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Food and nutrition security in Sierra Leone with a focus on fish in Tonkolili District



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Food and nutrition security in Sierra Leone with a focus on fish in Tonkolili District

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List of abbreviations

ACF	Action Contre La Faim
AIDS	acquired immune deficiency syndrome
BMI	body mass index
CAFOD	Catholic Agency For Overseas Development
cm	centimeter(s)
CRS	Catholic Relief Services
DFID	United Kingdom Department for International Development
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FEWS NET	Famine Early Warning System Network
FGM	female genital mutilation
g	gram(s)
GDP	gross domestic product
HIV	human immunodeficiency virus
HKI	Helen Keller International
IFAD	International Fund for Agricultural Development
IMC	International Medical Corps
kg	kilogram(s)
L	liter(s)
m ²	meter(s) squared
µg	microgram(s)
NaCSA	National Commission for Social Action
NGO	nongovernmental organization
SCP	Smallholder Commercialization Programme
SLL	Sierra Leonean leone (in 2015, SLL 4355 = USD 1)
SNAP	Sustainable Nutrition and Agriculture Promotion
SPRING	Strengthening Partnerships, Results, and Innovations in Nutrition Globally
SUN	Scaling Up Nutrition
UIC	urinary iodine concentration
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USD	United States dollar
WHH	Welt Hunger Hilfe
WHO	World Health Organization
WFP	World Food Programme

Definitions and terms

1000 days:

The period of time from the onset of pregnancy to a child's second birthday, which is considered the window of opportunity to positively impact the child's growth, development and cognition.

Acute malnutrition:

Also known as wasting, acute malnutrition is characterized by a rapid deterioration in nutritional status over a short period of time. In children, it is measured using the weight-for-height nutritional index or mid-upper arm circumference. There are two different levels of severity of acute malnutrition: moderate acute malnutrition and severe acute malnutrition.

Anemia:

Characterized by reduction in hemoglobin levels or red blood cells, which impairs the ability to supply oxygen to the body's tissues, anemia is caused by inadequate intake and/or poor absorption of iron, folate, vitamin B12 and other nutrients. It is also caused by infectious diseases such as malaria, hookworm infestation and schistosomiasis, as well as genetic diseases. Women and children are high-risk populations. Clinical signs include fatigue, pallor (paleness), breathlessness and headaches.

Body mass index (BMI):

Defined as an individual's body mass in kilograms (kg) divided by height in meters squared (m^2). Acute malnutrition in adults is measured by using BMI.

Chronic malnutrition:

Chronic malnutrition, also known as stunting, is a form of growth failure that develops over a long period of time. Inadequate nutrition over long periods of time (including poor maternal nutrition and poor infant and young child feeding practices) and/or repeated infections can lead to stunting. In children, it is measured using the height-for-age nutritional index.

Complementary feeding:

The use of age-appropriate, adequate and safe solid or semisolid food in addition to breastmilk or a breastmilk substitute. The process starts when breastmilk or infant formula alone is no longer sufficient to meet the nutritional requirements of an infant. It is not recommended to provide any solid, semisolid or soft foods to children less than 6 months of age. The target range for complementary feeding is generally considered to be 6–23 months of age.

Early initiation of breastfeeding:

Breastfeeding within 1 hour of birth.

Early warning system:

An information system designed to monitor indicators that may predict or forewarn of impending food shortages, worsening of the nutritional situation or famine.

Exclusive breastfeeding:

An infant receives only breastmilk and no other liquids or solids, not even water, with the exception of oral rehydration salts or drops or syrups consisting of vitamins, mineral supplements or medicine. The United Nations Children's Fund (UNICEF) recommends exclusive breastfeeding for infants aged 0–6 months of age.

Food fortification:

The addition of micronutrients to a food during or after processing to amounts greater than were present in the original food product. This is also known as enrichment.

Food and nutrition security:

Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life, as defined by the 2012 Committee on World Food Security.

Food security:

Food security exists when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life, as defined by the 1996 World Food Summit.

Infant mortality:

Probability of dying between birth and exactly 1 year of age, expressed per 1000 live births.

Infant and young child feeding:

Term used to describe the feeding of infants (less than 12 months old) and young children (12–23 months old). Infant and young child feeding programs focus on the protection, promotion and support of exclusive breastfeeding for the first 6 months of life, on timely introduction of complementary feeding from 6 months of age, and continued breastfeeding for 2 years or beyond.

Low birthweight:

A birthweight of less than 2.5 kg.

Malnutrition:

People are malnourished if their diet does not provide sufficient nutrients for growth and maintenance or if they are unable to fully utilize the food they eat due to illness (undernutrition). They are also malnourished if they consume too much energy in relation to energy expenditure (overnutrition).

Maternal mortality:

The probability of dying while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Micronutrients:

Essential vitamins and minerals required by the body in miniscule amounts throughout the life cycle.

Minimum acceptable diet:

Proportion of children aged 6–23 months who receive a minimum acceptable diet (apart from breastmilk). It is a composite indicator that is calculated from two fractions: (1) the proportion of breastfed children 6–23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day, and (2) the proportion of non-breastfed children 6–23 months of age who received at least two milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day.

Minimum dietary diversity:

Proportion of children aged 6–23 months who receive foods from four or more food groups.

Minimum meal frequency:

Proportion of breastfed and non-breastfed children aged 6–23 months, who receive solid, semisolid or soft foods (and milk feeds for non-breastfed children) the minimum recommended number of times or more.

Nutritional status:

The growth or micronutrient status of an individual.

Obesity:

A person with a BMI of 30 or more is considered obese.

Overweight:

A person with a BMI of 25 or more is considered overweight.

Standard fish length:

The measurement of a fish from the most anterior point of the body (the tip of the snout) to the caudal peduncle (the narrow part of the body between the posterior ends of the dorsal and anal fins and the base of the tail fin).

Supplementation (micronutrient):

Provision of micronutrients via a tablet, capsule, syrup or powder.

Total fish length:

The length of the whole body of a fish, from the most anterior point of the body to the most posterior point, in a straight line, not over the curve of the body.

Under-five mortality:

Probability of dying between birth and exactly 5 years of age, expressed per 1000 live births.

Underweight:

Wasting, stunting or a combination of both, measured through the weight-for-age nutritional index.

Executive summary

Sierra Leone, located on the west coast of Africa, has a population of 6.3 million, with an annual growth rate of 2.2%. With a Human Development Index of 0.413, Sierra Leone's level of development is below the average for countries in the low human development group, as well as below the average for countries in sub-Saharan Africa. Although the country has substantial natural resources and is committed to attaining middle-income status, the institutional damage caused by the 10-year civil war and the Ebola virus disease outbreak in 2014 have constrained social and economic development.

Food insecurity and malnutrition are national concerns, as almost a quarter of the population is undernourished. Poor food availability, access and utilization contribute to undernourishment. The subsistence nature of the agricultural sector, poor dietary diversity and seasonal periods of hunger impact the food security and nutritional status of the population. Recognizing the need to improve food and nutrition security in the country, the Government of Sierra Leone joined the Scaling Up Nutrition (SUN) movement in 2012 to better coordinate multisectoral nutrition interventions. A multisectoral coordination group commenced the development of the 2013–2017 National Food and Nutrition Security Implementation Plan to design and operationalize efforts to scale up nutrition strategies.

Fish is an important part of the Sierra Leonean diet, so increasing fish production—and thus its availability and consumption—may help reduce malnutrition. Fish contains a significant quantity of micronutrients, essential fatty acids and animal protein and is a valuable food to improve diets that lack essential vitamins and minerals. The consumption of fish is particularly important during the first 1000 days of life (from the onset of pregnancy to a child's second birthday), as the fatty acids it provides promote optimal brain and neurological development. The fisheries sector, which is composed of artisanal, inland and industrial fishing, has significant growth potential in Sierra Leone. Growth in the fisheries sector would create opportunities to improve food and nutrition security and increase employment and income generation.

This report is a literature review on food and nutrition security in Sierra Leone, based on data collected by the Sierra Leone Statistics Office, government ministries and international and national organizations working in Sierra Leone. It describes the current food and nutrition situation in Sierra Leone for the purpose of planning and implementing interventions aimed at improving food and nutrition security, especially within aquatic agricultural systems, through fisheries production systems. The review provides a country overview, with an emphasis on Tonkolili District, which is the focal district selected for the USAID Feed the Future Sierra Leone Agriculture project. Tonkolili produces the most fish of all the districts, and in 2013 it was identified by the Comprehensive Aquaculture Baseline Study for Sierra Leone as the most suitable area for promotion of integrated rice-fish farming. Developing 2% of the inland valley swamp in Tonkolili with rice-fish farms is estimated to lead to 177 modified rice fields, covering 1060 hectares, with a total production of 318 metric tons of fish per year. This development is estimated to improve the food security of 32,000 people.

Methodology

Preparation of this review of food and nutrition security in Sierra Leone began in August 2015. Data collection and analysis were done in two parts. The first part consisted of a desk review and analysis of reports, publications and data available online through UN agencies, the Demographic and Health Surveys, CGIAR centers and academic journals. The second part involved secondary data collection and analysis through consultations with partners in Freetown, Makeni and Magburaka, Sierra Leone. These partners included government ministries, the Sierra Leone Statistics Office, UN agencies, international nongovernmental organizations (NGOs), local NGOs and donors. Information was collected on food and nutrition security in Sierra Leone, as well as on the programs, interventions and strategies of relevant partners. Focus was placed on Tonkolili District, as this is the focal district of the USAID Feed the Future Sierra Leone Agriculture project. Following the completion of data collection, analysis and compilation of the first draft was done by the first author, and feedback, revisions and finalization of the report were done by all authors.

Key learning on fish and nutrition in Sierra Leone

- Fish is a unique animal-source food, as it is rich in multiple essential nutrients.
- Fish is the most commonly consumed animal-source food in Sierra Leone.
- Sierra Leone has great potential to develop fish production because of its abundant water resources.
- The promotion of fish production would lead to improved food and nutrition security through increased fish consumption, income generation and livelihood opportunities, especially for women.
- The potential to develop rice-fish farming and aquaculture is particularly high in Tonkolili District, where over 40% of children under 5 years of age are stunted.
- Infant and young child feeding practices in Sierra Leone are poor, and only a small proportion of children receive animal-source foods during complementary feeding.

Key knowledge gaps

The following gaps must be considered in further research and in the design of implementation approaches:

- micronutrient deficiencies and micronutrient intake among women and children
- consumption patterns, particularly of fish, other aquatic animals and nutrient-rich vegetables, among different population groups
- food beliefs and any changing attitudes concerning these beliefs
- intrahousehold allocation of fish
- the role of fish in complementary feeding and in the diets of children
- processing and preparation of fish for consumption, particularly with respect to hygienic conditions and food safety
- potential to utilize discarded fish products
- fish species, especially small indigenous fish, present in inland water bodies
- seasonality, particularly of inland fishing, food crops grown in inland valley swamps, and food shortages in Tonkolili District.

Introduction

Sierra Leone is located on the west coast of Africa and shares borders with Guinea and Liberia. The country is divided into four provinces: Northern, Southern, Eastern and Western. These four provinces are divided into 14 districts, which are subdivided into 149 chiefdoms (Statistics Sierra Leone and ICF International 2014). The capital, Freetown, is located in Western Urban District, Western Province. The population was estimated at 6.3 million in 2014, with an annual growth rate of 2.2% (World Bank 2014d, 2014e). There are over 20 ethnic groups in Sierra Leone and more than 24 languages. The major ethnic groups are Temne, Mende, Limba, Kono, Creole, Mandingo and Loko (Statistics Sierra Leone and ICF International 2014). Seventy-eight percent of the population is Muslim and 21% is Christian (Assessment Capacities Project 2014).

In 2002, Sierra Leone emerged from a 10-year civil war that resulted in the displacement of about a third of the population. Although the country has considerable mineral, agricultural and fishery resources, it is still recovering from the institutional damage caused by the civil war. The Ebola outbreak in 2014 caused additional constraints on social and economic development, hindering the government's national plan to reach middle-income status (CIA 2015).

Poverty is pervasive in Sierra Leone, with 52% of the population living on less than USD 1.90 a day (World Bank 2011b). With a Human Development Index of 0.413, Sierra Leone ranks 181 out of 188 countries, indicating that the country's level of development is below the average for countries in the low human development group, as well as below the average for countries in sub-Saharan Africa (UNDP 2014a).



Source: DPKO 2004.

Figure 1. Map of Sierra Leone.

Twenty-two percent of the population is undernourished, indicating that about a quarter of the population consumes less food than the amount needed to meet their dietary energy needs.

As such, food insecurity and malnutrition are national concerns. Poor distribution, access, availability and utilization of food, as well as unexpected shocks to the agricultural sector, contribute to undernourishment in Sierra Leone (Larbi 2012). The subsistence nature of the agricultural sector, the country's dependence on rice and poor dietary patterns negatively impact the food security and nutritional status of households. Although the prevalence of child malnutrition decreased between 2008 and 2014, almost 30% of children under 5 years of age are stunted (MOHS and UNICEF 2014).

Sierra Leone has significant growth potential in aquaculture and the fisheries sector, which includes artisanal, inland and industrial capture fisheries (Larbi 2012). Properly developing the fisheries sector would create opportunities for employment and income generation, particularly among rural households. Fish and rice integration in inland valley swamp systems has been shown to have similar potential (FAO 2008). Fish is an important part of the Sierra Leonean diet, so increasing fish production can lead to increased intake and improved nutrition, especially among food-insecure households. Fish, which is rich in micronutrients, essential fatty acids and animal protein, is highly nutritious. It is unique from other animal-source foods because of the high quantities of multiple nutrients that it contains. Fish is therefore a valuable food to improve diets that lack essential vitamins and minerals. The consumption of fish is particularly important during pregnancy and the first 2 years of a child's life, as the long-chain omega-3 fatty acids that it provides promote optimal brain and neural system development (FAO 2014).

Population	6.3 million
Rural (%)	62.2
Female:male ratio	1.05
Population growth rate (%)	2.2
Average household size	5.6
Literacy rate (%) women	35
Literacy rate (%) men	57
Poverty rate (%)	52.3
Total fertility rate	4.7
Adolescent fertility rate*	120
Life expectancy at birth (years)	46
Income distribution (Gini index)	34.0

*Births per 1000 women aged 15–19 years

Table 1. National statistics for Sierra Leone (World Bank 2011a, 2011b, 2013a, 2013b, 2014a, 2014d, 2014e; Statistics Sierra Leone and ICF International 2014; WHO 2015a).

Food and nutrition security

Food insecurity, a situation in which people lack secure access to sufficient amounts of safe and nutritious food, is a major cause of poor nutritional status. A high prevalence of undernourishment indicates that a large proportion of the population is not consuming sufficient food to meet dietary energy requirements. Although 22% of the population in Sierra Leone is undernourished, the prevalence of undernourishment has been decreasing since 1991, while the adequacy of average dietary energy supply has been increasing (Figure 2; FAO et al. 2015; FAOSTAT 2015).

Yet, among West African countries, Sierra Leone scores the poorest on the Global Hunger Index, a combined measure of undernourishment, wasting, stunting and under-five mortality, with a value of 38.9 (von Grebmer et al. 2015). Furthermore, food insecurity is unevenly distributed across the country, especially between rural and urban areas. Data collected between September and October 2015, during which the Ebola outbreak began to subside, indicated that the districts with the highest percentages of food-insecure households were Kailahun (70.5%), Pujehun (68.7%), Kambia (67.3%), Tonkolili (63.9%) and Port Loko (61.4%). In comparison to data collected in 2010, levels of food insecurity in 2015 remained high, notably in Pujehun, Kambia, Tonkolili and Port Loko. While Tonkolili had the highest percentage of households (22.5%) identified as severely food insecure in 2010, that percentage decreased to 14% in 2015. However, Tonkolili still ranks among the districts with the highest percentages of severely food-insecure households (Table 2; WFP 2011; MAFFS et al. 2015).

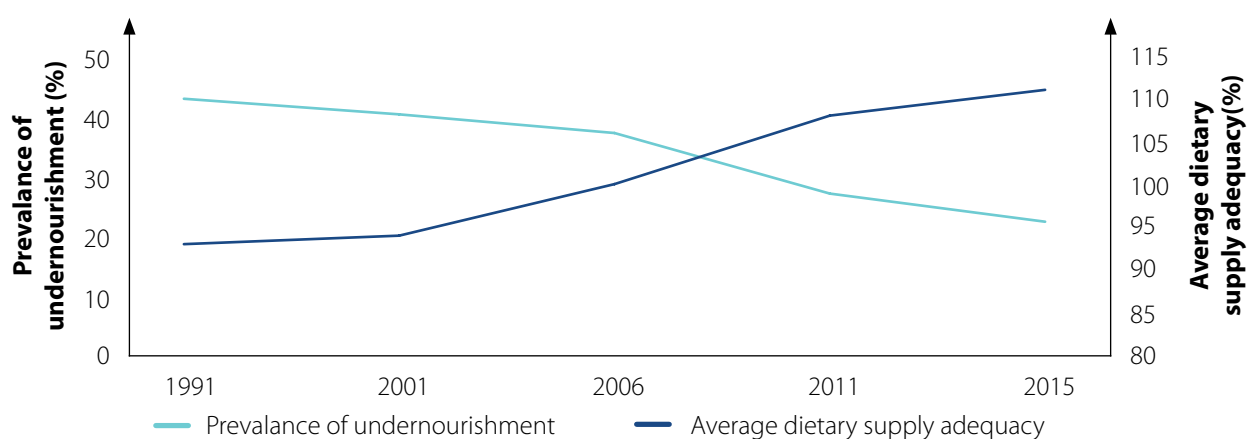
Undernourishment in Sierra Leone is due to a variety of factors, including poor distribution, access, availability and utilization of food at the subnational and household levels (Larbi 2012). Furthermore, unexpected shocks to the agricultural sector increase vulnerability to food insecurity. For example, districts that were first affected by the Ebola outbreak, such as Kailahun and Kenema, showed an increase in food insecurity from 2010 to 2015 (MAFFS et al. 2015).

Food availability

Agriculture production

The agricultural sector in Sierra Leone, which consists of food crops, tree crops, fisheries, livestock and forestry, is considered the backbone of the economy (Larbi 2012). The agricultural sector is responsible for 56% of gross domestic product (GDP; World Bank 2014b). Major food crops include rice, cassava, maize, millet, sorghum, sweet potato and groundnut, which are produced by smallholder farmers with an average land holding of 0.5–2.0 hectares. Rice, which is cultivated by 85% of farmers, is the primary staple crop (Larbi 2012). Cassava, the second-most consumed staple crop, is grown by 77% of agricultural households (WFP 2011). Other crops include palm oil, citrus, cocoa, coffee, coconut and sugar cane.

In contrast to the crops subsector, which makes up 33% of agricultural GDP, livestock contributes 3%. Cattle rearing is concentrated in two districts,



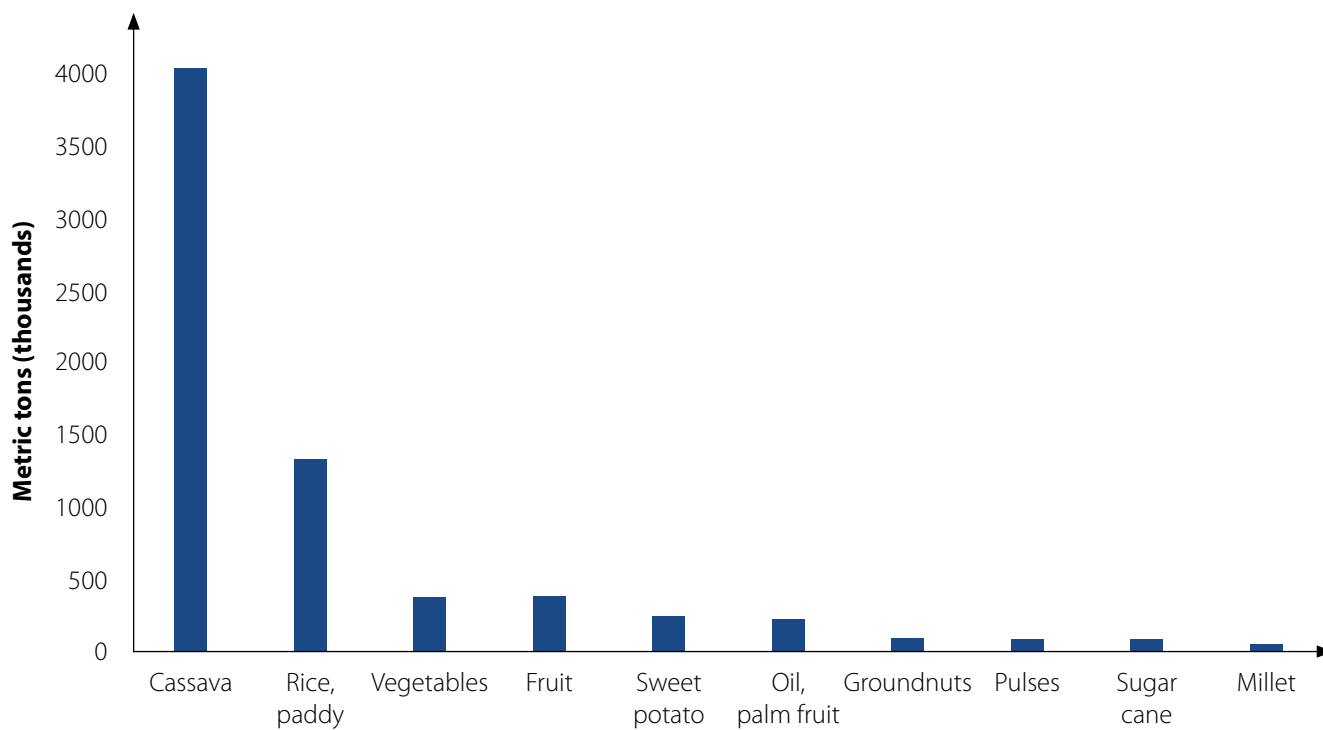
Sources: Sandler 2014; FAOSTAT 2015.

Figure 2. Trends in food security, demonstrated by changes in the prevalence of undernourishment and average dietary energy supply adequacy between 1991 and 2015. Average dietary energy supply adequacy represents dietary energy supply as a percentage of average dietary energy requirements. It exceeds 100% in Sierra Leone.

Koinadugu and Bombali. With an abundance of water resources, Sierra Leone has significant growth potential in the fisheries sector, both capture fisheries and aquaculture (Larbi 2012).

Overall, crop yields have been low due to various constraints on agricultural production. These include limited access to inputs, low levels of mechanization,

crop infestations and disease, poor market access, small land size, low quality of landholdings, labor shortages and a weak private sector (FEWS NET 2010; FAO and WFP 2014). The Ebola outbreak in 2014 created additional constraints on agriculture through quarantine measures and restrictions that led to labor shortages and market closures (FAO and WFP 2014).



Source: FAOSTAT 2013.

Figure 3. National crop production in Sierra Leone by metric tons.

District	Food-insecure households (%)		Severely food-insecure households (%)	
	2015	2010	2015	2010
Kailahun	70.5	21	7.2	3.7
Pujehun	68.7	79.9	18.8	6.8
Kambia	67.3	71	15.4	4.3
Tonkolili	63.9	74.1	14	22.5
Port Loko	61.4	70.6	17.1	5
Bombali	56.5	25.5	7.7	2.1
Kono	56	47.6	9.1	7.9
Kenema	55.1	33.8	9.5	1.9
Bonthe	53	22.7	7.6	1.1
Moyamba	52.2	75.9	7.6	17.9
Koinadugu	51.9	65.7	7.9	13.4
Western Rural	41.6	22	3.6	1.3
Bo	37.1	32	8.1	0.9
Western Urban	12.3	23	0.2	6.3
Sierra Leone	49.8	45	8.6	6.5

Source: WFP 2011; MAFFS et al. 2015.

Table 2. Level of food insecurity by district.

Furthermore, the subsistence nature of the agricultural sector and the country's dependence on rice create instability for the food insecure. The majority of farmers are small-scale cultivators who lack the resources to increase rice production and are often unable to produce enough rice for their own household's consumption (Coalition for African Rice Development 2009). A 2014 food supply and demand balance sheet (Table 3) predicted that Sierra Leone would experience a food deficit in 2015 due to the gap between the amount of cereals produced and utilized nationally (FAO and WFP 2014). In fact, a 2015 Emergency Food Security Assessment found that on average, districts harvested 39% less rice in 2014 than in the previous year. This drop was greatest in Tonkolili, Moyamba, Koinadugu and Bo (WFP 2015b). In order to cover the food deficit, Sierra Leone is reliant on imports, of which rice accounts for the majority of cereal products imported (FAO and WFP 2014). Food imports have also been increasing to satisfy the dietary requirements of a growing population (WFP 2013).

Domestic food supply

The national food supply has been increasing since the end of the civil war in 2002. Cereals and grains (including rice, maize, millet and sorghum) make up almost 50% of the domestic food supply in terms of energy measured in kilocalories per person per day (Figure 4). Rice predominates as the cereal crop most utilized domestically. Roots and tubers (including cassava and sweet potato) and oils (particularly palm oil) each contribute about 14% of the food energy supply. Pulses, nuts and seeds make up 8%, total vegetables and fruit 3%, fish 3%, sugar 2% and meat (including beef, goat and poultry) 2%. The remaining energy supply consists of products such as coffee, cocoa, spices and alcoholic beverages (FAOSTAT 2011). The national food supply provides 56 g of protein and 56 g of fat per capita per day, the majority of which comes from plant-based products (FAOSTAT 2011).

	Rice (milled)	Maize	Sorghum, millet, other	Wheat	Total cereals	Cassava (cereal equivalent)*	Total cereal equivalent
Domestic production	770	38	98	0	907	1,183	2,090
Total utilization	985	66	104	52	1,208	1,183	2,390
Food consumption	791	51	89	44	974	296	1,270
Feed use	0	4	5	0	9	591	600
Seed requirement	43	1	1	0	45	0	45
Postharvest losses and waste	116	6	10	0	131	296	427
Import requirements	215	28	6	52	300	0	300
Anticipated commercial imports for 2015**	200	15	0	30	245	0	245
Uncovered deficit	15	13	6	22	55	0	55

* Cereal equivalent is the unit of measurement used as the alternative to the actual weight of commodities in metric tons for cereal-derived products. Commodity-specific conversion rates are used to convert a product into a cereal equivalent based on energy content (WFP 2015a).

** Anticipated commercial imports are the predicted quantities of rice, wheat and maize to be imported in 2015, as measured in metric tons. While total annual import requirements were estimated to be 300,000 metric tons, based on total utilization in 2015, anticipated annual commercial imports were estimated to be less, at 245,000 metric tons. This was due to the forecasted decrease in GDP growth and cash crop export earnings, which would inhibit the country from importing enough cereal products to meet requirements. The food deficit has historically been met through international food assistance and/or additional budgetary allocation by the government (FAO and WFP 2014).

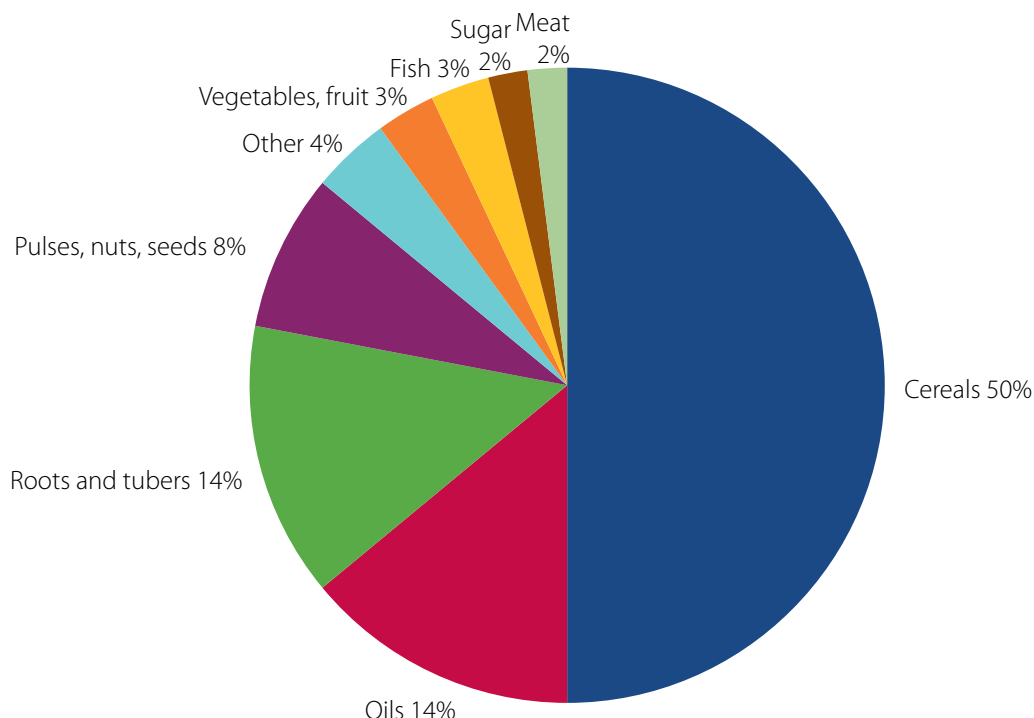
Source: FAO and WFP 2014.

Table 3. 2014 balance sheet for major cereals in Sierra Leone. Crop production is measured in '000 metric tons.

Seasonal trends

The majority of livelihoods in Sierra Leone are based in agriculture, so food insecurity varies with trends in agricultural production (FEWS NET 2010). Seasonal calendars also show that the population experiences a hunger season from June to August, indicating temporal changes in food security. The hunger season coincides

with the months in which rice is less available and households rely on the consumption of cassava (FEWS NET 2010). Rice is less available during July and August because this is the period when planting is undertaken (Statistics Sierra Leone 2014). Figure 5 depicts seasonal changes in climate, hunger and food availability based on the period when food crops are harvested.



Source: FAOSTAT 2011.

Figure 4. Food energy supply in kilocalories per capita per day.

Seasons	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainy												
Dry												
Hunger						*	*	*				
Food crop harvest												
Rice												
Cassava												
Sweet potato												
Yam												
Maize												
Sorghum												
Groundnut												
Millet												
Vegetables												
Fishing (coastal)												
Livestock diseases and pests												
Cash crop marketing												

Sources: FEWS NET 2010, 2015a.

Figure 5. Seasonal trends in the harvest of food crops.

Households experience food shortages throughout the year, as reported in the 2011 Sierra Leone Integrated Household Survey. The percentage of households that experience food shortages each month is shown in Figure 6. In line with Figure 5, Figure 6 shows that grains and flours are limited from June to August due to the shortage of rice. Upland rice is harvested from September to January, and lowland rice from August to January. Upland cassava is harvested from October to January and lowland cassava from June to July. The harvest periods of sweet potato, yam, maize, sorghum, groundnut, millet and vegetables vary slightly, depending on the livelihood zone. (Livelihood zones are defined in the section *Food accessibility*.)

In terms of cereal crops other than rice, maize is scarce in December and January, millet in May, sorghum in July and guinea corn in October. Starchy roots and tubers are particularly scarce from July to September, but cassava is limited in May and April because the change in season from dry to wet makes it difficult to process the crop. Pulses, nuts and seeds are especially scarce in May and June. Households have a shortage of palm oil in September, October, November and December, as the oil is purchased by buyers during the harvest period and then sold at a higher price.

With respect to fruit, banana is scarce in August, orange in May and mango in November. For vegetables, pepper is scarce in February and March, while cassava leaves and potato leaves have low availability in March because the dry season reduces the cultivation of these crops. The high season for coastal fishing is from September to January and

the low season from February to April. Households experience a shortage of fresh fish in July and August, during which the weather and tide level create poor conditions for fishing. Dried and smoked fish is consequently less available in September (Statistics Sierra Leone 2014).

Food accessibility

Livelihood strategies

Livelihood, income and wealth influence a household's ability to access sufficient food and its resilience to shocks. The main livelihood strategies practiced in Sierra Leone are food crop production, petty trade, commercial trade, cash crop production, salaried and skilled labor, unskilled labor, mining, handicrafts, livestock rearing and fishing. The majority of the population practice two or more livelihood strategies (WFP 2011; MAFFS et al. 2015).

Households practicing food crop production, fishing and petty trade have the highest prevalence of food insecurity. This demonstrates that producing food does not guarantee sufficient access to it. For example, before the Ebola outbreak, 65% of households that cultivated rice did not produce enough of it to feed their family and relied on markets at some point during the year (WFP 2011).

In 2010, the Famine Early Warning System Network (FEWS NET) and partners identified 10 food economy livelihood zones that run across the country's 14 districts, as shown in Figures 7 and 8. The livelihood zones are based on the practice of similar activities by households to obtain food and income.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grains and flours	14	13.7	14.4	17.5	21	22.1	22.1	23.3	21.2	18.8	15.3	13.3
Starchy roots, tubers and plantain	9.3	8.1	8.6	10.8	12.6	12.9	13.8	14.6	14.5	13.4	13.1	11.1
Pulses, nuts and seeds	11	10.4	11.3	12.9	14.2	14.3	13.4	12.4	12.8	12.7	11.8	10.4
Fats and oils	4.9	4.1	2.7	2	2.4	3.8	5.1	5.7	6.6	7.3	7.6	7.6
Fruit and fruit juices	13.7	12.4	10.2	9.2	9.6	11.8	15.3	16.7	18	18.3	17.2	16
Vegetables	39.6	44.2	45.2	40.4	33.3	25.5	19.6	15.9	17	20.8	27.2	35
Poultry and poultry products	1.8	1.9	1.6	1.5	1.8	2.1	2.2	2.2	2.9	2.8	3.1	2.2
Meat	1.1	1.1	1	1.1	1.2	1.2	1.1	1	1.3	1.3	1.5	1.4
Fish and shellfish	3.2	2.9	2.9	2.7	2.7	4.3	5.4	6.2	4.3	2.9	2.1	2.1

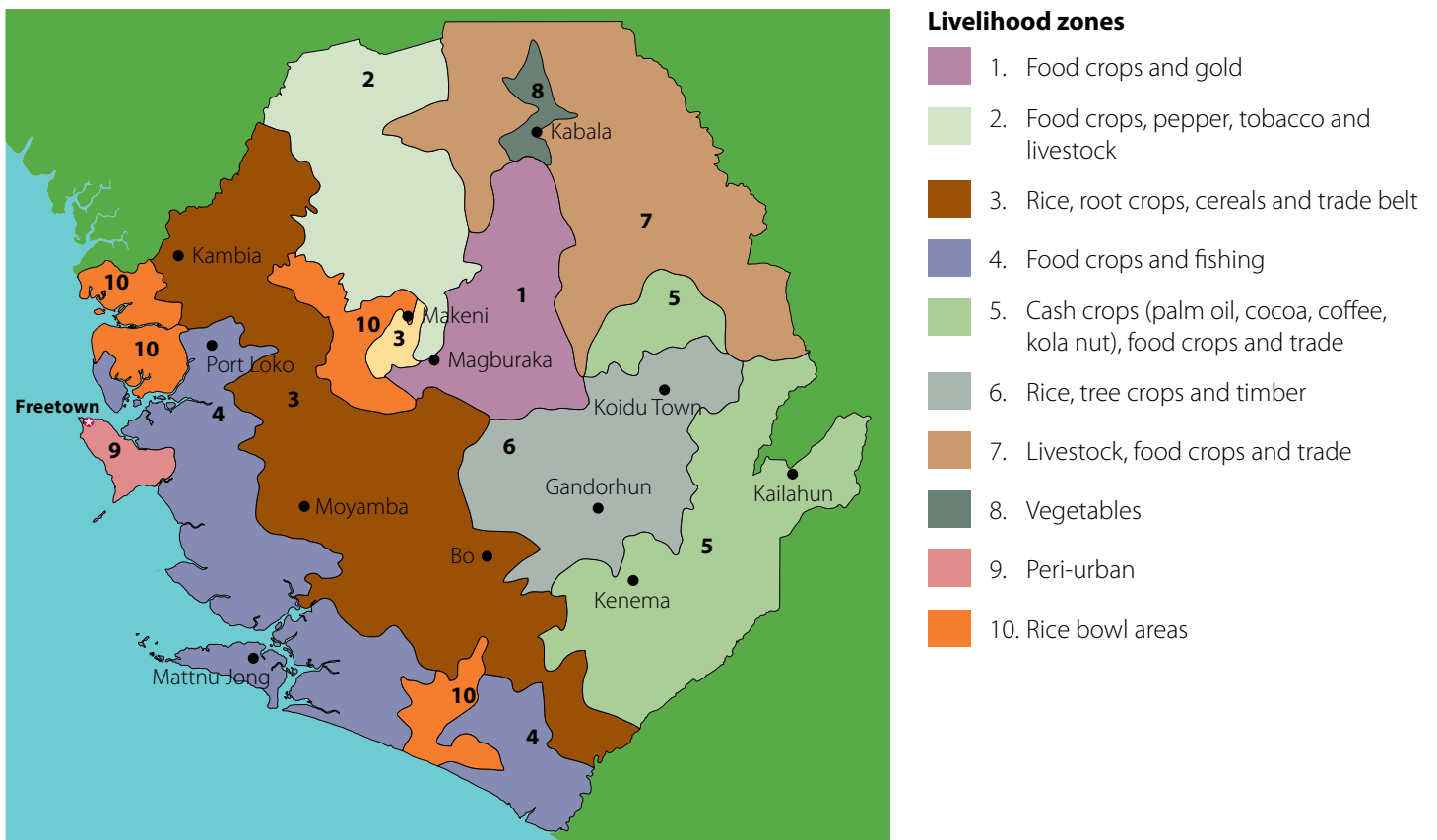
Sources: Statistics Sierra Leone 2014.

Figure 6. Household food shortages (% of households).



Source: Assessment Capacities Project 2014.

Figure 7. Map of Sierra Leone showing the 14 districts.



Source: FEWS NET 2010.

Figure 8. Map of Sierra Leone showing the 10 livelihood zones based on the practice of similar activities by households to obtain food and income.

The first livelihood zone covers a large portion of Tonkolili and one chiefdom in Koinadugu. Households in this region cultivate rice, cassava and other tubers and practice small-scale gold mining as a coping strategy. In the second livelihood zone, which encompasses the northern portion of Bombali, households cultivate both food and cash crops, including cassava and tobacco.

The large-scale production of cassava and tobacco in this zone creates a high demand for wage labor. Zone three, a trade hub for the country, spans Kambia, Port Loko, Moyamba, Tonkolili, Bo and Pujehun. Other livelihood strategies in zone three include inland capture fisheries and food crop production. Coastal fishing and the production of rice, cassava and palm oil are practiced in zone four, which runs along the coast. Zone five covers the southeast region and borders Liberia. As a result, it is an important region for trade. There is also significant production of cash crops such as palm, cocoa, coffee and kola nut.

Rice, tree crops and timber are produced in zone six, where wage labor and mining are additional livelihood strategies. Zone seven, which is located in Koinadugu and Kono, is associated with livestock rearing. This livelihood activity is dominated by the Fulani people, a minority ethnic group. Zone eight in Koinadugu is known for vegetable production. While this area is considered self-sufficient in terms of food production, the poor road infrastructure hinders the competitive advantage of the zone's vegetable production. The population in zone nine, located in Western Area, practices agriculture, petty trade and salaried labor. Zone 10 is known as the rice bowl, as it is distinguished by a heavy concentration of inland rice production. The rice bowl zone is geographically dispersed in Bombali, Tonkolili, Kambia, Port Loko, Bonthe and Pujehun (FEWS NET 2010).

In Tonkolili, where households practice food crop production, small-scale gold mining, inland capture fisheries and trade, about half of the population belongs to the lowest and second-lowest wealth quintiles (Statistics Sierra Leone and ICF International 2014). Tonkolili also had one of the highest percentages of food insecurity (63.9%) and of severe food insecurity (14%) in 2015 (MAFFS et al. 2015). Households that are severely food insecure have a low consumption of a few foods, mainly cereals, oil and some vegetables. These households rarely consume pulses, sugar or fruit and never consume animal-source foods. In contrast, food-insecure households have borderline food consumption, meaning that they

more frequently consume cereals, oil and vegetables in comparison to severely food-insecure households. They also eat some pulses and consume sugar and animal-source foods less than once a week (WFP 2015b).

Market infrastructure

Road networks in Sierra Leone are limited and in need of maintenance and repair. Such poor road infrastructure constrains access to markets and therefore inhibits the potential of households to develop farming systems, increase income generation and improve their nutritional status. Market access has a significant impact on food and nutrition security in Sierra Leone, with about 75% of the population relying on markets as their main source of food, especially during the lean season (WFP 2011). Individuals reach markets by foot, motorbike, motor vehicle and—rarely—bicycle (SNAP 2015).

The market system is comprised of three categories: rural markets or collecting markets, assembly or redistribution markets, and urban consumer markets. There is usually a large number of diverse foods in the permanent urban markets, as well as a large number of sellers and buyers, especially during the lean season (WFP 2013). The ban on periodic markets (trading markets held on one or more days of the week on the same day or days of the week) during the Ebola outbreak reduced access to markets, particularly in sparsely populated areas, thereby contributing to the increasing level of food insecurity (FAO and WFP 2014). The market ban was lifted in August 2015, and markets have resumed their normal functionality (FEWS NET 2015b).

Cost of diets and food prices

Households spend a considerable amount (59%) of total expenditure on food (MAFFS et al. 2015). Per person, the average total monthly expenditure is SLL 89,155 (USD 20)—less than USD 1 per person per day. Severely food-insecure households have the lowest monthly level of expenditure at SLL 56,000 (USD 13) per capita. Given that the cost of a balanced basket of local foods, including rice, dried beans, palm oil, vegetables, fish, cassava flour, groundnuts and fresh cassava, is slightly greater than USD 13 per capita per month, severely food-insecure households struggle to cover their basic food needs (WFP 2015b).

As a result of the reliance on food purchases, any increases or fluctuations in food prices threaten a household's ability to remain food secure (WFP 2011). The consumer price index in Sierra Leone has

increased by over 50% since 2010, reflecting the increased cost to the average consumer of acquiring a basket of goods and services, including food, housing, clothing, transportation, medical care and education. As of 2014, the consumer price index in Sierra Leone was 155.2 (World Bank 2014c). The domestic food price level index, which measures the relative price of food in a country, has also increased since 2010. The current index value of 6.83 for Sierra Leone is greater than the average value for low-income, food-deficit countries (FAOSTAT 2015).

As shown in Figure 9, as food availability is seasonal, so are trends in food prices. During the lean season, the price of local rice increases to up to SLL 4,500 (USD 1.03) per kg in August and then decreases from October to December, which coincides with the main harvest period. The price for cassava also varies by season. Additionally, the lack of storage facilities forces farmers to sell the majority of their harvest immediately, when prices are at their lowest. Later, they are forced to purchase food during the lean season, when prices are at their highest (WFP 2011). Improvements in storage facilities are therefore necessary to stabilize household financial costs and gains from food products.

Consumption patterns and dietary diversity

Food consumption patterns are a reflection of food availability and food access at the household level. The food composition score includes dietary diversity, frequency of consumption of food groups and the relative nutritional importance of the food groups consumed by a household; it is used to determine the household's level of food security (Spencer 2012). Food composition scores broken down into three categories (poor, borderline and acceptable). A household with a poor food composition score has a diet almost exclusively limited to cereals, vegetables and oil and is considered severely food insecure.¹

Throughout 2015, food composition scores were measured in eight districts through the FEWS NET assessments. As shown in Figure 10, on average, households consumed a staple food seven times a week, and oil and vegetables four times a week. The majority of vegetables consumed were leafy greens (MAFFS and ACF 2015). The consumption of fruit was low: once per week. In terms of animal-source foods, households consumed meat or fish three times per week and milk once per week. However, fish was consumed more often than any other flesh food, including poultry, pork, beef and wild game (MAFFS and ACF 2015).



Source: WFP 2015c.

Figure 9. Trend of the price of local rice in Sierra Leone in SLL per kg.

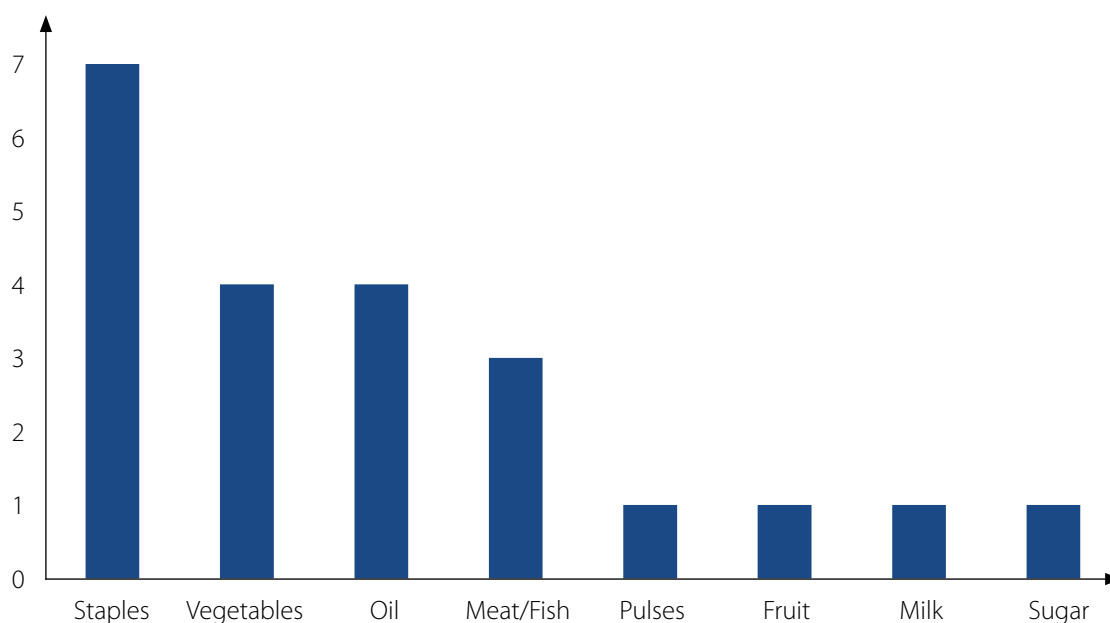
The data reflects that the Sierra Leonean diet is cereal-based with some vegetables and oil and a low intake of fruit and animal-source foods. While the national Household Dietary Diversity Score stands at 4.6, a number of districts, including Tonkolili (4.1), have a score below the national average (MOHS and UNICEF 2014), indicating that dietary diversity varies across the country. Nationally, both adults and children under 5 years of age average 1.9 meals a day, and only 22% of children consume three meals a day (Government of Sierra Leone 2013). Rice dominates as the staple cereal, with an annual consumption of 76 kg per person. Tubers and the leaves of tuber plants are also commonly consumed, as are cassava products such as *gari*, flour and chips (Larbi 2012). Common foods grown in Tonkolili include rice, cassava, sweet potato, pepper, beans, groundnut, *benni* (sesame seed), banana, millet, maize, yam, okra, pineapple, mango, orange, pawpaw, guava, coconut, vegetables, palm oil and sugar cane (SNAP 2015).

It is important to note, particularly in terms of a healthy diet, that there are a number of traditional food beliefs for pregnant women and young children. For example, if a pregnant woman eats eggs, it is believed she will have a miscarriage or her future child will become a thief. The consumption of eggs, as well as that of fish, among pregnant women is considered to cause deformities in the fetus or delay the child's walking. Additionally, meat or fish consumption among pregnant women is believed to cause the mother's stomach to swell after delivery.

For children under 5 years of age, it is believed that the consumption of fish or meat will cause worms. Food beliefs vary depending on local adherences and should be considered before implementing a nutrition intervention (UNICEF 2007). Focusing on production of these foods and complementary behavior change interventions can contribute to improving nutrition. A list of food beliefs is given in Annex 3.

Intrahousehold food allocation

Food is generally not distributed equally among members of a household within either urban or rural areas of the country, which has significant implications for the nutritional status of women and children. Among male-headed households, the male, husband or father is given the largest portion and best selection of food because he is considered the household provider and leader. Food allocation is done according to household status and is not based on the nutritional needs of individuals. The woman, wife or mother who does the cooking decides how the food will be allocated. However, in Koromosila, where CARE had carried out nutrition education initiatives, focus groups discussed situations in which women are given the best or most food, such as if they are breastfeeding or have a heavy workload. Likewise, children are now given more food because they "are [the] future" and "are still growing" (UNICEF 2007). These results indicate the benefits of conducting behavior change and nutrition education interventions in communities.



Source: MAFFS and ACF 2015.

Figure 10. Frequency of consumption of food groups (times per week).



Photo Credit: Success Ibrahim / Sai Kamara / Worldfish

Kadiatu Turay, WorldFish research farmer, on her farm in Mayira community, Kunike Barina chiefdom.

Coping strategies

Households rely on a number of strategies to overcome periods of food insecurity and other household shocks. Shocks include flooding (particularly between June and September), death, illness, unemployment, crop infestation and livestock disease. Before the Ebola outbreak, 83% of households experienced at least one household shock in a year. Such shocks often inhibit a household from securing sufficient food to meet its needs. Commonly employed coping strategies are to consume less preferred and less expensive food, spend savings and borrow money (WFP 2011). Household saving is done through savings accounts or *osusu*, which are cooperative-like institutions that act as traditional banks but are not connected to the formal financial sector. The majority of households that have savings accounts are in Western Urban Area, while households

in the other provinces primarily participate in *osusu* (Statistics Sierra Leone 2014). Other coping strategies are listed in Table 4.

Borrowing money is very common in Sierra Leone, with more than half of households borrowing money within a year. The main sources of credit are relatives and friends, local lenders and cooperatives. Only 2% of households reported using a bank as a source of credit. Repayment is often a problem, with 30% of households unable to repay the full amount borrowed (WFP 2011). Currently, a number of organizations, such as BRAC, Oxfam, CARE, Action Contre La Faim (ACF) and the National Commission for Social Action (NaCSA), are implementing conditional and unconditional cash transfer programs. More detailed information on these activities is given in Annex 5.

Coping strategies
Borrow money or food; purchase food on credit
Reduce the number of meals per day or the quantity of food in meals; skip eating on some days
Rely on less preferred, less expensive food
Sell durable household goods or crops before harvest; sell or consume livestock
Gather wild food
Sell or rent out land
Some household members migrate
Helped by relatives; send children to live with relatives
Consume seed stock
Spend savings
Work for food
Reduce expenditures on health and education

Source: WFP 2011.

Table 4. Coping strategies.

Nutritional status of women and children

Maternal and child malnutrition are global problems that negatively affect economic productivity and development (Black et al. 2013). According to the UNICEF conceptual framework on the causes of malnutrition (Annex 2), nutritional status is influenced by three underlying factors: food, health and care. These factors, which cover access to diverse and nutrient-rich food, appropriate maternal and childcare practices and health services, safe water and sanitation, and good hygienic practices, influence nutrient intake and the prevalence of disease. Inadequate dietary intake and disease, the two immediate causes of malnutrition, lead to a variety of negative short-term, long-term and intergenerational consequences. Undernourished children under 5 years of age, for example, are more likely to suffer from serious infection and die from diarrhea, pneumonia, measles or malaria (UNICEF 2013). It is essential to understand the various causes of malnutrition within the context of Sierra Leone to select and implement appropriate interventions.

Nutritional status of women

Poor maternal nutrition negatively impacts fetal development and contributes to low birthweight, stunting and other forms of undernutrition. Ensuring that pregnant and lactating women receive adequate nutrition is essential for the well-being of the mother and child (UNICEF 2013).

The indicators used to evaluate the nutritional status of women are height and body mass index (BMI). Short stature in women is considered a risk factor for delivery and child development. A woman is at risk if her height is less than 145 cm (Black et al. 2008). A low percentage of women in Sierra Leone have short stature, as shown in Table 5. Women with a BMI (kg/m²) below 18.5 are considered acutely undernourished and at risk for poor birth outcomes and complications during delivery

(Black et al. 2008). The majority of women in Tonkolili, and in Sierra Leone as a whole, have normal weight. However, with 22.3% of women classified as overweight or obese, Sierra Leone appears at risk of developing a double burden of malnutrition—overweight and obesity coupled with micronutrient deficiencies (Black et al. 2013).

Nutritional status of children

Sierra Leone has made progress toward eradicating hunger, shown by the decrease in the prevalence of child malnutrition between 2008 and 2014 (MOHS and UNICEF 2014). However, there are large differences between districts, and almost 30% of children under 5 years of age remain stunted. Stunting is caused by long-term inadequate nutrition or frequent illness (UNICEF 2013). The highest rates of stunting and severe stunting are found in Tonkolili (MOHS and UNICEF 2014).

Wasting, or acute undernutrition, occurs when a child receives inadequate food intake in the short time preceding a survey or if the child contracts an illness that causes the onset of malnutrition (Statistics Sierra Leone and ICF International 2014). While Sierra Leone as a whole has reached the 2025 World Health Assembly goal to reduce childhood wasting to less than 5% (WHO 2015c), the rate of wasting in Tonkolili remains above the global target and is relatively high when compared to the other districts.

Underweight is a composite indicator that reflects both chronic and acute malnutrition (UNICEF 2013). Although the national prevalence of underweight has declined since 2010, Tonkolili has the highest prevalence of underweight in the country. The high prevalence of stunting and underweight found in Tonkolili demonstrates that there is a need to prioritize more vulnerable regions and populations to further decrease malnutrition in Sierra Leone.

Nutritional Status Indicators	Non-pregnant women	
	Sierra Leone (% of women)	Tonkolili(% of women)
Height		
< 145 cm	2.1	1.8
BMI (kg/m²)		
< 18.5	6.2	7.1
18.5–24.9	71.5	77.7
25.0–29.9	16.7	13.2
≥ 30	5.6	2.1

Note: < 18.5 is underweight, 18.5–24.9 normal weight, 25.0–29.9 overweight and ≥ 30 overweight.

Sources: MOHS and UNICEF 2014; Statistics Sierra Leone and ICF International 2014.

Table 5. Nutritional status of non-pregnant women.

Nutrition in pregnancy, lactation and early childhood

Micronutrient intake among women and young children

Good nutrition during the first 1000 days of a child's life is important for optimal brain development, healthy growth and a strong immune system (1,000 days 2015). Reducing hunger and improving nutrition have also been shown to enhance future economic growth and national development. A country that aims to improve the nutritional status of its population is investing in human and social capital, since an improvement in social welfare creates a healthier workforce that is more productive (Wang and Taniguchi 2003).

Therefore, while the effects of poor micronutrient intake begin in pregnancy and early childhood, they have a long-term impact on both the health of an individual and the development of a country. Severe vitamin A deficiency, for example, may cause blindness, reduce immunity and increase the severity of infections, while iron deficiency can lead to anemia. In Sierra Leone, nutritional deficiencies are considered one of the leading causes of mortality and morbidity (DESA 2012). Over the past two decades, the government has implemented programs to combat micronutrient malnutrition, such as salt iodization, biannual vitamin A supplementation for

children 6–59 months of age, deworming, universal bed net distribution and iron-folate supplementation for pregnant women. There is also a program for fortification of vegetable oil and wheat flour, which has an impact beyond the first 1000 days of life (MOHS et al. 2015).

Vitamin A deficiency

Nearly all women in Sierra Leone have adequate levels of vitamin A (Table 7). In contrast, 17%² of children 6–59 months suffer from vitamin A deficiency, which reflects a moderate public health concern. Biannual vitamin A supplementation, which began in 1999, has recently been incorporated into the biannual Maternal and Child Health Week. It is important to consider long-term approaches to reducing vitamin A deficiency among children, such as promoting the consumption of vitamin A-rich foods (MOHS et al. 2015). Differences in eating habits among women and young children may explain why levels of vitamin A deficiency vary between these two population groups. For example, nationally, less than half of children under 2 years of age consume foods rich in vitamin A (Table 8). Understanding the reasons behind differences in vitamin A deficiency between women and children is a potential research area to further explore.

Children 6–59 months old	Sierra Leone (% children)	Tonkolili (% children)
Height-for-age		
< -2 SD	28.8	41.2
< -3 SD	7.8	15.2
Weight-for-height		
< -2 SD	4.7	5.3
< -3 SD	1.0	1.6
Weight-for-age		
< -2 SD	12.9	19.8
< -3 SD	3.2	4.9
> +2 SD	2.2	1.6
> +3 SD	0.3	-

Note: SD = standard deviation. Children with height-for-age, weight-for-height and weight-for-age < 2 SD are classified as stunted, wasted and underweight, respectively. < 3 SD is classified as severe. Children with weight-for-age > +2 SD and > +3 SD are classified as overweight and obese, respectively.

Sources: MOHS and UNICEF 2014; Statistics Sierra Leone and ICF International 2014.

Table 6. Children 6–59 months old classified as malnourished, according to anthropometric measures.

Non-pregnant women (%)	
Vitamin A deficiency	2
Anemia	45
Iron deficiency	8
Iron deficiency anemia	6
Folate deficiency	79
B12 deficiency	0.5
Median UIC* (non-lactating)	189.8 µg/L
Median UIC* (lactating)	175.6 µg/L
Pregnant women (%)	
Anemia	70
Median UIC*	176 µg/L
Children 6–59 months (%)	
Vitamin A deficiency	17
Anemia	76
Iron deficiency	5
Iron deficiency anemia	4

*UIC = median urinary iodine concentration; median UIC > 100 µg/L (> 150 µg/L for pregnant women) indicates adequate iodine status.

Source: MOHS et al. 2015.

Table 7. Micronutrient deficiency levels among women and children in Sierra Leone.

Children 6–23 months (%)		
	Sierra Leone	Tonkolili
Vitamin A-rich foods	46	38
Iron-rich foods	32	18
Children 6–59 months (%)		
Vitamin A supplementation	96	94
Iron supplementation	36	26
Deworming medication	58	60
Living in households with iodized salt	80	84
Women 15–49 years (national figures, %)		
	Non-pregnant	Pregnant
Vitamin A supplementation after last delivery	48	34
Iron supplementation	25	44
Folic acid supplementation	36	51
Iron or folic acid supplementation during last pregnancy for ≥ 90 days	66	61

Sources: Statistics Sierra Leone and ICF International 2014; MOHS et al. 2015.

Table 8. Micronutrient intake among children and women.

Anemia and iron deficiency

In Sierra Leone, anemia among women and children is a severe public health concern, particularly as the prevalence of anemia has not significantly decreased since 2008. Among women aged 15–49 years, the prevalence of anemia was reported highest in Pujehun (70%), Bonthe (66%), Tonkolili (57%) and Bombali (51%). The public health system provides iron-folic acid tablets and deworming medication to pregnant women to combat anemia (Statistics Sierra Leone and ICF International 2014).

Among non-pregnant women, while almost half are anemic, few have iron deficiency or iron deficiency anemia.³ Similar trends in anemia and iron deficiency are found among children 6–59 months. Iron deficiency is therefore not common in non-pregnant women or young children, nor is it associated with the high prevalence of anemia in Sierra Leone. Possible explanations for low levels of iron deficiency include the impact on the nutritional status of iron-rich soil, iron supplementation programs, consumption of dark green leafy vegetables and food preparation in iron pots. It is recommended that trends in iron intake and deficiency be further explored.

As iron deficiency is low, anemia was reported to be associated with malaria, inflammation, diarrhea (in children only) and vitamin A deficiency (in children only). Furthermore, chronic inflammation and hemoglobinopathies, such as sickle cell disease, may be linked to anemia (MOHS et al. 2015).

Iodine

At the household level, although the coverage of adequately iodized salt has increased since 2010, it is still below the recommended coverage of > 90%. However, iodine status among non-pregnant and pregnant women is high. Because the national prescribed range for salt to be iodized in Sierra Leone is substantially greater than the international recommendation, and

because median urinary iodine concentrations are above levels of adequacy, salt iodization levels may need to be adjusted (MOHS et al. 2015).

Infant and young child feeding practices

The World Health Organization (WHO) recommends a number of infant and young child feeding practices during the first 1000 days of life. These include initiation of breastfeeding within 1 hour of birth, exclusive breastfeeding until 6 months of age, continued breastfeeding up to 2 years of age and beyond, timely introduction of complementary feeding at 6 months, and appropriate complementary feeding to children 6–23 months. The Ministry of Health and Sanitation has instituted an infant and young child feeding program to increase awareness and improve caregivers' knowledge of proper feeding practices. The activities are conducted at both the facility and community levels, through mother support groups (Statistics Sierra Leone and ICF International 2014).

Almost all children are breastfed at some point, and about 60% of children younger than 6 months are exclusively breastfed (Table 9), a substantial increase from 32% in 2013. This improvement indicates progress made in promoting good infant and young child feeding practices nationally (MOHS and UNICEF 2014; Statistics Sierra Leone and ICF International 2014).

In addition to early initiation of breastfeeding and exclusive breastfeeding, international infant and young child feeding guidelines recommend the introduction of safe, appropriate and adequate complementary foods at 6 months of age (UNICEF 2013). Contrary to WHO recommendations, complementary foods are often given to children younger than 6 months in Sierra Leone. Nationally, 9% of infants aged 2–3 months and 31% of infants aged 4–5 months receive solid or semisolid foods. Sixty-three percent of children start receiving complementary foods at age 6–8 months. The food types consumed by infants and young

Children under 2 years of age (%)		
	Sierra Leone	Tonkolili
Breastfed at some point	99	100
Breastfed within 1 hour of birth	55	59
Exclusively breastfed for first 6 months of life	59	61
Received pre-lacteal feed	21	7
Continued breastfeeding at 1 year of age	86	96

Sources: MOHS and UNICEF 2014; Statistics Sierra Leone and ICF International 2014.

Table 9. Trends in breastfeeding.

children are shown in Figure 11. A large percentage of breastfed infants under the age of 2 years (44%) consume food made from grains. Twenty-four percent consume vitamin A-rich fruit and vegetables, and 18% consume meat, fish or poultry (Statistics Sierra Leone and ICF International 2014). This indicates that micronutrient-rich and animal-source foods make up a small portion of the complementary feeding diet.

The adequacy of infant and young child feeding practices is also assessed through three additional indicators: minimum dietary diversity, minimum meal frequency and minimum acceptable diet. Minimum dietary diversity represents the proportion of children 6–23 months of age who receive food from four or more food groups per day. Minimum meal frequency is the proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semisolid or soft foods the minimum

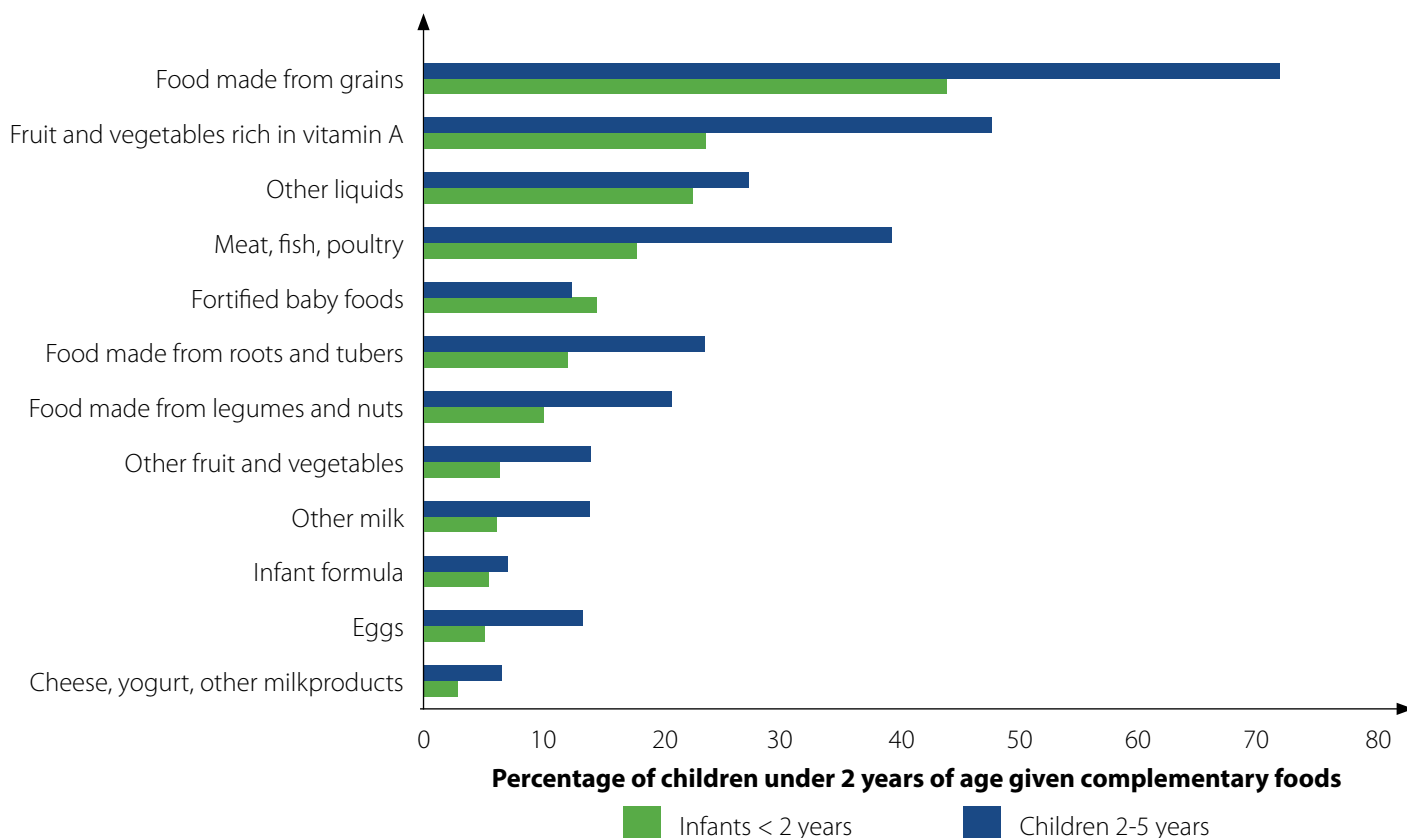
recommended number of times per day or more.⁴ Minimum acceptable diet represents the proportion of children aged 6–23 months who receive a minimum acceptable diet apart from breastmilk (WHO 2010).

The most recent figures for national minimum dietary diversity and minimum meal frequency indicate that they are low: 36% and 14% respectively. Data from 2013 shows that the figure for national minimum acceptable diet is also low at 7%. Table 10 allows for comparison between national figures and those for Tonkolili for these three indicators. Overall, a lower percentage of children age 6–23 months in Tonkolili consume diets that meet minimum dietary diversity and minimum acceptable diet standards than in the country as a whole, and the percentage of children that reach minimum meal frequency standards is also low (MOHS and UNICEF 2014; Statistics Sierra Leone and ICF International 2014).

Children 6–23 months (%)		
	Sierra Leone	Tonkolili
Minimum dietary diversity	36	29
Minimum meal frequency	14	16
Minimum acceptable diet	7	3

Sources: MOHS and UNICEF 2014; Statistics Sierra Leone and ICF International 2014.

Table 10. Infant and young child feeding practices in Sierra Leone and Tonkolili district.



Source: Statistics Sierra Leone and ICF International 2014.

Figure 11. The food types consumed by infants and young children.

National food and nutrition security policies and strategies

On 16 January 2012, Sierra Leone joined the Scaling Up Nutrition (SUN) movement, a joint effort among government, civil society, UN agencies, donors, the private sector and academia to improve multisectoral coordination among partners working in food and nutrition security strategies (SUN 2014). The SUN Secretariat in Sierra Leone is located in the Office of the Vice President.

A number of national and subnational coordination mechanisms have been established since 2012. At the national level, the Presidential Task Force of Agriculture is the leading policy-making body governing the Smallholder Commercialization Programme (SCP). The National Food and Nutrition Security Steering Committee is responsible for facilitating the coordination of multisector food and nutrition security strategies. Chaired by the Vice President, the committee's members include ministers from the nine key ministries⁵ and representatives from NaCSA, UN agencies and donors. The National Food and Nutrition Security Technical Coordination Committee is the operational arm, with technical experts from relevant partners. There are a number of sector-based technical coordination mechanisms at the national level, including the Nutrition Technical Coordination Committee; Water, Sanitation and Hygiene Committee; Health Development Partners Committee; and Agriculture Advisory Group. At the subnational level, coordination mechanisms include the District Food and Nutrition Coordination Committee (which is still to be established), District Sector Coordination Committees, and chiefdom, ward and village coordination committees.

In terms of policy, Sierra Leone made nutrition a priority in its 5-year Poverty Reduction Strategy Paper, titled *Agenda for Prosperity*. Nutrition is also a key priority area in the 2010–2015 National Health Sector Strategic Plan, which recognizes malnutrition as a major cause of illness and death. Additionally, the 2011–2015 Reproductive, Newborn and Child Health Strategy includes objectives on improving the nutritional status of women and children and promoting appropriate nutritional status among adolescents (MOHS 2009, 2011). The Ministry of Health and Sanitation houses the Food and Nutrition Directorate, which works with partners to implement programs in maternal, infant and young child nutrition; integrated management of acute malnutrition; micronutrients; clinical nutrition; nutrition surveillance;

and research. The Ministry of Health and Sanitation, through the infant and young child feeding program, has established mother support groups to promote improvement of feeding practices. The Ministry of Health and Sanitation has also developed a basic package of essential health services and in 2010 introduced the Free Health Care Initiative for all pregnant and lactating women and children under 5 years old.

Through the Ministry of Agriculture, Forestry and Food Security, the SCP was developed to improve production, diversification, value addition, marketing, irrigation, road maintenance, access to financial services, social protection, food security, and monitoring and evaluation of activities, all of which have direct or indirect impacts on nutrition. Additionally, the 2010–2030 National Sustainable Agriculture Development Plan emphasizes the need to diversify eating habits, intensify food processing and preservation, and promote farmer field schools to assist farmers in gaining knowledge and adopting basic processing and food preservation methods. The Women in Agriculture and Nutrition Unit, which is housed in the Extension Division of the Ministry of Agriculture, Forestry and Food Security, focuses on food production and nutrition-sensitive approaches to improving nutrition.

Sierra Leone developed a National Nutrition Policy in 2012 and subsequently the 2013–2017 National Food and Security Implementation Plan. The National Nutrition Policy has eight objectives, as seen in Table 11. Details on the priority areas, strategic actions and targets outlined in the 2013–2017 Food and Nutrition Security Implementation Plan are given in Annex 4. The plan stresses the need to strengthen interventions focused on the first 1000 days of life and to promote the integration of health and agriculture-based approaches. Examples of such integrated approaches include the promotion of nutritious foods through the SCP, Food and Agriculture Organization of the United Nations (FAO) Right to Food initiative and family planning strategies. Other areas to be improved include market linkages, income-generation activities, social protection packages, integrated nutrition and food security surveillance, governance, coordination, advocacy and capacity to scale up nutrition interventions (Government of Sierra Leone 2013).

Objectives

1. Increase commitment from policymakers, policy advisors and program designers at national and district levels to accord nutrition a high priority in the political and national development agenda.
2. Improve household food security situation in order to satisfy the daily dietary needs of the population.
3. Improve the nutritional status through appropriate feeding practices of children under the age of 5 years and women of reproductive age.
4. Strengthen preventive measures against nutrition-related diseases.
5. Improve access to quality curative nutrition services.
6. Strengthen surveillance systems for monitoring the food and nutrition situation.
7. Enhance evidence-based decision-making on food and nutrition issues through research.
8. Strengthen the effective and efficient coordination of food and nutrition interventions.

Source: Government of Sierra Leone 2013.

Table 11. Sierra Leone National Nutrition Policy 2012.

Fish and nutrition

Fish contributes to the food and nutrition security of households in a number of ways. First, the increased consumption of fish, a nutrient-rich animal-source food, directly and positively impacts nutritional status. Second, the commercialization of fish and increased product distribution leads to income generation, which improves a household's ability to purchase food. Third, involvement in fish production creates livelihood opportunities, particularly for women participating in the production, processing and sale of fish (FAO 2014).

Fish is an important part of the Sierra Leonean diet. Fish is an excellent source of animal protein, and it is unique from other animal-source foods because of the significant quantity of additional nutrients that it contains (FAO 2014). Fish is rich in micronutrients, minerals, essential amino acids and essential fatty acids, especially omega-3 long-chain polyunsaturated fatty acids. Even when consumed in small quantities, fish adds multiple nutrients to plant-based diets that lack essential vitamins and minerals and improves the overall quality of dietary protein intake (Beveridge et al. 2013; FAO 2014).

Essential minerals and vitamins provided by fish include calcium, phosphorus, magnesium, iron, potassium, sodium, zinc, copper, manganese, selenium, folic acid, choline and vitamins A, C, B12, E and D (Roos 2001; Roos et al. 2002; Bogard et al. 2015a). Small fish have particularly high levels of micronutrients, especially in the bones, head and gut. Since small fish species are often eaten whole, these portions are usually consumed, thereby providing the highest nutritional benefits (Bogard et al. 2015a; Bogard et al. 2015b).

The consumption of fish is particularly important during pregnancy and the first 2 years of a child's life, as the long-chain omega-3 fatty acids that it provides

are associated with a reduced risk of early pre term delivery in pregnancy and promote optimal brain and neural development (Hibbeln et al. 2007; Imhoff-Kunsch et al. 2012). Fish consumption also has health benefits for the adult population, as it is associated with a 36% reduced mortality rate from heart disease (Rimm and Mozaffarian 2006).

Of the 130.1 million metric tons of fish available worldwide in 2010, fish supply was lowest in Africa, at 9.7 kg per capita per annum (FAO 2014). Fish supply in Sierra Leone (33.2 kg per capita per annum) is significantly greater than the average for the African continent (FAOSTAT 2011). Additionally, the proportion of animal protein that comes from fish is higher in Sierra Leone than in some of its neighboring countries, such as Senegal, Gambia and Ghana (FAO 2014). Fish consumption in Sierra Leone was 17 kg per capita per annum, and fish made up about 80% of the animal protein consumed in 2003 (FAO 2016). Fish is more commonly consumed than any other type of flesh food in Sierra Leone, including beef, lamb, pork, goat and wild game. Fresh, dried and smoked fish are particularly popular for consumption (Statistics Sierra Leone 2014).

The dietary importance of fish in Sierra Leone, combined with its high nutritional value, suggests that increasing fish production and consumption can significantly contribute to improving the nutritional status of pregnant and lactating women, infants and young children, as well as improving the food and nutrition security of vulnerable households. Estimated benefits of developing rice-fish farming and aquaculture in Tonkolili, where food and nutrition insecurity is prevalent and stunting and underweight rates are the highest in the country, indicate potential to develop fish production in this district to improve food and nutrition security.

	Primary sector	Secondary sector
Industrial fisheries	1,000 full-time	2,500 full-time
Artisanal fisheries	30,000 full-time	200,000 part-time
Inland and aquaculture fisheries	5,000 full-time	5,000 part-time

Note: Primary sector includes direct employment for fishers. Secondary sector includes activities like processing, marketing, boat building and engineering.

Source: FAO 2008.

Table 12. Employment in the fisheries sector 2005.

Potential to increase fish production and consumption

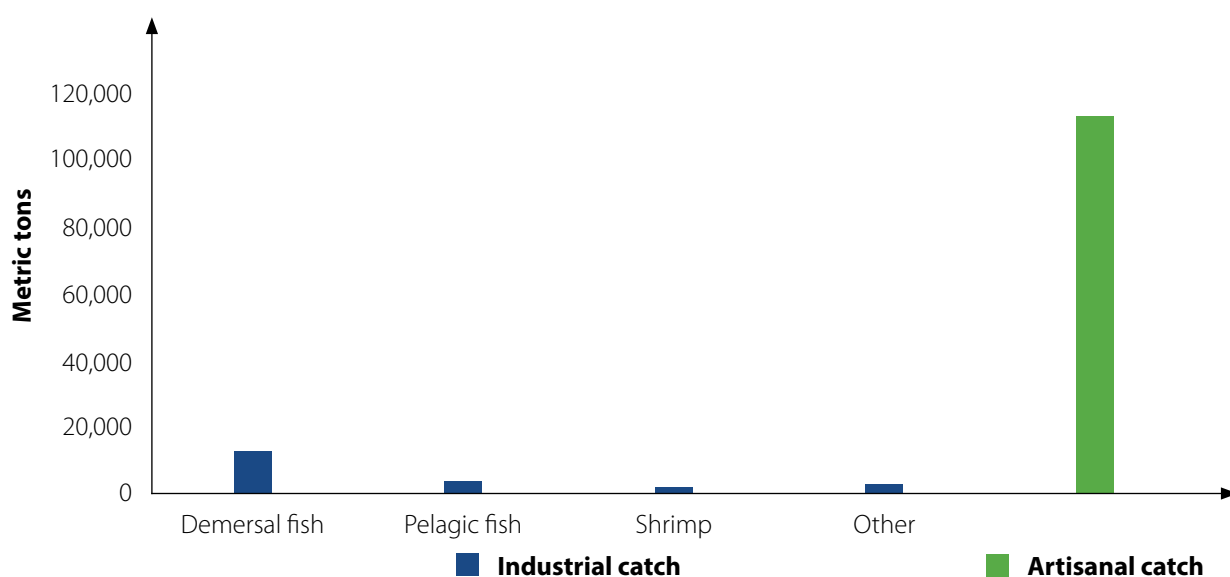
Sierra Leone has potential to increase fish production and consumption by harnessing its abundant natural water resources (Larbi 2012). The shoreline of the country is 560 km long and includes estuaries of three large river networks and four coastal islands. Currently, industrial and artisanal subsectors make up the fisheries sector (FAO 2008; Larbi 2012).

Industrial fisheries, which operate in deep waters, are export-oriented and dominated by foreign companies. The fishing of demersal fish (bottom feeders) predominates, followed by pelagic (oceanic) fish and shrimp. Products are usually frozen and exported to other African countries, Asia and the United States. Export to the European Union (EU), however, is prohibited by an EU ban. Proposed strategies to improve the industrial sector have included development of a fish harbor complex, strengthening of institutional support for fisheries management and improvement in the sanitary conditions of fish and fish products (FAO 2008).

The artisanal sector is small-scale and includes marine and inland capture fisheries, as well as aquaculture. As shown in Table 12, artisanal fisheries account for the majority of employment in the fisheries sector. They also contribute to the majority of total fish production, as shown in Figure 12. Artisanal marine capture fishery is a livelihood strategy concentrated in Western Area, Port Loko, Kambia, Moyamba, Bonthe and Pujehun. Artisanal inland fishery, which is primarily capture-based, is practiced at subsistence level in

lakes, rivers and floodplains. There are about 150 freshwater species found in these inland water bodies. Fish products from artisanal fisheries are smoked and traded in domestic markets or exported to other African countries, Asia and the United States. Some fish products are also salted and sun-dried and then traded in local and export markets (FAO 2008). Fish and rice integration in inland valley swamp systems has been shown to have potential to create opportunities for employment and income generation, particularly among rural households (FAO 2008). Integrated rice-fish farming can have a positive impact on local food security. The most suitable area to promote rice-fish farming is Tonkolili and could result in the development of 177 modified rice fields, with a total fish production of 318 metric tons per year and improvement of the food security of around 32,000 people (COFREPECHE 2013).

Aquaculture production, which began in 1974 in Sierra Leone, is concentrated in Tonkolili and Bombali in the north; Bo, Moyamba and Pujehun in the south; and Kailahun, Kenema and Kono in the east. There are 2593 fishponds in the country, but only 12% are operational. The majority of ponds (2164) are located in Tonkolili (Sankoh 2016). Most fishponds are privately owned, although an estimated quarter of ponds belong to village communities or fishing associations. Private ponds are usually owned by the men who construct and manage them. Women play a role in harvesting, as well as in day-to-day maintenance activities. The main farmed species is Nile tilapia. It is reported that there is potential to increase the production of catfish species (FAO 2008, 2015; COFREPECHE 2013).

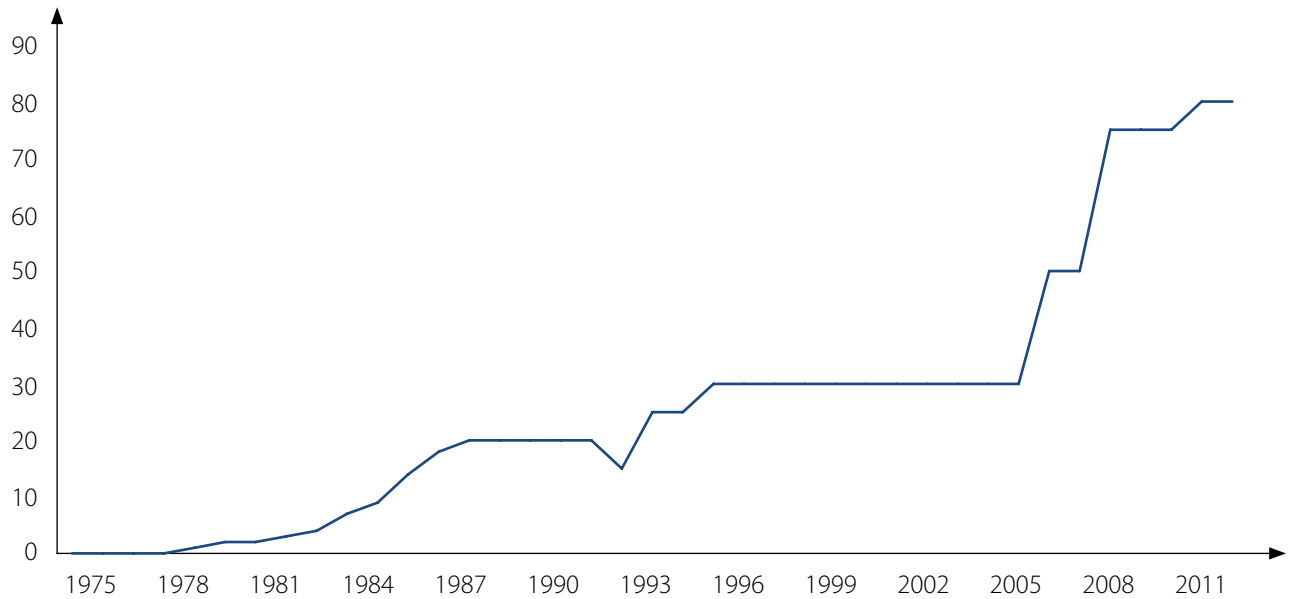


Source: MFMR 2010.

Figure 12. Total fish production 2010 in Sierra Leone (metric tons).

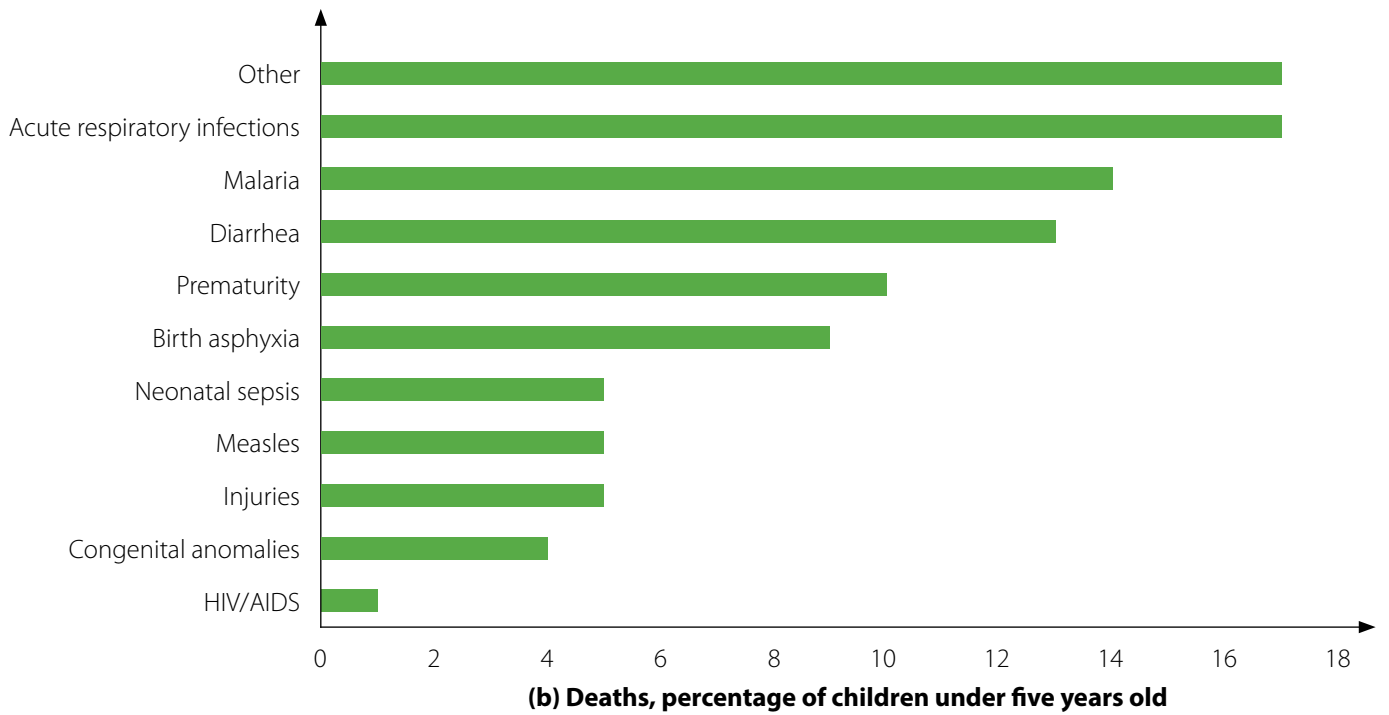
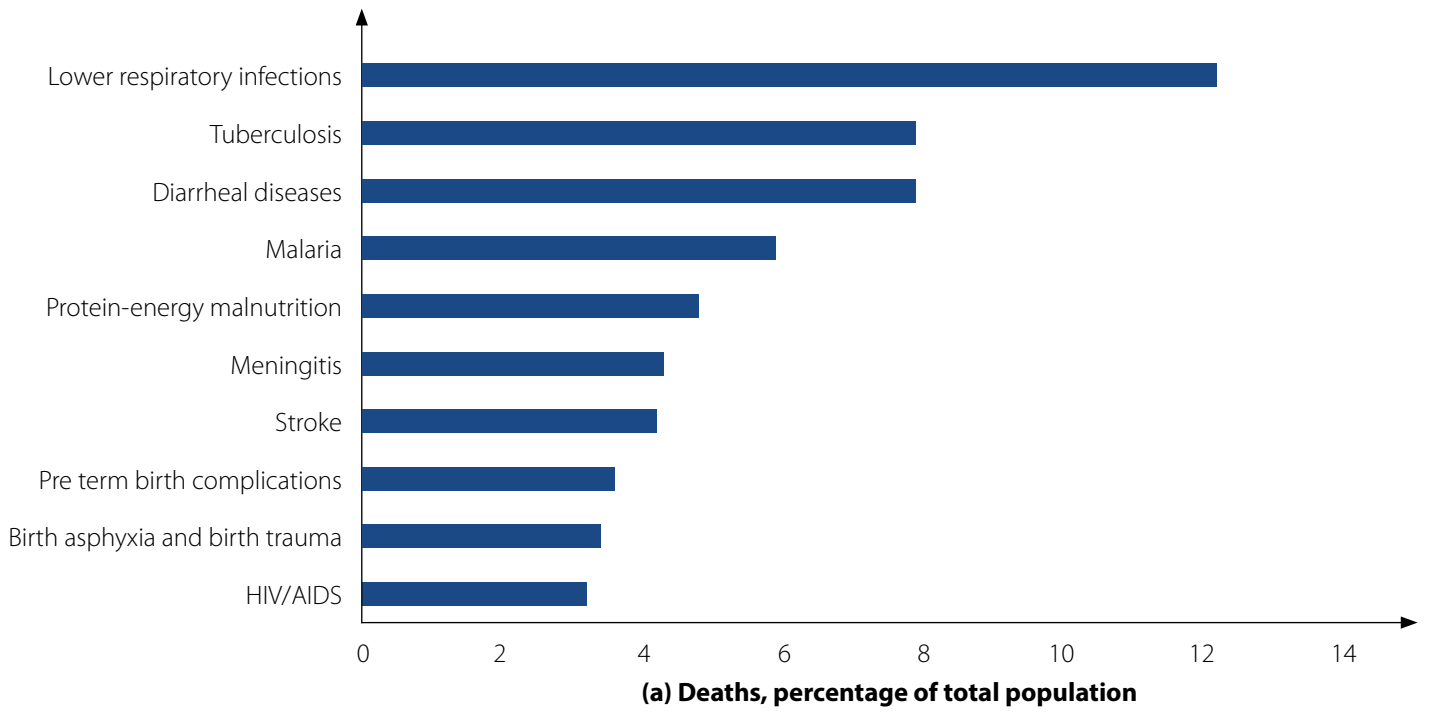
Aquaculture is practiced mainly at a subsistence level, and development of the sector has been slow, despite having begun over 40 years ago. Constraints to aquaculture development include lack of capacity, low availability of fish feed and fish seed, and poor access to land (COFREPECHE 2013). Some fish produced in ponds are sold at local markets. The price of farmed tilapia ranges from SLL 5000 to SLL 13,000 (USD 1.15 to USD 2.99) per kg, while the price of farmed catfish ranges from SLL 3000 to SLL 25,000 (USD 0.69 to USD 5.74) per kg (Siriwardena and Rajts 2015). As Figure 13 indicates, aquaculture production is low, especially when compared to total fish production.

Increasing fish supply through the fisheries sector should create opportunities for employment and income generation, particularly among rural households. Additionally, by increasing overall purchasing power from the sale of fish, the development of fisheries, integrated agriculture-aquaculture systems and aquaculture can improve household food security through improved access to fish. Engagement of women in fisheries-related activities, such as processing and trading, can result in a greater proportion of household income being spent on food (Beveridge et al. 2013).



Source: FAO 2016.

Figure 13. Aquaculture production (metric tons).



Source: WHO 2015a.

Figure 14. Leading causes of death in Sierra Leone in (a) total population and (b) in children under five years old.

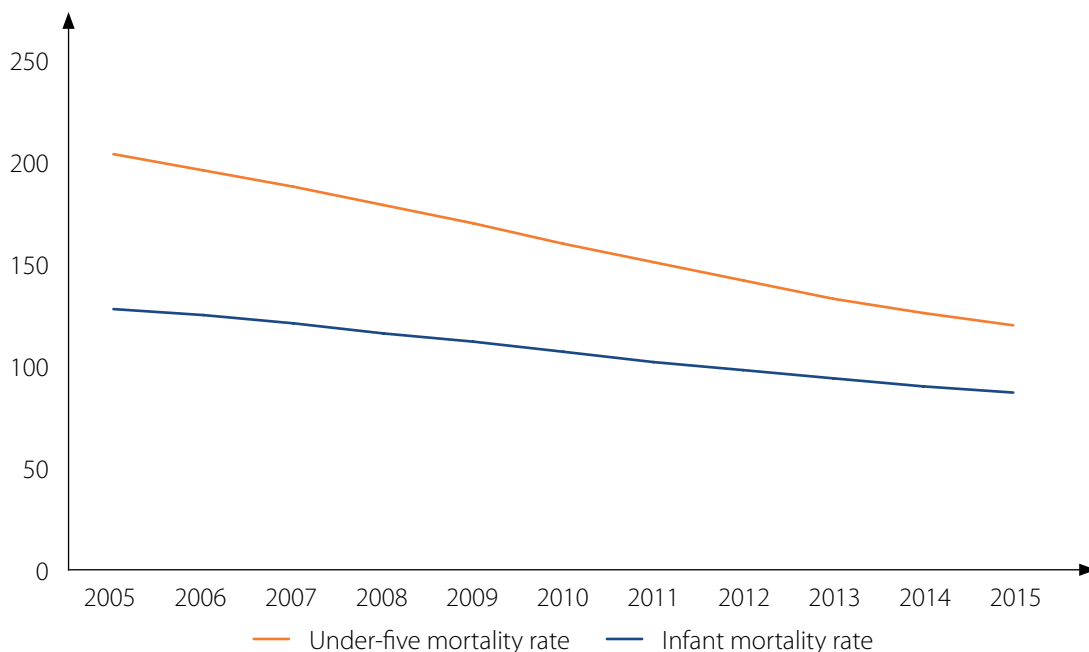
Health

The health system in Sierra Leone comprises three levels: peripheral health units, district and secondary hospitals, and regional and tertiary hospitals. Peripheral health units include community health centers, community health posts, and maternal and child health posts (MOHS 2009). The government implemented the Free Health Care Initiative in 2010, which led to an increase in the number of women and children attending health facilities. However, inadequate human resources, a lack of equipment and supplies, and poor infrastructure persist and impede the provision of satisfactory health care and services (African Health Observatory of WHO 2015).

Life expectancy at birth in Sierra Leone is 46 years, which is lower than the WHO regional average of 58 years (WHO 2015a). This low life expectancy rate is associated with a heavy burden of disease, as seen in Figure 14. High levels of mortality and morbidity in Sierra Leone are due to pervasive poverty, limited access to safe drinking water, inadequate sanitation, poor feeding and hygiene practices, insufficient access to quality health services, overcrowded housing and high levels of illiteracy, especially among women (African Health Observatory of WHO 2015). Most recently, the Ebola outbreak, which was declared a public health emergency of international concern by the WHO Director-General in August 2014, claimed the lives of 3995 Sierra Leoneans (WHO 2015b).

One of the leading causes of death in Sierra Leone is malaria. To reduce the burden of malaria in the country, the Ministry of Health and Sanitation established the National Malaria Control Program in 1994 and the 2011–2015 National Malaria Control Program Strategic Plan. Despite international and national efforts to reduce malaria, challenges remain, such as poor supply chain management and poor distribution of anti-malarial medications, minimal involvement of the private sector, nonadherence to malaria policy, incomplete and irregular reporting of malaria cases and low levels of use of long-lasting insecticidal nets (Statistics Sierra Leone and ICF International 2014). Furthermore, the persistence of malnutrition among women and children contributes to malaria-associated morbidity and anemia, as malnutrition increases the risk of death from infectious diseases (Ehrhardt et al. 2006).

Although Sierra Leone's infant and under-five mortality rates have been decreasing, as shown in Figure 15, they are still high, at 87 and 120 deaths per 1000 live births, respectively (World Bank 2015a, 2015b). Immunization of children is crucial to reducing infant and child mortality. Sierra Leone has adopted the WHO Expanded Program on Immunization, which calls for children to receive vaccinations against tuberculosis; diphtheria, pertussis and tetanus; polio; and measles. When bringing their children for vaccinations, mothers



Sources: World Bank 2015a, 2015b.

Figure 15. Trends in mortality rates.

are asked to provide their child's health card to record the dates of the children's vaccinations. This health card, which was recently revised with the promotion of integrated programs in 2013, also includes information on optimal child growth patterns, feeding practices, malaria and prevention of mother-to-child transmission of human immunodeficiency virus (HIV). Vaccination coverage has improved over the past 5 years, with the proportion of children fully vaccinated by age 12 months increasing from 31% in 2008 to 58% in 2013 (Statistics Sierra Leone and ICF International 2014).

Maternal mortality remains high at 1100 deaths per 100,000 live births (World Bank 2013c). Overall, 72% of women reported experiencing at least one of the following barriers to accessing health care: getting money for treatment, distance to a health facility, getting permission to go for treatment and not wanting to go alone. The high rate of teenage pregnancy is also a major health concern in Sierra Leone because of its association with higher risks of morbidity and mortality for both the mother and child. In Sierra Leone, 1 in every 10 women between the ages of 25 and 49 had given birth by the age of 15, and 56% become mothers by the age of 20 years (Statistics Sierra Leone and ICF International 2014).



Photo Credit: Success Ibrahim / Sei Kamara/WorldFish

Water, sanitation and hygiene

Lack of access to clean water and sanitation facilities, together with poor hygienic practices, increases the prevalence of preventable diseases. Sixty-one percent of households in Sierra Leone obtain drinking water from an improved source, as reported by the 2013 Demographic and Health Survey, which is a slight increase from 51% of households in 2008. Improved sources of drinking water include a piped source within the dwelling or plot, public tap, tube well or borehole, protected well or spring, and rainwater (Statistics Sierra Leone and ICF Macro 2009). In rural areas, the majority of households (52%) obtain water from non improved sources, most commonly from lakes, streams and rivers. Eighty-five percent of households do not treat drinking water, rural households being less likely to treat water than urban households. Water treatment has seen no significant improvement since 2008; 89% of households reported not treating their water. Adding bleach or chlorine, boiling water, and straining water through cloth are the most common forms of water treatment (Statistics Sierra Leone and ICF International 2014).

In terms of sanitation, only 10% of households have access to an improved facility, such as a toilet or latrine, that is not shared with other households. Urban households are substantially more likely to have an improved toilet facility than rural households, at 20% and 5%, respectively. The most common type of toilet facility in rural areas is an open pit latrine or one without a slab. Overall, 21% of households have no toilet facility. Access to adequate sanitation has not substantially changed since 2008; 24% of households, mostly rural, did not have a toilet facility (Statistics Sierra Leone and ICF International 2014).

Hand washing with soap and water reduces the transmission of diarrhea, respiratory infections and other diseases. Nationally, only 22% of households have a designated place for washing hands. Furthermore, among households with a place for washing hands, almost half had no water, no soap and no other cleansing agent. Table 13 allows for comparison between the country as a whole and Tonkolili with respect to hand washing (Statistics Sierra Leone and ICF International 2014).

	% of households observed with a place for washing hands	Among households observed with a place for hand washing, % with:						
		Soap and water	Water and other type of cleansing agent	Water only	Soap but no water	Cleansing agent other than soap	No water, no soap, no other cleansing agent	Missing
Sierra Leone	21.7	32.8	1.5	11.6	4.8	0.5	48.3	0.5
Tonkolili	24.9	12.1	6.6	10.0	1.0	0.5	69.8	0.0

Source: Statistics Sierra Leone and ICF International 2014.

Table 13. Hand washing in Sierra Leone and Tonkolili.

Gender inequity

Sierra Leone ranks 183 out of 187 countries on the Gender Inequality Index, a composite measure reflecting inequality between women and men in reproductive health, empowerment and the labor market (UNDP 2014b). There is also significant gender disparity in education, access to resources and civil liberties. For example, literacy among women and men is 35% and 57%, respectively (World Bank 2013a, 2013b). Although the country has ratified the Convention on the Elimination of all Forms of Discrimination against Women and passed a set of gender laws⁶ to increase women's legal protection, women continue to experience discrimination, as their rights are often subject to customary law and the traditions of the ethnic group to which they belong (SIGI 2015; United Nations Treaty Collection 2015).

For example, although the constitution grants women equal property rights, women generally cannot inherit land, and their land use options are controlled by their fathers, brothers or husbands and the strength of their lineage within their community.^{7,8} Even though women participate in all household agricultural activities and more than a fifth of households are headed by women, the land-use system makes it difficult for them to access or invest in agricultural development (WFP 2011; Larbi 2012; SIGI 2015).

Early marriage is common. The median age of women at their first marriage is 18 years, and 35% of women are married to men who are in a polygamous union (Statistics Sierra Leone and ICF International 2014). Although polygamy is prohibited under Sierra Leone's Penal Code, it is authorized in customary marriages (SIGI 2015).

Violence and rights violations against women and girls are also common. Most girls and women belong to secret societies, known as *bondo* or *sande*, which uphold and reinforce harmful practices like female genital mutilation (FGM) and early marriage. There is no law against FGM, and it is common throughout the country. Ninety percent of women between the ages of 15 and 49 have undergone FGM. Additionally, although domestic violence is a criminal offence, violent acts against women remain prevalent and underreported, especially in the Northern Province (SIGI 2015).

Food and nutrition security interventions

There are many local and international organizations designing and implementing interventions to improve the food and nutrition security in the country. These include UN agencies, international and local nongovernmental organizations (NGOs), donor agencies, research centers and government ministries. A complete list of stakeholders participating in food and nutrition security, as well as a description of their current activities, is given in Annex 5.

Food production systems

The current strategy of the Ministry of Agriculture, Forestry and Food Security is to encourage crop diversification, as the over-reliance on rice is viewed as negatively affecting the country's level of food security. Farmers are encouraged to alternate rice with other crops such as yam, cassava and sweet potato (Government of Sierra Leone 2009). Some organizations, such as the International Fund for Agricultural Development (IFAD) and Welt Hunger Hilfe (WHH), encourage double-cropping in the inland valley swamp systems to promote crop diversification. Developing inland valley swamps is one potential area to improve crop production. However, most projects in Sierra Leone have focused on rehabilitation, not development, of inland valley swamps. These projects have been led by IFAD, WHH, Catholic Relief Services (CRS), World Vision and the World Bank. Little attention has been paid to the possibility of integrating fish production. Thus, there is an unexplored opportunity to develop integrated rice-fish production systems in the inland valley swamps. An assessment of inland valley swamps in Tonkolili will provide information on the potential to develop this production system, as well as on the species of fish present and potential to integrate vegetable production with rice and fish.

An increase in the production of fish would improve households' availability of and access to an animal-source food, providing multiple essential nutrients. In addition to promoting integrated aquatic agricultural systems, there is potential to develop stand-alone aquaculture approaches. The majority of fishponds are located in Tonkolili, so the development of pond aquaculture could contribute to the livelihoods of those living in one of the most food-insecure districts in the country. Polyculture with small indigenous fish should be explored, as these fish are highly nutritious and can contribute to the improved nutritional status of women and young children. The fish species present in Tonkolili water resources are given in Annex

6; these are derived from a survey of fish species in the area conducted in 2012 by MacAlister Elliott and Partners and Fourah Bay College.

Promotion of vegetable production increases the diversity of food crops available for consumption. Vegetable production is mainly carried out by women as a livelihood strategy. Many organizations, such as ACDI/VOCA and Concern Worldwide, promote vegetable production among women through homestead gardening initiatives. Mother support groups are heavily utilized by the Ministry of Health and Sanitation and many NGOs to engage women in optimal childcare and feeding practices, so the opportunity to organize vegetable farming among these groups is good. Women often sell vegetables for cash. Therefore, programs focusing on vegetable production should also include a component that encourages women to set aside a portion of their production for household consumption, especially for themselves and their children. Additionally, considering the high level of community engagement through mother support groups and the level of agricultural engagement among women, there may be an opportunity to encourage the participation of women in fishpond culture through these groups. Engagement of women in fish farming and vegetable cropping interventions is essential to increasing their access to nutrient-rich foods, as well as providing a means of income generation.

In addition to homestead gardening, there is potential to improve nutrition through linking with schools and promotion of school gardening. Organizations such as BRAC, WHH and World Vision have worked with the World Food Programme (WFP) on promoting local foods for use in school feeding programs. Encouraging home gardening and linking it with school feeding empowers local farmers to provide food for schools. The presence of school gardens also sensitizes children to eating a variety of vegetables. As described in the Food and Nutrition Security Implementation Plan, school gardens can shape the future food choices of youth to reduce their dependence on rice by promoting demand for a diversity of nutritious foods. The FAO Right to Food initiative has also expressed interest in developing fishponds and integrated fish-vegetable systems in schools.

Postharvest methods

The improvement of postharvest techniques is also a priority outlined in the Food and Nutrition Security Implementation Plan. Improving storage facilities and methods, increasing market access, diversifying food preparation at the household level, exploring preservation techniques, and analyzing the effect of processing methods on the nutrient quality of fish and food crops would ensure less loss and spoilage. Increasing the shelf life of products would also result in higher prices for farmers, as they would be able to keep their products for some time instead of selling them immediately. Additionally, training on hygienic processing methods would promote food safety. Collaboration with the Ministry of Fisheries and Marine Resources and Njala University on pre- and postharvest methods for fish is one way to improve the availability of fish and ensure that it is processed hygienically. Women lead the processing and trading of fish, so they should be targeted in postharvest interventions. Engagement of women can be established through the Market Women's Association, which is already involved in food and nutrition security activities through its participation in SUN and partnership with local NGOs such as Focus1000. The Food and Nutrition Directorate has also expressed interest in exploring fruit and vegetable preservation techniques to reduce losses and provide households with means to cope during food shortages.

Behavior change

An increase in the production of fish and other animal-source foods does not necessarily translate into increased consumption of these foods among those most vulnerable. Therefore, it is essential to implement behavior change interventions that promote the consumption of micronutrient-rich foods and animal-source foods among children and pregnant and lactating women. Many partners already work in promoting optimal infant and young child feeding practices through mother support groups, so one opportunity is to work with these partners to encourage greater fish consumption during complementary feeding, as well as among adolescent, pregnant and lactating women. Special attention should be paid to adolescent girls, as the rate of teenage pregnancy in Sierra Leone is extremely high. The Ministry of Health and Sanitation, Helen Keller International (HKI), CARE, ACF, BRAC, the International Medical Corps (IMC) and Save the Children all work with mother support groups. The Ministry of Health and Sanitation has recently developed an infant and young child feeding strategy and is currently updating the national infant and young child feeding

guidelines, which were rolled out in early 2016. Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) is also working in the country to assess how best to develop behavior change interventions along the value chain of high-nutrient food products. It is highly recommended that fathers and/or grandmothers be involved in discussions concerning proper nutrition for women and children, as they are heavily influential at the community and household levels. Nutrition advocacy and sensitization at the community level should also target paramount chiefs, other local authorities, local councils and secret societies to address cultural norms that can compromise the nutritional status of women and children.

Cooking demonstrations and recipe books are means of sensitizing communities to diverse and healthy eating habits. According to the Food and Nutrition Security Implementation Plan, women involved in vegetable production lack knowledge on the nutritional value of vegetables and the proper preparation of crops like carrots and lettuce that have been newly introduced. The *Local Complementary Food Recipe Booklet for Health Workers, Mothers and Caregivers*, developed by the Ministry of Health and Sanitation, focuses on complementary feeding, providing knowledge on how to properly prepare complementary food for infants and young children. Some recipes included incorporate fish powder or dried fish (MOHS 2015). Another potential intervention is to develop a recipe book for pregnant and lactating women.

National food-based dietary guidelines specific to Sierra Leone are being developed by FAO, together with the Ministry of Health and Sanitation and the Ministry of Agriculture, Forestry and Food Security, as part of the Mainstreaming Food and Nutrition Security and the Right to Food into the SCP of Sierra Leone project. The guidelines, which are to be validated, include fish among other animal-source foods. Future behavior change interventions can use these guidelines to promote healthy diets among vulnerable groups.

Food and nutrition education

The Mainstreaming Food and Nutrition Security and the Right to Food into the SCP of Sierra Leone project also includes activities focused on food and nutrition education and training. One activity is a curriculum review of the schools of agriculture, forestry, education and social science at Njala University to ensure the integration of food and nutrition security and the Right to Food modules into their degree programs. A proposed module outline for an introductory course

on food and nutrition security has been developed by Njala University, in collaboration with the Ministry of Agriculture, Forestry and Food Security, the Ministry of Health and Sanitation, FAO and other development partners. This activity falls in line with the Food and Nutrition Security Implementation Plan, which stresses the importance of nutrition education.

The implementation plan also states that the Ministry of Agriculture, Forestry and Food Security will work closely with the Ministry of Health and Sanitation and other ministries to develop nutrition education materials to be disseminated through multiple channels, including primary and secondary schools,

universities, farmer field schools and farmer-based organizations. There therefore exist opportunities to promote production and consumption of fish through these channels, working with relevant government ministries, FAO and other partners. There may also be the opportunity to form nutrition-focused school clubs to promote nutrition and healthy eating habits among school-aged children. BRAC, for example, has formed such clubs with a focus on malaria. A food and nutrition security module on production, processing and utilization of locally produced nutritious foods has been developed for farmer field schools and is currently in the pre testing phase.



Conclusion

This literature review gives an overview of the food and nutrition security situation in Sierra Leone, with a focus on the role of fish and an emphasis on Tonkolili District. Tonkolili District was selected as the focal district for this literature review because the WorldFish-led United States Agency for International Development (USAID) Feed the Future Sierra Leone Agriculture project is being conducted in this district. This project investigates the potential to develop integrated rice-fish production systems and the estimated positive impact that this development would have on food and nutrition security.

The food and nutrition security situation in Sierra Leone is characterized by low crop yields, vulnerability to shocks, poor dietary diversity, inadequate complementary feeding and seasonal periods of hunger. The primary staple food consumed is rice, with staples, vegetables and oil being consumed more frequently than fruit and animal-source foods. There is potential to increase the availability and consumption of fish, which is consumed more often than any other flesh food in Sierra Leone, through improvements in fisheries production systems to diversify the diets of vulnerable households. There is a particular need to improve the diets of pregnant and lactating women and infants and young children, as poor micronutrient intake in the first 1000 days of a child's life negatively impacts brain development and healthy growth. In Sierra Leone, poor health care infrastructure, lack of clean water sources and sanitation, gender inequity, socio-cultural norms, low incomes and lack of knowledge concerning nutritional needs are contributing factors to the poor nutritional status of women and children.

Increasing fish and vegetable production, improving postharvest techniques, implementing behavior change interventions and promoting food and nutrition security education are possible ways to improve the dietary diversity of households and individuals. The promotion of integrated aquatic agricultural farming technologies in inland valley swamp systems and improved management of aquaculture may enhance the supply and productivity of fish, rice and other crops at the household level. The development of the fisheries sector holds the potential to improve food and nutrition security through greater availability of fish for household consumption, increased income generation and the creation of livelihood opportunities, particularly for women. To implement such food and nutrition security interventions in Sierra Leone, forming partnerships with

government ministries, NGOs, UN agencies, donors and other institutions is crucial.

This review has also identified key knowledge gaps that need to be considered in further research and in the design of implementation approaches:

- Concerning micronutrient deficiencies and intake among women and children, knowledge is needed on why the rate of vitamin A deficiency is low among women but moderately high among children, as well as why high rates of vitamin A deficiency among children persist despite high vitamin A supplementation coverage. A specific issue is how, when and why levels of vitamin A deficiency change from childhood to adulthood. Additionally, the reason behind low levels of iron deficiency among women and children, despite inadequate food intake and low dietary diversity, should be explored.
- A better understanding is needed of consumption patterns, especially of fish and other aquatic animals, to provide information on dietary diversity among women and children specific to Tonkolili District, as well as on the potential to increase fish consumption. Specifically, information is needed on the age at which fish is first given to children; the relationship between food beliefs and fish consumption; intrahousehold allocation of fish; the species, sizes and parts of fish consumed and by whom; and how fish is processed and prepared for consumption.
- In terms of fish production, knowledge is needed on the species of fish found in inland water bodies, the seasonality of inland fisheries and fish production, and types and origins of fish products. An assessment of the inland valley swamp system is expected to provide information on the potential to develop integrated rice-fish farming, the current presence and practices of fishing, and the seasonality of food crops grown in inland valley swamps.
- Information is needed on the potential to utilize fish products that are normally discarded to provide additional fish for consumption and reduce wastage.
- Seasonal assessments should also explore food shortages specific to Tonkolili District to understand how to better bridge seasonal gaps in food availability.
- Knowledge is needed on which vegetables are grown locally and which are commonly consumed and sold. There should be a focus on vegetables rich in micronutrients and an understanding of the seasonal availability of vegetables.

- ¹ A poor food composition score indicates that the nutritional value of a diet is inadequate, as food intake is almost exclusively limited to cereals, vegetables and oil; pulses, fruit, flesh foods and dairy are rarely consumed. A household with a poor food composition score, from 0 to 21, is considered severely food insecure. Households with borderline food composition scores have a more frequent intake of cereals, oil and vegetables, eat some pulses and fruit, and have some sugar and animal-source food less than 1 day a week. Borderline food composition scores range from 21.5 to 35. Households with acceptable food composition scores have a more diverse diet, with the ability to have an animal-source food 5 days a week. An acceptable food composition score is greater than 35 (WFP 2015).
- ² The prevalence of vitamin A deficiency among children 6–59 months, which was originally reported as 28.5%, was later corrected for inflammation and reported as 17% (MOHS et al. 2015).
- ³ Anemia is a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs. Globally, iron deficiency is considered the most common cause of anemia (known as iron deficiency anemia). However, other conditions, including folate, vitamin B12 and vitamin A deficiencies; chronic inflammation; parasitic infections; and inherited disorders can cause anemia (WHO 2016).
- ⁴ When energy density of meals is 0.8–1 kilocalories per gram, breastfed infants 6–8 months old need 2–3 meals per day and breastfed children 9–23 months need 3–4 meals per day, with 1–2 additional snacks. Non breastfed children need 1–2 cups of milk and 1–2 extra meals per day (WHO 2010).
- ⁵ The nine key ministries are the Ministry of Agriculture, Forestry and Food Security; the Ministry of Education, Science and Technology; the Ministry of Energy and Water Resources; the Ministry of Fisheries and Marine Resources; the Ministry of Local Government and Rural Development; the Ministry of Finance and Economic Development; the Ministry of Health and Sanitation; the Ministry of Social Welfare, Gender and Children's Affairs; and the Ministry of Trade and Industry.
- ⁶ The Domestic Violence Act, the Registration of Customary Marriage and Divorce Act, and the Devolution of Estates Act. The enactment of the Sexual Offences Act in 2012 followed these acts (SIGI 2015).
- ⁷ Land tenure in Sierra Leone is characterized by a dual ownership structure. Land in the Western Area is held under the English freehold concept. Land in the other districts is held through communal ownership under customary tenure.
- ⁸ However, customary law does vary: women are allowed to own plots of land in the north and west, but they can only access land through their husbands or male family members in the south and east (SIGI 2015).

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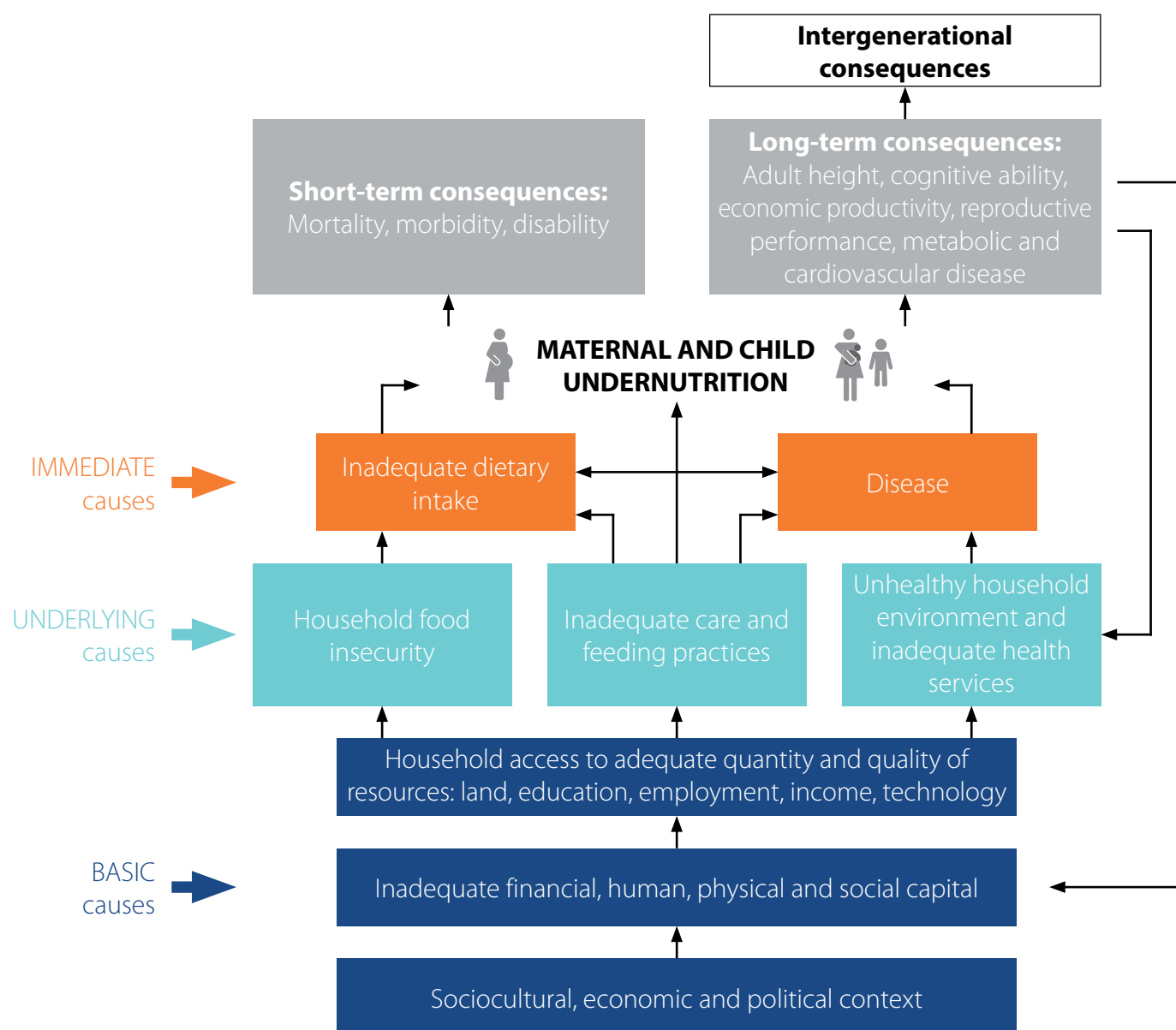
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Annex 1. Livelihood zones in Sierra Leone

	Zone 1 – Food crops and gold	Zone 2 – Food crops, pepper, tobacco and livestock	Zone 3 – Western rice, root crops, cereals and trade belt	Zone 4 – Coastal food crops and fishing	Zone 5 – Cash crops, food crops and trade	Zone 6 – Rice, tree crops and timber	Zone 7 – Livestock, food crops and trade	Zone 8 – Vegetables	Zone 9 – Freetown and peri-urban	Zone 10 – Rice bowl areas
District(s)	Tonkolili	Bombali	Bombali, Kambia, Port Loko, Tonkolili, Bo, Pujehun, Moyamba	Port Loko, Bonthe, Pujehun, Moyamba	Kailahun, Kenema, Kono	Kono, Kenema, Bo	Koinadugu, Kono	Koinadugu	Western	Bombali, Kambia, Port Loko, Tonkolili, Bonthe, Pujehun
Major food crops	Rice, cassava, sweet potato, yam	Rice, cassava, sweet potato	Rice, cassava, sweet potato, millet	Rice, cassava, sweet potato	Rice, palm oil, cassava	Rice, palm oil, cassava	Rice, millet, pulses	Rice, millet, cassava, sweet potato	Rice, cassava, other tubers	Rice, cassava, sweet potato
Food crops sold	Rice, cassava, palm oil	Rice, cassava, tobacco	Cassava, sweet potato, palm oil, maize	Cassava, rice, coconut oil	Palm oil, cocoa, coffee, kola nut	Palm oil, cocoa, coffee, kola nut, sorghum	Rice, pulses, groundnut, cassava	Chili and other vegetables, rice, groundnut, pigeon pea	Vegetables, fruit, rice	Rice, cassava, groundnut
Livestock	Poultry, goat, sheep, cattle	Cattle, goat, sheep	Poultry, sheep, goat	Poultry, goat, sheep	Local chicken, goat, sheep	Chicken, sheep, goat	Cattle, poultry, goat, sheep	Cattle, goat, sheep	Poultry, small ruminants, pig	Poultry, goat, sheep
Cash income	Selling farm products, gold mining, salaried work, logging	Cash crops, paid work, palm wine, petty trade, timber and charcoal, remittances	Crop sales, work, remittances, petty trade	Palm oil sales, food crop sales, fish sales, petty trade, remittances	Agricultural work, cash crop sales, trade, mining	Agricultural work, cash crop sales, timber and charcoal sales, mining	Crop sales, agricultural work, livestock sales, small-scale trade	Vegetable sales, livestock sales, crop sales, trading	Wage work or salary, vegetable sales, petty trade	Food crop sales, paid work, petty trade

Annex 2. UNICEF conceptual framework on the causes of malnutrition



Source: Adapted from UNICEF, 1990.

The black arrows show that the consequences of undernutrition can feed back to the underlying and basic cause of undernutrition, perpetuating the cycle of undernutrition, poverty and inequities.

Annex 3. Food beliefs

Beliefs on food consumption among pregnant women		
Cereals and grains	Bread, bulgur	<ul style="list-style-type: none"> The child will be fat.
	Cassava	<ul style="list-style-type: none"> The breastmilk will become yellow. The breastmilk will become warm, causing the child to have diarrhea. The child will defecate green stool. The child will vomit.
	<i>Foo foo</i> (boiled cassava shaped into balls)	<ul style="list-style-type: none"> The fetus will be too big and this will delay delivery.
	<i>Gari</i> (cassava flour)	<ul style="list-style-type: none"> The child will be fat.
	Maize	<ul style="list-style-type: none"> The woman will have itchy skin.
	Rice, leftover	<ul style="list-style-type: none"> The woman will defecate during delivery. The caregiver will suffocate and care will therefore be poor. There will be an increased risk of malaria for the woman. The child's walking will be delayed.
	Rice, uncooked	<ul style="list-style-type: none"> The child's skin will be stained and dirty. The child will be covered with rice when born. The child will be unduly attracted to the opposite sex.
Roots and tubers	Potatoes, boiled	<ul style="list-style-type: none"> The baby will defecate meconium.
	Root (<i>gbargba</i>)	<ul style="list-style-type: none"> There will be miscellaneous consequences to both woman and child.
Vegetables and fruit	Banana	<ul style="list-style-type: none"> The child's tongue will peel and his penis will enlarge. The child's walking will be delayed.
	Eggplant	<ul style="list-style-type: none"> The child's scrotum will be too big. The child will have a rash.
	Grapefruit	<ul style="list-style-type: none"> There will be fluid discharge at delivery and the woman will have irritation between her legs.
	Lime	<ul style="list-style-type: none"> The woman will have difficult labor, with dizziness and bleeding. The fetus will be too small. The child will be born prematurely or die. The child will have frequent stools.
	Okra leaf	<ul style="list-style-type: none"> Fluid will be prevented from flowing after delivery and cause the woman's stomach to swell. The child will have a sunken fontanelle.
	Orange	<ul style="list-style-type: none"> Body fluid will be increased in the woman during delivery. The woman will have a fever after delivery. The risk of malaria for the woman will be increased. The fetus will be too small.
	Pepper	<ul style="list-style-type: none"> The woman will have a skin rash and hairy chest. The child will feel pain when urinating.
	Pineapple	<ul style="list-style-type: none"> The child's skin will be like a pineapple, with a scaly rash. The scalp of the child will have sores. There will be redness between the legs of the woman.
	Plantain	<ul style="list-style-type: none"> The child's penis will be too big. The child will have a sunken fontanelle.
	Pumpkin	<ul style="list-style-type: none"> Lactating women will have edema. The child's skin will have boils.

Beliefs on food consumption among pregnant women

Fish and other aquatic animals	Crab	<ul style="list-style-type: none"> The child will drool.
	Crayfish	<ul style="list-style-type: none"> The child will have an allergy or vomit.
	Fish	<ul style="list-style-type: none"> The woman's stomach will swell after delivery. The fetus will be too big. The child's walking will be delayed.
	Seafood	<ul style="list-style-type: none"> The child will have convulsions.
	Snail	<ul style="list-style-type: none"> The child's eyes will be too small. The child will drool.
Poultry, meat, dairy and eggs	Baboon	<ul style="list-style-type: none"> The child will groan.
	Beef	<ul style="list-style-type: none"> The child will have worms.
	Bush cow	<ul style="list-style-type: none"> The child's crying will be delayed. The newborn will lie still and some might think he is dead and bury him, or try to wake him by shaking him and tapping his buttocks.
	Bush meat	<ul style="list-style-type: none"> The child will behave like animals in the bush. The child will look like a four-legged animal.
	Bush rat	<ul style="list-style-type: none"> The woman will have stomach pain. The child will be a thief.
	Cat meat	<ul style="list-style-type: none"> The child will steal.
	Chameleon	<ul style="list-style-type: none"> The child will die or be born with a humpback.
	Chicken	<ul style="list-style-type: none"> The child will convulse.
	Cow milk	<ul style="list-style-type: none"> The woman will have a complicated delivery. Cow milk thins breastmilk and the child will have frequent stools.
	Eggs	<ul style="list-style-type: none"> The mother will have a miscarriage or still birth. The child will be born prematurely or die. The child's skin will peel, flake or crack. The child will become a thief. The fetus will be too big. The child's walking will be delayed.
	He-goat	<ul style="list-style-type: none"> The woman will have a toothache. The child will be a prostitute or womanizer, or his life will ultimately be ended by a woman.
	Iguana	<ul style="list-style-type: none"> The woman will have a difficult delivery.
	Imported eggs	<ul style="list-style-type: none"> The blood system of the woman will be disrupted.
	Meat	<ul style="list-style-type: none"> The woman's stomach will swell right after delivery. Lactating women will have edema. The child will resemble an animal.
	Meat bone	<ul style="list-style-type: none"> The child's ear will discharge pus.
	Monkey	<ul style="list-style-type: none"> The child will resemble a monkey. The child will have a bald head. The child will convulse.
	Pigeon	<ul style="list-style-type: none"> The child will have convulsions.
	Pork	<ul style="list-style-type: none"> The child will look like a pig.
	Rat	<ul style="list-style-type: none"> The child will not sleep.
	Snake	<ul style="list-style-type: none"> The child will crawl like a snake. The child will have a rash. The child will have crossed eyes.
Squirrel	<ul style="list-style-type: none"> The child will be a thief. The child will have hernias. 	
Viper	<ul style="list-style-type: none"> The woman will die after delivery. 	

Beliefs on food consumption among pregnant women

Nuts, seeds and oils	Coconut	<ul style="list-style-type: none"> The child will vomit.
	Kola nut	<ul style="list-style-type: none"> The child will talk too much. The nut sucks the child's blood, so she or he will have marasmus.
	Groundnuts	<ul style="list-style-type: none"> The child will vomit.
	Palm oil	<ul style="list-style-type: none"> The fetus will be too big. The woman will vomit. The child's crying will be delayed.
Miscellaneous	Honey	<ul style="list-style-type: none"> The woman will have a difficult labor and too much water in her body.
	Soup	<ul style="list-style-type: none"> The woman will have a premature labor.
	Sugar	<ul style="list-style-type: none"> The woman will have pelvic pain.
	Sugar cane	<ul style="list-style-type: none"> The woman will have a delayed and difficult delivery, maybe a Caesarian section.

Beliefs on food consumption among children under 5 years of age

Vegetables and fruit	Banana	<ul style="list-style-type: none"> The child will eat his own feces. The child will have cancer.
	Okra	<ul style="list-style-type: none"> The child will have a runny nose.
Fish and other aquatic animals	Fish	<ul style="list-style-type: none"> The child will have worms.
Poultry, meat, dairy and eggs	Meat, beef	<ul style="list-style-type: none"> The child will have worms.
	Egg	<ul style="list-style-type: none"> Eggs are forbidden among girls who have not been initiated into secret society; female circumcision healing will be delayed. The child will have tetanus.
	Reptile	<ul style="list-style-type: none"> The child's skin will peel.

Annex 4. Food and Nutrition Security Implementation Plan: 2013–2017

priority areas, strategic actions and targets

NUTRITION INDICATOR TARGETS FOR IMPLEMENTATION PLAN		
Indicator	Sierra Leone (2013)	Target (2017)
Prevalence of stunting among children 6–59 months old	34.1%	28.5%
Prevalence of underweight among children 6–59 months old	18.7%	13.1%
Prevalence of wasting among children 6–59 months old	6.9%	4.8%
Prevalence of overweight among children 6–59 months old	8%	5.6%
Child mortality	140 per 1000 live births	98 per 1000 live births
PRIORITY AREA 1: ADVOCACY		
Strategic actions		
1.1. Integrate food and nutrition security into the national development agenda.		
1.2. Review, align and harmonize messages on food and nutrition security across all sectors.		
1.3. Strengthen the human resource capacity in food and nutrition security.		
1.4. Institutionalize and operationalize gender equity policies.		
PRIORITY AREA 2: PROMOTION AND FACILITATION OF ADEQUATE NATIONAL AND HOUSEHOLD FOOD SECURITY		
Strategic actions		
2.1. Integrate nutrition activities into farmer field school activities.		
2.2. Promote research to facilitate food diversification and availability of adequate and appropriate technologies.		
2.3. Enhance availability of improved agricultural inputs to farmers at the appropriate time in the agricultural season (focusing on vulnerable groups).		
2.4. Integrate nutrition education into schools and institutions of higher learning.		
2.5. Enhance postharvest handling and storage of foods at farm and household levels.		
2.6. Support farmers to process, add value to and market their farm produce.		
2.7. Support vulnerable groups to receive livelihood support through cash and food for work.		
2.8. Support vulnerable groups to access nutritious food.		
Indicator	Sierra Leone (2013)	Target (2017)
Food consumption score	20–21.5	30–36
Food diversity score	N/A	N/A
Percentage of population identified as food insecure	45	20
Percentage of household expenditure spent on food	63	50
Incidence of low birth weight (percentage of newborns weighing < 2500 grams)	11	5
Prevalence of underweight among children < 2 years (%)	40.9	13.1
PRIORITY AREA 3: ADOPTION OF APPROPRIATE FEEDING PRACTICES FOR VULNERABLE GROUPS		
Strategic actions		
3.1. Develop strategy document on adolescent and maternal nutrition and infant and young child feeding.		
3.2. Adapt to local situation and implement code on marketing of breastmilk substitutes.		
3.3. Promote and strengthen implementation of baby-friendly hospital initiative and baby-friendly community initiatives.		
3.4. Develop and disseminate harmonized key nutrition messages aimed at decision-makers in households (fathers, mothers, grandmothers).		
3.5. Review and update training curricula to incorporate infant and young child feeding at all levels.		
3.6. Promote appropriate complementary feeding for children 6–23 months and optimum feeding practices for children 2–5 years.		
3.7. Provide nutritional support to children infected and affected by HIV, acquired immune deficiency syndrome (AIDS) or tuberculosis, and orphans and vulnerable children.		
3.8. Promote nutritional status of people living with HIV or tuberculosis and orphans and vulnerable children.		
3.9. Provide nutrition assessment, education and counseling to people living with HIV or tuberculosis and other vulnerable groups.		

Indicator	Sierra Leone (2013), %	Target (2017), %
Early initiation of breastfeeding (within 1 hour of birth)	45	60
Infants under 6 months old exclusively breastfed	32	60
Children 6–23 months old with minimum acceptable diet	19	40
Timely initiation of semi/solid food at 6 months of age	51	60
Prevalence of malnourished people living with HIV	44	20
Orphans and vulnerable children 5–8 years of age food insecure	50	25
Prevalence of malnutrition among tuberculosis patients	40	80

PRIORITY AREA 4: PREVENTIVE MEASURES AGAINST NUTRITIONAL AND OTHER RELATED INFECTIOUS DISEASES

Strategic actions

- 4.1. Promote and sustain vitamin A supplementation for children under 5 years old and postpartum women.
- 4.2. Promote iron folate compliance in pregnant women.
- 4.3. Develop and promote pre service capacity in micronutrient supplementation.
- 4.4. Fortify widely consumed foods such as wheat flour with micronutrients (iron, vitamin A and zinc).
- 4.5. Introduce and scale up use of micronutrient powder to improve the quality of complementary feeding for children 6–23 months old.
- 4.6. Promote consumption of iodized salt and ensure that all imported or locally produced salt for human and animal consumption is fortified with adequate levels of iodine.
- 4.7. Implement and scale up use of zinc in oral rehydration treatment of diarrhea.
- 4.8. Intensify deworming interventions targeting children 12–59 months old, primary school-enrolled children and pregnant women.
- 4.9. Promote utilization of insecticide-treated nets and intermittent preventive treatment during pregnancy for malaria control.
- 4.10. Improve access to, treatment of and storage of water at the community and household level.
- 4.11. Improve household hygiene and sanitation practices.
- 4.12. Improve food safety and hygiene practices.
- 4.13. Provide counseling and support on lifestyle changes to prevent and treat noncommunicable diseases.
- 4.14. Integrate management of common noncommunicable diseases into the training curriculum of primary health care workers.

Indicator	Sierra Leone (2013), %	Target (2017), %
Children < 5 years with vitamin A deficiency	47	20
Children 6–59 months with anemia	76	51
Women 15–49 years with anemia	45	36
School-aged children with low urinary iodine	34	20
Prevalence of stunting among children 6–59 months old	34.1	28.5
Children < 5 years infected with soil-transmitted helminthes	54	20
Malaria prevalence among children < 5 years	25	13
Prevalence of anemia among pregnant women	62	32
Prevalence of diarrhea among children < 5 years	11	7
Prevalence of overweight and obesity in women	17.9	6
* Prevalence of noncommunicable diseases	-	-
Average age at first pregnancy among women 20–49 years old	19	20
* Median number of months since preceding birth	-	-
* The FNSIP does not include values for these indicators. The FNSIP states that the on-going development of a comprehensive, regular and coordinated food and nutrition surveillance system will assist in the planning, management and design of programs to monitor these indicators.		

PRIORITY AREA 5: PROVISION OF CURATIVE SERVICES TO MALNOURISHED INDIVIDUALS**Strategic actions**

5.1. Promote quality care and management of children with acute malnutrition.

5.2. Strengthen community mobilization for early detection of cases of acute malnutrition.

Indicator	Sierra Leone (2013), %	Target (2017), %
Severe acute malnutrition prevalence among children 6–59 months old	1	0.2
Global acute malnutrition prevalence among children 6–59 months old	6.9	4.8

PRIORITY AREA 6: NATIONAL SURVEILLANCE SYSTEM DEVELOPED AND STRENGTHENED**Strategic actions**

6.1. Strengthen the early warning system, incorporating food security and nutrition status indicators.

6.2. Develop preparedness plans for shocks.

6.3. Strengthen monitoring and evaluation systems.

PRIORITY AREA 7: OPERATIONAL RESEARCH**Strategic actions**

7.1. Promote action-related research on food and nutrition issues.

PRIORITY AREA 8: COORDINATION OF ACTIVITIES OF RELEVANT AGENCIES INVOLVED IN FOOD AND NUTRITION ISSUES**Strategic actions**

8.1. Develop and implement appropriate structures to coordinate nutrition activities.

8.2. Establish an information sharing platform.

Note: There are no indicators or targets for priority areas 1, 6, 7 or 8 identified in the Food and Nutrition Security Implementation Plan.

Annex 5. Stakeholder matrix (September–December 2015)

Type	Name	Thematic areas	Geographic areas	Activities	Notes
Government	Ministry of Agriculture, Forestry and Food Security	Food security, agriculture, nutrition	National	<ol style="list-style-type: none"> 1. Women in Agriculture and Nutrition Unit focuses on food production and nutrition-sensitive interventions in the agricultural sector, especially on inputs and food processing 2. Mainstreaming Food and Nutrition Security and the Right to Food in the SCP: pre-testing of food and nutrition security module in farmer field schools, development of new dietary diversity guidelines, development of new food and nutrition security course, and revisions to food and nutrition security curriculum at Njala University 3. 2015 Comprehensive Food Security Vulnerability Assessment and quarterly Early Warning System Assessments 	Partners include FAO, SUN, WFP, UNICEF, Ministry of Health and Sanitation, ACF, Sustainable Nutrition and Agriculture Promotion (SNAP) and Focus1000.
	Ministry of Education, Science and Technology	Nutrition education	National	The Home Economics division works on programs at the primary, secondary and tertiary educational levels; subjects covered include food and nutrition, clothing and textiles, family life education, family resource management, home management, and agriculture; nutrition education courses focus on food preparation, processing, preparation and consumption; there are 15 home economic centers in primary schools in Western Area	The Ministry of Education, Science and Technology is a task force member of SUN on nutrition curricula and guidelines. The Food and Nutrition Security Implementation Plan has a focus on nutrition education.
	Ministry of Fisheries and Marine Resources	Fisheries and aquaculture	National	<p>Fish Quality Assurance Unit:</p> <ol style="list-style-type: none"> 1. Through the regional fisheries program, there was a focus on training women to improve smoking methods and in pre- and postharvest of fish; the program worked in the Tombo fishing community in 2013; it is possible to build on the nutrition aspect of this and work with community management associations (e.g. fishers, fish processors) 2. The unit organizes trainings for fishers, processors and handlers; it also conducts monthly market surveys during the dry season (less often during the rainy season), inspection of fish processing facilities, and fishing vessels 	The Deputy Director, Ministry of Fisheries and Marine Resources is the SUN focal point for this ministry, representing this ministry at SUN coordination meetings and leading SUN activities.
	Ministry of Health and Sanitation	Nutrition, health, water, sanitation and hygiene	National	<ol style="list-style-type: none"> 1. Promotion of good infant and young child feeding through mother support groups; currently working with CRS on assessment of these groups; the next stage will be including fathers 2. Development of new infant and young child feeding strategy and guidelines and integrated management of acute malnutrition protocol, as well as infant and young child feeding recipes with SNAP and new child health card with HKI 3. Development of new food-based dietary guidelines with partners; plan to roll out strategy on sensitization of healthy eating habits 4. Completed 2014 Standardized Monitoring and Assessment of Relief and Transition survey 5. Implementing 6-month contact point with HKI focused on reducing vitamin A deficiency, prevention of mother-to-child transmission of HIV, malaria prevention and increased family planning uptake 6. Focus on the scaling up of nutrition activities 	<p>Regional Ministry of Health and Sanitation headquarters:</p> <ol style="list-style-type: none"> 1. Western: Freetown 2. Northern: Makeni, Bombali 3. Southern: Bo, Bo 4. Eastern: Kenema, Kenema <p>Nutritionists are in place in all districts.</p>
	NaSCA	Livelihoods, nutrition	National	Cash transfers program, which has established two types of groups: (a) self-help affinity groups (focus on women to promote the culture of saving) and (b) microenterprise groups; they also have a new project with community development groups focused on women; they plan to focus their cash-transfer program more on nutrition by making it conditional, based on the nutrition activities a mother has undertaken with her children	
	SUN	Multisectoral nutrition governance, advocacy, policy	National	<ol style="list-style-type: none"> 1. Launch of the Food and Nutrition Security Implementation Plan 2. Increasing support to district coordination to implement the Food and Nutrition Security Implementation Plan in collaboration with UNICEF and Irish Aid; working on a plan to put a structure in place that will handle coordination at the district level 3. Development of nutrition advocacy tools to harmonize information across sectors 4. Civil society platform trains media in reporting on nutrition and health, trains market women in nutrition and health advocacy communities, works with partners on studies on district level coordination 5. District coordinating bodies are working in nutrition advocacy and teen pregnancy with district nutritionists, mother support groups, outpatient therapeutic feeding programs, market women and religious leaders 	SUN seeks to ameliorate problems of project duplication among organizations and to support district coordination.

Type	Name	Thematic areas	Geographic areas	Activities	Notes
UN	FAO	Food security, agriculture, aquaculture, nutrition, policy, water, sanitation and hygiene	National	<ol style="list-style-type: none"> 2015 Comprehensive Food Security Vulnerability Assessment with partners Aquaculture assessment with WorldFish Involved in Mainstreaming Food and Nutrition Security and the Right to Food in the SCP: development of food-based dietary guidelines, food and nutrition security introductory course at Njala University, and food and nutrition security modules for extension officers and farmer field schools Right to Food project is working to place food and nutrition security in the constitution, which is currently in review and was to be finalized by the end of 2015 Tippy Tap water, sanitation and hygiene project Animal health clubs Anthropological studies on bush meat and Ebola Developing the Cadre Harmonisé with the Ministry of Agriculture, Forestry and Food Security and partners 	
	IFAD	Agriculture	Kailahun, Kenema, Kono, Koinadugu, Bo, Pujehun, Bombali, Port Loko and Tonkolili	<p>Covering the entire country for inland valley swamps under two projects:</p> <ol style="list-style-type: none"> Inland valley swamp project (ends 2016) in Kailahun, Kenema, Kono and Koinadugu focuses on working with farmer organizations and training service providers (farmers receive cash in kind) Supervising an assessment (ongoing for 2 years) that also has an inland valley swamp component in Bo, Pujehun, Bombali, Port Loko and Tonkolili; it involves training service providers who work with the communities to develop swamps; farmers also receive cash in kind; other projects: tree cropping in Kono, Kenema and Kailahun and cash crops (palm oil, coffee) 	<p>The focus on inland valley swamp work has been in rehabilitation and in some cases development. It has also focused on rice, but the project encourages farmers to do 2–3 crops per season. They also promote vegetables on a pilot basis and are exploring water management and pilot greenhouses (farmers cultivate vegetables in the highlands, close to inland valley swamps).</p> <p>IFAD wants to start thinking about aquaculture.</p> <p>It would be possible for WorldFish to conduct activities with fish in one of IFAD's focal districts.</p>
	UNICEF	Nutrition, health	National through support to Ministry of Health and Sanitation	<p>UNICEF supports the Ministry of Health and Sanitation on integrated management of acute malnutrition and infant and young child feeding with a focus on evidence generation and supply provision:</p> <ol style="list-style-type: none"> Evidence generation: micronutrient survey, Standardized Monitoring and Assessment of Relief and Transition survey, infant and young child feeding guidelines (rollout and assessment) will begin in 2016. Integrated management of acute malnutrition support: revised guidelines based on WHO guidelines, capacity building, supply and reporting Infant and young child feeding: community-level initiatives, 6-month contact point with Ministry of Health and Sanitation and HKI Food fortification: pilot with University of British Columbia, Canada 	<p>Opportunity to promote fish in complementary feeding and identify gaps between fish supply and consumption among women and children.</p>

Type	Name	Thematic areas	Geographic areas	Activities	Notes
UN	WFP	Food security, livelihoods, nutrition, emergencies, aquaculture	Kenema, Kailahun, Bonthe, Kambia, Port Loko (nutrition country program) National through support to the Ministry of Agriculture, Forestry and Food Security and the Ministry of Health and Sanitation	<ol style="list-style-type: none"> 1. Nutrition Unit directs nutrition-specific activities and is moving to integrate more sustainable actions through nutrition-sensitive projects; areas of focus are on livelihoods and supplementary feeding for children under 5 years old with moderate acute malnutrition and pregnant and lactating women; the supplementary feeding program, which will end in September 2016, has worked in nine districts; in April 2016, WFP conducted national screening for malnutrition through mid-upper arm circumference measurement; the unit will start the country program with a focus on children under 5 years old and pregnant and lactating women in October; support to malnourished HIV and tuberculosis-positive individuals 2. Livelihoods Unit works in line with the Ministry of Agriculture, Forestry and Food Security in terms of its action plan, which focuses on cultivation and irrigation; starting new aquaculture project with Caritas 3. 2015 Comprehensive Food Security Vulnerability Assessment 	<p>Other activities of the Nutrition Unit: 1000 days preventative feeding in Moyamba program (currently not active); research project in Kenema with Tufts University, USAID, UNICEF (suspended because of Ebola); research with Abdul Latif Jameel Poverty Action Lab on how nutrition-related incentives increase immunization uptake (currently looking for donor support for Moyamba).</p> <p>Other activities of the Livelihoods Unit: support smallholder farmers in cash crop areas, food for work or cash, improve market access (road maintenance), focus to move from subsistence to business, food assistance during Ebola, support training of farmers with the Ministry of Agriculture, Forestry and Food Security through farmer field schools' school feeding program (was suspended because of Ebola, but will restart and plan to implement nationwide with the Ministry of Agriculture, Forestry and Food Security and Ministry of Education, Science and Technology taking ownership).</p>
Financial institution	World Bank	Agriculture, aquaculture, fisheries	National	<p>Projects:</p> <ol style="list-style-type: none"> 1. Regional fisheries project (currently suspended in Sierra Leone, ends 2016) in Guinea, Sierra Leone, Liberia, Cote d'Ivoire and Ghana, with a focus on infrastructure and supporting the artisanal sector 2. Rural and Private Sector Agricultural Development project (ended 2015; nationwide but specific depending on commodities): linking farmers to markets (rice, cassava, vegetables, coconut) and also assisting with fish farming in terms of drying, processing and getting the fish to the market; a large portion of the project was focused on rehabilitating roads, processing rice and establishing warehouses for the storage of rice; some focus on rehabilitating inland valley swamps 3. West Africa Agriculture Productivity program (regional, in 13 countries in West Africa): in Sierra Leone, the focus is on revamping research and development, particularly for rice and cassava; nationwide, but with a focus on Kenema (Rokupr rice center) and Moyamba (Njala cassava research center), as well as developing the capacity and infrastructure of Sierra Leone Agricultural Research Institute; the project is funded by the World Bank and Japanese Trust Fund 4. Smallholder Commercialization and Agribusiness Development project (to begin February 2016): focus on the private sector and four value chains (rice, cocoa, palm oil and poultry) to identify agribusiness in each value chain to link with farmers 	For the new World Bank project, there may be an opportunity to incorporate fish farming and nutrition more into the design, as there has been a focus on production but less so on consumption.
Academia	Njala University	Food security, agriculture, aquaculture, nutrition education	National	<ol style="list-style-type: none"> 1. Postharvest methods 2. Reviewing and updating food and nutrition security curriculum with partners 	Aquaculture and agriculture expertise.
NGO	ACDI/VOCA	Agribusiness, food security, agriculture, livelihoods, nutrition	Tonkolili, Bombali	<ol style="list-style-type: none"> 1. Agribusiness work with FAO 2. SNAP program: conduct farmer field schools (participants receive training and demonstration plots to improve agricultural production and postharvest handling techniques); form cluster groups of farmer field school graduates to receive business development, business planning, governance and gender training, and agricultural input support to engage in the cultivation of larger areas of nutritious, high-value crops; develop vegetable gardens for mother care groups to promote access to nutritious foods for families after the end of the SNAP project; establish and support village savings and loan associations to promote individual and community savings in areas without access to commercial or community banks 3. Postharvesting management training 	

Type	Name	Thematic areas	Geographic areas	Activities	Notes
NGO	ACF	Food security, nutrition, health, water, sanitation and hygiene	Kambia, Kailahun, Western Area	<ol style="list-style-type: none"> 1. Nutrition: conduct surveys, focus on prevention and treatment, provide support to outpatient therapeutic programs, community health workers, mother support groups, and Ebola patients 2. Health: conduct surveillance (Ebola), seek to improve primary health care in peripheral health units and hospitals 3. Food security: integrated nutrition and food security through mother support groups (Western Area), health gardening (mostly in communities but also in urban areas), land usage and land rights, income-generation activities, short- and long-term cash transfers 4. Water, sanitation and hygiene 5. Assessments and studies: participated in the 2014 Standardized Monitoring and Assessment of Relief and Transition survey with the Ministry of Health and Sanitation, early warning systems with the Ministry of Agriculture, Forestry and Food Security and FAO, conducted 2013 Cost of Diet study, 2012 Poverty Study in Western slums, and knowledge, attitudes and practices surveys in their target areas 	ACF has been in the country since 1991. ACF does not currently work in aquaculture, but is looking to expand in capture fisheries.
	BRAC	Food security, nutrition, livelihoods, health, microfinance	Port Loko, Bombali, Tonkolili, Bo, Kenema, Western (agriculture projects), Moyamba, Kambia, Pujehun	<ol style="list-style-type: none"> 1. Nutrition: <ol style="list-style-type: none"> a. Past projects: Reducing Poverty and Hunger in Sierra Leone (ended June 2015); there was a focus on poultry and dairy, kitchen gardening, and a nutritional awareness campaign; another project was the School and Supplementary Feeding program with WFP that ended in 2012 and focused on school gardens and linking that to increasing women's income, as well as on food preparation b. BRAC also has a project supporting community agricultural promoters, which creates linkages to farmers c. Current nutrition-relevant activities: community health workers are being trained in a number of issues in six districts; a different topic is given each month for 12 months; the topic for August 2016 was exclusive breastfeeding and nutrition 2. Post-Ebola and development projects: <ol style="list-style-type: none"> a. 6-month recovery and post-Ebola project with World Vision and CRS b. Cash transfers during rainy season with Oxfam (unconditional cash transfers for food security and conditional for livelihoods) 3. Health programs: <ol style="list-style-type: none"> a. Essential Health Care: Focus on Ebola and water, sanitation and hygiene post-Ebola to reduce cholera and other diseases b. Malaria: community sensitization through health and school clubs c. Manoshi: maternal and child health care in slums of Freetown d. Community Medicine Point: working in remote health facilities to improve pharmaceuticals and community health worker training in over-the-counter drugs e. Slum project: youths selected and trained in sexual health, hygiene, skills, microfinance, human rights and sexual harassment, and health 	
	Barefoot Women Solar Engineers Association	Food security, gender	Port Loko	Using solar energy to process cassava; focus on training rural, illiterate women in solar energy use; it also has an agriculture farm in Port Loko	Local NGO.
	Children Advocacy Forum – Sierra Leone	Child protection, nutrition, health, education	Freetown	<ol style="list-style-type: none"> 1. Forming student clubs at schools to discuss health, water, sanitation and hygiene, nutrition, and immunizations 2. Work with market women's association on awareness of nutrition and immunization 	Local NGO with relationships with SUN, Focus1000, and Ministry of Social Welfare, Gender and Children's Affairs.
	Catholic Agency For Overseas Development (CAFOD)	Food security, agriculture	Bombali, Kenema	<ol style="list-style-type: none"> 1. Food security: 2012–2015 Unlocking the Potential of Moringa in Fish and Poultry Production project, funded by the European Commission: <ol style="list-style-type: none"> a. Three fishponds in Bombali and three in Kenema (deemed unsuccessful because of a lack of technical expertise); partners were Caritas Makeni and Caritas Kenema; CAFOD provides technical support and manages community mobilization b. The ponds in Bombali are in Binkolo (one well taken care of pond), Mabamba (two ponds for research purposes) and Tecko (one pond, participants were uninterested and then it was affected by flooding) 2. No current nutrition programs, but CAFOD has its own funding from the Catholic Church 	Interested in continuing with fish production and previous experience with nutrition programs.








Type	Name	Thematic areas	Geographic areas	Activities	Notes
NGO	CARE	Food security, livelihoods, nutrition	Tonkolili, Bombali, Koinadugu	<ol style="list-style-type: none"> 1. Nutrition: there is no current nutrition program; however, women's empowerment is a part of CARE's strategy, which includes giving more information to women, including information on nutrition; future nutrition programs depend on funding; the Window of Opportunity project ended in 2012 and focused on promoting infant and young child feeding in Koinadugu; it included training of women through mother support groups, promoting exclusive breastfeeding and reducing bottle feeding; there was also a focus on diversification of food and minimum meal frequency 2. Food security project ended in 2011 3. Food for Peace project: 1-year project that ends August 2016; it is an unconditional cash transfer program based in Tonkolili and Bombali; partners include Mankind's Activities for Development Accreditation Movement, Rofutha Development Agency (RODA) and NaSCA 	
	Caritas Makeni	Food security, nutrition, aquaculture	Northern Province	<ol style="list-style-type: none"> 1. Unlocking the Potential of Moringa in Fish and Poultry Production project, which focuses on increasing communities' access to fish and meat; the funding ends at the end of 2015, but the next strategy is to restock the poultries; the project also involves nutrition sensitization to promote vegetables and eggs and diversification of the farming approach through focus group discussions, women's groups and health personnel 2. Pilot program on fishponds with WFP 3. Crop diversification: activities suspended with Ebola, but should restart soon in the communities 	
	Concern Worldwide	Education, health, food security, market linkages, microsavings, protection, governance, gender, climate, HIV (cross-over theme)	Tonkolili, Western Area	<p>Food security and nutrition:</p> <ol style="list-style-type: none"> 1. 2013–2016 Linking Agriculture and Natural Resource Management and Nutrition project: integrates agriculture, nutrition and natural resources with a focus on nutrition education, women's groups and community engagement; they are working with WHH on the project (WHH implements it in Kenema and Concern in Tonkolili); one component includes the utilization of wild foods (so including a fish element would be good) 2. Disaster Emergency Committee funding: phase 1 has been on health, water, sanitation and hygiene, and psychosocial programs; phase 2 will be on food security in terms of a recovery phase for communities affected by Ebola, with a focus on education and nutrition 3. Fish farming in Tonkolili: project ended in 2013 and no research was done on impact 	<p>Other activities: livelihoods project in urban area (ended); women's protection project on domestic violence; cash payment project for people to work the farms of Ebola patients who were quarantined; cooking demonstrations and food preparation.</p> <p>Partners: Pikin, local NGO – education (could be used for nutrition too); WHH (it is in an alliance); Irish Aid.</p>
	CRS	Agriculture, food security	Koinadugu, Kailahun, Kenema, Bonthe (with West African Rice Company), Bombali (Ebola)	<ol style="list-style-type: none"> 1. Agriculture: 2013–16 Integrating Savings and Agricultural Development program in Koinadugu (developing swamps for rice, savings and internal lending committees for farmers, farmer field schools); Supporting West African Rice Center's inland valley swamp development in Bonthe, which is focused on rice, but interested in integrating soybeans and poultry 2. Health and Nutrition: doing an assessment with the Ministry of Health and Sanitation on infant and young child feeding in mother support groups; before Ebola, it had a small program on maternal care, childcare and nutrition with UNICEF (growth monitoring of children and providing supplementary feeding) 3. No current nutrition program 	<p>CRS does partner work in agriculture; also works with World Vision and Child Fund.</p> <p>Experience and expertise in food security and nutrition in other countries; works in nutrition in Malawi under a USAID program with mother care groups; CRS has also included fathers in nutrition through husband schools in East and Southern Africa.</p>
	Food and Nutrition Security Initiative	Food security, nutrition, water, sanitation and hygiene	Western Area, Bo	<ol style="list-style-type: none"> 1. Assessments on stunting 2. Supporting women in agriculture (small-scale farming and backyard gardening) 3. Nutrition and water, sanitation and hygiene sensitization and education 4. Cost-benefit analysis of locally prepared food for supplementary feeding 	Community-based organization; started in February 2015.
	Finn Church Aid	Food security, education	Pujehun, Kenema	<ol style="list-style-type: none"> 1. Implementing a 1-year food security project with two local partners (Partners in Integrated Community Empowerment Programs in Kenema and Network Movement for Justice and Development in Pujehun); distributed seeds and tools at trade fairs organized in June 2015; also organized farmer field schools until 2016; additionally, providing emergency support post-Ebola for farmers through a one-time cash distribution 2. Promoting education through partnerships with local NGOs 	








Type	Name	Thematic areas	Geographic areas	Activities	Notes
NGO	Focus1000	Nutrition, teenage pregnancy, health, water, sanitation and hygiene, education, advocacy, capacity building, community engagement	National	It focuses on facilitating communities through the following: 1. Evidence: it has done studies in nutrition, water, prevention of mother-to-child transmission (HIV and AIDS), family planning, attitudes and practices 2. Advocacy: to advocate with decision-makers 3. Capacity building: work with community health workers to improve capacity, especially in regard to interpersonal communication with mothers and to increase the utilization of services 4. Community engagement: through community structures (i.e. work with religious leaders to reach people, work in all chiefdoms where there are churches or mosques)	Focus1000 leads the civil society platform of SUN. It also works in Guinea. It has recently signed a memorandum of understanding with Universal Radio to promote discussion of these issues in communities.
	GOAL	Protection and empowerment of children and women, health (children under 5, pregnant and lactating women, nutrition), water, sanitation and hygiene, livelihoods	Kenema, Bo, Bonthe, Port Loko, Kambia, Bombali and Western Area	Livelihoods: 1. Provides grants for Ebola survivors to replace household essentials, discharges kits to survivors and food items to households 2. Focus on child laborers, income generation, training for sex workers and youth, health for children and women	GOAL has had limited involvement in livelihoods. It is hoping to expand its livelihoods work to include work with farmer cooperatives in production of rice, groundnuts, cassava and vegetables with a gender lens. It wants to create a market information system. Partners: Tim and Tim International, IsraAid, local NGOs, different consortiums (one consortium with Focus1000, British Broadcasting Corporation media action, Center for Disease Control and Protection, a water, sanitation and hygiene consortium with Plan, CARE, Save the Children and Oxfam).
	HKI	Tropical disease control, school for the blind, nutrition	Western Area, Bombali, Kenema, Bo, Port and national support through the Ministry of Health and Sanitation	Nutrition (focus is on vitamin A and food diversification): 1. 6-month contact point program (started in 2014, now scaling up) with focus on vitamin A, infant and young child feeding, and family planning; the Ministry of Health and Sanitation implements and HKI monitors and supervises; scale-up of the program is funded by Irish Aid and the United Kingdom Department for International Development (DFID); the next step will be the institutionalization of the 6-month contact point at the peripheral health unit level; infant and young child feeding practices focus on a variety of foods, hygiene, and cooking demonstrations at peripheral health units to promote dietary diversity (currently using locally fortified blended food in demonstrations) 2. Participated in research for the new dietary guidelines and barriers to infant and young child feeding 3. Currently preparing recipes for children from 6 months of age 4. Provided support to Ministry of Health and Sanitation in the revision of the child health card	HKI has been working in nutrition since 2004. Primarily health-focused, they are interested in incorporating fish in recipes for complementary feeding. Partners in nutrition include the Ministry of Health and Sanitation, WHO, UNICEF and World Vision.
	IMC	Nutrition, capacity building, water, sanitation and hygiene, family planning, health, behavior change	Kailahun, Koinadugu, Bombali, Tonkolili	Part of the SNAP program (with ACDI/VOCA) that focuses on reducing chronic acute malnutrition in children under 5 and women; IMC works in communities through mother support groups and in health facilities; has also started organizing men as partner groups; trains women in health and nutrition through four modules: immediate and exclusive breastfeeding, complementary feeding and micronutrients, essential hygiene action and family planning; also trains mothers to screen children using mid-upper arm circumference and organize cooking demonstrations; has developed a recipe book and support the Ministry of Health and Sanitation campaigns in immunization, vitamin A and the annual breastfeeding week; distributes tippy taps among households	Primary partners are the Ministry of Health and Sanitation and UNICEF.








Type	Name	Thematic areas	Geographic areas	Activities	Notes
NGO	Save the Children	Nutrition, health	Pujehun (infant and young child feeding), Freetown, Tonkolili and Bombali (SPRING)	<ol style="list-style-type: none"> 1. Nutrition assessment: logistical team is working with SPRING 2. Infant and young child feeding practices and reducing maternal, child and infant mortality: working with UNICEF on a project to reach peripheral health units and community health workers, conducting mid-upper arm circumference screening, and mainstreaming nutrition in the health program; the 3-year project ends in December 2016; also organized baby shows and backyard gardening 3. Community health workers program: supporting districts and training community health workers in infant and young child feeding; it also works with mother support groups and father groups to support exclusive breastfeeding and infant and young child feeding according to Ministry of Health and Sanitation guidelines 4. Organize a contest on the healthiest baby to promote breastfeeding, participate in annual breastfeeding awareness week and promote exclusive breastfeeding through radio and TV 5. Slums in Freetown: working with traditional birth attendants and mothers' groups on delivery, breastfeeding and newborn practices 6. Developing a project with ACF and Irish Aid on promoting better childcare practices among teenage mothers 	
	Sierra Leone Alliance Against Hunger and Malnutrition	Nutrition	Freetown	<ol style="list-style-type: none"> 1. Working on a paper to support the Right to Food movement 	Local NGO.
	Trocaire	Food security		<ol style="list-style-type: none"> 1. Food security mapping 2. Organic farming 	Works through partners to implement programs.
	WHH	Food security	Eastern and Southern provinces	<p>Food security programs:</p> <ol style="list-style-type: none"> 1. 2009–2014 Food Security and Economic Development with EU: <ol style="list-style-type: none"> a. Aquaculture development in Bo and Pujehun b. Inland valley swamps in Bo, Pujehun and Kenema with farmer associations: focus on rice and fish (ongoing) 2. 2010 rice value chain development project with CARE in Koinadugu, Bombali and Tonkolili 3. 2015 project with WFP (ongoing): encourages home gardening and links it with school feeding 4. Agricultural business center project with FAO in Bo and Kenema 5. Agriculture for Development: focus on trade crops (coffee and cacao) in Eastern Province 	WHH would be interested in a partnership, but it does not work much in Northern Province.
	World Vision	Sponsorship, education, health, emergency response, livelihoods	Kono, Bonthe, Bo, Pujehun are the main areas, but also works in other districts depending on grant funding	<ol style="list-style-type: none"> 1. Food security (Pujehun, 2012–2017): support communities in food production, microsavings, inputs and training in inland valley swamps. The inland valley swamp program has been focused on rehabilitation with a focus on rice, but the goal is to encourage double cropping of rice and vegetables (WFP provides the food for inland valley swamp activities) 2. Food aid program: works with WFP with a focus on children under 5 years of age <ol style="list-style-type: none"> a. food for work (suspended because of Ebola) b. school feeding c. nutrition: food rations determined based on assessment of malnutrition rates 3. Nutrition: supports the Ministry of Health and Sanitation in immunization and vitamin A at the national level; there have been 3 projects at the district level: <ol style="list-style-type: none"> a. Nutrition Capacity and Empowerment project in two chiefdoms in Bo; ended in 2013 b. Integrated management of acute malnutrition project; ended in 2013 c. Grandmothers project: pilot phase in Bonthe; promoting infant and young child feeding practices among grandmothers d. Nutrition assessment surveys in the four focal districts 4. Livelihoods Economic Development program: focuses on agriculture (crop production, farmer field schools, capacity building); there is minimal focus on fish (some in Bonthe and Bo), more so on other animals (looking to diversify livelihoods in terms of animal production) 	Interested in changing attitudes about selling versus consuming nutritious food.


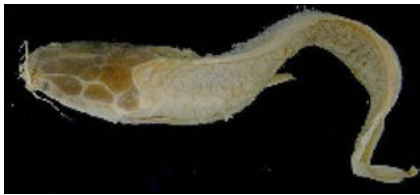





Type	Name	Thematic areas	Geographic areas	Activities	Notes
Program	Assessment Capacities Project	Humanitarian crises	National	Supports the humanitarian community with needs assessments; completes country thematic and assessment reports; in Sierra Leone, looking to assist with community reintegration post-Ebola	Consortium of Save the Children, Norwegian Refugee Council and ACF.
	SPRING	Nutrition, food security, dietary diversity, behavior change	Tonkolili, Bombali	<ol style="list-style-type: none"> SPRING conducted a nutritional needs assessment in-country, 20–30 September 2015, to inform future nutrition activities in Sierra Leone; in early 2016, SPRING selected HKI as its implementing partner to undertake three assessments (a barrier analysis on fish and pumpkin, assessment on water, sanitation and hygiene practices for children under 2 years of age, and value chain assessment on fish and pumpkin); following the completion of these assessments, SPRING and HKI will develop behavior change messages with a focus on fish and pumpkin SPRING also conducted value chain analysis on maize, sorghum, millet, groundnut, cowpeas, vegetables and livestock (poultry) 	SPRING is a program run by John Snow, Inc., HKI, Save the Children, the International Food Policy Research Institute and The Manoff Group. The objective is to reduce stunting and anemia. The project is funded by the Bureau of Food Security and Global Health, USAID. SPRING is interested in gender, complementary feeding and income generation.
	Western Regional Fisheries Program	Fisheries	National	Funding is coming to an end and there is uncertainty as to the future of the program	
Donor	DFID	Nutrition, health		Funds 6-month contact point program scale-up, implemented by HKI and the Ministry of Health and Sanitation	
	European Union	Food security		Funds 2009–2014 Food Security and Economic Development program, implemented by WHH	
	Government of Germany	Food security, nutrition		Funds Right to Food program, implemented by FAO, the Ministry of Agriculture, Forestry and Food Security, and the Ministry of Health and Sanitation	
	Irish Aid	Nutrition, gender, food security		<ol style="list-style-type: none"> Supports SUN's efforts to improve district coordination, with UNICEF Often partners with Concern Worldwide Funds 6-month contact point program with DFID, implemented by HKI and the Ministry of Health and Sanitation Funds Save the Children and ACF project on promoting better childcare practices among teenage mothers 	The Ambassador of Ireland is very keen on gender and nutrition.
	USAID	Food security		<ol style="list-style-type: none"> Food for Peace program, implemented by CARE Feed the Future program, implemented by WorldFish and partners SNAP program, implemented by ACDI/VOCA and IMC 	

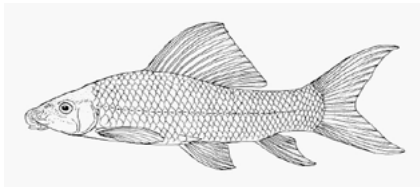
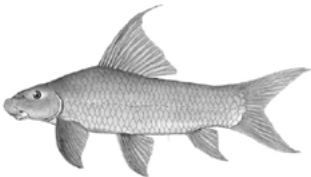



Annex 6. Fish species in Tonkolili




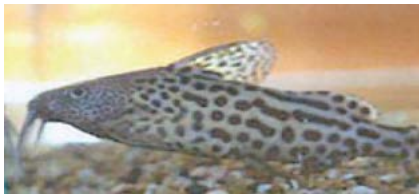

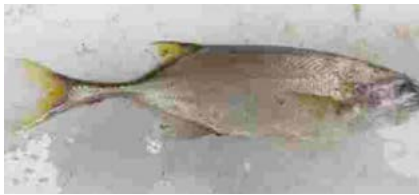
Family	Species	Length	Photo
Amphiliidae (local catfishes)	<i>Amphilius rheophilus</i>	12.2 cm standard length male/unsexed	 <p>Source: Rob Palmer</p>
Anabantidae	Silverbelly climbing perch or tailspot climbing perch (<i>Ctenopoma kingsleyae</i>)	12.2 cm standard length male/unsexed; 18.2 cm standard length female	 <p>Source: Rob Palmer</p>
Aplocheilidae	<i>Epiplatys fasciolatus</i>	9.0 cm total length male/unsexed	 <p>Source: Kjell Nilsson</p>
	<i>Epiplatys bifasciatus</i>	6.0 cm total length male/unsexed	Not available
Bagridae	Giraffe catfish or bubu (<i>Auchenoglanis occidentalis</i>)	70.0 cm standard length male/unsexed	 <p>Source: Benchawan Thiansungnoen</p>
	<i>Chrysichthys maurus</i>	51.0 cm standard length male/unsexed	 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
	<i>Chrysichthys nigrodigitatus</i>	65.0 cm standard length male/unsexed	Not available
	<i>Chrysichthys johnelsi</i>	33.0 cm standard length male/unsexed	 <p>Source: Rob Palmer</p>
Centropomidae	African snook or Nile perch (<i>Lates niloticus</i>)	200.0 cm total length male/unsexed	 <p>Source: Demeke Admassu</p>






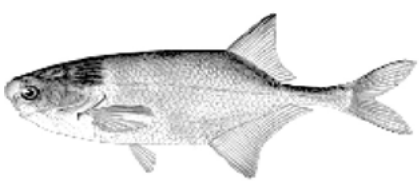
Family	Species	Length	Photo
Characidae	Longfin tetra (<i>Brycinus longipinnis</i>)	12.0 cm standard length male/unsexed	 Source: Rob Palmer
	True big-scale tetra (<i>Brycinus macrolepidotus</i>)	53.0 cm standard length male/unsexed	 Source: Mark Towers
	Nurse tetra (<i>Brycinus nurse</i>)	25.0 cm total length male/unsexed	Not available
	Elongate tigerfish (<i>Hydrocynus forskahlii</i>)	78.0 cm standard length male/unsexed	 Source: Panfli IRD
Cichlidae	<i>Sarotherodon occidentalis</i>	28.3 cm standard length male/unsexed	 Source: Tobias Musschoot/Royal Museum for Central Africa
	Banded Jewelfish (<i>Hemichromis fasciatus</i>)	20.4 cm standard length male/unsexed	 Source: Rob Palmer
	Jewelfish (<i>Hemichromis bimaculatus</i>)	13.6 cm standard length male/unsexed	 Source: Kjell Nilsson
	<i>Anomalochromis thomasi</i>	5.0 cm standard length male/unsexed	Not available
	<i>Pelmatochromis buettikoferi</i>	16.4 cm standard length male/unsexed	 Source: Tobias Musschoot/Royal Museum for Central Africa

Family	Species	Length	Photo
Cichlidae	<i>Pelvicachromis humilis</i>	12.5 cm total length male/unsexed	 <p>Source: Lutz Doring</p>
	<i>Sarotherodon caudomarginatus</i>	15.6 cm standard length male/unsexed	 <p>Source: Melanie L.J. Stiassny</p>
	<i>Tilapia brevimanus</i>	24.8 cm standard length male/unsexed	Not available
	<i>Tilapia buttikoferi</i>	30.8 cm standard length male/unsexed	 <p>Source: Daniel Hofer</p>
	<i>Tilapia louka</i>	25.0 cm total length male/unsexed	 <p>Source: Joerg Albering</p>
	<i>Tilapia joka</i>	9.6 cm total length male/unsexed	 <p>Source: Kjell Nilsson</p>
	Spotted tilapia (<i>Tilapia mariae</i>)	32.3 cm standard length male/unsexed	 <p>Source: Andreas Svensson</p>
	<i>Tylochromis jentinki</i>	27.0 cm standard length male/unsexed	Not available
	<i>Tylochromis leonensis</i>	21.9 cm standard length male/unsexed	Not available
	Nile tilapia (<i>Oreochromis niloticus</i>)	60.0 cm standard length male/unsexed	 <p>Source: WorldFish</p>

Family	Species	Length	Photo
Claridae	<i>Clarias laeviceps</i>	31.7 cm total length male/unsexed	 <p>Source: Museum National d'Histoire Naturelle</p>
	<i>Clarias anguillaris</i>	100.0 cm total length male/unsexed	 <p>Source: Swedish Museum of Natural History</p>
	<i>Clarias buettikoferi</i>	19.2 cm total length male/unsexed	Not available
	<i>Heterobranchus isopterus</i>	90.0 cm total length male/unsexed	 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
	African catfish (<i>Heterobranchus bidorsalis</i>)	150.0 cm total length male/unsexed	Not available
Cyprinidae	<i>Barbus liberiensis</i>	10.0 cm standard length male/unsexed	 <p>Source: Swedish Museum of Natural History</p>
	<i>Barbus sacratus</i>	25.6 cm standard length male/unsexed	 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
	<i>Barbus ablaves</i>	9.6 cm standard length male/unsexed	 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
	<i>Barbus</i> spp.		 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
	<i>Barbus leonensis</i>	3.3 cm standard length male/unsexed	Not available

Family	Species	Length	Photo
Cyprinidae	African carp (<i>Labeo coubie</i>)	75.0 cm standard length male/unsexed	 Source: Food and Agriculture Organization of the United Nations
	<i>Labeo parvus</i>	38.0 cm standard length male/unsexed	 Source: Guy Teugeis
	<i>Leptocypris guineensis</i>	6.3 cm standard length male/unsexed	 Source: Rob Palmer
	<i>Raiamas nigeriensis</i>	11.1 cm standard length male/unsexed	Not available
	<i>Raiamas scarciensis</i>	15.4 cm standard length male/unsexed	Not available
	Silver fish (<i>Raiamas senegalensis</i>)	24.5 cm total length male/unsexed	Not available
	<i>Raiamas steindachneri</i>	12.5 cm standard length male/unsexed	 Source: Rob Palmer
	<i>Varicorhinus wurtzi</i>	21.2 cm standard length male/unsexed	Not available
Distichodontidae	<i>Ichthyborus quadrilineatus</i>	20.8 cm standard length male/unsexed	Not available
	<i>Neolebias unifasciatus</i>	4.2 cm standard length male/unsexed	Not available
Gobidae	West African freshwater goby (<i>Gobius guineensis</i>)	15.5 cm total length male/unsexed	Not available
Hepsetidae	African pike (<i>Hepsetus odoe</i>)	27.8 cm standard length male/unsexed	 Source: Rob Palmer

Family	Species	Length	Photo
Malapteruridae	Electric catfish (<i>Malapterurus electricus</i>)	122.0 cm standard length male/unsexed	 <p>Source: Lothar Seegers</p>
Mastecembelidae	<i>Mastecembellus liberienis</i>	36.8 cm standard length male/unsexed	 <p>Source: Rob Palmer</p>
Mochokidae	<i>Synodontis tourei</i>	8.5 cm standard length male/unsexed	Not available
	<i>Synodontis annectens</i>	24.3 cm standard length male/unsexed	Not available
	<i>Synodontis filamentosus</i>	26.0 cm standard length male/unsexed	Not available
	Wahrindi (<i>Synodontis gambiensis</i>)	37.0 cm standard length male/unsexed	 <p>Source: Akewake Geremew</p>
	<i>Synodontis thysi</i>	22.9 cm standard length male/unsexed	Not available
	<i>Synodontis waterloti</i>	14.1 cm standard length male/unsexed	 <p>Source: Allan James</p>
	<i>Synodontis sorex</i>	36.0 cm standard length male/unsexed	Not available
	<i>Synodontis resupinata</i>	26.0 cm standard length male/unsexed	Not available
	Upsidedown catfish (<i>Synodontis batensoda</i>)	20.5 cm standard length male/unsexed	 <p>Source: Benutzer:Haps</p>
Mormyridae	<i>Petrocephalus levequei</i>	13.0 cm standard length male/unsexed	 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>

Family	Species	Length	Photo
Mormyridae	<i>Brienomyrus longianalis</i>	16.0 cm standard length male/unsexed	Not available
	<i>Isichthys henryi</i>	28.7 cm standard length male/unsexed	Not available
	<i>Marcusenius meronai</i>	18.7 cm standard length male/unsexed	Not available
	<i>Marcusenius thomasi</i>	20.0 cm standard length male/unsexed	 <p>Source: The Trustees of The Natural History Museum, London</p>
	Cornish jack (<i>Mormyrus anguilloides</i>)	150.0 cm total length male/unsexed	 <p>Source: Luc de Vos</p>
	<i>Mormyrops caballus</i>	46.0 cm standard length male/unsexed	Not available
	<i>Mormyrus tapirus</i>	43.0 cm standard length male/unsexed	Not available
	<i>Hippopotamyrus paugyi</i>	25.0 cm standard length male/unsexed	 <p>Source: Museum National d'Histoire Naturelle</p>
	<i>Marcusenius mento</i>	26.0 cm standard length male/unsexed	 <p>Source: The Trustees of The Natural History Museum, London</p>
	<i>Mormyrops breviceps</i>	65.0 cm standard length male/unsexed	 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
	<i>Petrocephalus simus</i>	12.0 cm total length male/unsexed	 <p>Source: Guy Teugels</p>
	<i>Mormyrops oudoti</i>	11.4 cm standard length male/unsexed	Not available






Family	Species	Length	Photo
Notopteridae	Reticulate knifefish (<i>Papyrocranus afer</i>)	80.0 cm total length male/unsexed	 <p>Source: Hakon</p>
Palaemonidae	<i>Macrobrachium</i> spp.		 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
Potamonautidae	<i>Potamonautes</i> spp.		 <p>Source: MacAlister Elliott & Partners & Fourah Bay College 2012</p>
Schilbeidae	<i>Schilbe mandibularis</i>	50.0 cm total length male/unsexed	 <p>Source: D. Thys van den Audenaerde/Royal Museum for Central Africa</p>
	<i>Schilbe micropogon</i>	21.0 cm standard length male/unsexed	 <p>Source: Tobias Musschoot/Royal Museum for Central Africa</p>



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