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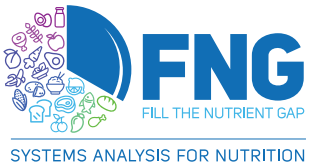
Fill the Nutrient Gap

Guinea-Bissau

Summary Report

April 2022

This summary and further information can be found electronically at: wfp.org/fillthenutrientgap



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Executive Summary

The population of Guinea-Bissau is expected to double by 2050 and temperatures are projected to rise by more than 3 degrees Celsius around the same time. This could put the current food system, which lacks diversity and affordability, under increased pressure to provide for increasing numbers of people while simultaneously facing erratic weather associated with climate change. The country is heavily dependent on cashew nut monocropping and higher temperatures are detrimental to their production. An estimated 60 percent of the population works in agriculture (80+ percent in rural areas), and this would put their livelihoods at risk through lost income. With most of the population living in multi-dimensional poverty[1], this scenario jeopardizes improvement to the nutrition situation. Monocrop systems do not have the safety net of crop diversity required to protect them from more frequent impending shocks and this could drive smallholders into deeper poverty, further exacerbating the poor nutrition situation.

Healthy diets depend on good access to, and availability of, a diverse range of nutritious foods. Guinea-Bissau's food system lacks affordable nutritious foods and is heavily dependent on imported rice - almost half the rice consumed in the country is imported while almost all fish in Guinea-Bissau is exported. This dichotomy has resulted in limited food availability, especially of nutrient-dense foods. A focus on increasing and diversifying production of nutritious food crops such as fruit, vegetables, nuts, legumes, and indigenous grains, plus animal source foods through improved agricultural practices, could strengthen national food sovereignty and improve access and availability for households to meet their nutritional needs.

Opportunities exist to improve and diversify livelihoods. Development of a food fortification strategy focused on improving nutrient intake could include a plan for in-country fortification of local rice and peanut oil, which could expand the country's food processing sector. Local cashew processing could create jobs in the sector and increase availability of cashews for local consumption. Development of home-grown school feeding programmes could increase availability of nutritious foods and improve dietary diversity for local children and communities, linking smallholder farmers to the school system and creating sustainable incomes and livelihoods via the programmes.

Medium to high rates of stunting and wasting, especially in the east and north, and prevalence of micronutrient deficiencies, are common throughout the country and stem from poor dietary diversity. This was particularly true for vulnerable individuals, including young children, women and adolescent girls. In the Fill the Nutrient Gap (FNG) analysis, crop diversification, improved agricultural practices and social protection interventions were examined alongside nutrition-specific interventions targeting vulnerable individuals. The aim was to understand the impact that each could have on improving nutrition and food security in Guinea-Bissau. An integrated approach to addressing the country's nutrition challenges will be necessary to see a positive shift in nutrition outcomes.

Process

The FNG in Guinea-Bissau began in April 2020. Cost of the Diet (CotD) training and data collection followed in August and September. Identification of data, CotD and secondary data analyses were conducted from October to December 2020. Modelling plan development and intervention modelling was conducted from January to June 2021, with technical adjustments made through stakeholder engagement.

Methodology

The FNG approach complements a CotD analysis with a large secondary data analysis. Primary food price data was collected to analyse the cost of two diets. The 2019 (SiSSAN-Food and Nutrition Security Monitoring System) and 2018 ZHR Bissau Agregado surveys, with adjustments from Consumer Price Index (CPI) data, were used to estimate the proportion of households that could afford each diet.

Main findings

1. High poverty levels in Guinea-Bissau mean that even an energy-only diet is unaffordable for more than a quarter of the population (28 percent), costing an estimated 1,322 West African Francs (FCFA) per day (USD 2.35) for an average household of seven people. The nutritious diet cost, estimated at FCFA 2,234 (USD 4.00), would be unaffordable for almost three quarters of the population (68 percent).

2. Opportunities exist to increase the availability of nutritious foods by diversifying production and developing the fishing industry. Current levels of domestic food production are insufficient and could be improved by focusing on increasing fresh fruit, vegetables, legumes, nuts and animal source foods.

3. Food sovereignty could be strengthened by improving crop yields, thus reducing reliance on rice imports. Improving agricultural practices could improve yields and decrease post-harvest losses, thus minimizing the need for rice imports.

[1] Multidimensional poverty: Percentage of the population with a deprivation score of at least 33 percent based on deprivations in health, education and standard of living from household surveys.

4. Guinea-Bissau's monocrop cashew economy is high risk for vulnerable farmers and has come at the detriment of feed security and dietary diversity. As climate shocks become more frequent and temperatures rise, so does the risk associated with cashew cultivation which is dependent on stable temperatures. Thus, reliance on a single cash crop threatens potential income and livelihoods of smallholder farmers, who are mostly women.

5. Current cash-based transfers (CBTs) reduce the cost of a nutritious diet by 40-50 percent depending on their amount and frequency. Cash transfers could be accompanied by targeted advocacy messages promoting the consumption of nutritious fresh fruit, vegetables and animal source foods, outlined in a social behaviour change (SBC) strategy.

6. A food fortification policy and implementation plan could improve micronutrient intake and reduce the prevalence of micronutrient deficiencies. Fortification of oil and rice could target limiting nutrients such as vitamin A and iron that are difficult to reach through locally available foods. Local fortification could be built into, and create jobs within, the current food processing sector.

7. Home fortification for children under 5 years could cover up to 40 percent of micronutrient needs. While continued breastfeeding is acceptable to the financially poorest group, complementary feeding indicators[2] were found to be low. Improvements in complementary feeding could be targeted through SBC messages and activities included in an SBC strategy.

8. Children aged under 5 are particularly vulnerable to stunting and micronutrient deficiencies. Targeted interventions could help meet their nutritional needs. Provision of either groundnut paste or medium quantity lipid-based nutrient supplement (LNS-MQ) could, respectively, result in a 20 percent or 37 percent reduction in the cost of their nutritious diet.

9. It is difficult for adolescent girls and pregnant and lactating women to meet their nutrient needs because of the high cost of nutrient-dense foods. These two individuals have the highest nutrient needs and would account for more than 40 percent of the cost of the household's nutritious diet. Targeted supplementation could be considered in areas with high prevalence of anaemia.

10. School meals could be improved by adjusting portion sizes and increasing fresh, nutritious foods. By adding fresh foods that target limiting nutrients, such as eggs, guava fruit and cassava leaves, and increasing portion sizes, the meal could be locally appropriate, more nutritious, and lower the amount that households need to spend on a nutritious diet for school-age children.

Stakeholder identified priorities by sector

During regional workshops in the north, east and south and a national workshop in Bissau at the end of March / beginning of April 2022, the main FNG findings were shared and discussed with participants to identify priority areas for action. Based on sector recommendations, the following list was compiled by the WFP country office with input from stakeholders who were involved throughout the FNG process.

Key stakeholder recommendations

Please note that the exhaustive list of recommendations can be found on page 31.

Agriculture

- Develop a market regulation framework to control prices of local vs. imported food products to incentivize purchase of locally nutritious foods.
- Inform and support design of 'Lei de Terra' (land use policy) to ensure that vulnerable agricultural households have access to arable land to increase the production of local nutritious foods and household income.
- Implement nutrition smart agriculture programmes through women farmer's associations.
- Support development of fishponds, home gardens, livestock breeding of small ruminants & poultry at the community level.
- Strengthen capacity of Agricultural Technicians to support smallholders, community, and schools to produce nutritious foods.
- Sensitize community leaders, producers, and farmers' associations to promote community, home, and school gardens to increase availability of local nutritious foods.
- Provide financial support or facilitate access to micro-credits for women farmer's associations to improve access to inputs and artisanal fisherman to further develop local fishing value chain and increase domestic supply of fish in markets.

Health

- Increase the number of health centres (and mothers centres) to facilitate access to pre- and post-natal care for pregnant women or implementation of mobile clinics to access remote areas.

[2] Minimum acceptable diet (MAD), minimum meal frequency (MMF), minimum dietary diversity (MDD).

- Implement national iron and folic acid supplementation programmes for women and adolescent girls.
- Ensure adequate supply of specialised nutritious foods, equipment, and health kits in health centres.
- Strengthen capacity of health workers to deliver recommendations on adequate feeding practices and optimal nutrition.

Social protection

- Use FNG results to inform design of a national social protection policy to ensure adequate and timely support to the most vulnerable.
- Design and implement a national social protection plan based on the social protection policy to support the most vulnerable individuals.
- Create a database to register vulnerable individuals and monitor their support through a social safety net programme.
- Increase the transfer duration, selection criteria and expand the catchment areas of cash transfer programmes to improve coverage.
- Advocate to telecommunication companies for national mobile phone network coverage to enable money transfer services to deliver cash transfers through mobile money in remote areas.
- Develop an SBC campaign to raise awareness on nutrition for vulnerable groups to create demand for nutritious foods to meet needs.
- Create and allocate a budget to support the development of the social protection assistance in the general state budget (OGE).

Private sector

- Create a national food quality and safety laboratory to implement ECOWAS standards for regular quality control and certification of nutritious foods, fortified and processed foods.
- Conduct feasibility study of community-level milling facilities for production of fortified staple foods.
- Develop a regulatory framework and national specifications for fortified products.
- Strengthen community level knowledge in processing nutritious foods to extend their shelf-life.
- Strengthen technical capacity of smallholder farmers, artisanal fishers, and livestock producers through trainings to improve access to local markets.

Education

- Reactivate the multi-sectorial commission for school canteen management published in the official bulletin n.21.
- Develop national food-based dietary guidelines for the school feeding programme to support the design of recipes using local foods.
- Establish minimum standards for local purchasing of nutritious foods and implement regulatory framework on food safety and quality control.
- Implement mandatory school gardens using nutrition smart agriculture (climate resilient crops) as part of the project and tailor the production of crops according to childrens' nutrient needs as identified in the FNG.
- Advocate to include adolescent girls in the school feeding programme.
- Raise community awareness on healthy eating practices and the importance of dietary diversity for school children and adolescent girls.

Infrastructure, Energy & Commerce

- Identify incentives (laws, subsidies, exemptions) for the production, processing and trade of nutritious foods and adjust the regulatory framework to support incentives.
- Implement infrastructure and energy investment plans and prioritise the supply of nutritious foods: cold storage in the supply chain, regional agricultural centres to deliver technical support to farmers; community agricultural centres for processing and storage of nutritious foods.
- Rehabilite infrastructure for schools and agricultural production centres.
- Prioritize investment in development of structural systems to improve the supply of nutritious foods.

Introduction to Fill the Nutrient Gap (FNG) Guinea-Bissau

Guinea-Bissau joined the Scaling Up Nutrition (SUN) Movement in 2014. Around the same time, the government adopted the Terra Ranka, Strategic and Operational Plan (2015–2020) with a vision of improving political stability through inclusive development, good governance, and biodiversity conservation. In 2020, the Ministry of Economy, Planning and Regional Integration replaced the Terra Ranka with the Hora-Tchiga, a new national Strategic and Operational Plan (2020–2024). The latest SUN Progress Report (2019) highlighted the need for mobilization of strategic resources to implement the plan[3]. The country has struggled to achieve its ambitious goals, with the World Bank and SUN reporting major bottlenecks caused by weak governance, business, and regulatory frameworks (1).

The population of Guinea-Bissau is expected to double by 2050 and temperatures are projected to rise by more than 3 degrees Celsius around the same time. This could put the current food system, which lacks diversity and affordability, under increased pressure to provide for increasing numbers of people while simultaneously facing erratic weather associated with climate change. The country is heavily dependent on cashew monocropping and higher temperatures are detrimental to their production. An estimated 60 percent of the population works in agriculture (80+ percent in rural areas) and this would put their livelihoods at risk through lost income. Medium to high rates of malnutrition, especially in the east and north, and prevalence of micronutrient deficiencies, are common throughout the country. In this analysis, crop diversification, improved agricultural practices and social protection interventions were examined to understand the impact that each could have on improving nutrition and food security in Guinea-Bissau.

Building consensus for improved nutrition

Nutrition is a crucial 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 diets, especially of children and women, brings immediate and long-term health, education and economic benefits. The two Lancet series (2013 and 2021) on maternal and child undernutrition identified a variety of nutrition interventions that have proven effective. Improving the nutrition situation in a country requires coordinated actions across the food, social protection, health and education systems. The actions need to be grounded in a good understanding of the local context, its opportunities and bottlenecks, and a synthesis of global and local evidence.

[3] Additional priorities included creating a joint monitoring and evaluation plan for national level multisectoral activities, ensuring technical and financial support to conduct emergency food and nutrition surveys and development of a social behaviour change (SBC) strategy.

Fill the Nutrient Gap (FNG) is an analytical process comprised of a secondary literature review in combination with CotD linear optimization to understand local drivers that affect the availability, cost and affordability of a nutritious diet. Solutions of interest for improving availability of nutritious foods, lowering their cost and/or increasing income are then assessed for their potential to improve affordability, using the CotD software. In this way, the context-specific potential for impact of proven interventions can be quantified.

This summary report presents findings from the analysis and a discussion of its process, methodology and limitations. It highlights recommendations and priorities identified by stakeholders. By identifying and contextualizing new findings, the FNG analysis contributes to building consensus around a vision and a path forward for improved nutrition in Guinea-Bissau in a sustainable way that is integrated across the country's food systems.

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

Malnutrition has two direct causes: inadequate dietary intake and disease. The FNG assessment focuses on gaps in dietary intake to inform national policies and actions that can be taken across food, social protection, and health systems to improve nutrition, with a focus on the most vulnerable populations. The FNG considers whether nutritious foods are available, accessible, and affordable in a specific context, and identifies the barriers that lead to gaps in nutrient intake. The analysis focuses on the extent to which vulnerable people have choices in the foods they consume and how those choices are made. The FNG process identifies and models the impacts of context-appropriate interventions to improve diets and nutrient intake across food, health, education, and social protection systems. The results are used to identify entry points across systems, to refine programmes, and to make recommendations to policymakers.

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 (CotD) linear programming software developed by Save the Children (UK), and includes modelling of the economic impact of possible interventions to increase nutrient intake and fill nutrient gaps.

Preventing malnutrition, including through improved access to nutritious foods, cannot be achieved 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.

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 together with the analytical team 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, etc.

The FNG methodology has been developed by WFP with technical support from partners including 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.

Between 2016 and early 2021, FNG analyses were completed in 32 countries and, at the time of writing in March 2021, were ongoing in 12 countries with more in the pipeline.

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

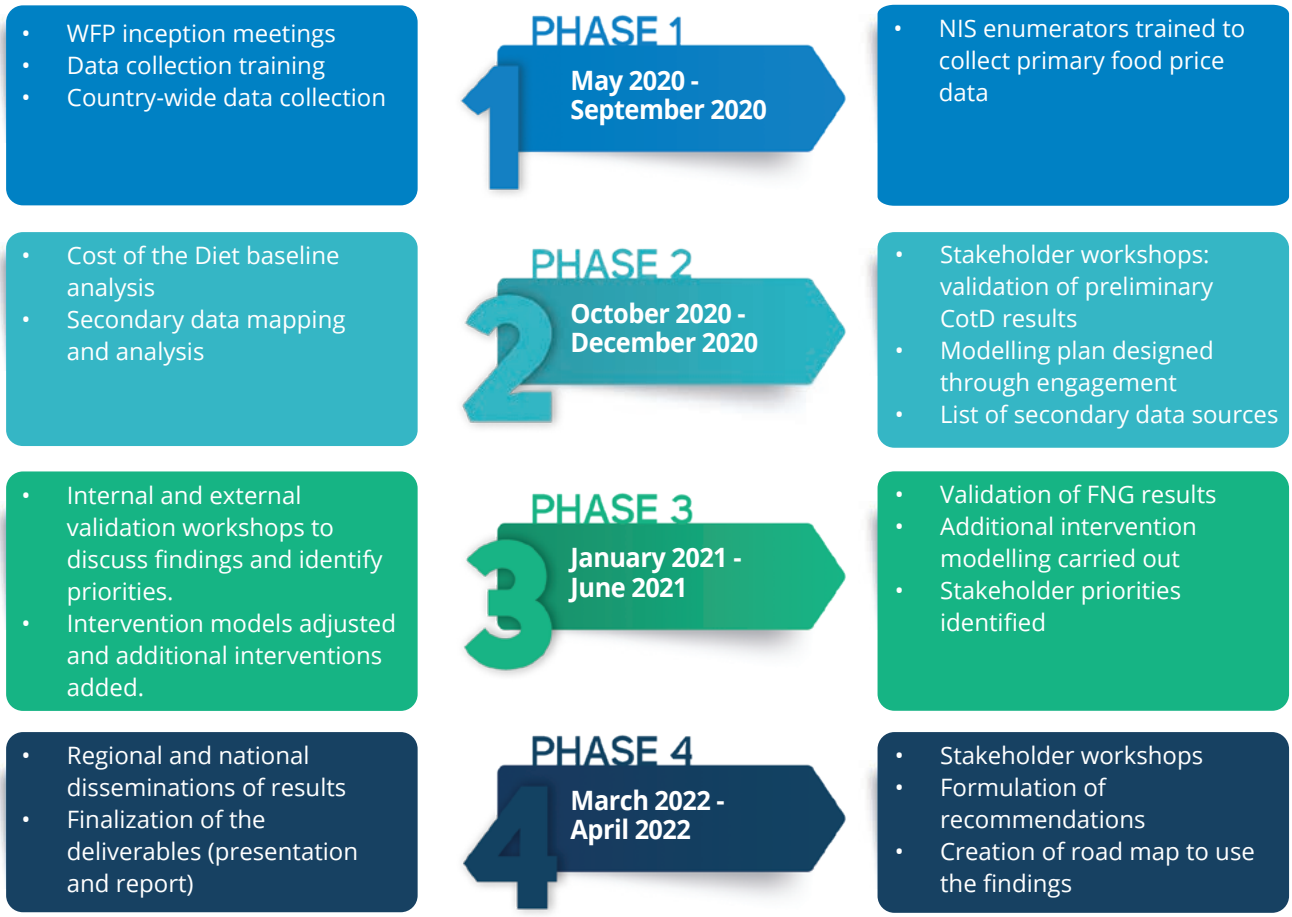
Process and Scope of the Analysis

Process of the FNG Analysis in Guinea-Bissau

The FNG process began in April 2020 when Guinea-Bissau's World Food Programme (WFP) country office contacted the FNG team through the WFP Regional Bureau Dakar to enquire about undertaking an analysis. Inception meetings with the WFP country office staff took place in June and July 2020 to prepare for training and data collection. Because of COVID-19 restrictions, remote CotD enumerator training was carried out by the WFP Headquarters team, Systems Analysis for Nutrition (SAN), in August 2020. Data collection followed in August and September 2020, undertaken in collaboration with the National Institute of Statistics (NIS) and the Ministry of Agriculture and Rural Development.

The FNG assessment was led by the SAN team in Rome, with information shared and inputs provided by the WFP country office in Guinea-Bissau. A preliminary baseline CotD analysis was presented to the Guinea-Bissau country office in December 2020. A further 'deep dive' data analysis was undertaken from December 2020 to April 2021. The revised CotD baseline analysis and preliminary intervention modelling were presented to internal WFP stakeholders virtually in May 2021. In June 2021, the FNG results were presented to external stakeholders in a virtual validation meeting. The final summary report was written in July and August 2021 to prepare for the final dissemination workshops in early September 2021. Due to COVID-19 restrictions limiting large groups, the dissemination was delayed to March-April 2022.

Figure 1: The Fill the Nutrient Gap (FNG) process followed in Guinea-Bissau



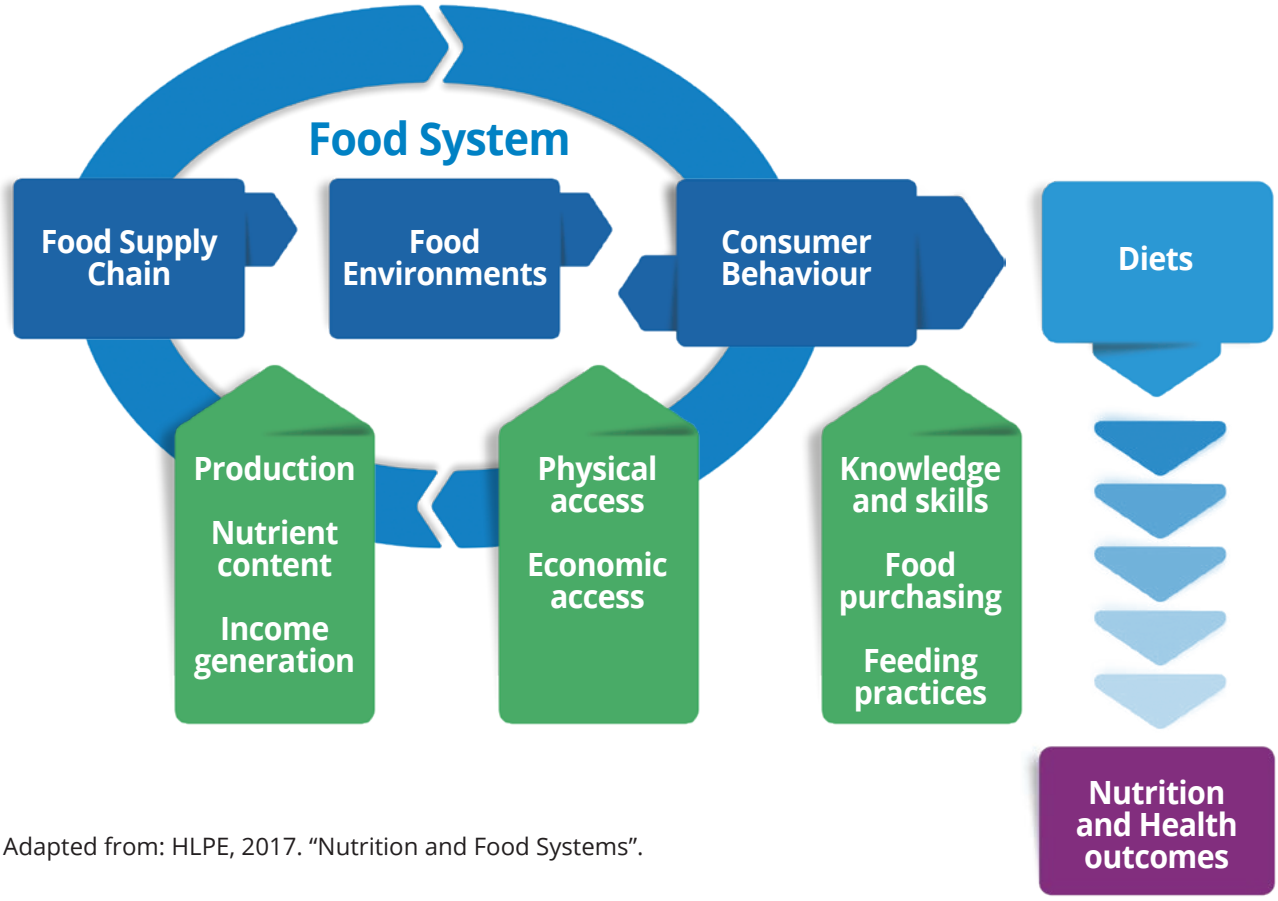
Scope and Focus of the FNG Analysis

Long-term solutions to malnutrition require transformation of the food system along food supply chains, food environments and consumer behaviour patterns (Figure 2). To understand and address factors influencing access to, and affordability of, nutritious diets in Guinea-Bissau, an FNG analysis was undertaken from May 2020 to August 2021.

The FNG analysis had four main objectives:

- To inform policies and strategies across sectors, including the National Nutrition Policy and its Multisectoral Strategic Plan, which was scheduled for revision in 2020 with the participation of the SUN-led multisectoral nutrition group.
- To identify cost-effective programme measures given the wide diversity of contexts in Guinea-Bissau, particularly in the regions of Oio, Bafatá and Gabú.
- To identify opportunities and challenges to meet the nutritional needs of key target groups, a prerequisite for preventing malnutrition.
- To enable a multisectoral discussion on the barriers to nutrient intake and the prioritization of specific nutritionally sensitive strategies to improve the nutritional situation through food, health and social protection systems.

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



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

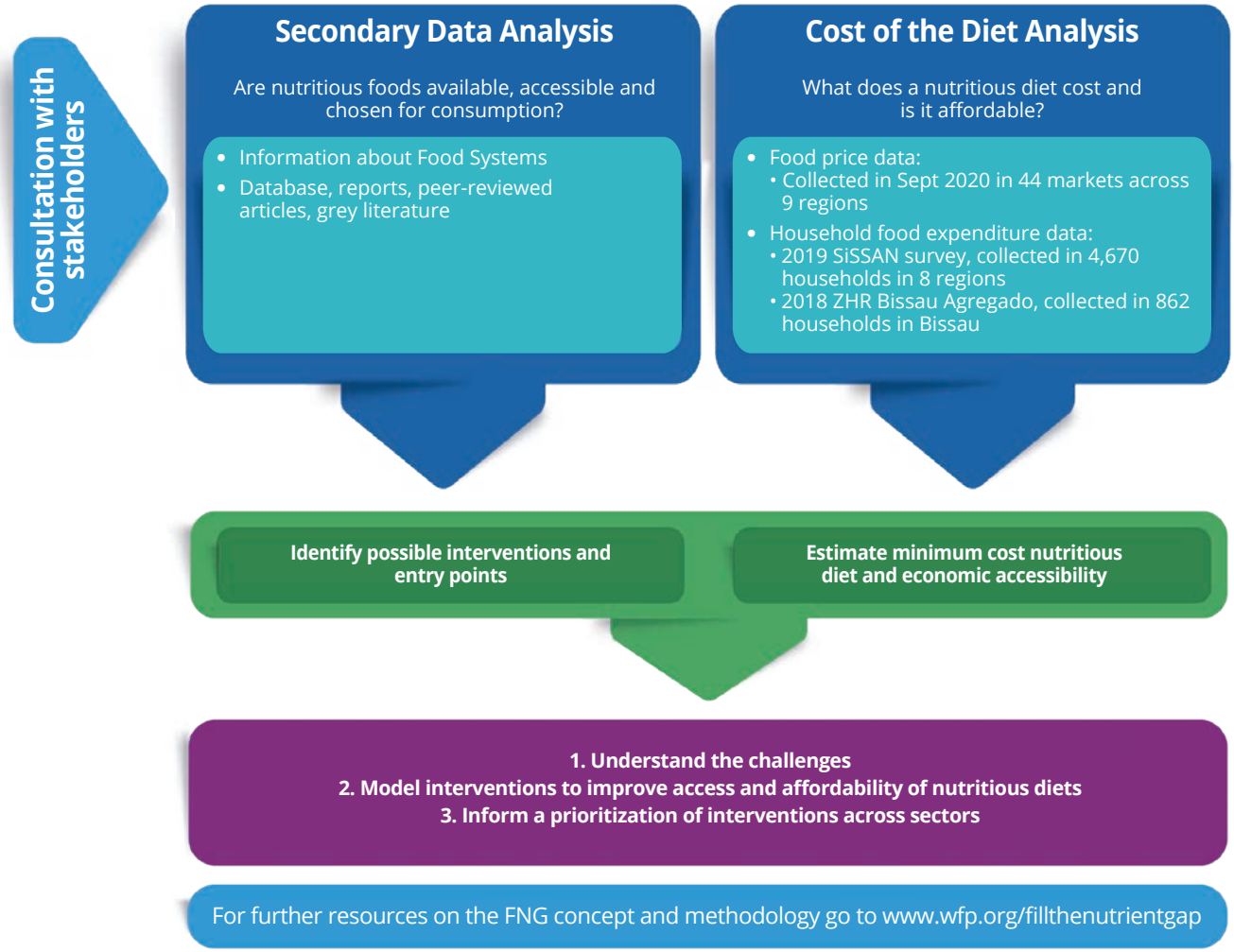
Methodology

The FNG analysis is composed of a secondary literature review of the food system and the social protection and health sectors (focusing on entry points for current and potential nutrition interventions), and a CotD analysis. The latter uses linear optimization to examine availability, cost and affordability of nutritious diets in detail (Figure 3).

Secondary Data Analysis

FNG secondary data analysis identifies barriers to accessing healthy diets, platforms for reaching nutritionally vulnerable groups, and opportunities for policy and programme interventions to improve access to nutritious foods through multiple sectors, including agriculture, health, social protection and education.

Figure 3: FNG analytical framework



COST OF THE DIET (CotD) ANALYSIS

CotD software uses linear programming to understand the extent to which poverty, food availability and food 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 lowest possible cost of local foods that are required to provide individuals or households with their average needs for energy, and their recommended intake of protein, fat and micronutrients.[1] 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' as the lowest cost nutritious diet that includes a typical staple food and excludes foods that are prohibited.[2] This diet is referred to as the 'nutritious diet' throughout this summary. It meets requirements for nutrients, including protein, nine vitamins and four minerals, and does not exceed energy and fat requirements. The nutritious diet is conceptually similar to the 'nutrient-adequate' diet estimated as the second level of diet quality in the State of Food Insecurity (SOFI) 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. The estimate of non-affordability is a conservative estimate of the share of households unable to afford the lowest cost nutritious diet, assuming optimized selection of nutritious foods. The real cost and non-affordability of a nutritious diet is likely to be higher, as reflected by a healthy diet, which includes foods from several food groups and has greater diversity within food groups.

[1] As defined by the Food and Agricultural Organization (FAO) and the World Health Organization (WHO).
[2] 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. Foods that are prohibited could be for customary or public health reasons, e.g., raw meat during pregnancy in some parts of the world.

Data sources for CotD analysis

To calculate the cost of the diet, primary food price data was collected by 44 enumerators across 39 sectors in Guinea-Bissau. In consultation with the WFP Guinea-Bissau country office, it was decided that the CotD would be analysed at geographical level[4] based on the number of markets collected per region[5] to align with proper CotD methodology. It is important to note that all markets where primary food price data was collected are assumed to be urban and that data was not collected in more traditional and rural markets that are difficult to access. This assumption was based on knowledge about accessing rural markets and based on the items in the food list.

Non-affordability was estimated for energy-only and nutritious diets using weighted percentiles of monthly food expenditure extracted at geographical level from 1) the 2019 Sistema de Seguimento da Segurança Alimentar e Nutricional survey (SiSSAN) (Food and Nutrition Security Monitoring System) for all geographic regions except Bissau, and 2) the 2018 survey on coping strategies in the urban environment for Bissau (known locally as ZHR). To adjust for inflation from 2018 for Bissau and 2019 for all other regions, food CPI data were used.

Following discussions with the WFP country office, data from the Food and Agricultural Organization of the United Nations (FAO) statistics website was used to confirm staple food consumption through food balance sheets for the country (2).

Modelled household & main target groups for the analysis

Diet costs were estimated for a household of seven people, purposefully selected to represent the average household in Guinea-Bissau and vulnerable target groups. According to the most recent Multiple Indicator Cluster Survey (MICS) report, the average household size in Guinea-Bissau was 6.8 nationally (3). The household composition used for the analysis reflects different stages of the life cycle with different nutrient needs, and was found to provide a good per capita average for the population. The household is composed of:

- Breastfed child 12-23 months
- Child 4-5 years
- Child 10-11 years
- Adolescent girl 14-15 years
- Breastfeeding woman
- Adult man
- Elderly woman 60+ years.

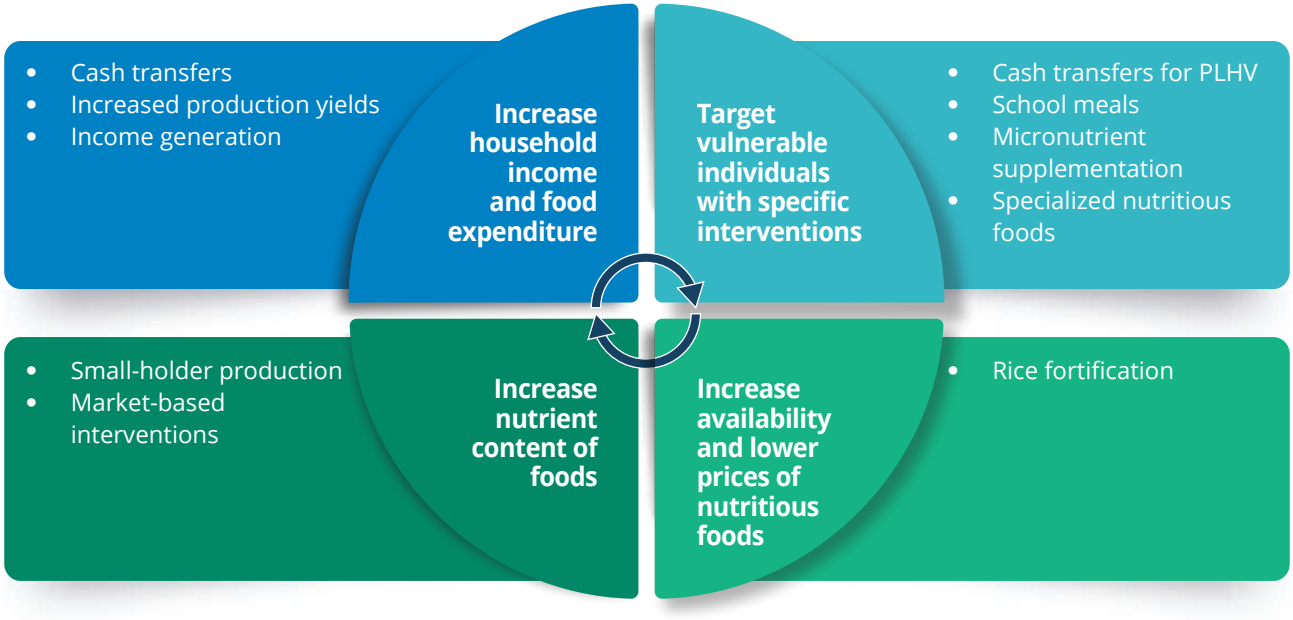
[4] Geographical areas: north (Cacheu, Biombo, Oio); east (Bafatá, Gabú); south (Bolama, Quinara, Tombali); Bissau (urban).
[5] Number of markets where primary food price data was collected per region: Bafatá 6; Biombo 3; Bissau 6; Bolama / Bijagos 4; Cacheu 6; Gabú 5; Oio 5; Quinara 4; Tombali 5.

Intervention modelling

Based on discussions with stakeholders, all interventions modelled in the FNG analysis were defined and approved by stakeholders. To identify concrete recommendations based on analyses, the FNG process concentrated on modelling the interventions outlined in Figure 4.

The modelling plan was developed after the second CotD baseline analysis was presented. Interventions were based on priorities defined by the WFP country office, Ministry of Public Health, Ministry of Economy, Ministry of Finance, General Directorate of Agriculture, Ministry of Fishing, UN partners, NGOs (ASAS-Socorro, ECAS-D, ESSOR, Action Contre la Faim, Catholic Relief Services, Caritas) and donor (European Union). Intervention modelling was based on available data. The impact of interventions was modelled by geographical region; however, most of the results presented in the report are at national level.

Figure 4: Entry points and interventions modelled to estimate reduction in cost of a nutritious diet



Considerations for interpretation and data gaps

The estimates reported for energy-only and nutritious diets should be interpreted as hypothetical least-cost diets, or as economic benchmarks based on what was available in the analysed markets. They should not be interpreted as desirable or realistic diets that reflect actual consumption patterns or preferences. As the data was assumed to be collected in mostly urban and easily accessible markets, this should be considered when using this report. Highly local and/or seasonal foods may not have been available at the time of data collection and may be missing from the analysis (e.g., cashews).

Data collection did not follow the traditional CotD methodology. Rather than having teams of 8–10 enumerators travel across 6–8 markets per area, 44 individual enumerators collected the food price data at markets across the country. This increased data cleaning time and led to the previously mentioned 'deep dive' data (outlier) analysis, which resulted in removal of approximately 5 percent of food prices. For high quality data, it is recommended that food price data collection follow the CotD methodology with a minimum of two enumerators per market, supervisors to oversee the process, and activities to ensure proper, consistent data collection.

Findings

1.
High poverty levels in Guinea-Bissau mean that even an energy-only diet is unaffordable for more than a quarter of the population.

At the time of analysis, Guinea-Bissau ranked 175 of 189 countries on the Human Development Index. In 2019, life expectancy at birth was 58.3 years, with women expected to live slightly longer than men (60.2 and 56.3 years respectively). Almost two thirds (67.3 percent) of the population lived in multidimensional poverty, of which 40.4 percent were in severe multidimensional poverty. An additional 19.2 percent of the population was at risk of multidimensional poverty. An estimated 67.1 percent of the population lived below the income poverty line (purchasing power parity (PPP) of USD 1.90 per day), while 78.9 percent were considered "working poor" (PPP USD 3.20 per day). More than three quarters of the population was considered vulnerably employed[6] (4). According to the Cost of Hunger in Africa (COHA) series, Guinea-Bissau lost an estimated 10 percent of gross domestic product (GDP) due to loss of potential productivity because of malnutrition-related mortality in 2014 (5).

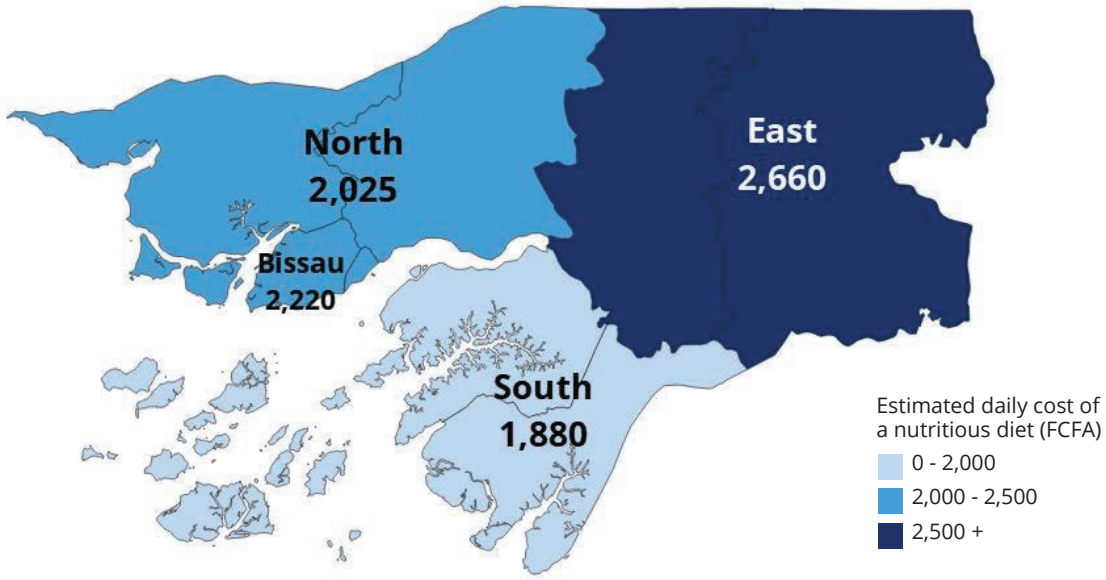
Most Bissau-Guineans did not have access to life's necessities, particularly the 57 percent who lived in rural areas (6). Three quarters (74.4 percent) of the 43 percent who lived in urban areas lived in slums or informal settlements. Nationally, 71 percent of people did not have access to electricity, with only 10 percent of rural households and 53 percent of urban households accessing electricity respectively. Sixty seven percent of the population used at least basic drinking water services[7] (53 percent rural, 84 percent urban). Less than 7 percent of the population had basic handwashing facilities that included soap and water (4.6 percent rural, 8.8 percent urban) (7).

The CotD analysis found that the cost of an energy-only diet for an average household of 7 people[8] was estimated at FCFA 1,322 per day (USD 2.35 USD). An estimated 3 in 10 households (28 percent) could not afford this diet which meets energy (caloric) needs but lacks dietary diversity and many essential nutrients. The cost of a nutritious diet was estimated at FCFA 2,234 (USD 4.00) for the same household. It was estimated that 7 out of 10 households (68 percent) could not afford a nutritious diet which meets energy, protein, fat, and micronutrient needs.

The daily nutritious diet household cost (FCFA 2,234/ USD 4.00) distribution per individual member was estimated to be 21 percent for the adolescent girl (FCFA 468), 20 percent for the lactating woman (FCFA 456), 17 percent for the adult male (FCFA 374), 14 percent for the elderly woman (FCFA 319), 15 percent for the school-age child (FCFA 331), 9 percent for the child under 5 years (FCFA 189) and 4 percent for the breastfed child (FCFA 97).

Figure 5 shows the estimated cost of a nutritious diet in the 4 analysed geographical regions. The daily nutritious diet cost was highest in the east (FCFA 2,660), mid-range in the north (FCFA 2,025) and urban Bissau (FCFA 2,220), and lowest in the south (FCFA 1,880). The east was also found to have the highest percentage of people unable to afford energy-only and nutritious diets (36 and 83 percent respectively), followed by the north (EO: 29 percent/NUT: 70 percent), south (EO: 20 percent/NUT: 59 percent) and Bissau (EO: 27 percent/ NUT: 54 percent).

Figure 5: Estimated cost of a nutritious diet for an average household of 7 people by geographic region



[6] Vulnerable employment: percentage of employed people engaged as contributing family workers and own-account workers.
[7] Basic drinking water services: drinking water from an improved source, provided collection time is not more than 30 minutes for a round trip. Improved water sources include piped water, boreholes or tubewells, protected dug wells, protected springs, and packaged or delivered water.
[8] A child 12–23 months, a child 4–5 years, a school-age child 10–11 years, an adolescent girl 14–15 years, a breastfeeding woman 30–59 years, an adult male 30–59 years and an elderly woman >60 years.

The high cost of the diet and non-affordability in Guinea-Bissau were not surprising considering the country's weak infrastructure, particularly the transport system. The main port of Bissau, which connects the capital to the outer islands, had only one operational ferry. Of the 4,400 km of state-owned road network, only ten percent was paved (8). The primary paved road – accessible year-round - connected from neighbouring Senegal in the northwest, southwards to Bissau, and then across the northeast to Guinea via Bafáta and Gabú (9). The additional 90 percent of secondary (unpaved) roads had deep ditches, making them dangerous and problematic for transport of fresh, perishable nutritious foods. During the rainy season, June to October, rains could affect transport on primary and secondary roads (10). In the south, roads were more deteriorated. For example, in Tombali some roads were inaccessible to large trucks and small vehicles during rainy periods (9).

Limiting nutrients are those hardest to meet using locally available foods and are often responsible for high diet costs. Table 1 presents the limiting nutrients for individuals in the modelled household. At the household level, key limiting nutrients were vitamin C (south, Bissau), vitamin B_1 (north, south, Bissau), folic acid (north, south, Bissau), calcium (east, south) and iron (north, east, Bissau). It is worth mentioning that Vitamin A was an important limiting nutrient in the east, vitamin B_2 in the south, Bissau and north (for children 10-11 years and adult men). Zinc was limiting for young children in all regions.

Table 1: Limiting nutrients by individual and household by geographical region

Individual	Vitamin A	Vitamin C	Vitamin B_1	Vitamin B_2	Pantothenic acid	Folic acid	Calcium	Iron	Zinc
Child 12-23 months	N, B	N, E, S, B	N, S, B	S, B		N, S, B	E, S, B	E, B	N, E, S, B
Child under 5 years (4-5 years)	N, E, B	S, B	N, E, S, B	S		N, E, S, B	N, E, S, B	N, E, B	N
School-aged child (10-11 years)	E	S, B	N, E, S, B	N, S, B	E	N, S, B	N, E, S, B	N, E, B	
Adult man	E	S	N, E, S	N, S, B		N, E, S, B	N, E, S, B	N, E, B	
Lactating mother	E	N, S, B	N, E, S, B	B		N, E, S, B	N, E, S, B	N, E, S, B	
Adolescent girl (14-15 years)		N, S, B	N, S			N, S, B	E, S	N, E, S, B	
Elderly woman (60+ years)	N, E, B	S, B	N, E, S, B	S, B		N, E, S, B	N, E, S, B	N, E, B	
Household		S, B	N, S, B			N, S, B	E, S	N, E, B	
N = North; E = East; S = South; B = Bissau									

The foods selected by the CotD software for a nutritious diet for each geographical region can be found in Table 2. It was assumed that, apart from grains and grain-based products (especially white rice), most foods were produced locally.

Table 2: Foods selected for a nutritious diet for a household of seven people by the CotD software

Foods included in the diet	North	East	South	Bissau
Grains and grain-based products				
Rice, paddy	x			
Rice, white, raw	x	x	x	x
Wheat, flour, white	x			x
Millet, whole grain, raw		x	x	
Rice, brown, parboiled, milled, raw		x		
Maize, whole kernel, dried			x	
Roots and tubers				
Sweet potato, orange, raw		x		
Sweet potato, white flesh, raw			x	
Legumes, nuts and seeds				
Bean, pinto, mature, raw	x		x	x
Groundnut, shelled, dried, raw	x	x	x	x
Groundnut flour, with fat			x	x
Meat and offal				
Pork, liver, raw	x		x	x
Beef, liver, raw		x		
Lamb or mutton, liver, raw				x
Fish, seafood, amphibians and invertebrates				
Fish, small, dried	x		x	x
Fish, cichlids, dried		x		
Shrimp, dried		x		
Conch, dried			x	
Vegetables and vegetable products				
Leaf, cassava, raw	x			
Leaf, sweet potato, raw	x			
Leaf, roselle, raw		x		x
Leaf, baobab, raw				x
Fruit and fruit products				
Guava fruit			x	x
Mango, deep orange flesh				x
Oils and fats				
Oil, groundnut	x	x		x
Oil, vegetable			x	

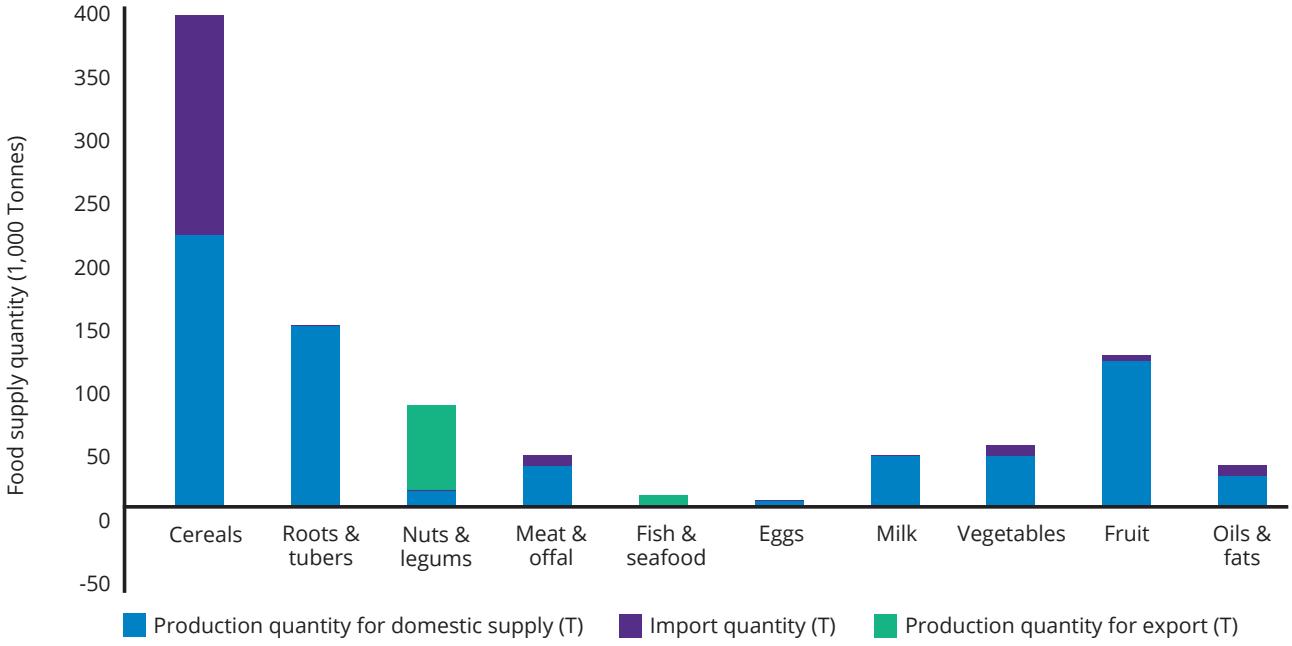
2.
Opportunities exist to increase the availability of nutritious foods by diversifying production and developing the fishing industry.

The World Bank reports that 31 percent of Guinea-Bissau's GDP in 2020 came from agriculture, with a negative annual growth rate of 0.78 percent from 2019 (11). However, other reports indicate that agriculture could account for 40 to 50 percent of gross domestic product (GDP) (12,13). In 2019, 60 percent of the population worked in agriculture (57 percent of the male population, 64 percent of the female population) (7). In 2007, 90,000 households were traditional farmers, of which 2,000 commercial farmers had access to land concessions (14).

In 2017, the country's main agricultural trading partners were India and Vietnam, with bilateral exports equal to USD 254 million and USD 60 million respectively. In the World Trade Organization's joint report, World Tariff Profiles 2019, the average final bound duties on animal and dairy products, fruit, vegetables, and plants were 40 percent, while oilseeds, fats and oils were 40.1 percent, and fish and fish products were 49.9 percent (15). This is likely increasing the cost of nutritious food imports and contributing to high non-affordability of nutritious diets.

Figure 6 presents domestic food production for domestic supply, imports for domestic supply and production quantity for export from the FAO's food balance sheets for 2018. Almost 50 percent of cereals were imported, with rice making up most cereal imports (112 thousand tons of milled and broken rice). Almost all nuts and legumes were exported (69 thousand tons of tree nuts, assumed to be cashew nuts) (2).

Figure 6: Guinea-Bissau's food production and supply (1,000 tons): production quantity for domestic supply, import quantity, production quantity for export (adapted from FAO Food Balance Sheets for 2018)



Based on the food balance sheets, the 2018 Bissau-Guinean diet comprised 47 percent cereals, 18 percent roots and tubers[9], one percent nuts and legumes, four percent meat and offal[10], less than half a percent each of fish (and shellfish) and eggs, five percent milk, six percent vegetables, 14 percent fruit[11], and four percent oils and fats by quantity (tons).

The annual nutritious diet generated through the CotD analysis offered a different profile. As an example, the diet in the north (see Table 2) included more cereals (59 percent of mostly paddy rice as per the staple adjustment) and no tubers. However, the diet included five percent nuts and legumes (pinto beans and groundnuts), two percent meat and offal (pork liver), six percent fish (small dried fish), 15 percent vegetables (mostly raw cassava leaves) and four percent oils and fats (groundnut oil).

Guinea-Bissau's tropical weather is favorable to the production of cereals, nuts and fruit. According to the World Bank, the country has the potential to diversify and grow a range of cultivated crops, including millet, sorghum, groundnuts, mangoes, citrus fruit, papayas, cassava and sweet potatoes (13). The food system was constrained by low production levels of nutritious

[9] Mostly cassava (53 thousand tons).
[10] Mostly pork (15 thousand tons) and bovine meat (8 thousand tons).
[11] Mostly plantains (57 thousand tons) and coconuts (39 thousand tons).

foods as shown in the FAO food balance sheets. Small shifts towards diversifying and increasing production of nutritious foods could improve availability and variety of nutritious foods found in markets, and improve dietary diversity.

The country, however, is vulnerable to droughts, floods and rising sea level. The eastern region receives less rainfall (< 1200 mm/year) than the north and south. From 2046, temperatures are expected to increase significantly by between 3 and 3.2 degrees Celsius due to global warming caused by greenhouse gases. Droughts are projected for the future, particularly in the east. As most agriculture is rain-fed, rising temperatures and climate change puts future yields at increased risk (16). It is therefore essential that farmers are prepared and able to mitigate the risks associated with climate change.

Guinea-Bissau's archipelago offers great potential for fishing yet, according to the FAO, lacks the regulatory framework and monitoring systems to ensure its proper functioning. Most fishing was supplemental, especially when rice harvests were poor during the dry season. Only ten percent of fish caught annually was caught by domestic fishers (14). In 2017, the total value for fishery[12] exports (USD 4,654,000) was almost double that of imports (USD 2,983,000) (17). As seen in figure 6, most fish caught in Guinea-Bissau was for export in 2018, with a negative overall balance[13]. Foreign industrial fleets and overfishing are major threats to fishing-related livelihoods and prolong the southern population's fragility.

According to the FAO, total capture production[14] for 2017 equaled 6,700,000 tons. In 2016, FAO food balance sheets showed that only 1.3 kg per capita supply of fish contributed to the country's protein supply, and fish accounted for 0.9 percent of total protein consumption (17). The fishing sector represents an area of significant potential for Bissau-Guineans.

Four resilience interventions were modelled[15] to understand the impact that each might have on the cost of a nutritious diet: green leafy vegetable[16], eggs[17], milk[18] and small dried fish[19]. The green leafy vegetable and egg interventions could result in an estimated ten and eight percent reduction in the cost of a nutritious diet respectively. The milk intervention could result in a 21 percent reduction in the cost of a nutritious diet, while the dried fish intervention could result in a 12 percent decrease in the cost of the diet. The interventions could lower household non-affordability by an estimated 7 percent with the green leafy vegetable intervention, 2 percent with eggs, 18 percent with milk, and 9 percent with dried fish.

3.
Food sovereignty could be strengthened by improving crop yields, thus reducing reliance on rice imports.

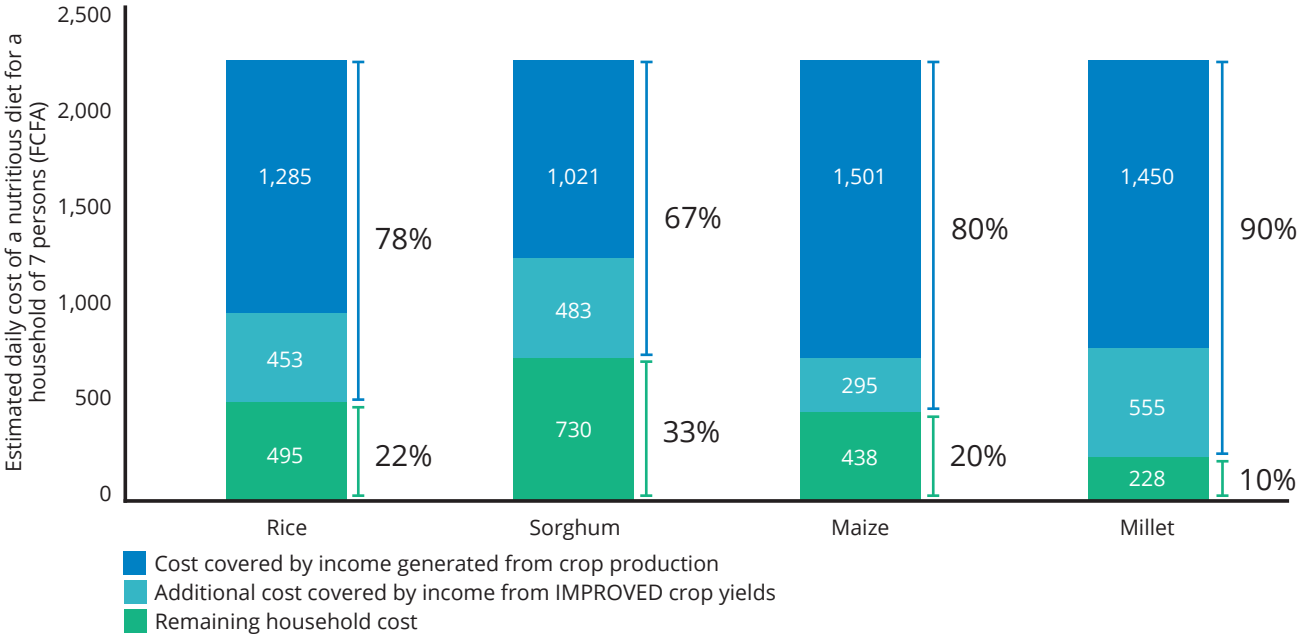
While Guinea-Bissau once cultivated rice for export, at the time of analysis it was mostly grown for subsistence (18). The main staple produced and consumed in Guinea-Bissau was rice, with cashew nuts and groundnuts as two important cash crops. According to the FAO food balance sheets for 2018, 45 percent of rice consumed in the country was imported (2). While other staple food crops – millet, sorghum, and maize - were grown in Guinea-Bissau, rice was preferred, with production and consumption far outweighing other crops.

Projects focused on improving agricultural practices to improve food security by increasing income – and thus household purchasing power – were being carried out in the country. ECAS-D, a local non-governmental organization (NGO), focused their work on capacity building with smallholder farming households to increase their yields, which included training on proper seed identification and selection, improving irrigation and drainage systems, appropriate use of inputs[20] and financial management (19). Other organizations, such as CAURAL REMOBE and Guiarroz (NGO), focused activities on seed selection with producers, sharing information and raising awareness about the importance of agricultural diversity and climate change, producer association organization, seed distribution to member associations, and training of members on seed multiplication techniques (20).

An analysis of four cereal crops[21] was conducted to understand how improved agricultural practices could affect the cost of a nutritious diet for smallholder farmers. Figure 7 shows that by improving agricultural practices, the estimated daily cost of a nutritious diet for rice farmers could be reduced by almost half (48 percent: FCFA 948 to FCFA 495), for sorghum farmers by 40 percent (FCFA 1213 to FCFA 730), for maize farmers by 40 percent (FCFA 733 to FCFA 438), and for millet farmers by two thirds (70 percent: FCFA 783 to FCFA 228).

[12] Total value of international trade of seven fishery commodity groups.
[13] Higher exports than production quantity for domestic supply + imports.
[14] Fish, crustaceans, molluscs, etc.
[15] The models and assumptions were based on criteria from previous Sahel FNGs and stakeholder inputs from the baseline validation workshop.
[16] Assumption: 2kg of moringa leaves and 2kg of djambo leaves produced per week. 100 percent of leaves consumed by the household (with 80 percent edible portion factor).
[17] Assumption: Farmer has four chickens, each producing 3-4 eggs per week (~60 eggs per month). 50 percent consumed by household; 50 percent sold at the market. Of income generated from sales, assumed 70 percent spent on food.
[18] Assumption: One cow that produces 1 litre of milk per day: 40 percent consumed by the household; 60 percent sold at the market. Of income generated from sales, assumed 70 percent spent on food.
[19] Assumption: 985g caught fish dehydrated to 500g dried fish (985g/1.97 conversion factor) per week. 40 percent consumed by the household; 60 percent sold at the market. Of income generated from sales, assumed 70 percent spent on food.
[20] Inputs include, but are not limited to, agricultural products such as fertilizers and pesticides (recommended and approved by ECOWAS and European Union).
[21] Information on yields provided by ECAS-D.

Figure 7: The estimated cost (FCFA) covered by current crop production, the additional amount that could be covered by improved crop yields and remaining amount needed to cover the cost of a nutritious diet for a seven person smallholder household for four cereals (rice, sorghum, maize, millet)



A national affordability analysis found good reductions in estimated percentage of smallholder households unable to afford a nutritious diet before and after the interventions to improve agricultural practices: rice farmers from 23 percent to 5 percent; sorghum farmers from 24 percent to 12 percent; maize farmers from 11 percent to 7 percent; and millet farmers from 13 percent to zero.

4. Guinea-Bissau's monocrop cashew econcomy is high risk for vulnerable farmers and has come at the detriment of food security and dietary diversity.

Guinea-Bissau was the third largest exporter of cashew nuts in the world, after the Ivory Coast and Nigeria (21), and accounted for about 20 percent of global cashew exports in 2016 (18). Raw cashew nuts dominate the export market, accounting for 95 percent of Guinea-Bissau's total export revenue (12). In 2010, cashews accounted for 35 percent of income for female headed households and 26 percent for male headed households (18), with 85 percent of the rural population involved in cashew cropping (22).

Data suggests that the movement to cashew monocropping, with high dependence on a single export commodity, has come at the expense of the country's food security (20, 23). According to the World Bank, Guinea-Bissau experienced a 5.7 percent economic growth in 2017 which reflected high global cashew prices and good annual production in the country. However, in 2018, economic activity slowed due to adverse weather and the declining price of cashews (24).

Cashews began to be cultivated as a cash crop in the 1950s and as it intensified in the 1990s, production of other food - such as cassava, groundnuts, maize, and sorghum – fell (22). Cashew farming and harvesting was mainly done by women during peak season, March to May, on land owned by male relatives (husbands/fathers) (13). Most farmers were reported to work at "primitive levels", with little access to water, tools, equipment, and decent roads. Although women undertook the hard labour, men sold the nuts to traders or exporters, and made the decisions about what might be stored for later sale or exchange for income, or kept for consumption (25).

The cashew campaign runs from March/April to August, during which time small freelance buyers and medium-sized companies travel through Guinea-Bissau to acquire cashew nuts in exchange for rice (23). While cashews were traditionally traded for rice at a ratio of one kilo of rice for one kilo of nuts (1:1), fluctuations have seen the ratio drop to one kilo of rice for three kilos of nuts (1:3) (25). High international prices acted as incentives for farmers to shift to cashew farming, as well as land tenure customs that protected investments in land: individuals and households that plant the trees retain the land if the trees remain, which guarantees longer security of land tenure. Although the value chain was relatively short, high transaction costs were reported with import tariffs at the Port of Bissau up to ten times higher than neighbouring rivals, such as Banjul and Dakar (13).

Cashew cropping is considered high risk for farmers, as quality and quantity of production are dependent on climate. Cashew trees absorb nutrients in the soil following the rainy season (late May – early November).

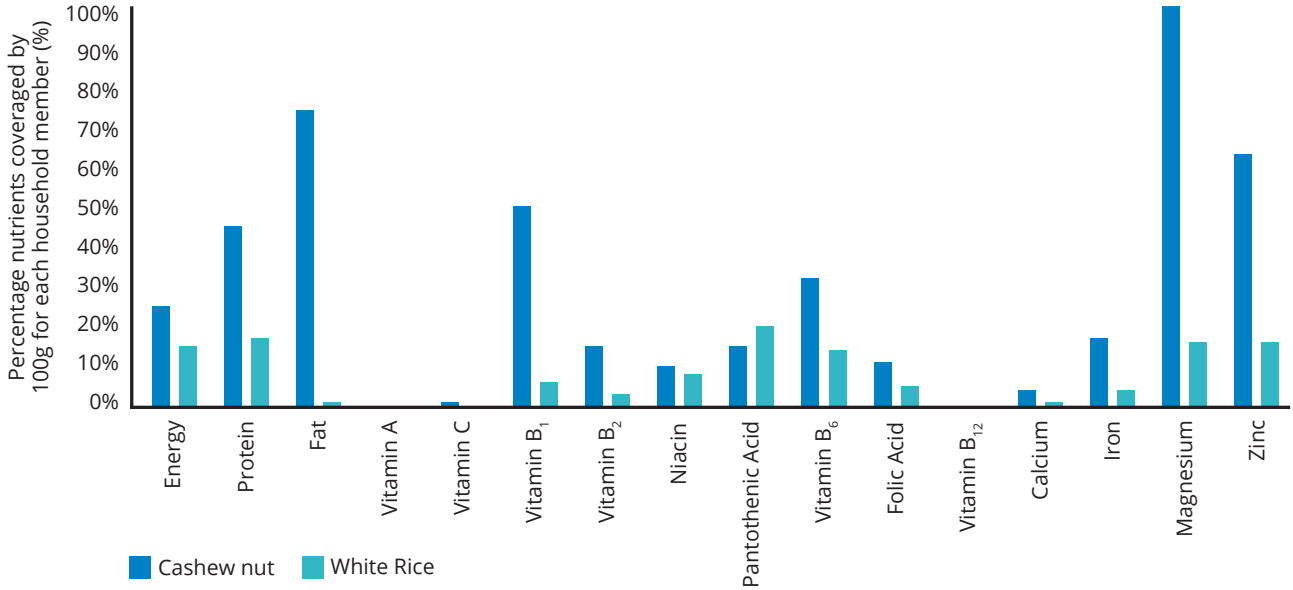
The trees blossom from February to March: the blossoms then turn into cashew fruit and nut from April to June, when harvesting begins. High temperatures are harmful to the trees as they dry out the earth and produce atmospheric dust particles that damage the blossoms. Therefore, high temperatures around January and February reduce the amount of cashew export per worker, and thus income gained from their cultivation. Projected increasing temperatures, especially in the eastern region, could adversely affect cashew harvests (lower production, higher prices) (18). Dependence on only one source of income with rising temperatures and erratic weather means that farmers risk loss of income and livelihoods.

No cashew nuts or cashew apples (fruit from which cashew nuts are derived) were found in any of the markets surveyed during the CotD data collection. According to Cont and Porto (26), in 2013 cashew exports equalled 138,000 tons, while stock for local processing was 2,000 tons. According to the country's Strategic and Operational Plan (2015-2020), Terra Ranka, the government set a goal of increasing four-fold the revenue generated by cashew cropping by 1) increasing yields and quality, 2) 30 percent local processing of raw cashew nuts, and 3) targeting the most lucrative markets (27).

The analysis examined the nutritional composition of rice and cashew nuts to understand whether the current barter system was fair. Figure 8 shows the nutritional coverage of 100g of cashew nuts compared to 100g of rice for each household member[22]. Raw cashew nuts exceed rice in coverage for all nutrients except pantothenic acid. Cashews are a good source of vitamin B_1, a limiting nutrient in the north, south and Bissau, and an excellent source of fat which was found to be limiting in the north, east and south.

At the time of analysis there were no cashew processing plants in Guinea-Bissau – possibly one of the reasons for no cashews being found in the markets. Farmers sell their production before the rainy season due to lack of storage facilities at household and community levels (28). Cashew processors had only 1.2 percent and 1.5 percent of market share in 2011 and 2013 respectively (26). Investment in local storage, infrastructure and processing, including food safety, coupled with educational/information campaigns promoting the consumption of cashews, could have a positive impact on nutrition outcomes, further develop cashew cropping livelihoods - especially for women - and initiate a local cashew market.

Figure 8: The percentage of nutrients provided by 100g of cashew nuts versus 100g of white rice for each household member



[22] 100g assigned to each household member. Although these are not realistic portion sizes, the exercise is simply a comparison of nutrient coverage.

5.
Current cash-based transfers reduce the cost of a nutritious diet by 40-50 percent depending on the amount and frequency.

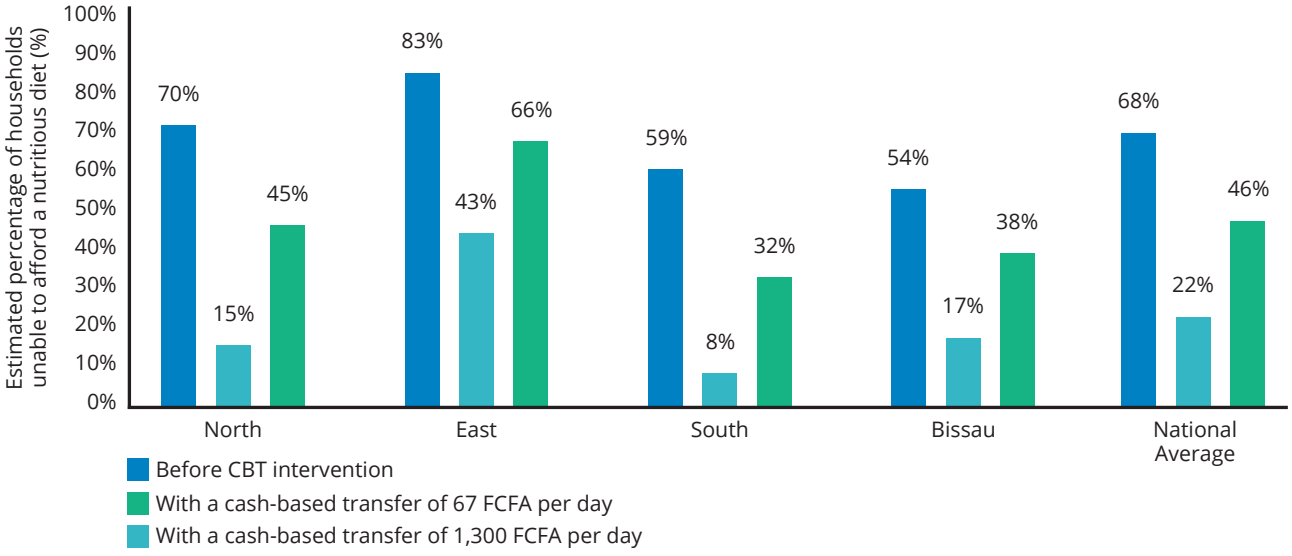
Cash-based transfers (CBT) paired with social behaviour change (SBC) activities can have mutual benefits by providing caregivers with means, knowledge and skills, while empowering them to use the skills acquired through cash purchases. CBTs are appropriate in environments where food is available and markets function properly. Two CBTs being provided at the time of analysis were modelled to understand the impact that each could have on reducing the cost of a nutritious diet for a household.

WFP and UNICEF jointly provided a monthly transfer of FCFA 40,000 per household, while Projeto de Redes Sociais e Serviços de Base (PRSSB), funded by World Bank, provided FCFA 10,000 trimestral[23] transfers to individuals from vulnerable households. Nationally, WFP's transfer was estimated to reduce the household cost of a nutritious diet by just over 40 percent, while PRSSB's transfer was estimated to reduce the cost by just under 25 percent. Figure 9 shows that WFP's transfer could reduce the number of people unable to afford a nutritious diet from 68 percent to 22 percent, while PSSRB's transfer could reduce non-affordability to approximately 46 percent.

In partnership with the Ministry of Public Health, Family and Social Cohesion and UNICEF, WFP provided food and nutrition assistance to malnourished clients receiving anti-retroviral treatment (ART)[24]. As a complement, transfers of approximately FCFA 4,450 per month (FCFA 145 per day)[25] were given to households of people living with HIV (PLHIV) who could not work to earn income (29). The adult male was modelled to understand the impact the intervention could have on the cost of the diet for the household. The intervention reduced the estimated average cost of a nutritious diet from FCFA 412 per day by approximately 27 percent, to FCFA 310 per day for the PLHIV. CBTs for PLHIV should be complemented by SBC activities to ensure purchase and consumption of nutritious foods for positive nutrition outcomes.

The modelling assumes that nutritious foods are available in local markets and that nutritious foods would be chosen, consumed, and shared within the household based on needs. Therefore, it is critical that CBTs be accompanied by targeted SBC messages and education programmes that promote the purchase and consumption of nutritious foods. For example, this could be delivered through the existing Ianda Guinea! Programme and its partners.

Figure 9: The estimated percentage of households unable to afford a nutritious diet by region, before an intervention and after two CBT interventions (FCFA 1,300 per day; FCFA 767 per day)



[24] This activity ended in 2018, however it is planned to restart at the end of 2021 or 2022.
[25] Assumption: 70 percent spend on food purchases (FCFA 145 x 0.70 = FCFA 102 per day).

6.
A food fortification policy and implementation plan could improve micronutrient intake and reduce the prevalence of micronutrient deficiencies.

It is not surprising that Bissau-Guineans are vulnerable to micronutrient deficiencies. WFP's 2019 Household Food Security Survey reported poor and limited household consumption scores for a third (37.7 percent) of the population. The poor and limited scores were found to be higher in rural areas than urban (41.4 percent and 25.2 percent respectively) (30). Anaemia, vitamin A deficiency and endemic goitres (iodine deficiency) were just a few of the country's micronutrient-related challenges.

A randomized placebo-controlled trial from 2007 to 2010 found a 66 percent[26] prevalence of vitamin A deficiency in children over 6 months old, which was 11 percent higher than the previous WHO estimate of 54 percent. The deficiency was found to be higher in the rainy season at 88 percent versus 53 percent in the dry season (31). The CotD analysis found vitamin A to be limiting for children aged 12–23 months in the north and Bissau; for children under 5 years in the north, east and Bissau; for school-age children, adult men, and lactating women in the east; and for elderly women in the north, east and Bissau.

The least expensive sources of vitamin A-rich foods identified through the CotD analysis were pork liver and cassava leaves in the north; beef liver, orange sweet potato, roselle (djambo) leaves and dried shrimps in the east; pork liver in the south; and pork liver and roselle leaves in Bissau. A market-based intervention of fortifying local oil with vitamin A could be considered. Providing one portion of fortified oil per person per day could provide the household with almost 10 percent coverage of vitamin A.

A study found the prevalence of anaemia to be 42 percent in school-age children in rural Cacheu (north) and Oio (north) (32), while another report found the prevalence to be 80.2 percent in remote islands belonging to the Bijagós Archipelago[27] (33). While anaemia can have many causes, iron deficiency anaemia is the most common nutrition-related form. The fact that iron was found to be an important limiting nutrient for households in the east and for adolescent girls and lactating women in the south could explain the rates of anaemia in the two regions. The least expensive sources of iron-rich foods in the east were dried cichlids (fish) and dried shrimp, and in the south they were pork liver and small dried fish.

Goitres[28] were found in 73.5 percent[29] of school-age children in a nationwide cross-sectional survey, despite satisfactory median urinary iodine concentrations at population level (34). Thyroid impairment (presence of goitres) may be attributed to poor iron and/or iodine consumption, as they are needed, in addition to selenium, to ensure thyroid regularity (35). Therefore, increasing consumption of both iodized salt and iron-rich foods could reduce the number of children presenting with goitres.

Fortification involves adding nutrients to foods to increase their nutritional content and prevent deficiencies such as anaemia. Nutrients include iron, folic acid, zinc and B vitamins. Fortification could offer a way of ensuring that inaccessible nutrients are consumed while the agricultural sector has time to develop and diversify. As rice is the preferred staple and consumed in large quantities, rice fortification was examined as a potential market-based intervention. Locally produced rice could be fortified and piggy-back on current distribution systems, including the current school feeding programme. It could also generate jobs as part of the industrial food processing sector.

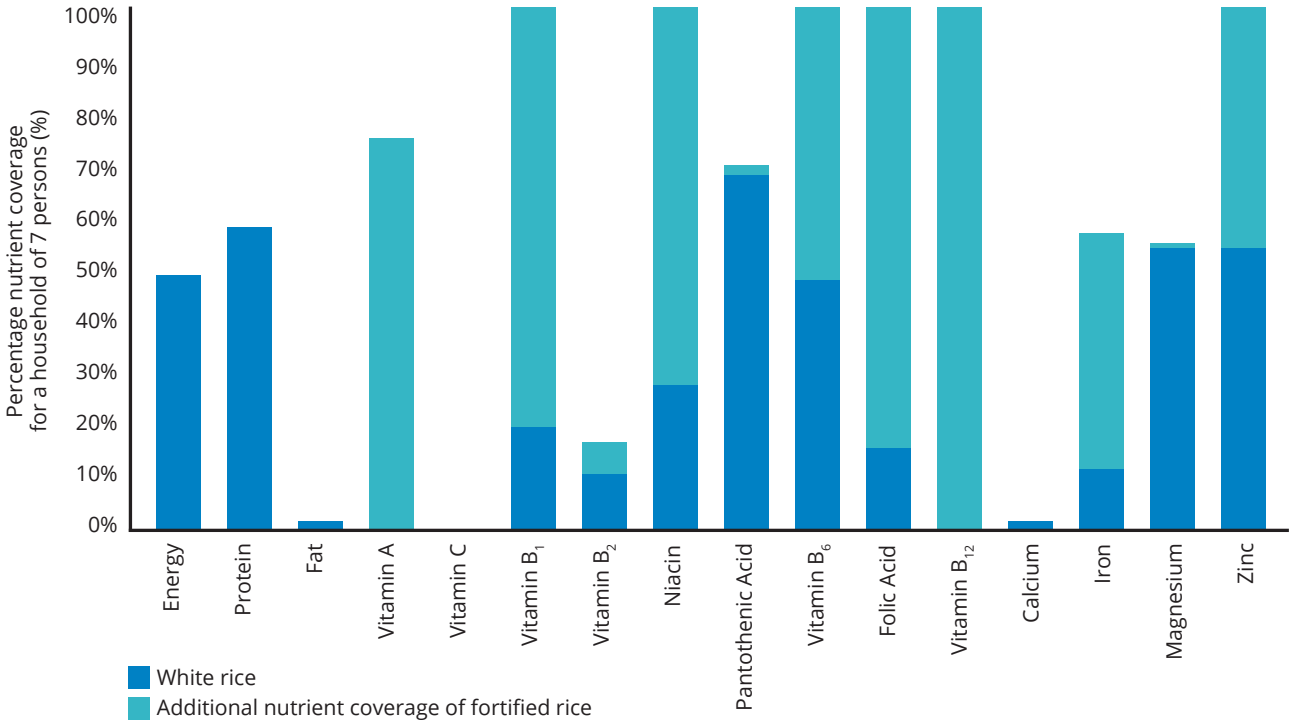
Fortified rice was modelled using the price of white rice with a two percent increase to adjust for the assumed higher price of fortification[30]. Nationally, switching to a fortified rice could reduce the estimated household cost of a nutritious diet from FCFA 2,234 per day to FCFA 2,027 per day – a reduction by roughly FCFA 200 or 10 percent for the household. Rice fortification could reduce the estimated number of people unable to afford a nutritious diet from 68 to 62 percent. This intervention could particularly help women and adolescent girls, the household members who would benefit most from rice fortification.

Figure 10 compares the nutrient coverage of white rice with fortified rice[31]. The fortified rice could cover 100 percent of vitamins B_1, B_6, B_{12}, niacin, folic acid and zinc for the analysed household. The fortified rice significantly increased vitamin A (74 percent) and iron (58 percent), two important limiting nutrients at individual and household level.

A fortification policy and strategic implementation plan focused on the limiting nutrients identified in this report (see Table 1) could result in better nutrition outcomes and develop the country's food processing sector, alongside the proposed cashew processing. Messages informing the local population of the benefits of fortification could be included in the SBC strategy.

[26] 95 percent confidence interval 62.9-68.5 percent.
[27] Bubaque, Rubane and Soga.
[28] Abnormal enlargement of the thyroid gland, normally due to iodine deficiency.
[29] 95% confidence interval 68.5-78.2%.
[30] A 2% increase was applied in line with feedback from WFP's Fortification experts in Regional Bureaus.
[31] Nutritional composition of fortified rice per 100g: energy (kcal) 361.6; protein (g) 6.7; fats (g) 0.6; saturated fat (g) 0.3; monounsaturated fat (g) 0.3; polyunsaturated fat (g) 0.3; carbohydrate (g) 79.61; fiber (g) 0.8; phytate (mg) 350.63; RAE (ug retinol) 150; vitamin B1 (mg) 0.56; vitamin B2 (mg) 0.06; niacin (mg) 9.4; vitamin B6 (mg) 0.74; folate (mcg) 222.67; vitamin B12 (mcg) 1; pantothenic acid (mg) 1.14; calcium (mg) 8; copper (mg) 0.36; iron (mg) 4.6, with 7% absorption rate; magnesium (mg) 36; manganese (mcg) 0.38; phosphorous (mg) 103.13; potassium (mg) 81; zinc (mg) 7.1.

Figure 10: Nutrient coverage of white rice versus fortified rice for a seven person household



7.
Home fortification for children under the age of 5 could cover up to 40 percent of micronutrient needs.

According to the 2019 State of the World's Children (SOWC) report, 56 percent of children born in Guinea-Bissau were not weighed at birth. Of those who were weighed, 21 percent were considered to have low birthweight (< 2,500g) (6). Children who are underweight at birth begin life at a disadvantage. The COHA series reported 23.5 percent infant mortality due to malnutrition from 2008 to 2013 (5).

The WHO recommends that infants under 6 months are exclusively breastfed without any other food or liquids (including water), and that children up to 2 years continue to receive breastmilk in addition to safe and adequate complementary foods from the age of 6 months (36). In Guinea-Bissau, 34 percent of mothers initiated breastfeeding within the first hour after birth, and approximately half (53 percent) of infants (<6 months) were exclusively breastfed. Continued breastfeeding (12–23 months) was highest for the poorest 20 percent of children (83 percent), and lowest for the richest 20 percent of children (57 percent), with an average of 77 percent of children receiving breastmilk after the age of 12 months (6).

As recommended by WHO, 57 percent of infants were introduced to solid, semi-solid or soft foods from 6–8 months of age. Only ten percent of children aged 6–12 months were reported as having minimum dietary diversity (MDD)[32], 57 percent had minimum meal frequency (MMF)[33], 8 percent received a minimum acceptable diet (MAD)[34], and 44 percent of children received zero fruit and vegetables (6).

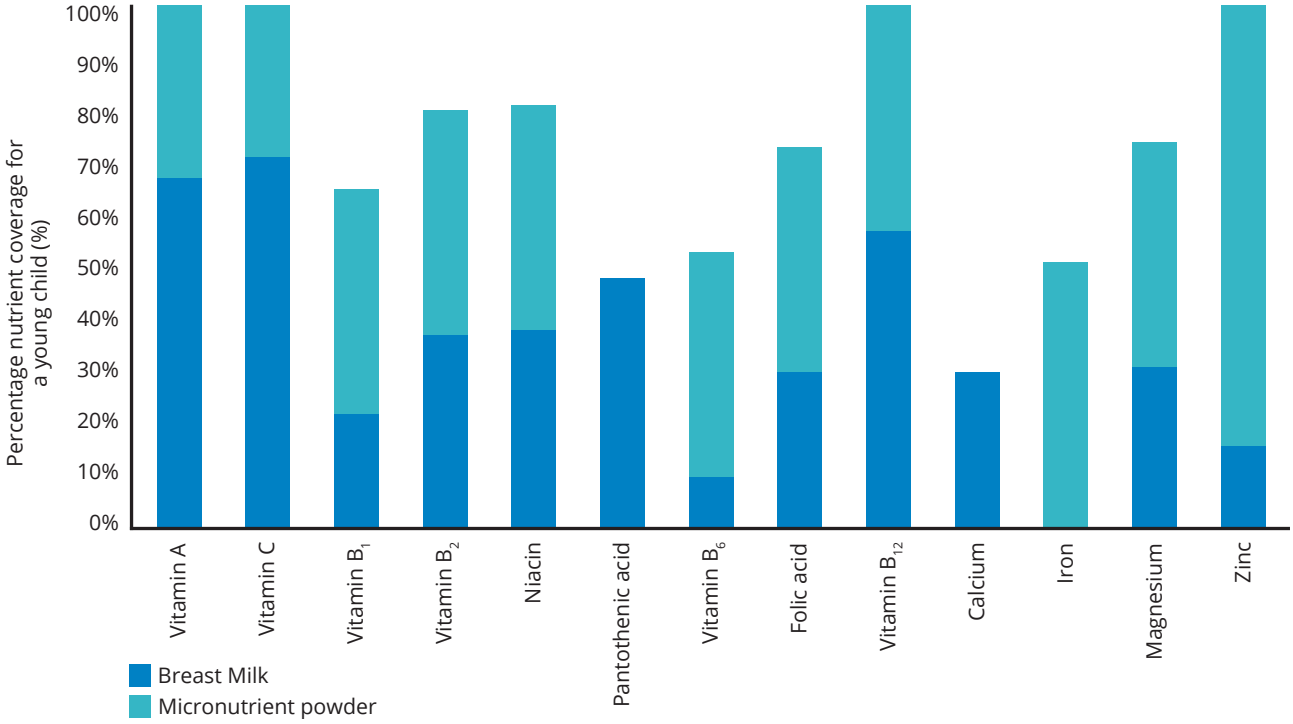
While the estimated cost of a nutritious diet was FCFA 97 per day for a young child (12–23 months) receiving optimal breastmilk (532g per day), this amount increased by 21 percent (to FCFA 118 per day) for a young child receiving sub-optimal breastmilk (266g per day), and it increased by almost half (48 percent) for a non-breastfed young child (FCFA 143 daily nutritious diet cost).

The analysis examined the potential impact of providing one gram of micronutrient powder (MNP)[35] three times a week for home meal fortification for children under 2 years. The results shows that the MNP intervention could reduce the cost of the nutritious diet for optimally breastfed young children by 23 percent (to FCFA 75 per day), sub-optimally breastfed young children by 16 percent (to FCFA 99 per day) and by 12 percent (to FCFA 126 per day) for young children who receive no breastmilk.

[32] MDD = Breastfed children consumed foods from 5 of 8 food groups during the previous day.
[33] MMF = Child received solid, semi-solid or soft foods (including milk for non-breastfed children) the minimum number of times or more the previous day (2x for breastfed infants 6-8 months, 3x for breastfed children 9-23 months, 4x for non-breastfed children 6-23 months).
[34] MAD = A proxy indicator for the combined energy adequacy and micronutrient density of a child's diet. For non-breastfed children, it also accounts for consumption of 2 milk feeds. For breastfed children = children 6-23 months who have met MDD and MMF in the past 24 hours. For non-breastfed = children 6-23 months who meet MDD (4 of 6 food groups after dairy removed) and MFF and received 2 milk feeds in the previous 24 hours.
[35] Micronutrient powder composition per 100g = RAE (µg retinol) 40,000; vitamin C (mg) 3,000; vitamin B_1 (mg) 50; vitamin B_2 (mg) 50; niacin (mg) 600; vitamin B_6 (mg) 50; folate (mcg) 15,000; vitamin B_{12} (mcg) 90; copper (mg) 56; iron (mg) 1,000 (absorption factor 7 percent), zinc (mg) 410.

Figure 11 shows the nutrient coverage of the micronutrient intervention. Providing the MNP to an optimally breastfed young child could result in full coverage of vitamins A, C and B_{12}, and very good coverage of vitamins B_1 (65 percent), B_2 (80 percent), B_6 (53 percent), folic acid (73 percent), iron (52 percent) and zinc (59 percent). Please refer to Table 1 to see which nutrients were limiting for young children in each region.

Figure 11: Daily nutrient coverage of breast milk and micronutrient powder for a young child who is optimally breastfed

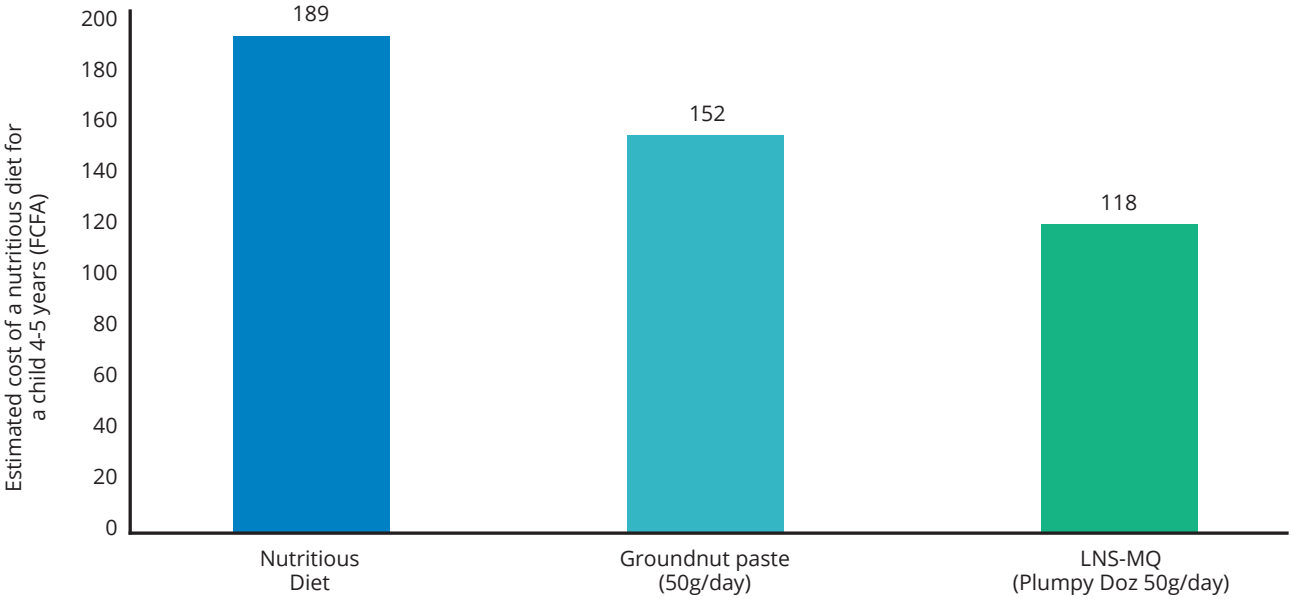


8.
Children under 5 years are particularly vulnerable to stunting and micronutrient deficiencies – targeted interventions could help meet their nutritional needs.

According to the last 2018–19 MICS report, 27.7 percent of children in Guinea-Bissau under 5 years were stunted[36], while 5.1 percent were considered wasted[37] (3). These rates classify the country in the 'high' category for stunting (20 - <30) and 'medium' category for wasting (5 - <10) (37). Stunting in Bafatá (34 percent) and Gabú (30 percent) in the east and Oio (35 percent) in the north were over the 30 percent threshold of being 'very high' (3). According to the COHA series, in 2014 Guinea-Bissau lost an estimated FCFA 38.1 billion (USD 70.6 million, 9.4 percent of GDP) to child malnutrition, including losses of health (2.3 percent), education (0.13 percent) and productivity (7 percent) (5).

Two interventions were modelled for children 4-5 years to understand the impact that each could have on cost of the diet and nutrient intake. The first intervention was provision of 50g of groundnut paste and the second was provision of a medium quantity lipid-based nutritious supplement (LNS-MQ), also known as 'Plumpy Doz' (50g). Figure 12 shows that the estimated cost of a nutritious diet for the child could be reduced from FCFA 189 per day to FCFA 152 per day with the groundnut paste and FCFA 118 per day with the LNS-MQ supplement (20 percent and 37 percent respectively).

Figure 12: The estimated cost of a nutritious diet for a child 4-5 years, with provision of groundnut paste (50g/day) and with provision of LNS-MQ (Plumpy Doz 50g/day)



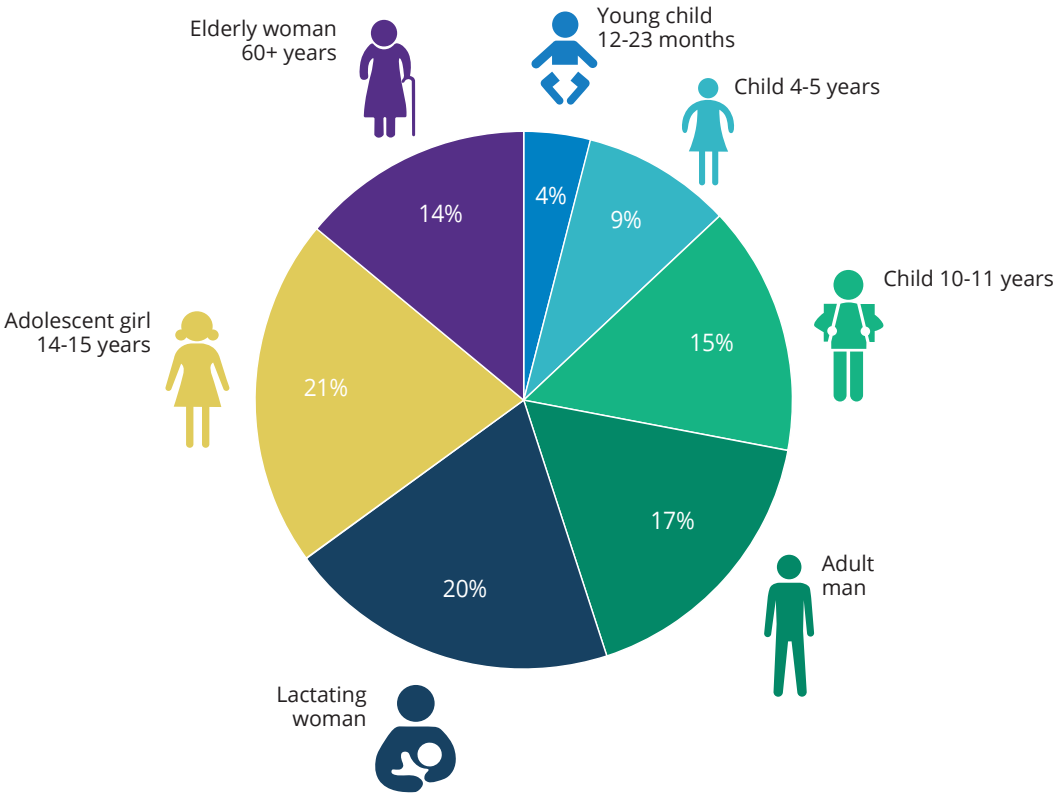
9.
It is difficult for adolescent girls and pregnant and lactating women to meet their nutrient needs due to the high cost of nutrient-dense foods.

The WHO recommends daily iron supplementation as a public health intervention for a period of three consecutive months for menstruating women and adolescent girls where prevalence of anaemia is 40 percent or higher (38). Prevalence of anaemia in Guinea-Bissau was found to be 44 percent for women of reproductive age and therefore iron supplementation would be recommended for adolescent girls and pregnant and lactating women (6). The CotD analysis examined the potential impact that daily iron and folic acid (IFA) tablets[38] or multiple-micronutrient tablets (MMT)[39] could have on the cost of a nutritious diet and nutrient coverage for these two individuals.

The average national cost of a nutritious diet for an adolescent girl was estimated to be FCFA 468 per day – 21 percent of the household cost. The cost for a lactating woman was estimated at FCFA 456 per day – 20 percent of the household cost. The adolescent girl was estimated to have the highest individual cost for the household in the north (FCFA 421) and east (FCFA 602), while the lactating woman was estimated to have the highest individual cost for the household in the south (FCFA 358) and Bissau (FCFA 474). Figure 13 illustrates the percentage that each individual within the modelled household contributes to the cost of a nutritious diet.

[36] Stunting = low height for age.
[37] Wasting = low weight for age.
[38] Iron and folic acid supplementation per 100g = folate (mcg) 66,667; iron (mg) 6,000 (% iron absorption factor).
[39] Multi-micronutrient tablet supplementation per 100g = RAE (ug retinol) 80,000; vitamin C (mg) 7,000; vitamin B_1 (mg) 140; vitamin B_2 (mg) 140; niacin (mg) 1,800; vitamin B_6 (mg) 190; folate (mcg) 66,667; vitamin B_{12} (mcg) 260; copper (mg) 200; iron (mg) 3,000 (7% absorption factor); and zinc (mg) 1,500.

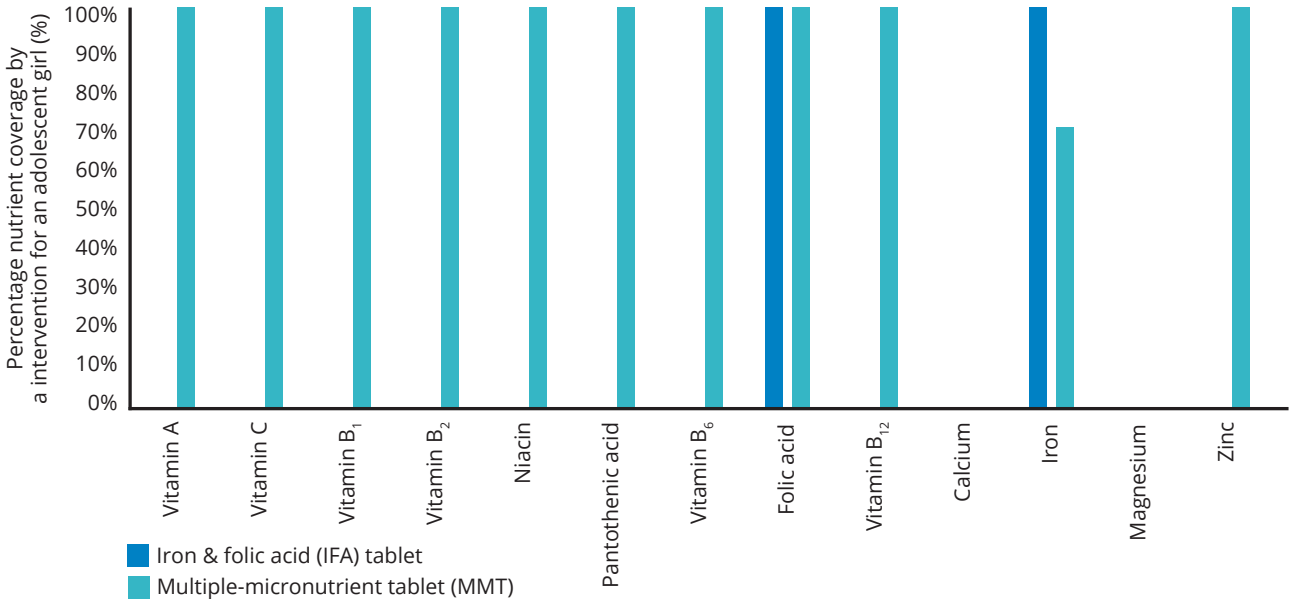
Figure 13: The percentage distribution to the cost of a nutritious diet by individual household member



An iron and folic acid intervention could reduce the daily cost of a nutritious diet for an adolescent girl by an estimated 26 percent (FCFA 368) and for a lactating woman by an estimated 17 percent (FCFA 380) nationally. Meanwhile, the multi-micronutrient tablet could reduce the daily cost the nutritious diet for an adolescent girl by an estimated 34 percent (FCFA 311) and for a lactating woman by an estimated 29 percent (FCFA 326).

Although the IFA tablet would cover 100 percent of iron and folic acid, the MMT intervention covers more nutrients. Figure 14 shows that the MMT could cover 100 percent of vitamins A, C, B_1, B_2, B_6, B_{12}, niacin, folic acid and zinc for the adolescent girl, and 68 percent of daily iron requirements. For the lactating woman, the MMT could cover 100 percent of vitamin C, niacin, folic acid and zinc, plus 94 percent vitamin A, 93 percent vitamin B_1, 88 percent vitamin B_2, 95 percent vitamin B_6, 93 percent vitamin B_{12} and 72 percent of iron.
IFA and MMT interventions do not include calcium,

Figure 14: Daily nutrient coverage of IFA intervention versus MMT intervention for adolescent girls



which was a limiting nutrient for adolescent girls in the east and south and for pregnant and lactating women in all geographic areas, driving up the cost of the diet for these individuals. Fishing interventions to increase access to, and availability of, small dried fish, and increase income for the local fishing community, accompanied by an SBC strategy that includes promotion of local fish consumption, could target this important nutrient.

10.
School meals could be improved by adjusting portion sizes and increasing fresh, nutritious foods.

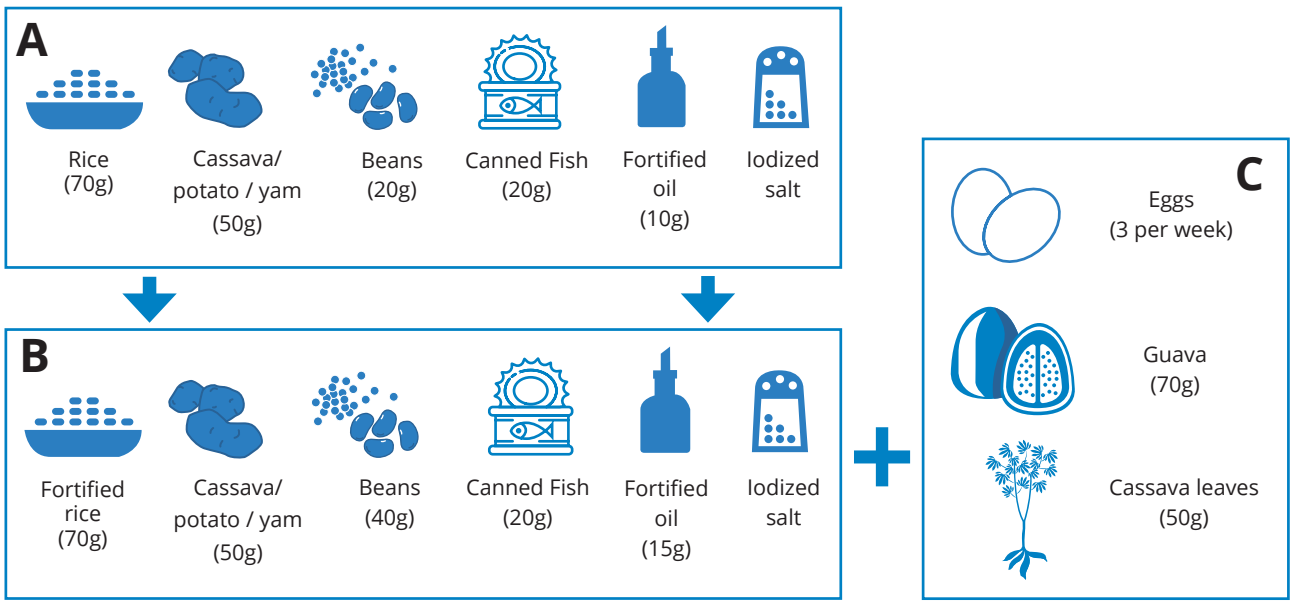
The most recent Human Development Report stated that the government of Guinea-Bissau spends an estimated 2.1 percent of GDP on education (4) - less than half of the sub-Saharan Africa average of 4.2 percent and only higher than five[40] of 48 countries within the region. The education system is the ideal entry point to improve dietary diversity for children by providing a nutritious meal and a nutrition curriculum on how to live long, healthy lives. Children are the perfect carriers of information and could return home to enlighten older family members on what has been learned, for example, about the importance of eating balanced diets that include fresh, nutritious foods. Expanding home-grown school feeding programmes could link local smallholder farmers to schools.

Home-grown school feeding programmes could have multiple benefits: for children, increased nutritious foods and dietary diversity; for households and communities, employment opportunities, engagement with - and ownership of - the programme, increased household dietary diversity and better eating habits; for farmers, traders and processors, income opportunities, increased access to markets, inputs, credit, increased dietary diversity, more resilient agriculture, and a stronger local food system; for governments, a more inclusive education and social protection system, a diversified agricultural sector and increased economic activity (39). WFP's April 2021 Country Brief reported that 92 schools from Southern Tombali and Quinara had been identified for participation in home-grown school feeding programmes (40).

Examination of the school meal being provided by WFP showed room for improvement. Figure 15A displays the ingredients that made up the school meal at the time of analysis: 70g rice, 50g mixture of cassava/potato/yam (based on market availability), 20g beans, 20g canned fish, 10g fortified oil and iodized salt. Figure 15B shows the adjustments made to the original menu: plain rice replaced with fortified rice, the portion of beans doubled (to 40g), and the portion of fortified oil increased (to 15g). Figure 15C shows the additional ingredients added to the school meal: 3 eggs per week, 70g guava, 50g cassava leaves.

The locally produced foods were purposefully selected to target limiting nutrients in Guinea-Bissau due to their availability in markets and as requested by the WFP country office. Guava was found to be one of the cheapest sources of vitamin C, while cassava leaves are an excellent source of vitamin B_1, folic acid and iron.

Figure 15A, B, C: Foods included in the current school meal (A) versus improved school meal (B + C), which targets limiting nutrients



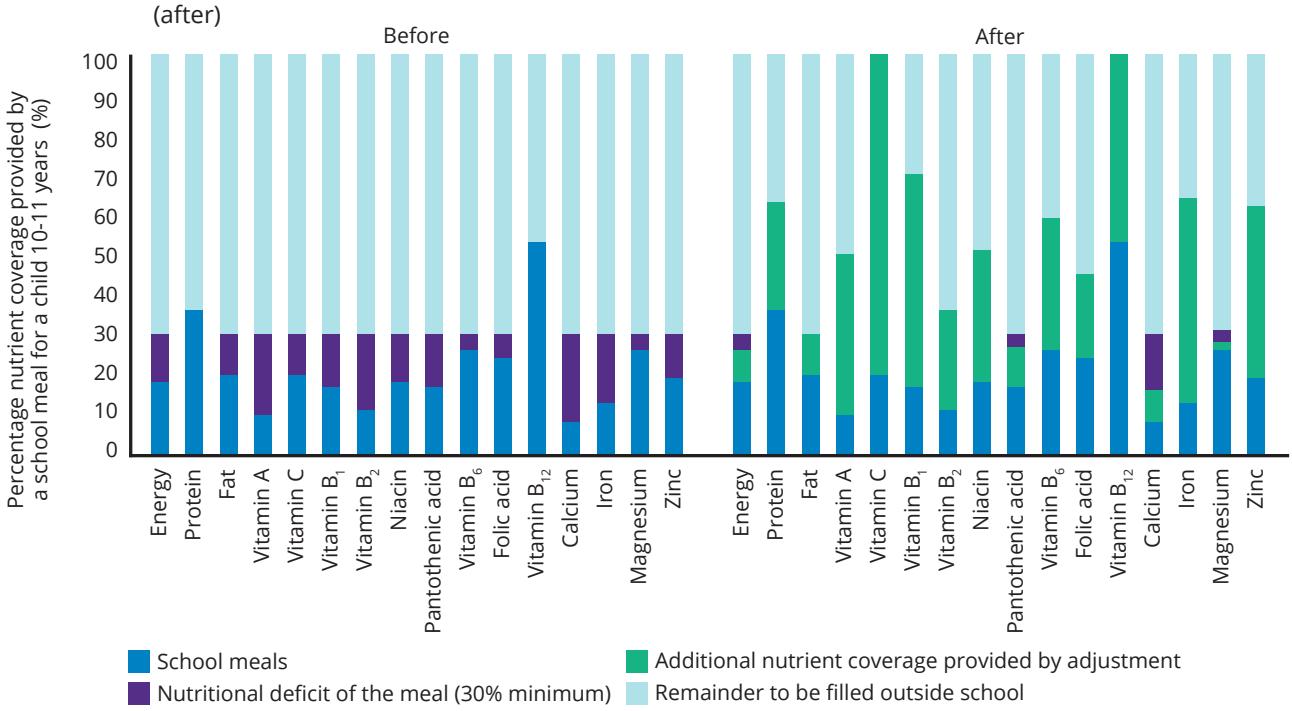
[40] Lower expenditure on education from GDP: Central African Republic, 1.1 percent; Democratic Republic of the Congo, 1.5 percent; Mauritania, 1.9 percent; Somalia, 1.3 percent; South Sudan, 1.5 percent.

The results of the analysis found that each standalone intervention resulted in only a small reduction to the daily cost of the diet for the child aged 10–11 (FCFA 276 with current school meal): adding three eggs per week FCFA 271; adding guava FCFA 271; increasing beans FCFA 266; substituting fortified rice FCFA 265; or adding cassava leaves FCFA 260. Yet combining interventions resulted in costs ranging from FCFA 186 per day in the south to FCFA 283 per day in the east, with a national average of FCFA 219 – a further 20 percent cost reduction.

Figure 16 shows the nutrient coverage of the school meal at the time of analysis (before) and with the adjustments and additions (after). The revised school meal met the 30 percent coverage target of daily nutrient needs for school feeding programmes for almost all nutrients (41). The hardest nutrient to meet was calcium, with a 14 percent deficit remaining after the adjustments. The cheapest sources of calcium in most regions were small dried fish such as cichlids. Adding dried fish to the school meal could be considered to hit the 30 percent target for calcium.

The school meal was modelled for a child aged 10–11 years whose nutrient requirements would be higher than that of younger children. For this child, increasing the portion size could result in further nutrient coverage.

Figure 16: Comparison of nutrient coverage from the current school meal (before) and adjusted school meal (after)



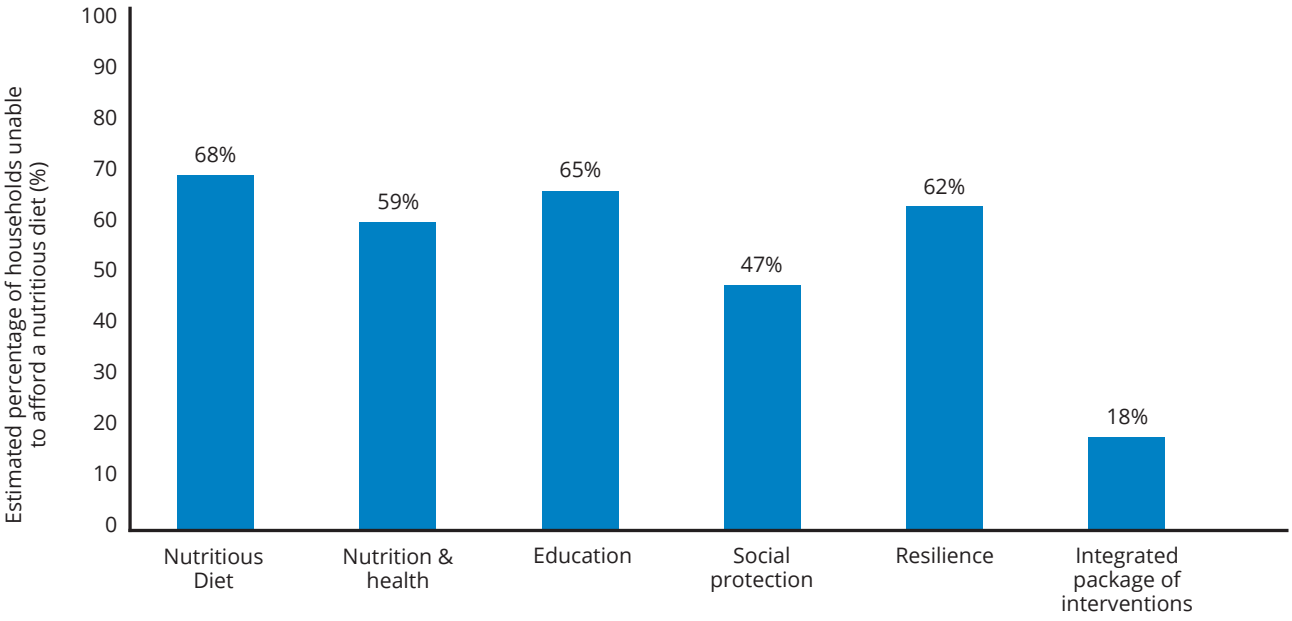
Intervention packages modeled

Improvements in the supply of nutritious foods could result in lower food prices and increased availability. For this to happen, multi-sectoral coordination, investments (funding) and advocacy should be focused on improving local production, expanding value chains to extend the shelf-life of highly nutritious foods, developing regulatory frameworks to control the safety and quality of available foods, and building the technical capacity to support farming, fishing and livestock livelihood-related activities. This should be accompanied by an SBC campaign to raise awareness on the importance of consuming a diverse range of nutritious foods, which could result in increased demand. Social protection interventions targeting vulnerable individuals and households in the form of supplements for women and adolescent girls, school feeding for children, and cash-based transfers could help to ensure that no one is left behind. Two packages of nutrition-specific and nutrition-sensitive interventions were modelled to understand the effect that each could have on household affordability of a nutritious diet, and their combined.

The package of interventions currently being implemented in Guinea-Bissau was modelled to understand the impact that it would have on household non-affordability: IFA supplementation for lactating women and groundnut paste for children 12-23 months and children under 5 (nutrition and health); the current school meal provided to children 10-11 years (education); and the FCFA 10,000 trimestral cash transfer for individuals from vulnerable households provided by the Projeto de Redes Sociais e Serviços de Base (social protection). Individually, the estimated percentage of households unable to afford a nutritious diet could be reduced from 68 percent to 64 percent with the nutrition and health interventions, to 67 percent with the education intervention and to 47 percent with the social protection intervention. The package of combined interventions could reduce household non-affordability to 40 percent.

As poverty and non-affordability is so high in Guinea-Bissau, a second package was modelled to see how a more integrated package of targeted interventions could better meet needs. Figure 17 shows the potential impact of an integrated resilience package: IFA supplementation for adolescent girls, MMT supplementation for pregnant or lactating women and MNP for children 12-23 months and children 4-5 years (nutrition and health); an improved school meal for children 10-11 years (education); and the same cash transfer for individuals from vulnerable households (social protection). As calcium was found to be an important limiting nutrient, a dried fish intervention was selected for the resilience package. The estimated percentage of households unable to afford a nutritious diet could be reduced from 68 to 18 percent with the integrated package, demonstrating the significant impact that could be achieved through multi-sectoral collaboration implementing interventions targeted towards vulnerable individuals and specific limiting nutrients.

Figure 17: Comparison of nutrient coverage from the current school meal (before) and adjusted school meal (after)



Recommendations

FNG Recommendations for Agriculture, Fisheries & Livestock		
Recommendations		Sector links
Governance	Scaling Up Nutrition working group to disseminate the FNG results, recommendations, and roadmap to stakeholders from Agriculture, Fisheries & Livestock.	SUN, SISSAN, ANFA, RESSAN, CONSAN
Regulation & policy framework	Develop a market regulation framework to control prices of local vs. imported food products to incentivize purchase of locally nutritious foods; Monitoring of price fluctuations by the local government.	Commerce, National Institute of Statistics
	Review the fishing policy to build and protect the domestic fishing industry; develop a regulatory framework to support the domestic value chain to ensure adequate supply in national & regional markets.	Fisheries
	Develop a regulatory framework on adequate use of agricultural inputs.	Commerce
	Inform and support design of 'Lei de Terra' (land use policy) to ensure that vulnerable agricultural households have access to arable land to increase the production of local nutritious food and household income.	Agriculture, Social Protection
	Allocate dedicated land to improve access to grazing areas for livestock.	Livestock
Programme & interventions	Implement programmes to support the diversification of local nutritious foods production (community and household level).	Government, Commerce
	Implement nutrition smart agriculture programmes through women farmer's associations.	Government, Commerce
	Develop a national seed bank to support the exchange of seeds adapted to local climate conditions to reduce small holder farmers dependence on international seed markets.	Agriculture, Private sector
	Rehabilitate the mangroves with natural materials (by-products of cashew, cow, and pig bark, etc.).	Agriculture
	Support development of fishponds (aquaculture), home gardens, livestock breeding of small ruminants & poultry at the community level.	Agriculture, Fisheries, Livestock
Capacity building	Strengthen capacity of Agricultural Technicians to support smallholders, community, and schools to produce nutritious foods.	Education, Private Sector
	Train community leaders on adequate use of mangroves and consumption local nutritious foods.	Agriculture, Health
	Strengthen and energize partnerships with local NGOs to incorporate nutrition messages into their community development activities to promote consumptions of healthy diets.	Health
	Empower women through farmers' associations to access, own land and use improved agricultural techniques adapted to climate change.	Social protection
	Strengthen capacity of artisanal fishers on improved fishing techniques, processing, and access to markets.	Fisheries
	Build capacity of women producers through local farmer's associations.	Agriculture
Advocacy	Advocate for infrastructure and transportation sectors to develop, improve and maintain the structures that supply nutritious foods.	Infrastructure, Transportation
	Advocate to increase investment in local fish processing industry to increase the local supply of fish to improve nutrient intake, especially of calcium.	Fisheries, Finance
Social behaviour change	Launch an SBC campaign to raise awareness on the importance of consumption of locally available nutritious foods and agroecological products when possible.	Health, Social protection
	Sensitize community leaders, producers, and farmers' associations to promote community, home, and school gardens to increase the availability of local nutritious foods.	Agriculture, Education
	Promote use of improved agroecological and horticultural production techniques in appropriate languages through local radio spots.	Agriculture, Media
	Sensitization of the community on the importance of the reforestation of palm tree fields and proper utilization of mangroves.	Agriculture

Finance & budgets	Ensure adequate investment for successful transition to a modernized and mechanized national agriculture system.	Agriculture, Industry
	Provide financial support or facilitate access to micro-credits for women farmer's associations to improve access to inputs.	Government
	Provide financial support or facilitate access to micro-credits for artisanal fisherman to further develop local fishing value chain and increase domestic supply of fish in markets.	Government
	Increase the budget allocation of agriculture in the general state budget (OGE). Comply with recommendation to allocate 10% of GDP to agriculture as declared in Malabo in 2014.	Government

FNG Recommendations for Health and Nutrition		
Recommendations		Sector links
Governance	Integrate the FNG road map into the Scaling Up Nutrition movement's multisectoral working group road map and disseminate the FNG results and recommendations jointly with Health and Nutrition stakeholders.	SUN
Regulation & policy framework	Use the FNG results to inform the next Multisectoral Nutrition Policy and Strategic Plan.	Government
Programme & interventions	Increase the number of health centres (and mothers centres) to facilitate access to pre- and post-natal care for pregnant women or implementation of mobile clinics to access remote areas.	Health
	Increase the number of community management of acute malnutrition (CMAM) rehabilitation centres within existing health centres.	Health
	Implement national iron and folic acid supplementation programmes for women and adolescent girls.	Health
	Ensure adequate supply of specialized nutritious and ready to use supplementary foods, equipment (MUAC, scales) and health kits in health centres.	Health
	Implement vitamin A supplementation programme for children under 5 years, pregnant and lactating women.	Health
	Develop recipe for enriched peanut paste using locally available nutritious foods. Provide to children U5 at community level.	Agriculture, Private sector
	Provide adequate in-kind assistance to support pregnant and lactating women to ensure adequate nutrient coverage.	Social protection
Capacity building	Strengthen capacity of caregivers on preparation of nutritious recipes using local foods to improve complementary feeding practices.	Health
	Strengthen capacity of health workers to deliver recommendations on adequate feeding practices and optimal nutrition.	Social Protection
	Ensure presence of one trained Nutritionist in each health centre.	Health
Advocacy	Raise awareness for implementation of programmes supporting TB/HIV clients.	Health
	Use FNG results to advocate for increased donor funding to supply health centres with adequate supplies for vulnerable groups.	Health
Social behaviour change	Develop an SBC campaign to raise awareness on the importance of IYCF practices and consumption of local nutritious foods.	Health, Media
	Broadcast nutrition messages for pregnant and lactating women, children U5, adolescents and PLHIV on local radio/TV spots.	Media
Finance & budgets	Increase sufficient funding for the health sector in the state general budget (OGE).	Government

FNG Recommendations for Social Protection and Gender		
Recommendations		Sector links
Governance	Transition current cash transfer programme to the Ministry of Families and Solidarities through a national social protection system to create an adequate social safety net for the most vulnerable households.	Ministry of Women, Family & Social Solidarity
	Coordinate social protection assistance with stakeholders to increase consistency of intervention packages.	Ministry of Women, Family& Social Solidarity
Regulation & policy framework	Use FNG results to inform design of a national social protection policy to ensure adequate and timely support to the most vulnerable.	Agriculture, Education, Women & Child's Institute, Health
	Design and implement national social protection plan based on the social protection policy to support most vulnerable individuals.	Health, IMC

Programme & interventions	Census mapping of most vulnerable individuals to understand the scope of the social protection needs.	National Institute of Statistics
	Create a database to register vulnerable individuals and monitor their support through a social safety net programme.	National Institute of Statistics
	Increase the transfer duration (period), selection criteria and expand the catchment areas of CBT programmes based to improve coverage.	Government
	Use social protection platforms as a mechanism to empower women.	Government
	Identify most appropriate interventions required to ensure that the nutrition needs of the most vulnerable are covered.	Health, Women & Child's Institute
Capacity building	Continue to provide technical assistance to the government to develop a social protection system.	UN agencies, Government
Advocacy	Advocate to telecommunication companies for national mobile phone network coverage to enable money transfer services to deliver cash transfers through mobile money in remote areas.	Infrastructure
Social behaviour change	Develop an SBC campaign to raise awareness on nutrition for vulnerable groups to create demand for nutritious foods to meet needs.	Health
	Raise beneficiary awareness on the adequate use of cash transfers to ensure overall improvement on diet quality.	Government
Finance & budgets	Create and allocate a budget to support development of social protection assistance in general state budget (OGE).	Government
	Create an emergency fund to support vulnerable populations /individuals affected by natural disasters (floods, wildfire, droughts).	Government
	Continue to provide resources to support the government to develop a social protection system.	UN Agencies, Government

FNG Recommendations for Private sector		
Recommendations		Sector links
Regulation & policy framework	Create a national food quality and safety laboratory to implement ECOWAS standards for regular quality control and certification of nutritious foods, fortified and processed foods (iodized salt, oil, etc.).	Health, Commerce
	Conduct feasibility study of community-level milling facilities for production of fortified staple foods.	Health, Infrastructure
	Develop a regulatory framework and national specifications (minimum nutrient requirements) for fortified products (rice, oil, wheat flour).	National Alliance for Food Fortification
Programme & interventions	Implement mandatory fortification of vegetable oil with vitamin A.	National Alliance for Food Fortification
	Improve lean season food availability and reduce waste by processing cashew and mango by-products.	Agriculture
	Develop and strengthen local value chain to improve the food environment (availability of animal-source foods, vegetables, fruits).	Agriculture
	Provide equipment to the National Alliance for Food Fortification to ensure that fortified foods meet fortification standards.	Infrastructure
Capacity building	Strengthen community level knowledge in processing nutritious foods to extend their shelf-life (drying, smoking, pickling, etc.).	Agriculture, Fisheries
	Strengthen technical capacity of smallholder farmers, artisanal fishers, and livestock producers through trainings to improve access to local markets (to ensure minimum quality standards).	Agriculture, Fisheries, Livestock
Advocacy	Incentivize private sector to increase use nutritious foods and by-products to develop local value chain and improve food environment.	Health, Commerce
Social behaviour change	Develop marketing campaign to promote the consumption of local processed nutritious foods.	Commerce
Finance & budgets	Provide financial support to the National Alliance for Food Fortification to implement ECOWAS standards on food safety and quality control.	Government

FNG Recommendations for Education		
Recommendations		Sector links
Governance	Scaling Up Nutrition working group to disseminate the FNG results, recommendations, and roadmap to stakeholders in Education sector.	SUN
	Reactivate the multi-sectorial commission for school canteen management published in the official bulletin n.21.	Education
Regulation & policy framework	Extend school feeding programme to all schools and all age groups and transition to home-grown school feeding programme.	Education
	Develop national food-based dietary guidelines for the school feeding programme to support the design of recipes using local foods.	Health
	Establish minimum standards for local purchasing of nutritious foods and implement regulatory framework on food safety and quality control.	Agriculture, Education, Health, Commerce
Programme & interventions	Standardize the national school curriculum, including nutrition education, healthy diets and school gardens.	Government
	Implement mandatory school gardens using nutrition smart agriculture (climate resilient crops) as part of the project and tailor the production of crops according to childrens' nutrient needs as identified in the FNG.	Agriculture, Health
	Ensure that all schools have access to safe drinking water and WASH services with integrated regular monitoring.	Health, UNICEF, Education
	Reactivate boarding schools for children from most vulnerable households to ensure school attendance and adequate consumption of nutritious meals (3 meals every day of the week).	Government
	Ensure timely supply of local nutritious foods to school canteens.	Agriculture
	Tailor school meal portion sizes to age groups to ensure adequate nutrient intake.	Health
Capacity building	Build capacity of food preparers on food management best practices.	Health, Education
	Train school feeding actors (council, directors, managers, cooks, teachers, parents) on food quality and safety, nutrition & WASH.	Health, Education
	Deliver trainings for education staff to identify malnourished children.	Health
Advocacy	Advocate to include adolescent girls in the school feeding programme.	Government
	Advocate for hiring qualified teachers and school directors.	Government
Social behaviour change	Raise community awareness on the importance of actively engaging and participating in the school feeding programme.	Agriculture
	Raise community awareness on healthy eating practices and the importance of dietary diversity for school children and adolescent girls.	Health
	Create radio and/or television spots promoting the importance of children enrolling and staying in school.	Media
Finance & budgets	Strengthen donor fund mobilization to expand the school feeding programme to all schools and all children using the FNG results.	Government, Donors
	Increase budget allocated to the purchase and inclusion of fresh, local foods in home-grown school feeding programmes.	Government
	Increase the value of education in the general state budget (OGE).	Government

FNG Recommendations for Infrastructure, Energy & Commerce		
Recommendations		Sector links
Governance	Scaling Up Nutrition working group to disseminate the FNG results, recommendations, and roadmap to stakeholders in the Infrastructure, Energy and Commerce sectors.	SUN, Energy, Infrastructure, Commerce
Regulation & policy framework	Identify incentives (laws, subsidies, exemptions) for the production, processing and trade of nutritious foods and adjust the regulatory framework to support incentives.	Agriculture, Fisheries, Transport
Programme & interventions	Implement infrastructure and energy investment plans and prioritise the supply of nutritious foods: cold storage in the supply chain, regional agricultural centres to deliver technical support to farmers; community agricultural centres for processing and storage of nutritious foods.	Agriculture, Transportation, Energy, Infrastructure
	In rural areas, improve and maintain access roads to increase the supply of nutritious foods.	Transport
	Construct wells to provide clean water and WASH services to households (home gardens) and health centres.	Agriculture, WASH
	Rehabilitate infrastructure for schools and agricultural production centres; ensure structures are accessible for people with disabilities.	Agriculture, Education
Capacity building	Strengthen community capacity to use and maintain small-scale processing units.	Private sector, Fisheries, Agriculture
Social behaviour change	Sign an agreement with telecommunication companies and radios to support SBC activities.	Health, Social Protection
Finance & budgets	Prioritize investment in development of structural systems to improve the supply of nutritious foods.	Government

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Acronyms

ART	Anti-retroviral treatment
BF	Breastfeeding
CBT	Cash-based transfer
COHA	Cost of Hunger in Africa
CotD	Cost of the Diet
CPI	Consumer Price Index
ECOWAS	Economic Community of West African States
EO	Energy-only diet
FAO	Food and Agricultural Organization of the United Nations
FCFA	West African Franc
GDP	Gross domestic product
IFA	Iron and folic acid
IFPRI	International Food Policy Research Institute
LNS-MQ	Lipid-based nutrient supplement, medium quantity
MAD	Minimum acceptable diet
MDD	Minimum dietary diversity
MICS	Multiple Indicator Cluster Survey
MMF	Minimum meal frequency
MNP	Micronutrient powder
MMT	Multiple-micronutrient tablet
NIS	National Institute of Statistics
NUT	Nutritious diet
NGO	Non-governmental organisation
PLHIV	Person living with HIV
PPP	Purchasing power parity
PRSSB	Projeto de Redes Sociais e Serviços de Base
SAN	Systems Analysis for Nutrition
SBC	Social behaviour change
SiSSAN	Sistema de Seguimento da Segurança Alimentar e Nutricional/Food and Nutrition Security Monitoring System
SOWC	State of the World's Children
SUN	Scaling Up Nutrition
UNICEF	United Nations Children's Fund
WFP	United Nations World Food Programme
WHO	World Health Organization
ZHR	Survey on coping strategies in the urban environment

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