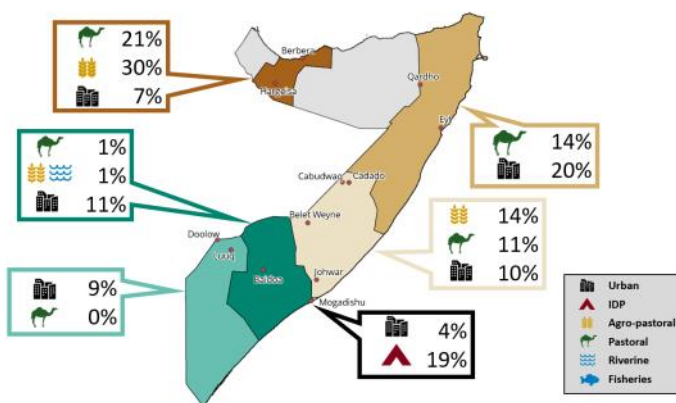
millet, sorghum) translates into a less expensive nutritious diet overall, although the staple itself is more expensive.

Figure 8: Daily cost of a nutritious diet for a modelled household by livelihood zone (CotD 2019).



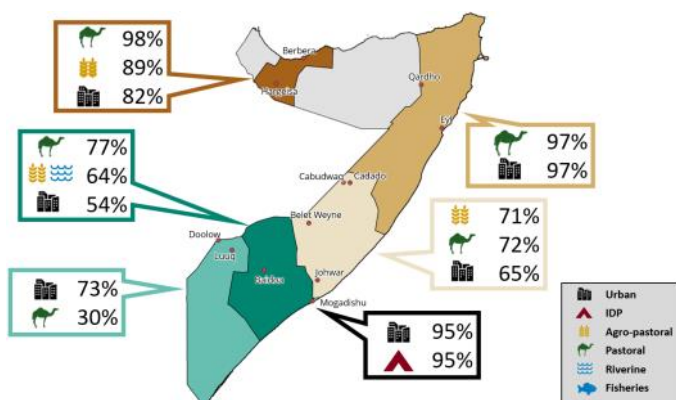
Non-affordability of the energy only diet ranged from 0 percent (meaning all households could afford it) for households from the pastoral communities accessing the Doolow/Luuq markets to 30 percent for households from the agropastoral communities accessing markets in Hargeisa and Berbera (Figure 9).

Figure 9: Average non-affordability of an energy only diet by livelihood within each analytical zone (CotD 2019).



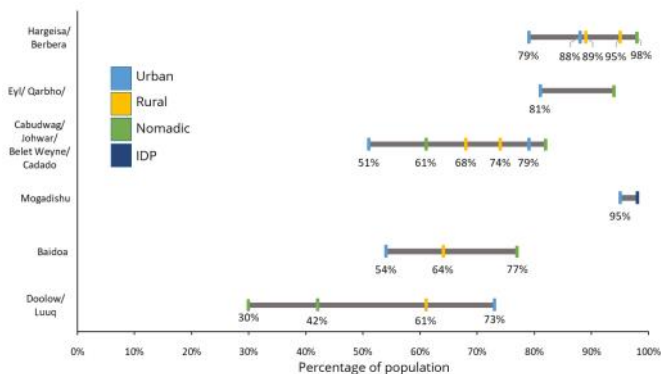
Non-affordability of the nutritious diet ranged from 30 percent for pastoral households accessing markets in Doolow/Luuq, to more than 90 percent for urban and IDP households accessing markets in Mogadishu, pastoral and urban households accessing markets in Qardho and Eyl and Pastoral households accessing markets in Hargeisa and Berbera (Figure 10).

Figure 10: Average non-affordability of a nutritious diet by livelihood within each analytical zone (CotD 2019).



As markets are accessed by a wide range of different livelihood groups, their non-affordability variations can be high. As Figure 11 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 11: Range of non-affordability estimates for all livelihoods within analytical zones (CotD 2019).⁵



Food Environment: Seasonal and Year-on-Year Fluctuations in Food Prices

Findings

- **During years of crisis, high food prices coincide with low prices for livestock, putting pastoralists at extreme risk.**
- **Year-on-year fluctuations in food basket prices appear to be more significant than seasonal fluctuations.**
- **No data is available on the variation of availability and prices of fruits and vegetables across seasons or the drivers of variation in food prices.**

Seasonal and year-on-year fluctuations in the food supply impact food availability. FNG analysis considered a range of data sources to determine trends of food price fluctuations, 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 fruits 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 market access.

An analysis of the variations in Cost of the Minimum Expenditure Basket (CMB) as calculated by FSNAU suggests that month-by-month fluctuations in food prices might be less pronounced than year-on-year fluctuations. Prices spike particularly in years of below-average rains and drought-related harvest losses.

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 Gu (spring), the season of heaviest rains. This highlights the need to tailor interventions to increase communities' resilience to shocks to livelihood systems-specific drivers of fluctuations.

The years 2011, 2014 and 2017 were considered "crisis" years due to widespread harvest losses. The prices of locally-grown staple foods had high volatility and were 14 percent higher than non-crisis years. The local price for livestock was 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 food, 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

Findings:

- **Food supply is heavily dependent on imports.**
- **Opportunities exist to improve the food supply through increased yields and diversified agricultural production, reduced post-harvest losses, improved value chains, expanded fisheries and staple food fortification.**

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 complementary ways to increase the availability of nutritious 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

Market availability impacts negatively on nutrition, especially for pastoralists. The impact of improved availability has been well-documented. Several interventions across the agricultural value chain are needed to make vegetable production an attractive and profitable livelihood, including 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. Since 1989 cereal production has declined by 60 percent, showing that

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

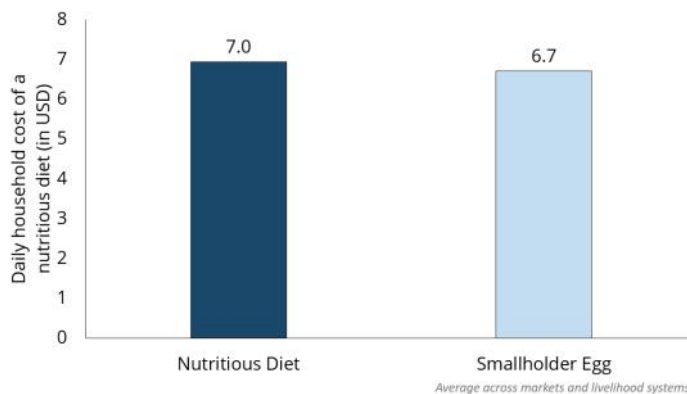
current production is well below its potential. Post-harvest losses for fruit and vegetables are 20-50 percent of total production and 26 percent for cereals, highlighting an opportunity to make better use of current production. Several studies have shown the potential to modernize across value chains to add value to raw products, such as chilled meat, honey and milk. Another opportunity is expanding the fisheries sector to take advantage of Somalia's coast, an abundant natural resource.

In Johwar and Qardho, the two markets where a diet meeting all nutrient requirements could not be calculated for all individuals, modelling the availability of spinach at the average price from all other markets 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's 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 12).

Figure 12: Daily cost of a nutritious diet with smallholder egg production (CotD 2019).

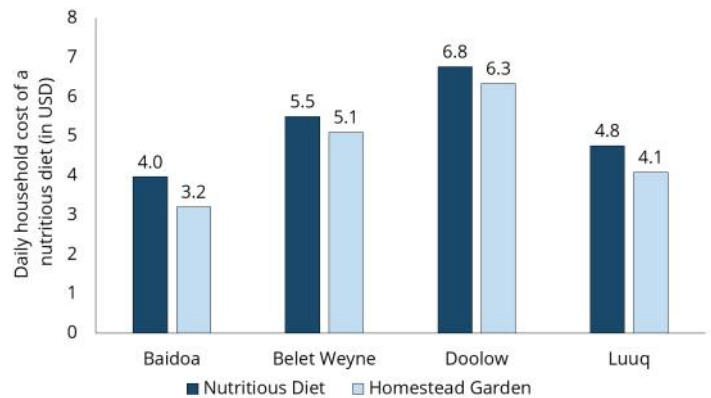


Similarly, having access to goats milk from own production shows great impact on the household's daily nutrition cost, which is partly driven by the high cost of meeting calcium requirements. Having access to 500ml of goats milk per day reduces the cost of the nutritious diet to the household by an average 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 13). Homestead food production can increase micronutrient intake and reduce cost, reducing the risk of micronutrient deficiencies among the most vulnerable.

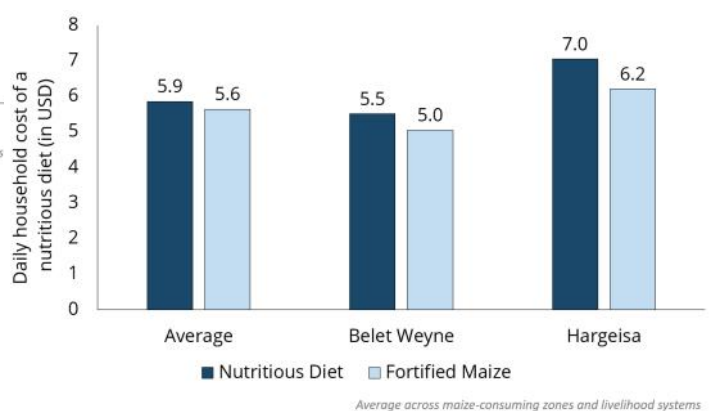
Figure 13: Daily cost of a nutritious diet for agro-pastoralist households in selected market regions (CotD 2019).



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 14).

Figure 14: 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 regulation 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 15 percent reduction.

Vulnerable Individuals

Findings:

- **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.**
- **Education can be leveraged to improve the nutrition of a wide group of children.**

The FNG assessment takes an explicit lifecycle approach to household composition to protect individual members when at their most vulnerable.

First 1000 Days (Children Under Two and Pregnant and Breastfeeding Women)

Findings:

- **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 a child’s second birthday. When children suffer nutrient deficiencies during this period, catching up on unattained development and growth is difficult and they will likely suffer the consequences throughout their lives.

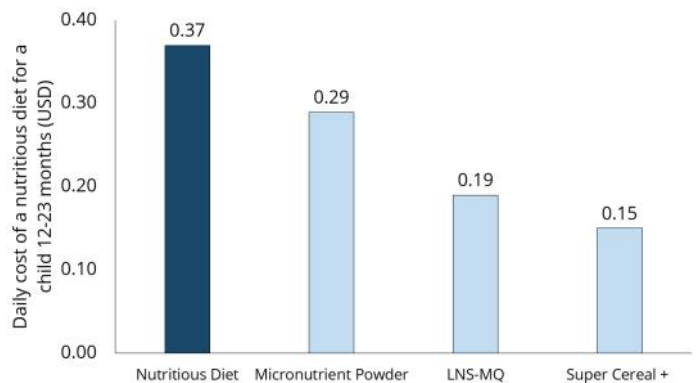
In Somalia breastfeeding rates are low, although exclusive breastfeeding during the first five months did improve from 5 percent in 2009 to 33 percent in 2016. Complementary feeding practices are sub-optimal: only 9 percent of children consume a minimum acceptable diet and dietary diversity is particularly low. 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.

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 and time to breastfeed.

Improving breastfeeding and complementary feeding are long-term interventions. 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 15), compensating for a minimum level of micronutrient intake.

Figure 15: Daily cost of a nutritious diet for a child 12-23 months old with SNFs (CotD 2019).



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).

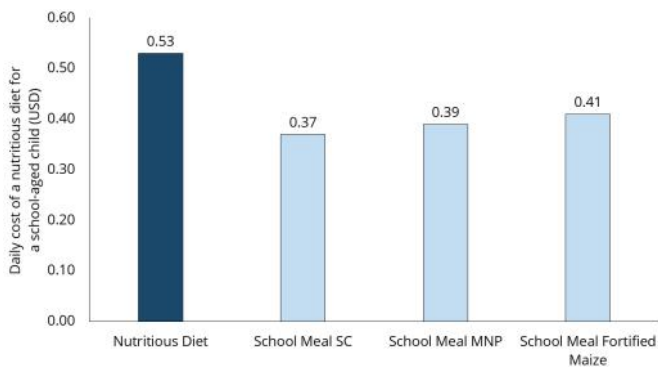
School-Aged Children

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. School meals based on Super Cereal, a micronutrient powder and fortified maize meal (Table 1) could reduce the cost of a nutritious diet by 30 percent, 26 percent and 23 percent, respectively (Figure 16).

Table 1: Foods included in school feeding models (breakfast and lunch).

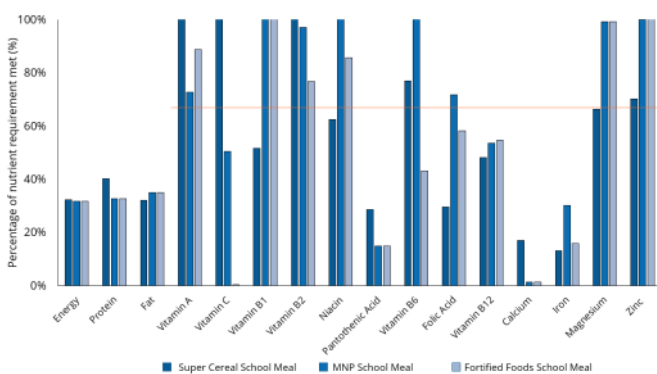
Super Cereal	MNP	Fortified
150g Maize Meal	230g Maize Meal	230 g Fortified Maize Meal
30g Pulses	30g Pulses	
25g Oil	25g Oil	30g Pulses
80g Super Cereal	1 Sachet MNP (0.4g)	25g Oil

Figure 16: Daily cost 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 energy-dense eating habits inside households, where diets are dominated by staples and lack micronutrients. 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 markets. A similar school meal given to an adolescent girl⁶ does not provide sufficient micronutrients (Figure 17). For school meal programming to fulfil a nutrition objective for this target group, adjustments would be needed, such as the introduction of SNF to meet the needs of the upper end of the age range.

Figure 17: Macro and micronutrients provided through different forms of school meals. Orange line indicates minimum target of micronutrients for 2 school meals per day during a 5-day school week (CotD 2019).



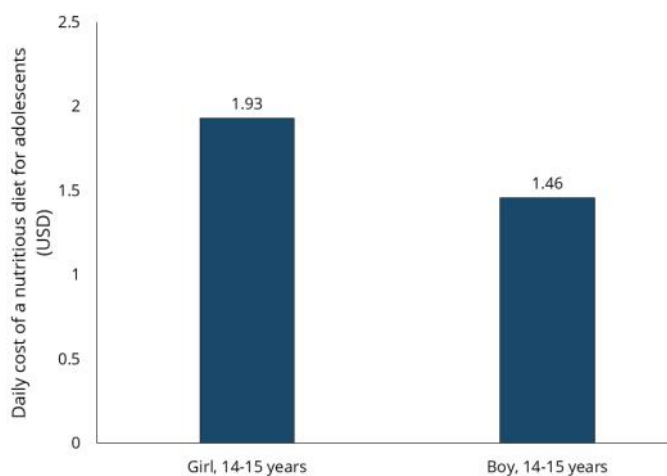
Adolescent Girls

Findings:

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

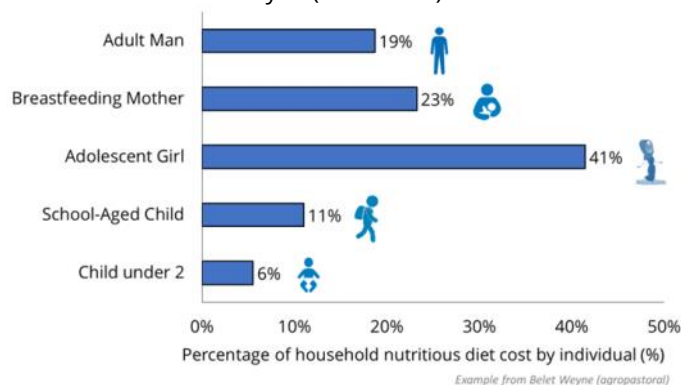
Adolescence is a critical time for nutrition. When boys and girls are experiencing body growth, their nutrition needs are different and may be exacerbated or alleviated differently by environmental factors. The adolescent boy needs larger quantities of energy (2,990 kcal) to support his growth and he 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 micronutrient needs (Figure 18).

Figure 18: Cost of a nutritious diet for 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 19). 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.

Figure 19: Percentage of household nutritious diet cost by individual; example from agro pastoral livelihood in Belet Weyne (CotD 2019).



To meet nutrient requirements adolescent girls need to eat greater quantities of more expensive nutrient-dense foods than other members of the household. The allocation of food expenditure across household members is unlikely

⁶ 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.

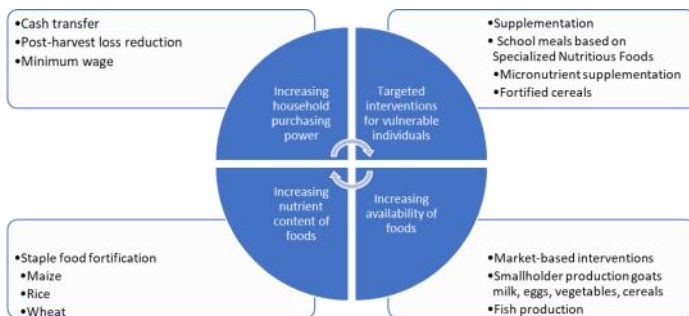
to match the proportional costs of the CotD nutritious diet. Focus group discussions found that men and small children eat first in many households, putting women and adolescent girls at greater risk of nutrient deficiencies. This illustrates that the nutritional vulnerability of adolescent girls is compounded by socio-economic vulnerability.

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).

Multi-Sectoral Action

Nutrition is complex, requiring a combination of different interventions to enable households and individuals to access nutritious diets. 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 20).

Figure 20: 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).

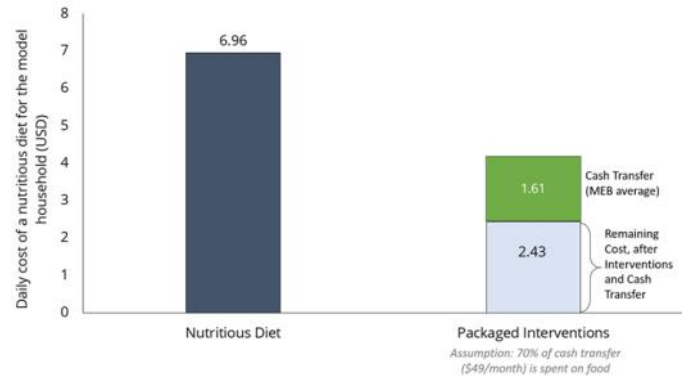


The FNG analysis estimated the daily cost of a nutritious diet with the following intervention package: LNS-MQ for a child 12-23 months; school meals for a school-aged child and adolescent girl, MMT for the breastfeeding mother, homestead production of goat's milk for the household and a cash transfer of \$70 per month (with 70 percent of the transfer spent on food) (Table 2). 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 21). 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 2: List of interventions in household package.

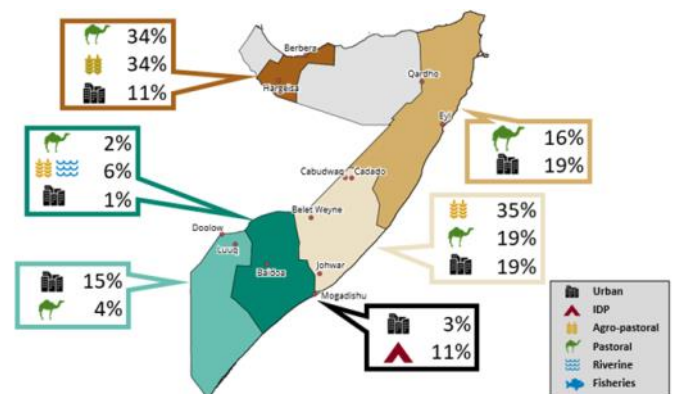
Target Group	Intervention
Child 12-23 months	LNS-MQ
School Aged Child & Adolescent Girl	School Meals with SC
Breastfeeding Woman	Multiple Micronutrient Tablet
Household	Own Production Goat Milk
Household	Cash Transfer (70 US\$ - MEB)

Figure 21: 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 22 shows the reduced non-affordability estimates (average for each livelihood within each analytical zone), to be compared with Figure 10. To achieve this impact, interventions must be delivered effectively and consistently, with delivery specific to the local context and livelihood.

Figure 22: Average non-affordability of a nutritious diet by livelihood within each analytical zone with package of intervention (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 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.

Short-term interventions	
Nutrition-specific interventions to safeguard nutrition	Continue and expand support of vulnerable individuals with existing supplementation (SNFs, IFA, MNP, MMT, CMAM) and add supplementation of adolescent girls with multiple micronutrient tablets (nutrition-specific interventions)
Health and Social safety nets interventions	<ul style="list-style-type: none"> • Continue deworming, immunizations, ante and post-natal care • Introduce cash transfers for households with PLW; • Continue and scale-up school meal programmes, linking to local production
Promotion of nutrition-sensitive agricultural production and income generation activities	<ul style="list-style-type: none"> • Professionalize and modernize commercial-level production, such as fisheries and vegetable crops. Improve supply chain to spread produce across markets. • Scale-up education and training for farmers to diversify agricultural production at household (vegetable gardens, livestock rearing) and entrepreneurial training to sell small surpluses • Widen availability of farming inputs through cooperatives and agro-dealers and/ or subsidize inputs to grow nutritious foods (e.g. seeds, fertilizers, microfinance) • Reduce postharvest losses through improved storage and supply chain solutions • Connect income generating interventions: cash for work/ training, government job creation with social behavior change communication
Governance and program implementation	<ul style="list-style-type: none"> • Establish interim system of community governance for IDPs to ensure provision of social services (police, health care, schools) • Identify synergies between humanitarian/development actors and local producers in areas where that is possible and avoid undermining the local commodity markets
Both short and long-term interventions	
School as entry points	<ul style="list-style-type: none"> • Continue providing nutritious school meals to increase enrollment, attendance and performance in school paired with including nutrition education into school curricula
Governance	<ul style="list-style-type: none"> • Use legislation to regulate what is sold, at what price commodities are sold and how they can be advertised (e.g. advertising of breastmilk substitutes, regulation of food prices)
Behavior change communication for improved nutrient intake	<ul style="list-style-type: none"> • Establish and/or scale up social and behavior change communication to improve diets of all members of the household • Focus on target behaviors such as: consumption of nutritious foods, desirability of fish and vegetables, birth spacing, breastfeeding, complementary feeding of children under 5, women's decision-making power

Conclusions and Recommendations

Long-term interventions	
Foster community (self-)organization	<ul style="list-style-type: none"> • Improve social (education, health) and financial (microfinance, community savings groups) services • Support natural resource management (e.g. boreholes in pastoralist areas) • Support access to productive assets (e.g. fishing supplies for fisheries communities)
Increase and diversify production and prevent post-harvest losses through investing in agricultural, fisheries and market infrastructure	<ul style="list-style-type: none"> • Invest in roads connecting producers to consumers, including across livelihood systems and among pastoralists • Improve water management (catchments, dams, boreholes, irrigation systems) and rainwater harvesting and storage • Promote drought and disease-resistant seeds and agricultural techniques • Improve post-production handling, including cold storage to make fresh fish available in non-coastal areas • Support the establishment of small-scale industry, particularly in food processing and preservation and agricultural services
Increase nutrient availability at the market through	<ul style="list-style-type: none"> • Make supplements and specialized nutritious food available through markets • Rollout of nation-wide staple food fortification and explore the possibility of bio-fortification of local crops
Other recommendations	<ul style="list-style-type: none"> • Improve women's participation in household decision-making, especially regarding nutrition and reproductive health, invest in girls' education and end child marriage • Enable households to diversify and innovate in their agricultural production and livelihood through education and vocational training • Involve private sector in all activities to ensure long-term sustainability
Data Gaps	
<ul style="list-style-type: none"> • Most identified data gaps center around women, girls and young children and focus on understanding their current status and gender-related drivers of malnutrition and access to health care services. • Other data gaps include information about the availability and cost of fresh nutritious foods, particularly at pastoralist markets, and the impact of clan dynamics on nutritional vulnerabilities. 	



CONTRIBUTORS

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LIST OF ACRONYMS

AME	Adult Male Equivalent
BMI	Body Mass Index
BMZ	German Federal Ministry of Economic Cooperation and Development
BRCiS consortium	Building Resilient Communities in Somalia
CMB	Cost of Minimum Expenditure Basket
CotD	Cost of the Diet
CPI	Consumer Price Index
FAO	Food and Agriculture Organization
FERO	Family Empowerment and Relief Organisation
FFA	Food for Assets
FGD	Focus Group Discussion
FGS	Federal Government of Somalia
FNG	Fill the Nutrient Gap
FSNAU	Food Security and Nutrition Assessment Unit
GAM	Global Acute Malnutrition
HFS	High Frequency Survey
IFA	Iron and Folic Acid Supplement
IRC	International Rescue Committee
KfW	Kreditanstalt für Wiederaufbau
LNS-MQ	Lipid-based Nutrient Supplement – Medium Quantity
LP	Linear Programming
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MMF	Minimum Meal Frequency
MMT	Multiple Micronutrient Tablet
MOP	Ministry of Planning
NMS	National Micronutrient Survey
OPM	Office of the Prime Minister
SBCC	Social Behaviour Communication Change
SDHS	Somali Demographic and Health Survey
SNF	Specialized Nutritious Food
SUN	Scaling Up Nutrition
UNICEF	United Nations Children's Fund
UNN-REACH	United Nations Network - Renewed Efforts Against Child Hunger
WFP	World Food Programme
WRA	Women of Reproductive Age
MSNPAN	Multi-Sectoral National Plan of Action for Nutrition
NNC	National Nutrition Centre
SBCC	Social Behaviour Communication Change
SDC	Swiss Agency for Development and Cooperation
UNICEF	United Nations Children's Fund
WHH	Welt Hunger Hilfe
WRA	Women of Reproductive Age

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