

# The State of Food Security and Nutrition in **Sierra Leone 2011**

Comprehensive Food Security  
and Vulnerability Analysis (CFSVA)

Data collected in  
June-July 2010



Republic of  
Sierra Leone



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European Union



## Acknowledgements

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**vam**  
food security analysis

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## KEY MESSAGES

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- Food insecurity increases sharply during the lean season (June to August). During this period, 45% of the population, or 2.5 million people, do not access sufficient food.
- Chronic malnutrition is serious with 34% of children between 6 and 59 months of age stunted and 10% severely stunted. Acute malnutrition is poor with 7% of children wasted. Malnutrition is more prevalent among girls than boys. Caring practices, nutrition awareness, dietary habits and access to adequate water, sanitation and health care are the key explanatory factors for these malnutrition rates.
- Domestic food production has recovered since the end of the conflict in 2002. This is driven by a threefold increase in the area planted with rice. Rice yields remain low and far below potential.
- The moderate increase in food grain production has improved Sierra Leone's cereal balance. Food imports have remained stable despite high increases in requirement levels due to population growth.
- Local rice is usually cheaper than imported rice but the latter is more readily available and acts as a buffer supply during the lean season. The response capacity of markets to react to price changes is severely hampered by poor road infrastructure and high poverty levels and thus, low demand.
- Producing food does not guarantee sufficient access to food. Only 6% of rice cultivators can rely on their own production to feed their family for the entire year.
- Households spend on average 63% of their total expenditure on food. Borrowing money to buy food is common (52%). Three quarters of the population rely on markets as their main source of food. Under such conditions, the trend of high and rising food prices poses a serious threat to food security in Sierra Leone.

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## Acronyms

ACF	Action Contre la Faim
ANC	Antenatal Care
APC	All Peoples Congress
ARI	Acute Respiratory Infection
BCG	Bacillus-Cereus-Geuerin (Tuberculosis)
CFSVA	Comprehensive Food Security and Vulnerability Analysis
CILLS	Comité Permanent Inter-Etats de Lutte contre la Sécheresse au Sahel
CO	Country Office
CP	Country Programme
CSI	Coping Strategy Index
CSPro	Census and Survet Processing System
DHS	Demographic and Health Survey
DPT	Diphtheria Pertussis Tetanus
EA	Enumeration Area
ERSG	Executive Representative of the Secretary General
EU	European Union
FAO	Food and Agricultural Organisation
FCS	Food Consumption Score
FEWS NET	Famine Early Warning System
HDI	Human Development Index
HH	Household
HIV	Human Immunodeficiency Virus
IITA	International Institute for Tropical Agriculture
IPA-SL	Innovations for Poverty Action – Sierra Leone
IYCF	Infant and Young Child Feeding
LTU	Livestock Tropical Unit
MAFFS	Ministry of Agriculture, Food Security and Forestry
DG	Millenium Developement Goal
MICS	Multiple indicator Cluster Survey
MoHS	Ministry of Health and Sanitation
MUAC	Mid-Upper Arm Circonference
NCA	Nutrional Causal Analysis
NGO	Non-Governmental Organisation
ORS	Oral Rehydration Solution
P4P	Purchase for Progress
PCA	Principal Component Analysis
PHU	Peripheral Health Unit
PLHIV	Person Living with HIV
PRRO	Protracted Relief and Recovery Operations
PRSP	Poverty Reduction Strategy Paper
SLPP	Sierra Leone Peoples Party
SMART	Standardized Monitoring and Assessment in Relief and Transitions
SPSS	Statistical Package for Social Sciences
SSL	Statistics Sierra Leone
STD	Sexually Transmitted Diseases
TB	Tuberculosis
TBA	Traditional Birth Attendant
UN	United Nations
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNIPSIL-ERSG	United Nations Integrated Peacebuilding Office in SL
VAM	Vulnerability Analysis and Mapping
WFP	World Food Programme
WHO	World Health Organisation
WI	Wealth Index

## FOREWORD

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This report presents the result of the 2010-11 Sierra Leone Comprehensive Food Security and Vulnerability Analysis (CFSVA) that was carried out from June 2010 through July 2010. It was designed to be representative for urban and rural analysis, by district and by the newly developed livelihood zones created by FEWSNET. In addition, the Western Area where the capital city Freetown is located was divided into three different strata: Western Urban, Western Urban Slum and Western Rural. The baseline, following the Vulnerability Analysis and Mapping (VAM) conducted in 2007, was implemented by WFP in collaboration with various stakeholders led by the Ministry of Agriculture Forestry and Food Security.

The purpose was to assist the Government of Sierra Leone and relevant stakeholders to better design, target and implement future development programmes for improving food security and nutrition in the country. In particular, it was intended to provide reliable baseline data in a post-war context which changes rapidly and needs regular situation monitoring; compare the food security status in rural versus urban areas and identify districts and livelihoods more affected by poverty and food insecurity.

The study contributes to the Risk and Disaster Management sub-component of the Government of Sierra Leone Small Holders Commercialization Programme. The study focused on livelihood-based food security and nutrition analysis with respect to the main pillars of food security. Therefore it is strongly believed that the results and recommendations of this survey will serve as a comprehensive resource for use by various stakeholders in the food security and nutrition sectors for planning, decision making and research.

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Minister of Agriculture Forestry and Food Security

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## BACKGROUND

Sierra Leone is located on the west coast of Africa, north of the equator. It covers an area of 71,740 km<sup>2</sup>. It borders Guinea in the north and northeast and Liberia in the east and southeast. The Atlantic coastline stretches about 340 kilometers. The country has a tropical climate and four main types of vegetation: forest, savannah, grassland and swamp.

Sierra Leone can be divided into four main physical regions:

1. Freetown peninsula, with its distinct mountains rising to a height of approximately 1000m.
2. The narrow and low-lying coastal plains which extend to about 40 km inland and are generally less than 30m above sea level.
3. The interior lowlands between 40-120 km inland at an average altitude of approximately 120m.
4. The interior hills and plateaux at an average altitude of 450m rising to a maximum of 2,000m.

The country has eight main river systems which typically flow from north-east to south-west and empty into the Atlantic Ocean.

Sierra Leone has an estimated population of 5.7 million and over 20 ethnic groups, speaking more than 24 languages besides English, the official language. The major tribes are the Mende, Temne, Limba and Krio. Its capital city Freetown has a population of over 800,000. More than half of the population is Muslim (60%) with Christians comprising a third (30%) and indigenous religions making up the rest (10%).

Administratively, the country is divided into four provinces -- northern, southern and eastern -- and the western area where Freetown is located. Each province is divided into districts (12 in total) and each district is subdivided into chiefdoms (150 in total).

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***The country relies on mining as its economic base. But two-thirds of the population survives on subsistence agriculture which represents more than half of the national income.***

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The country has two main seasons: the rainy season lasts about seven months from April to November peaking in July and August and the dry season lasts from December to May. Rainfall is relatively abundant throughout the country. The peninsula mountains receive more than 5,000 mm (200 inches) annually, while the northeast has about 2,000 mm (80 inches) a year. The dry season in the north is characterized by hot dry *harmattan* winds that blow from the Sahel. The south tends to be protected from these winds by the hills and mountains of the interior hills and plateaux region, which favours the production of tree crops. The most common natural hazard in Sierra Leone is flooding, which occurs mainly from June to September.

The practice of shifting cultivation means that there is little primary forest left with most of the country now covered by secondary forest or farm bush. Sierra Leone is rich in minerals (rutile), diamonds, gold and bauxite and relies on mining as its economic base. But two-thirds of the population survive on subsistence

agriculture, which represents more than half of the national income.

Historically, thanks to its location, Sierra Leone was the regional centre for trade and colonial administration. The country gained independence from the British in 1961, becoming a republic a decade later before adopting a one-party system of government in 1978. In 1991, it became a multiparty state with two main political parties, the Sierra Leone People's Party (SLPP) and the All People's Congress (APC). However a devastating civil war from 1991 to 2002 brought the country to its knees.

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***Seventy percent of the population lives below the national poverty line of US\$2 per day.***

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While significant progress has been made towards peace-building, the resettlement of displaced populations, reconstruction of war-affected communities and rehabilitation of productive household and community assets, the country still faces enormous challenges. Poverty levels are very high, with 70% of the population living below the national poverty line of US\$2 day. In terms of human development, its ranking has improved from 180 out of 182 countries in 2009 to 158 out of 169 countries for the 2010 classification of the Human Development Index.<sup>1</sup> But it has some of the worst human development indicators worldwide – especially for maternal and child mortality and malnutrition.

The war caused the displacement of 30% of the population with farms abandoned as

Sierra Leoneans fled into towns. However production of food and export of crops has to some extent recovered since the end of the war. But despite this, Sierra Leone remains highly dependent on food imports, and has been heavily affected by the 2008 global food price crisis. The 2009 global financial crisis hit the country hard too, with remittances and revenues from minerals dropping by 30% and the current high levels of commodity prices pose a great risk to the country's food security status.

This 2010 CFSVA is based on a nationally representative sample survey designed to provide information on food security and vulnerability in Sierra Leone. It is the first survey of this type carried out in both rural and urban areas. The Vulnerability Analysis and Mapping surveys of 2003, 2005 and 2007 were limited to only rural areas.

The objectives of the Sierra Leone CFSVA are:

- To produce reliable baseline data in a rapidly changing post-war context that needs regular situation monitoring
- To compare the food security status in rural versus urban areas following the rise in food prices
- To identify districts and livelihoods most affected by poverty and food insecurity
- To produce an updated reference document for agencies and institutions working in the area of food security in Sierra Leone.

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<sup>1</sup> UNDP, 2010

**Box I - Technical note on methodology**

The CFSVA was designed to be representative for urban and rural analysis, by district and by the newly developed livelihood zones created by FEWSNET. In addition, the Western Area where the capital city Freetown is located was divided into three different strata: Western Urban, Western Urban Slum and Western Rural. A sampling frame was created using a matrix where each livelihood zone was cross-referenced with each district to ensure that each stratum meets the minimum required sample size (see Annex for further details).

Based on this sampling frame, a total of 4,896 households were interviewed in 408 communities. Data collection began on 8 June 2010 and was completed on 15 July 2010.

Households were asked various questions regarding the demographic composition of the home, education, migration, assets, access to credit, various aspects of agricultural activities, sources of income, household expenditures, sources of food and foods consumed in the past week, shocks experienced and coping strategies. In addition, a health and nutrition module was included for children under five and their mothers/caretakers. The data from this module was used to examine linkages between household food security and nutrition outcomes.

A community questionnaire was also used in each of the enumeration areas. This questionnaire captured information about the community on topics such as health and road infrastructure, community health issues and access to education facilities. The data from this module was used to contextualize the communities surveyed for descriptive purposes.

A key indicator used throughout the analysis and the report is the Food Consumption Score (FCS). The FCS is commonly used as a proxy indicator for the current food security situation. It is calculated by determining the foods eaten by a household during a seven day recall period and applying weights to the food groups to which these food items belong based on their relative nutritional value. This score is then used to define a household into one of three food consumption groups: poor, borderline or acceptable, based on standard thresholds. More details on the calculation of the FCS and the thresholds for defining food consumption groups are provided in the Annex.

## PREVALENCE OF FOOD INSECURITY AND UNDERNOURISHMENT

### Food insecurity

At national level about 2.5 million are food insecure representing 45% of the country's population. Among them about 374,000 people (6.5%) are severely food insecure (Table 1).

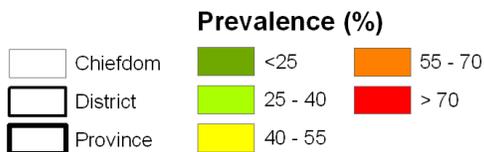
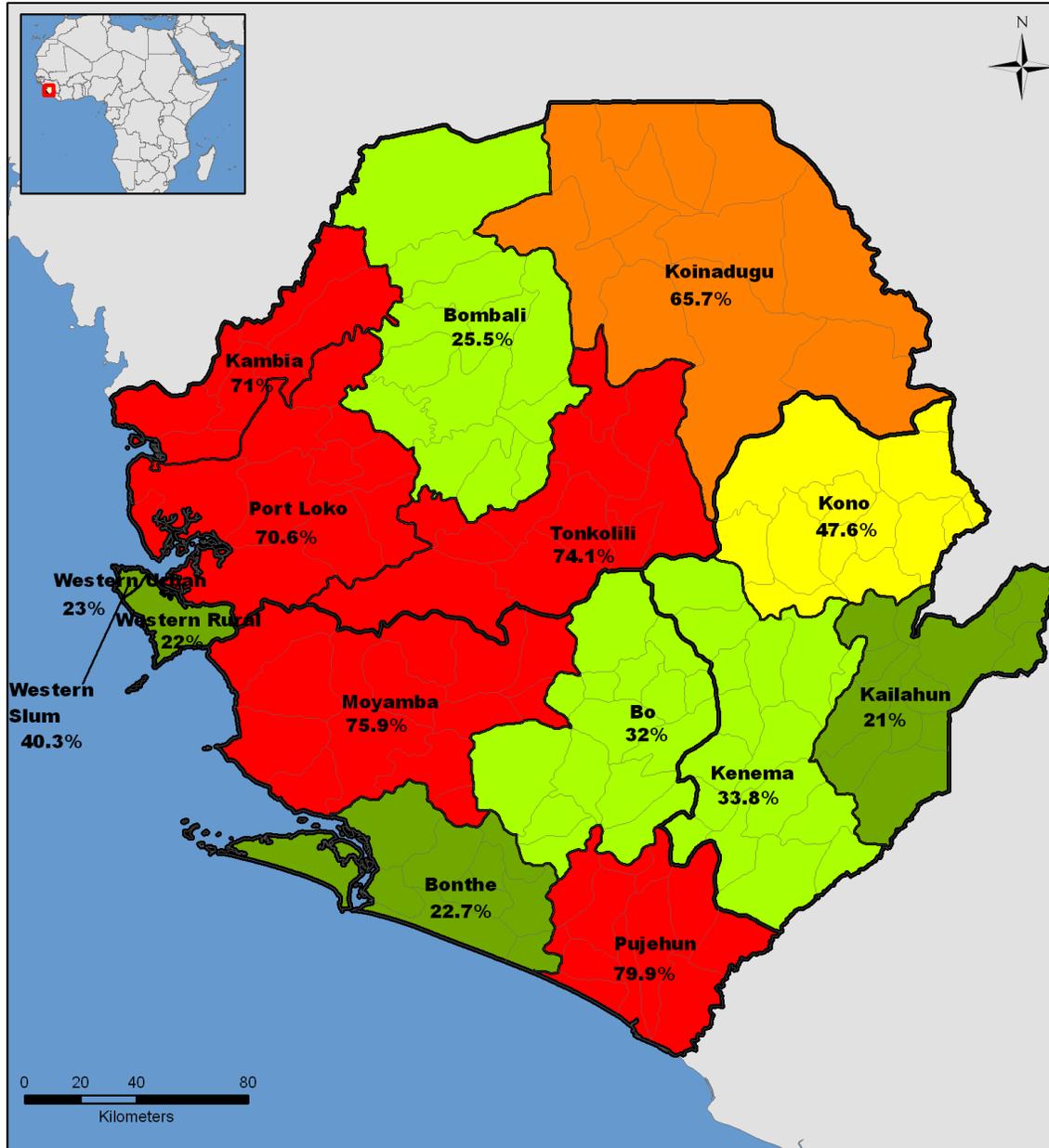
In FAO's latest *State of Food Insecurity in the World* (2010), the organisation estimates the number and prevalence of undernourishment in Sierra Leone, i.e. those people who consume fewer than 1,809 kcal per day, at 1.8 million and 35%, respectively. Given that the CFSVA was conducted at the height of the lean season, these figures are comparable to the ones presented here.

**Table 1: Prevalence of food insecurity**

Administrative sub-division	Total population	% of households severely food insecure	Population severely food insecure	% of households moderately food insecure	Population moderately food insecure	% of households food insecure (severe + moderate)	Total population food insecure
Port Loko	503,500	5.0%	25,175	65.6%	330,296	70.6%	355,471
Tonkolili	392,997	22.5%	88,424	51.6%	202,786	74.1%	291,211
Pujehun	306,700	6.8%	20,856	73.1%	224,198	79.9%	245,053
Kambia	308,929	4.3%	13,284	66.7%	206,056	71.0%	219,340
Western Area Urban	885,473	6.3%	55,785	16.7%	147,874	23.0%	203,659
Kenema	592,466	1.9%	11,257	31.9%	188,997	33.8%	200,254
Koinadugu	303,289	13.4%	40,641	52.3%	158,620	65.7%	199,261
Bo	596,469	0.9%	5,368	31.1%	185,502	32.0%	190,870
Moyamba	248,378	17.9%	44,460	58.0%	144,059	75.9%	188,519
Bombali	518,909	2.1%	10,897	23.4%	121,425	25.5%	132,322
Kono	214,956	7.9%	16,982	39.7%	85,338	47.6%	102,319
Kailahun	421,287	3.7%	15,588	17.3%	72,883	21.0%	88,470
Western Area Rural	241,438	1.3%	3,139	20.7%	49,978	22.0%	53,116
Bonthe	152,059	1.1%	1,673	21.6%	32,845	22.7%	34,517
Western Area Slum	59,905	6.0%	3,594	34.3%	20,547	40.3%	24,142
National	5,746,755	6.5%	373,539	38.5%	2,212,501	45.0%	2,586,040

Source of population figures: Directorate of Planning and Information (MOHS) Sierra Leone 2019

## Sierra Leone: Food Insecurity, based on the food consumption score (FCS)



**Percentage of households with poor or borderline food consumption by district**

Data sources: Country Office - 2010 CFSVA Sierra Leone  
 Geodetic Datum: WGS84  
 Map produced by WFP Food Security Analysis Service (OMXF) 01/2011  
 The Boundaries and names shown on this map do not imply official endorsement or acceptance by United Nations



**Map I: Food insecurity**

These estimates of food insecurity are based on current food consumption as measured by the food consumption score (see technical note on page 8). Households that have poor and borderline food consumption were classified as being food insecure. Households with poor food consumption were classified as severely food insecure. As such, food insecurity is not evenly distributed throughout the country. Rural areas are more affected by food insecurity (54.1%) than urban areas (29.1%). Households categorized as severely food insecure are also more prevalent in rural areas with 7.4% in rural areas compared with 5.1 % in urban.

There are large differences between districts in terms of food insecurity. As shown in Map 1, the districts most affected by food insecurity are Pujehun (79.9%), Moyamba (76%), and Tonkolili (74.1%), while the highest proportion of *severe* food insecurity is found in Tonkolili (22.5%), Moyamba (17.9%) and Koinadugu (13.4%).

Freetown peri-urban which corresponds to the whole of the Western Area has the lowest proportion of food insecurity. As expected, the Western Area Slum has higher levels of food insecurity than the Western Area Urban and Rural, but the prevalence of food insecurity in urban slums is still below the national average.

In absolute numbers Port Loko has the highest number of food insecure (355,000) followed by Tonkolili (291,000), Pujehun (245,000), Kambia (219,000) and the Western Area Urban (203,659). Severe food insecurity is concentrated in Tonkolili (88,000), Western Area Urban (55,500), Moyamba (44,000) and Koinadugu (40,600).

### Malnutrition

According to the UNICEF SMART survey<sup>2</sup>, 34.1% of children aged six to 59 months are stunted, with 9.5% severely stunted. WHO classifies this as serious on its severity scale (WHO, 1997). The figure underpins that for Sierra Leone chronic malnutrition is a serious problem that is linked to a poor quality of diet. Four districts exceed the 40% “critical” WHO threshold of chronic malnutrition (Moyamba, Pujehun, Kailahun, Kenema) as shown in Map 2.

The SMART survey found that 18.7% of children aged between six and 59 months are underweight, with 4.3% severely underweight. The highest prevalence of underweight is found in Kenema (24.3%), Moyamba (24.1%) and Pujehun (23.7%).

Wasting as a measure of acute malnutrition was found to be 6.9%, of which 0.9% of children are severely wasted.

<sup>2</sup> The 2010 SMART survey was conducted during the same period as the CFSVA and evaluated the nutritional status of children 6-59 months of age and women of reproductive age.

**Table 2: Acute malnutrition rates of prevalence at national level (boys and girls aged under five)**

2010 CFSVA			2010 SMART Survey				
	total	girls	boys		total	girls	boys
severe (MUAC <11.5cm)	1.3%	1.6%	1.1%	severe (MUAC <11.5 cm or oedema)	1.4%	1.7%	1.1%
moderate (MUAC = 11.5 - 12.49 cm)	4.7%	5.1%	4.3%	moderate (MUAC 11.5 - 12.49 cm)	4.4%	4.8%	4.0%
global (MUAC <12.5 cm)	6.0%	6.7%	5.4%	global (MUAC <12.5 cm or oedema)	5.8%	6.5%	5.1%

Acute malnutrition of children under five years old and their mothers was also assessed in the 2010 CFSVA using Mid-Upper Arm Circumference (MUAC) data to enable linkages between food security and nutrition analysis. The results for acute malnutrition measured by MUAC from the UNICEF SMART survey are presented alongside the MUAC rates of the 2010 CFSVA in table 2.<sup>3</sup> The results reveal that 6% are malnourished and 1.3% severely malnourished,<sup>4</sup> comparing favourably with those of the SMART survey which showed a prevalence of malnutrition based on MUAC of 5.8% and 1.4% of severe malnutrition.<sup>5</sup> While the SMART survey assessed children for oedema, the CFSVA did not do so.

Children with a MUAC of less than 11.5 cm are severely malnourished and have a high risk of mortality. Global Acute Malnutrition (GAM) based on weight for height in the SMART survey was

6.9% with 0.9% Severe Acute Malnutrition (SAM). The overall level of acute malnutrition in the country is poor according to the WHO classification.

**Table 3: Cut-offs for definition of acute malnutrition defined by MUAC (WHO, 2008)**

Classification	Cut-offs
Severe malnutrition	< 11.5 cm
Moderate malnutrition	11.5 cm ≤ MUAC < 12.5 cm
Not acutely malnourished – Normal	≥ 12.5 cm

Both the findings of the 2010 CFSVA and the SMART survey on malnutrition based on MUAC by sex show that malnutrition is more prevalent among girls than boys.

***Chronic malnutrition is a serious problem in the country and is linked to a poor quality of diet.***

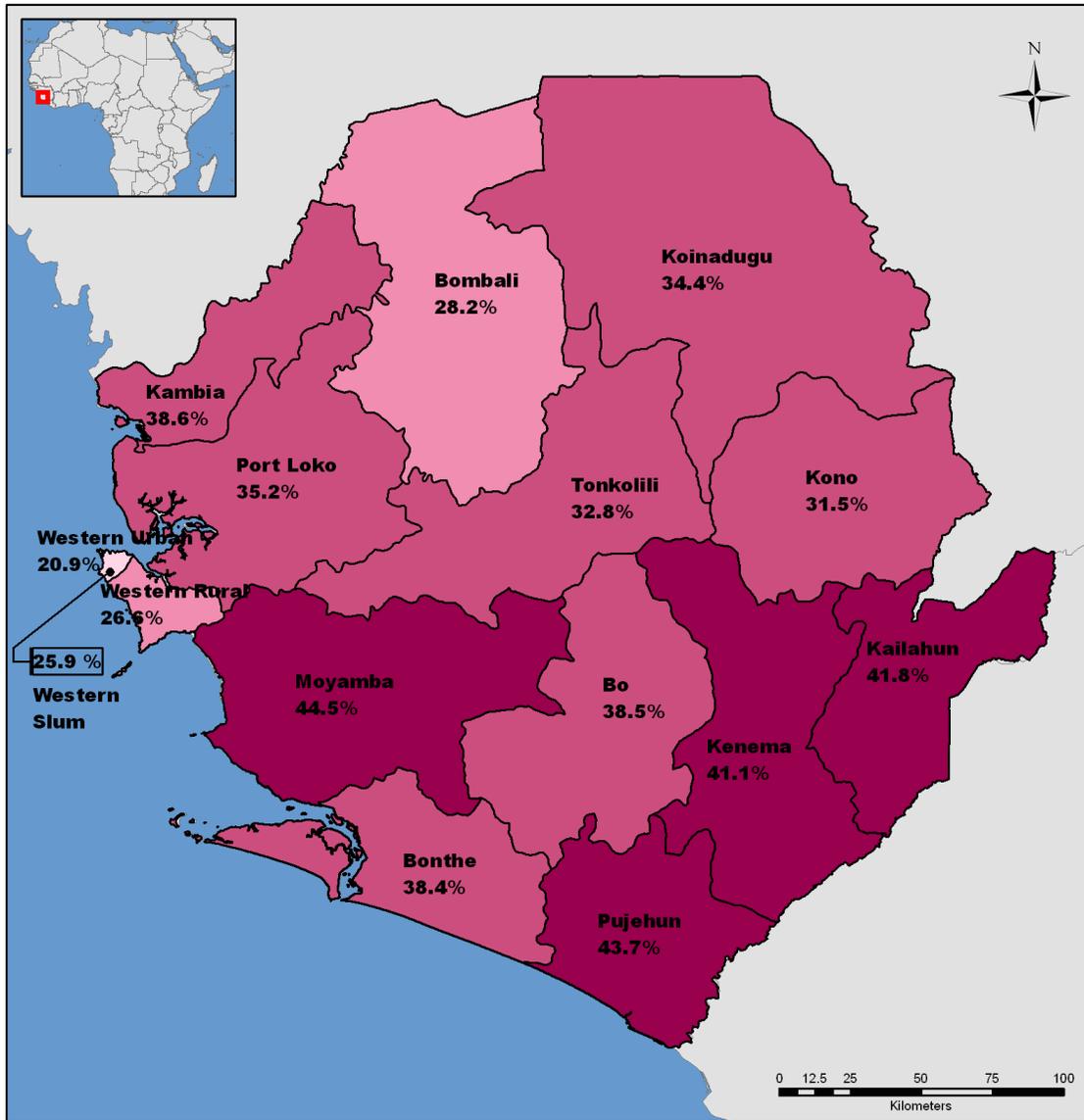
<sup>3</sup> The sampling for the CFSVA was based on the household. The number of children was therefore smaller than required to be representative at district level. In addition the MUAC data from Bonthe district were excluded; they showed very high prevalence of malnutrition which, when triangulated with data from the SMART survey and from qualitative information from the CFSVA, seemed unreliable.

<sup>4</sup> MUAC is typically used for rapid assessments and for screening of acute malnutrition as it is less cumbersome than taking weight and height measures. Therefore it is used in feeding programme centers and as a community level screening tool. It can be used as a proxy of wasting and is a very good indicator of risk of mortality.

<sup>5</sup> Oedema was taken into account in the SMART survey for the classification of acute malnutrition both for MUAC and weight for height.

According to the UNICEF SMART survey, the highest prevalences of acute malnutrition (MUAC < 12.5 cm) were found in Pujehun (8.9%), Moyamba (8.2%) and Western Area Slum (8.1%) and the highest prevalence of severe acute malnutrition in Pujehun (2.5%), Moyamba (2.3%) and Kenema (2.3%).

## Sierra Leone: Prevalence of Chronic Malnutrition as Measured by Stunting



Prevalence of chronic malnutrition according to Stunting in children 6 to 59 months of age by districts (WHO Standard)

- < 20 (Acceptable)
- 20 - 30 (Poor)
- 30 - 40 (Serious)
- >= 40 (Critical)

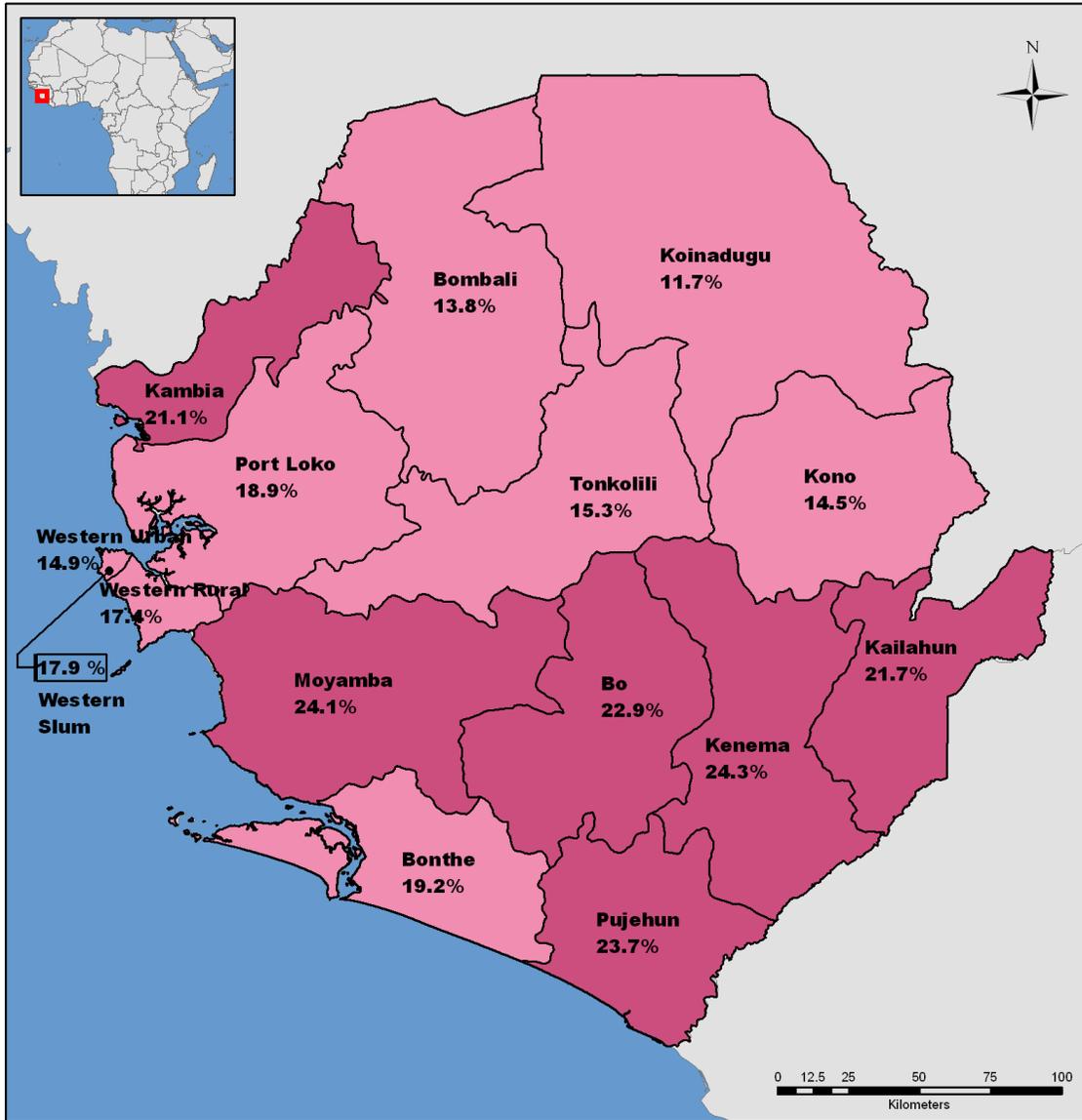
District

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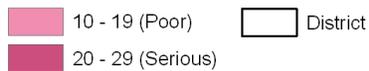


Map 2 - Stunting

## Sierra Leone: Prevalence of Malnutrition as Measured by Underweight



Prevalence of malnutrition according to Underweight in children 6 to 59 months of age by districts (WHO Standard)



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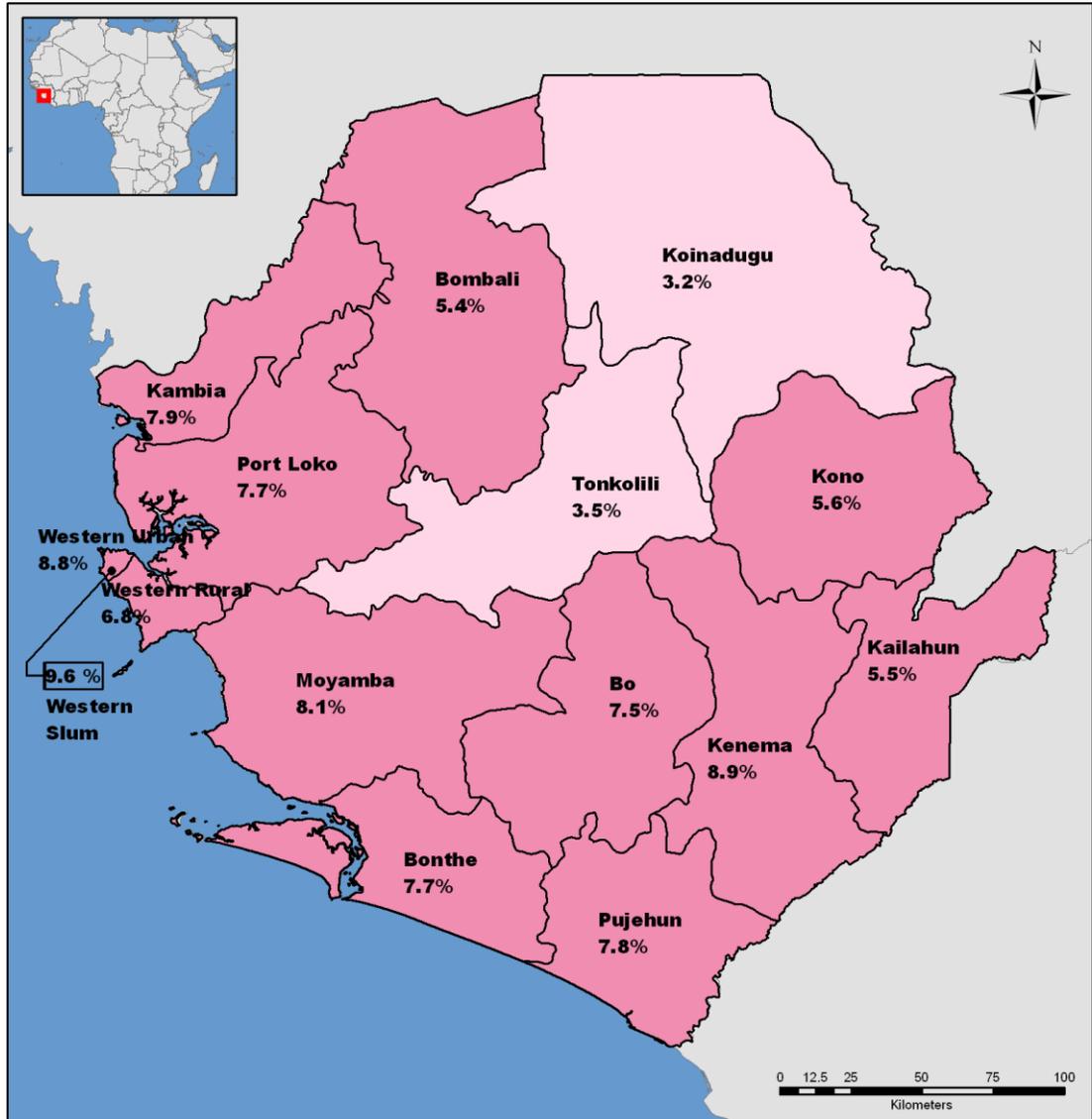
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Map 3 – Underweight

## Sierra Leone: Prevalence of Acute Malnutrition as Measured by Wasting



Prevalence of acute malnutrition according to wasting in children 6 to 59 months of age by districts (WHO Standard)

- < 5 (Acceptable)
- 5 - 9 (Poor)
- District

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Map 4 - Wasting

## Sierra Leone: Prevalence of Acute Malnutrition as Measured by MUAC of Children



Prevalence of acute malnutrition according to MUAC in children 6 to 59 months of age by districts (WHO Standard)

- < 5
- 5 - 7
- > 7
- District

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Map 5 - MUAC

**Table 4: Acute malnutrition prevalence by area (urban/rural)**

2010 CFSVA - MUAC categories			
	Severe acute malnutrition MUAC (<11.5)	Moderate acute malnutrition MUAC (11.5 - 12.49)	Not acutely malnourished MUAC (>=12.5)
<b>Rural</b>	1.4%	5.1%	93.5%
<b>Urban</b>	1.2%	3.8%	95.0%
<b>Total</b>	1.3%	4.7%	94.0%

Table 4 shows that children in rural areas are more affected by acute malnutrition than those in urban areas.

The prevalence of acute malnutrition among adults is low. Although there is no internationally agreed MUAC cut-offs for adults, both the 2010 CFSVA and the SMART survey used MUAC <214 mm to estimate acute malnutrition in non pregnant women aged 15-49 years old.<sup>6</sup> Accordingly, the 2010 CFSVA found 4.5% of non pregnant women were malnourished. These results of the SMART survey showed a prevalence of acute malnutrition among women, based on MUAC, of 3.5%.

The highest prevalences of acute malnutrition among adult women are found in Bonthe (5.8%), Kono (4.9%) and Tonkolili (4.6%)<sup>7</sup>.



**Malnutrition is more prevalent among girls than boys. Photo: WFP**

<sup>6</sup> This cut-off is based on UNHCR/WFP March 2009 supplementary feeding program guidelines.

<sup>7</sup> Source: SMART survey

## FOOD PRODUCTION AND MARKETS

### Local food grain production

Domestic food production has recovered rapidly since the end of the conflict. The increase in overall rice output, which accounts for more than 80% of Sierra Leone's total food grain production, has been the driving factor behind this. In 2009, milled rice production reached an estimated 465,000 tons, three times the average 1999-2001 milled rice production of 152,000 tons. However, the increase in production can be attributed to a trebling of the area harvested, from a 40-year low of 200,000 hectares in the year 2000 to over 600,000 hectares in 2005. Yields remain very low at 1.0 to 1.5 tons per hectare (see Graph 1), comparable to the average for Sub-Saharan Africa but far below potential. Production of root and tuber crops has also expanded rapidly.

### Cereal balance and food imports

The increased level of national production has significantly improved Sierra Leone's cereal balance over the past decade. According to United States Department of Agriculture (USDA) data, self-sufficiency in grains dropped to an all time low of 50% at the end of the conflict in 2000, compared with a self-sufficiency level of around 80-90% during the 1970s and 1980s (see graph 2).

As a consequence Sierra Leone has become less reliant on overseas markets for food supplies than it was in the immediate aftermath of the conflict. Although overall domestic consumption of food grains is growing steadily, imports have remained stable in absolute terms, accounting for a smaller share of overall consumption in the country.

Most food is imported via Freetown. As a consequence, the Western Area is the most

import-dependent in the country, making it the most exposed to global market shocks and hikes in food grain prices, particularly rice.

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*The recovery in domestic rice production has significantly improved Sierra Leone's cereal balance.*

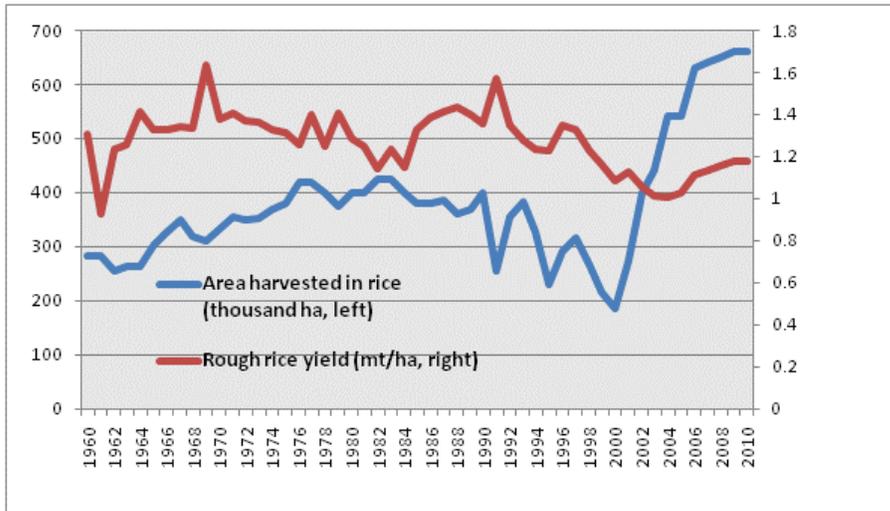
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### Domestic markets

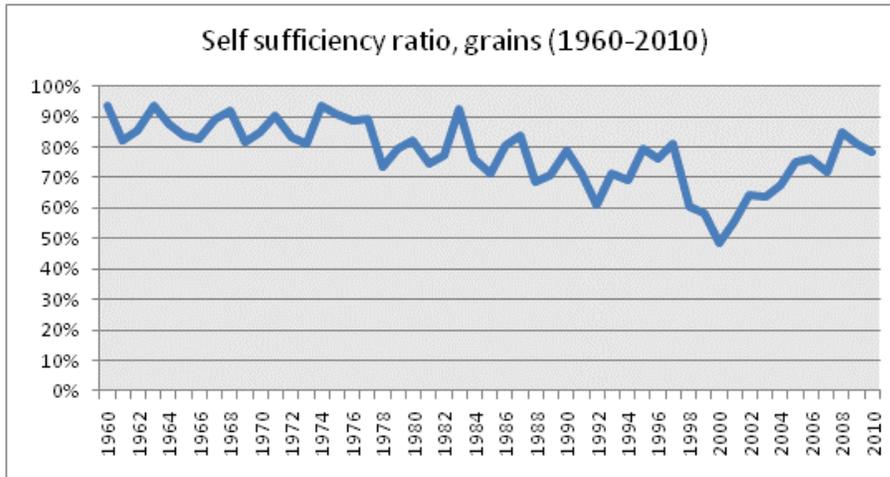
Rice is produced throughout Sierra Leone. However, the main rice surplus-producing areas are Kalangba, Pujehun and Makeni in the south. These areas export local rice surpluses to deficit regions (see Map 6) in the north and urban centres. Rice is also exported to neighbouring countries (see section on regional trade). The local rice trade is most active immediately after the harvest and slows as the surplus dwindles in the lean season, when the imported rice market ensures the continuity of supply to urban and rural areas.

Most rural areas are self-sufficient in rice during the post harvest period and become rice deficient at the peak of the lean season. The extent of household dependency on imported rice purchases will depend on the level of their own rice production and the availability of alternatives, such as cassava. In recent years the season during which local rice is unavailable has become shorter thanks to a rise in local rice production.

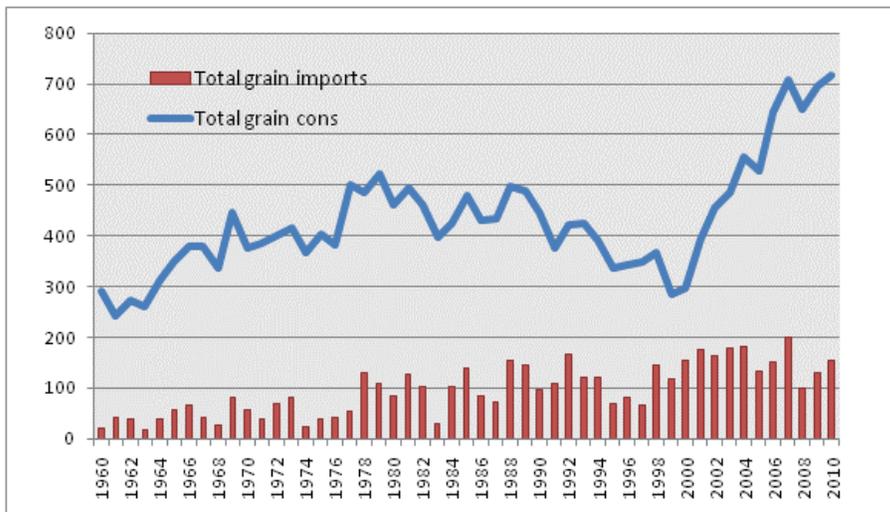
**Graph 1: Area of rice harvest and rice yield (1960 – 2010)**



**Graph 2: Self sufficiency ratio, grains (1960-2010)**



**Graph 3: Grain imports and consumption (1960-2010)**





**Map 6: Domestic rice trade flows**

Source: FEWSNET

Domestic markets are only partially integrated in Sierra Leone because of several factors that include the inter-annual variability in production, low volume of commercial surpluses and poor infrastructure. Better integrated markets would favour food security as they offer more stable and reliable market conditions with regard to price, variety and volume of food items.

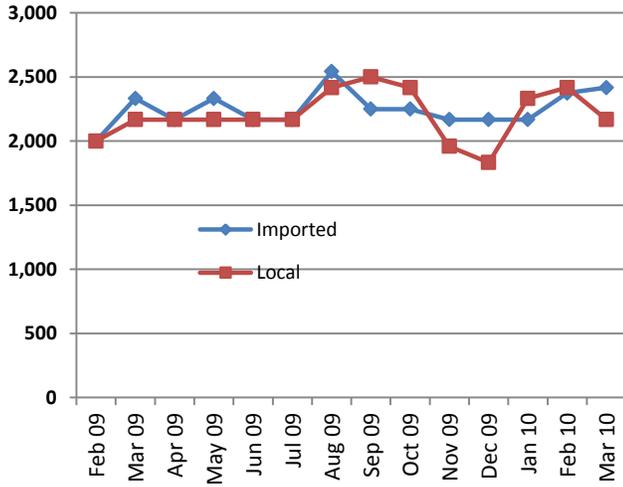
The market monitoring carried out by WFP since January 2009 can shed light on the degree of market integration in the country.

### Rice prices

Generally, the price of local rice is cheaper than that of imported rice, except during lean season months when local rice prices increase. The price in the main rice producing area of Barmoi demonstrates how the price peaks during the lean season (July-October), then dips from October to December, the main harvest period. Such seasonal price variations indicate that local rice production is failing to meet demand (especially from Guinea), that local market infrastructure is inadequate and marketing activities undeveloped.

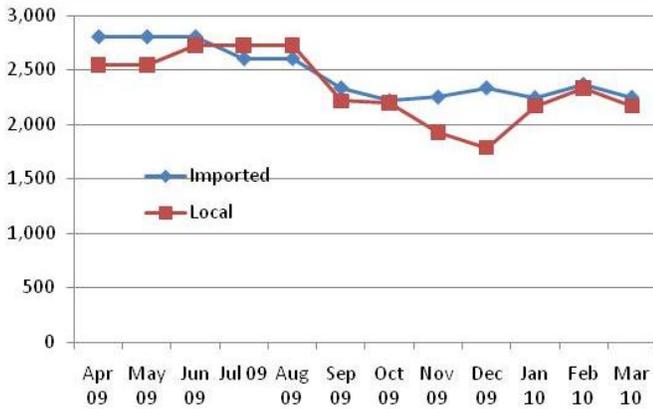
A study of price trends in Freetown offers similar insights. Here imported rice prices are more stable with imported rice becoming the cheaper commodity on the market when local rice prices rise during the lean season.

**Graph 4: Retail price of imported and local rice in Barmoi, Feb 2009-Mar 2010 (Le/kg)**



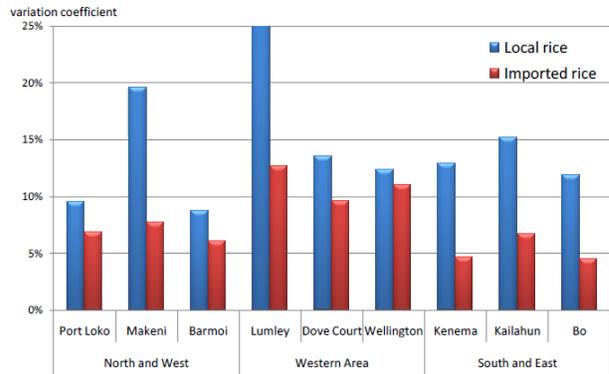
Graph 4 plots the prices of local and imported rice in Barmoi and graph 5 those of Dove Court, a wholesale market located in central Freetown.

**Graph 5: Retail price of imported and local rice in Freetown, Mar 2009-Mar 2010 (Le/kg)**



Graph 6 shows that the variability of prices for local rice is twice that of imported rice. In every market analyzed, the price of local rice varies more than that of imported rice with surplus producing areas, including Barmoi and Port Loko, showing the lowest variation and deficit areas a higher variability. Such variability is a great source of uncertainty for rice producers and poses a risk to poor rice consumers.

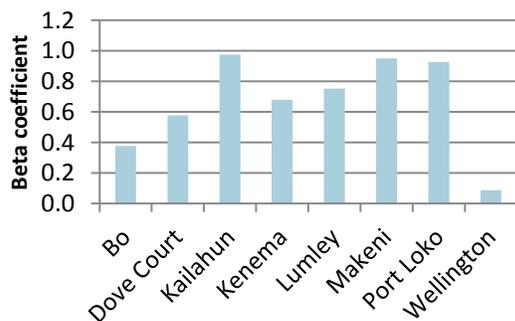
**Graph 6: Stability of local and imported rice in Sierra Leone, January 2009-March 2010**



*The price of local rice is cheaper than imported rice, except during the lean season when local rice prices increase.*

Graph 7 demonstrates how the local rice market in Sierra Leone is only partially integrated. It shows how a price shock in the main producing area of Barmoi is passed through to other national markets by calculating the beta coefficient<sup>8</sup>. A price change in Barmoi is almost completely reflected in the markets of Makerni, Port Loko and Kailahun. Prices in the markets of Lumley and Kenema react to a lesser extent while those in Bo and Wellington do not react much at all. The same analysis carried out using Port Loko as the central market yields similar results.

**Graph 7: Beta coefficient - Local rice, reaction to a price shock in Barmoi market**



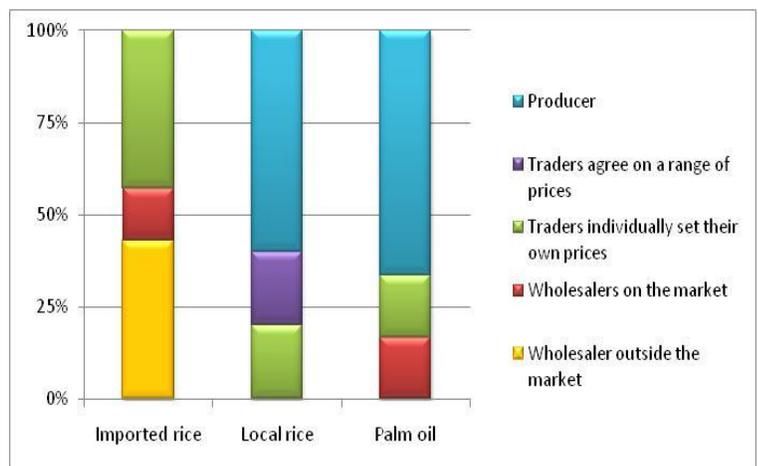
Prices for local rice are linked between neighbouring markets (Bo and Kenema, the markets of Western Area, Port Loko and Barmoi) but not across the country as a whole. The average correlation coefficient is 0.36, which is much lower than the 0.7-0.8 values commonly observed in Senegal or Guinea, and below the value of 0.46 for imported rice in Liberia.

The above suggests that a well-organized and structured national trading system for rice does not exist. Rice production in Sierra Leone is predominantly used for auto-consumption. Surpluses are mostly marketed in the immediate post-harvest season, not year round. Imported rice plays the role of the buffer

commodity, making up for domestic rice shortfalls during the lean season. As long as international rice prices are stable, this seems to offer a reasonable food supply mechanism for Sierra Leone.

One caveat however is that the imported rice market in Sierra Leone is heavily concentrated, with six firms accounting for 90% of the import trade. Such a high degree of concentration might offer opportunities for collusion between importers and could therefore result in anti-competitive practices. The concentrated nature of the imported rice market chain has implications for price-setting practices in local markets. As illustrated in graph 8, in the majority of markets external wholesalers determine the prices of imported rice (which contrasts with the largely producer-led price setting practices for local rice or palm oil). The phenomenon implies that during the lean season, when household food stocks are depleted and market dependence on imported rice at its highest, consumers rely on the market chains that afford them the least bargaining power.

**Graph 8: price setters**



<sup>8</sup> The beta coefficient is used to measure the dependency of one market on another by evaluating the covariance of a commodity price in two markets in relation to the variance of price in a central market

## Regional trade

Sierra Leone benefits from a buoyant regional trade, which offers an outlet for rice, *gari* (cassava flour) and palm oil.

Neighbouring Guinea is a rice-deficit country, importing about 400,000 tons of rice from overseas in 2009. The urban middle class of Guinea's capital Conakry has a preference for



**The area planted with rice has more than tripled since the end of the civil war. Photo: WFP**

local parboiled rice of the type produced in nearby Sierra Leone, offering a market opportunity for the rice producing districts of Kambia and Port Loko. Statistics gathered by the Guinean *Système d'Information sur les Produits Agricoles en Guinée* (SIPAG) in late 2009, as the harvest was being brought to the market, indicated that Guinea was importing at least 360 tons of local rice from Sierra Leone. These rice quantities are assembled and dispatched through Barmoi international market.

Distortions in trade policy can temporarily drive cross-border flows of imported rice. In 2009 Guinea imported large quantities of rice, duty free. This exceptional level of rice availability in Guinea consequently led to re-exports to Liberian border markets in late 2009. The same phenomenon may have taken place in Sierra Leone. As such, Guinea or Liberia's trade policy have an influence on Sierra Leone's food availability and ability to export regionally.

Substantial volumes of palm oil are traded in the West African region and Sierra Leone has been benefitting from this trade. Eastern Sierra Leone (Kailahun and Koindu) exports significant quantities of the oil to neighbouring Guinea through the market in Guékédou (Guinea). The quantities sent from eastern Sierra Leone to Guinea are difficult to ascertain, given the multiple crossing points between both countries. The palm oil producing areas of Western Sierra Leone (Kambia) export surpluses to Conakry, through the market in Barmoi, in quantities estimated at some 30mt per month. Since 2007, and notwithstanding a dip in late 2008, palm oil prices have been buoyant on the international and regional markets. These high prices for palm oil have supported producer incomes and have allowed palm oil producing groups to weather the shock of high food prices in 2008. Guinean traders commonly offer advances to producers in order to secure much desired palm oil supplies. These advances, normally provided during the lean season, provide an important cushion for small scale palm oil producers against food insecurity.

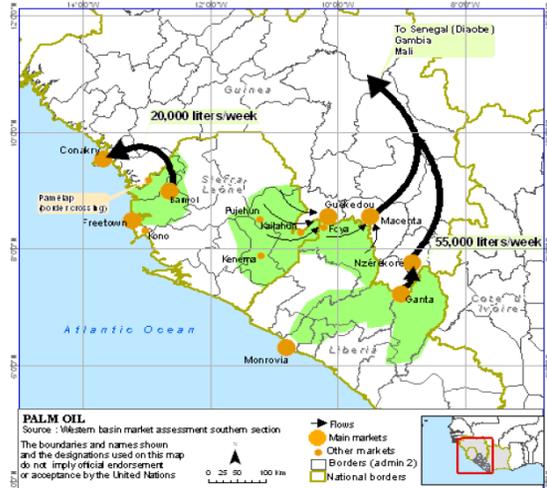
Since the increase in food prices in 2008, *gari* (cassava flour) has become an important substitute for rice in West African urban settings. Sierra Leone has a burgeoning *gari* industry that has started supplying neighbouring countries with cassava products made in Sierra Leone marketed to urban consumers in Conakry and Monrovia. Its monthly *gari* exports to Guinea through Barmoi are thought to exceed 400 tons at times of peak seasonal availability.

**Map 7: Gari cross-border trade flows**





Map 8: Parboiled rice cross border trade flow



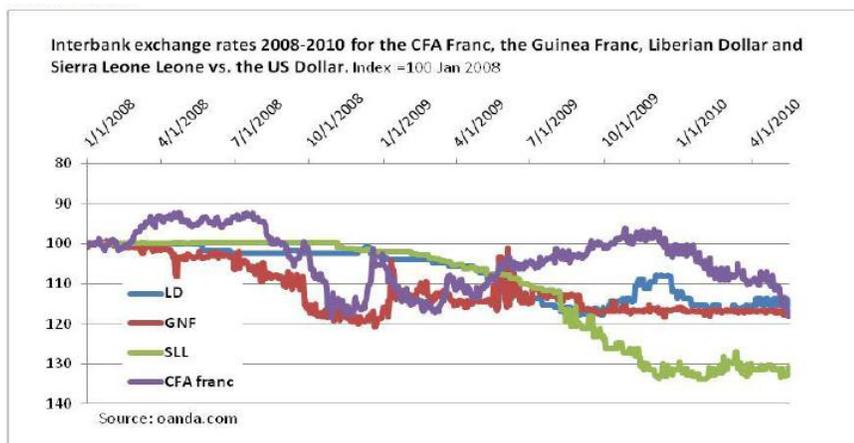
Map 9: Palm oil cross-border trade flows

### Box 3 - Market challenges

Food markets in Sierra Leone successfully link consumers and producers, but suffer from essential shortcomings:

- The high degree of concentration in the trade of imported rice and in the cocoa market chain risks leading to price setting practices and unfair competition.
- The local rice market is thin with local rice prices twice as volatile as those of the imported variety.
- Exchange rate variations and trade policies influence the direction of cross-border trade flows. Sierra Leone’s weak currency has been a source of competitiveness in the regional trade. In fact the Leone’s weakness against the US dollar has kept food imports at bay and favoured domestic food supply and exports. Graph 9 shows that the Leone lost one-third of its value against the dollar between January 2008 and May 2010. Other regional currencies (The Liberian dollar, the CFA franc, the Guinean franc) remained more stable during that period.
- Market response capacity suffers extensively from poor road infrastructure and limited transportation capacity.
- The lack of available credit as well as low demand because of widespread poverty (see next chapter) undermines the market’s capacity to reduce food insecurity.

Graph 9: Exchange rates W African currencies versus the US Dollar 2008 - 2010



## POVERTY AND LIVELIHOODS

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Livelihood, income and wealth are essential indicators of a household's ability to access sufficient food and its resilience to shocks. This chapter investigates these aspects of poverty and their relationship with food insecurity.

### Livelihood zones

In May 2010, the Government, FEWSNET and other partners updated a map of principal livelihoods. Ten livelihood zones were identified where people share similar options for obtaining food and income. Differences in income source are the main factors that distinguish zones (see Map 10).<sup>9</sup>

#### *Rice and secondary gold mines (Tonkolili food crops and gold)*

This livelihood zone covers the eastern and northern chiefdoms of the Tonkolili district as well as the bordering chiefdom of Diang in Koinadugu. The zone is comprised of a mixture of hills and plains where both highland and lowland rice are cultivated. There are more surface deposits of gold in this area than in the rest of Sierra Leone. Many households participate in small-scale gold-mining as a coping strategy to supplement other income sources, mostly food production in the form of rice and some cassava. Roads in this region are particularly poor as is access to markets.

#### *Crops, livestock, rice, cassava, sweet potato (Bombali food crops, peppers, tobacco and livestock)*

This zone encompasses nearly all of Bombali district in the north and is characterized by open-bush and grasslands. Rice, cassava and sweet potatoes are the staple food crops while groundnuts, peppers and tobacco comprise the

main cash/non-staple crops. Tobacco and large-scale cassava production require wage labour, a key income source in this zone. While the land is suitable for livestock rearing, theft during the civil war has hindered the continuation of this livelihood.

#### *Degradation, short cycle, root crops, trade, cassava, yam (western rice, root crops, cereals and trade belt)*

This zone runs from the northwest border with Guinea to the southeast border with Liberia covering much of Kambia, the eastern side of Port Loko and Moyamba, the west of Tonkolili and Bo, and a small portion of eastern Pujehun. It is a trade hub for Sierra Leone as the main rivers link it to the north-east and the coast and the main roads connecting to Guinea and Liberia run through it. It is mostly a plain between the coastal areas and the higher regions of the northeast of Sierra Leone with a number of rivers and streams descending to the ocean. In addition to the cultivation of rice and cassava, this zone produces palm oil and cereals – millet and maize. The production of maize is mostly for fodder (primarily chicken).

#### *Fish and food crop (coastal food crops and fishing)*

This zone covers the majority of the coast of Sierra Leone and consists of a series of river outlets to the ocean with swamplands and mangroves. Coastal fishing is important but varies across communities. Rice is cultivated to the north while cassava and palm oil are more important in the south. It has the highest rainfall in the country and less fertile soil than other parts of the country. Some areas are particularly inaccessible by road.

#### *Cash crop, food crop, trade (Kailahun-Kenema-Kono cash crops, food crops and trade)*

This zone comprises the south-east of the country and borders Liberia, which makes it an

<sup>9</sup> For more details on these food economy and livelihood zones, please refer to WFP (2002) Community Food Security Profiling - A Community Level Assessment of Food Security, Summary of Findings from the Six Study Areas and FEWS NET (2010) Livelihoods zoning "plus" activity in Sierra Leone.

important region for trade. It covers all of Kailahun, the southern half of Kenema and a portion of Kono and is mostly hilly with substantial tropical forest cover. Its substantial number of cash crops include palm oil, cocoa, coffee and kola nut. Wealthy land-owning households employ a significant number of agricultural workers.

#### ***Rice and trees (Kono-Kenema-Bo rice, tree crops and timber)***

This zone has cash crop cultivation from trees in its hilly terrain and rice cultivation in the plain region in the west. It also has a greater prevalence of timber for domestic use (construction and charcoal production).

Mining of gold employs migrants from bordering countries but it is also practised by locals as a coping mechanism.

#### ***Livestock trade, food crop (Koinadugu livestock, food crops and trade)***

This zone covers the majority of Koinadugu and a small part of Kono in the north-eastern part of the country bordering Guinea. It lies at a higher elevation, with lower rainfall than the rest of Sierra Leone. The vegetation is mostly grassland and bush. It is associated with livestock which is mostly practiced by the ethnic minority *Fulani* people. Rice and a variety of pulses are cultivated here but households are still largely dependent on markets for other food items which are problematic because of poor road coverage.

#### ***Vegetable production area (Follosaba Dembelia and Wara Wara Yagala vegetables)***

This small high-elevation zone covers two rice, chiefdoms in the north west of Koinadugu. It is self-sufficient in food production, producing funde (a cereal), cassava and pulses in the form of groundnuts and pigeon peas. It markets chilli peppers. It has poor road infrastructure which reduces the competitive advantage of the region's vegetable production.

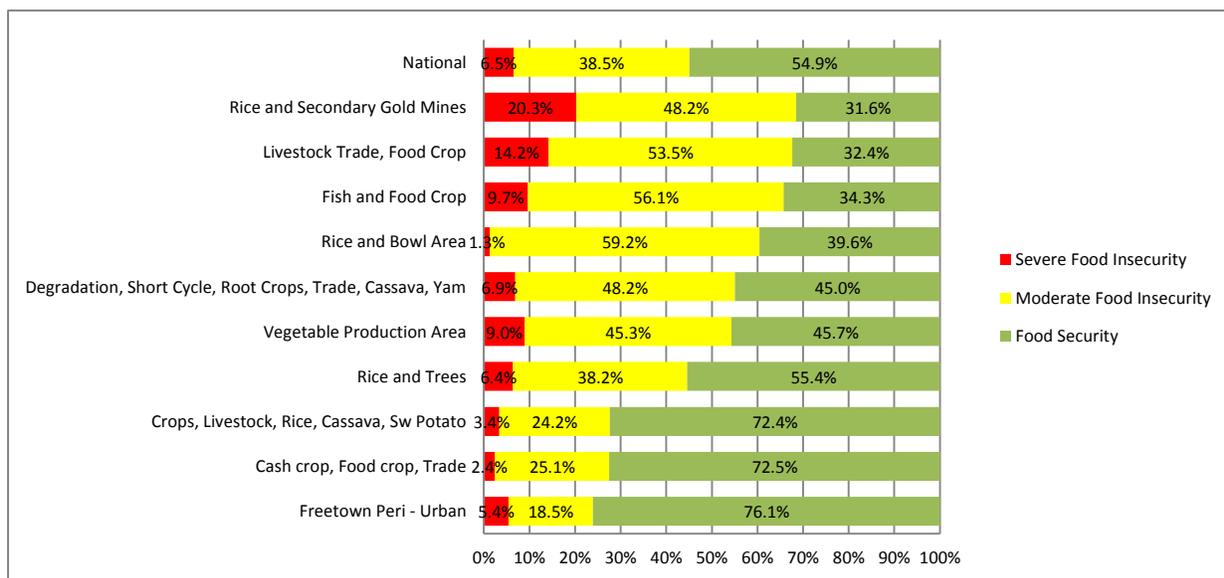
#### ***Freetown peri-urban***

The Freetown peri-urban zone is the densely populated peninsula covering Freetown, its surrounding towns and the less populated hills along the ridges of the mountain range. The population is involved in agriculture and urban activities such as petty trade and non-agricultural labour. The small amount of suitable agricultural land available has high value as urban demand for fruit and vegetables is high. This zone is the most reliant on markets for food.

#### ***Rice bowl areas***

This zone is geographically dispersed with sections in the centre of Sierra Leone in southern Bombali and northern Tonkolili, the western coast of Kambia and Port Loko and the border chiefdoms of Bonthe and Pujehun in the south. The zone is defined by its concentration of rice production.

**Graph 10: Food Insecurity prevalence by Livelihood Zones**





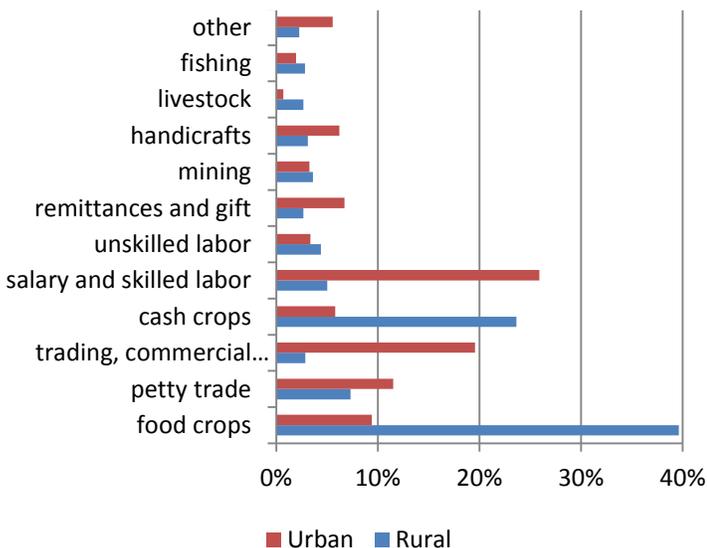
Map 10: livelihood zones

The state of food insecurity varies by livelihood zone. The rice and secondary gold mines zone is the worst off with more than 20% of households currently classified as severely food insecure. The livestock trade and food crop zone does not score much better with 14.2% of households experiencing severe food insecurity.

### Livelihoods

Households were asked about their three principle livelihoods during the past 12 months and they had to estimate the yearly cash value generated by each activity.<sup>10</sup> In addition, the gender and age of household members involved in this activity were recorded. Based on this information a cluster analysis was performed to identify 12 main livelihood categories, mostly consisting of one or two income generating activities. In rural areas the two most important livelihoods include food crop production (40%) and cash crop production (24%). In urban areas, the most important livelihoods include salary employment (26%), commercial trade activities (20%) and petty trade (12%).

Graph 11: Proportion of households in each livelihood



<sup>10</sup> It should be taken into consideration that households tends to underestimate their income and overestimate their expenditures, nevertheless the results obtained represent a good basis to compare the different groups.

While a quarter of households rely on one income source, it is more common for households to have more: 45% rely on two and 30% on three or more.

Matching these 12 livelihood groups to the livelihood zones defined earlier gives the results presented in table 5.

An agricultural based livelihood (food crops, cash crops and livestock) is most common, representing on average more than half of all households in each livelihood zone, except for Freetown. In some zones, food crop production is more common, while elsewhere agriculture is predominantly cash-crop based, including palm oil and vegetable production.

Important food crop producing districts include Koinadugu, Moyamba, Kambia, Bombali, Tonkolil, Bonthe, Pujehun and Port Loko. Kailahun, Kenema and Kono have a high proportion of households involved in cash crop production since these are the main districts where the two most important cash crops, cocoa and coffee, are grown.

While the livestock zone has a substantial number of livestock farmers (10%) about the same number of households depends on petty trade as their primary livelihood. Salary employment is the dominant livelihood in Urban Freetown (33%) but many depend on trade and commercial activities as well (28%). Mining is an important livelihood activity in the secondary gold mine zone as well as in the rice and trees zone. And as expected, fishing is concentrated in the coastal fishing communities that can be found along the Atlantic coast.

Bo has a very mixed pattern in terms of livelihood clusters, perhaps because Bo town, as the second largest city in the country, is a main commercial and trading centre.

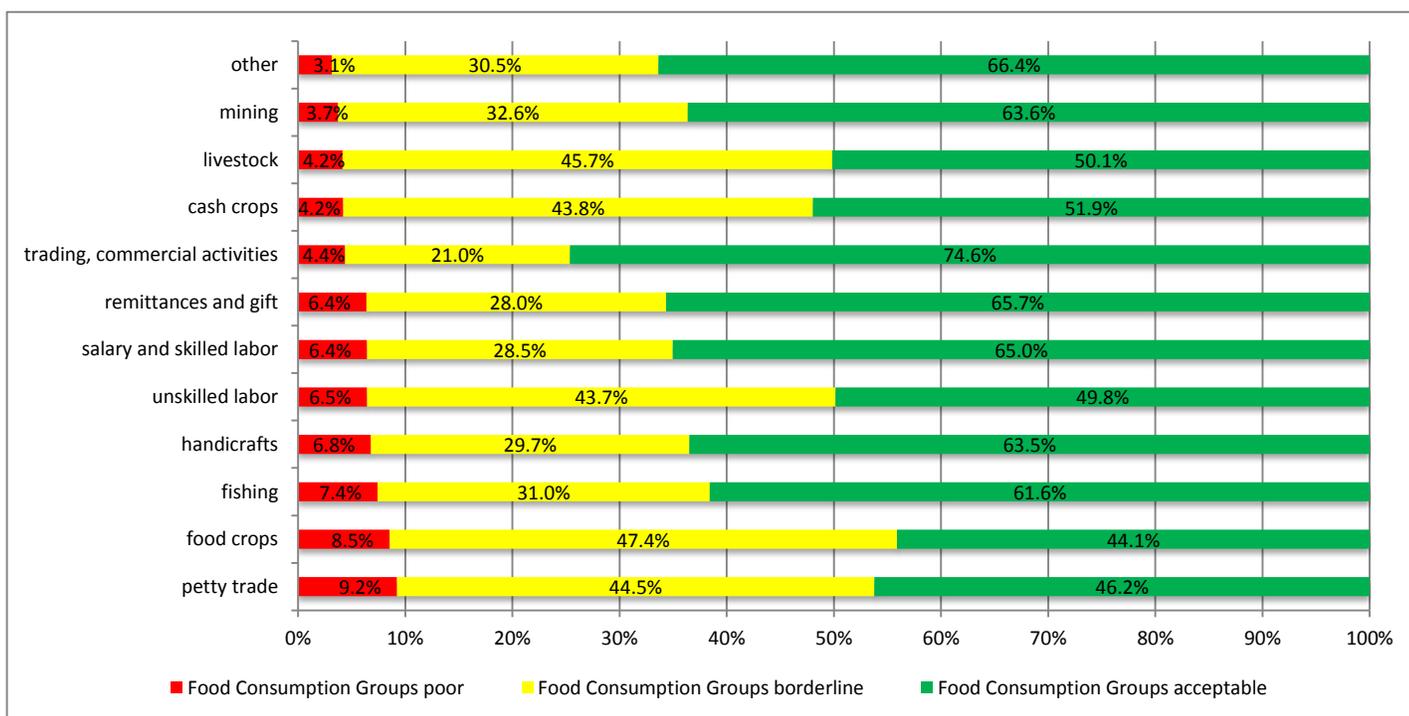
**Table 5 – Livelihoods and livelihood zones**

Livelihood zones	Livelihood classifications (12)											
	food crops	petty trade	trading, commercial activities	cash crops	salary and skilled labor	unskilled labor	remittances and gift	mining	handicrafts	livestock	fishing	other
Cash crop, Food crop, Trade	23.5%	9.1%	3.5%	38.5%	6.2%	3.6%	3.1%	4.4%	3.6%	.6%	.6%	3.4%
Crops, Livestock, Rice, Cassava, Sw Potato	58.8%	4.6%	1.1%	7.6%	3.8%	.7%	4.8%	4.7%	3.6%	7.8%	1.8%	.7%
Degradation, Short Cycle, Root Crops, Trade,	33.5%	8.8%	5.4%	17.6%	11.1%	5.1%	2.1%	3.4%	4.8%	2.6%	4%	5.1%
Fish and Food Crop	37.1%	8.8%	4.6%	18.1%	7.7%	3.1%	2.7%	.3%	3.2%	1.2%	10.2%	3.2%
Freetown Peri - Urban	6.7%	6.9%	27.6%	.8%	33.2%	2.8%	8.7%	.8%	5.7%	.2%	2.2%	4.4%
Livestock Trade, Food Crop	48.9%	10.4%	6.7%	7.8%	4.6%	1.9%	4.0%	.0%	3.4%	9.9%	.1%	2.4%
Rice and Bowl Area	46.6%	7.7%	3.0%	12.4%	3.3%	3.0%	3.6%	.0%	6.0%	1.8%	10.1%	2.6%
Rice and Secondary Gold Mines	43.5%	12.2%	1.1%	10.9%	5.3%	8.4%	2.1%	10.5%	1.8%	2.1%	1.1%	.9%
Rice and Trees	17.3%	12.1%	6.2%	28.4%	9.0%	7.1%	4.3%	11.3%	2.6%	.0%	.0%	1.6%
Vegetable Production Area	33.9%	14.3%	10.1%	13.2%	6.6%	3.4%	3.0%	.0%	5.8%	4.7%	.3%	4.6%

In terms of food insecurity, households relying on petty trade and food crop production have the highest incidence of food insecurity as measured by the food consumption score. In contrast those relying on cash crop farming seem to fare better with regard to variation of foods consumed, although a large share of these farmers have borderline food consumption.

Livelihoods that can most commonly be associated with an acceptable consumption pattern include commerce and trade, remittances and salaried employment.

**Graph 12: Livelihoods and food security**

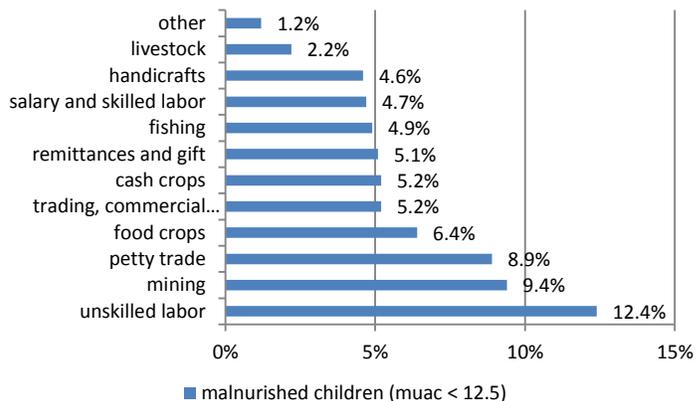


Food insecure households are significantly more likely to have children (under 18 years old) involved in the main activity that sustains their household; over a third (35%) of poor and borderline food consumption households have children who work compared with a quarter of households with acceptable food consumption.

Graph 13 shows the percentage of acutely malnourished children by livelihood. Households dependent on unskilled labour, mining, petty trade and food crop farming are most likely to have malnourished children.

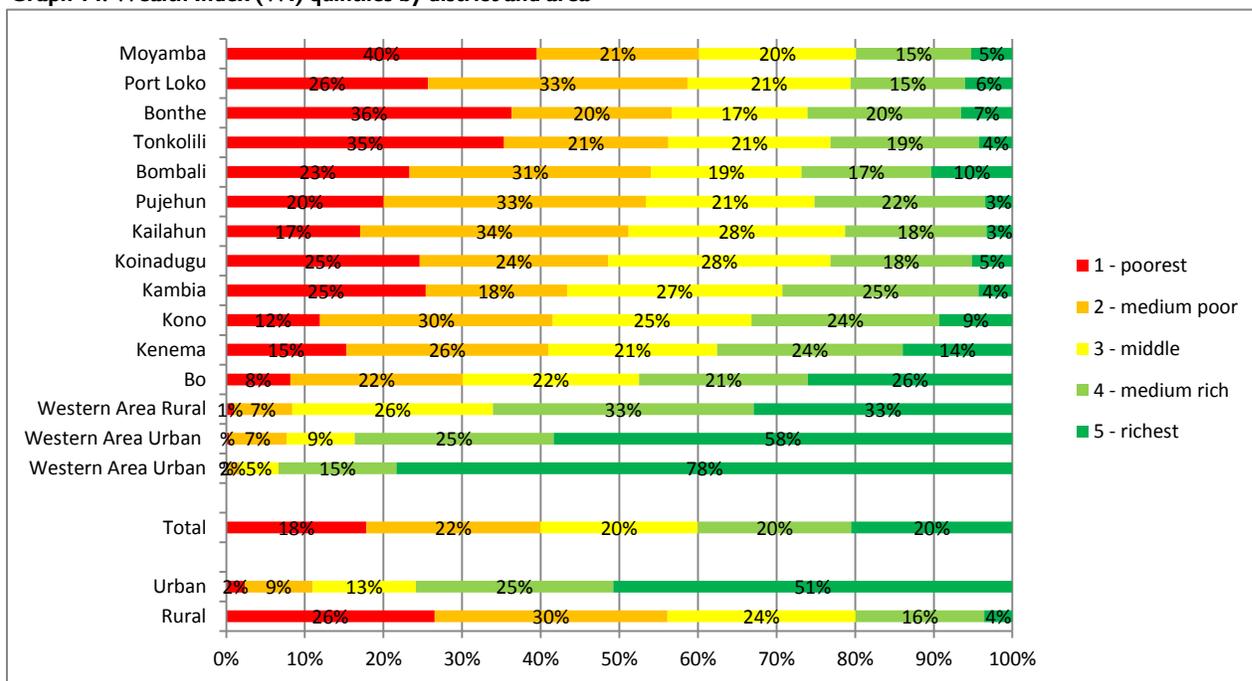
Women are involved in all of the major livelihoods identified in Sierra Leone, especially in trade and commercial activities (51% and 36% respectively). They are also the predominant receivers of remittances (24%) and gifts (23%). In the rural context, 94% of households in the food crop livelihood and 87% of households in cash crops engage both men and women in labour.

**Graph 13: Malnourished children by livelihoods**



**Households dependent on unskilled labour, petty trade and food crop farming are most likely to have malnourished children.**

**Graph 14: Wealth Index (WI) quintiles by district and area**



### Poverty and wealth

Poverty levels are very high, with 70% of the population living below the national poverty line of US\$2 per day and 26% living in extreme poverty.<sup>11</sup>

Income poverty is an economic indicator of a household's wealth which in turn determines a household's overall access to sufficient food. Wealth refers to the value of all natural, physical and financial assets owned by a household. It can be measured through the construction of a Wealth Index (WI) using a set of indicators on housing, household and productive assets, access to water, sanitation, electricity and other such non-livelihood-specific indicators. The wealth index is a comparative indicator. It indicates who -according to this proxy- is 'wealthier' or 'poorer' in relative terms. A detailed explanation of how the wealth index is calculated is provided in the Annex.

Map 11 shows how wealth is concentrated in urban areas. In rural areas almost six households out of 10 can be found in the two poorest quintiles compared with one in 1 in urban areas.

Moyamba has the highest proportion (61%) of households in the two poorest quintiles, followed by Port Loko (59%), Bonthe and Tonkolili (56%). The three Western Area sub-divisions are the least affected by poverty, with 1% or fewer households in the poorest quintile. Moreover, the highest proportion of households in the richest quintile are in the Western Area Urban (78%), followed by the Western Area Slum (58%) and thirdly Western Area Rural, which, with a third of households in the richest quintile is long way behind the first two but still ahead of the other districts.

A comparison of the WI maps with the FCS maps on page 10 reveals that wealth is an

important driver of food insecurity but not the only factor (see further discussion in the following chapter on causes of food insecurity).



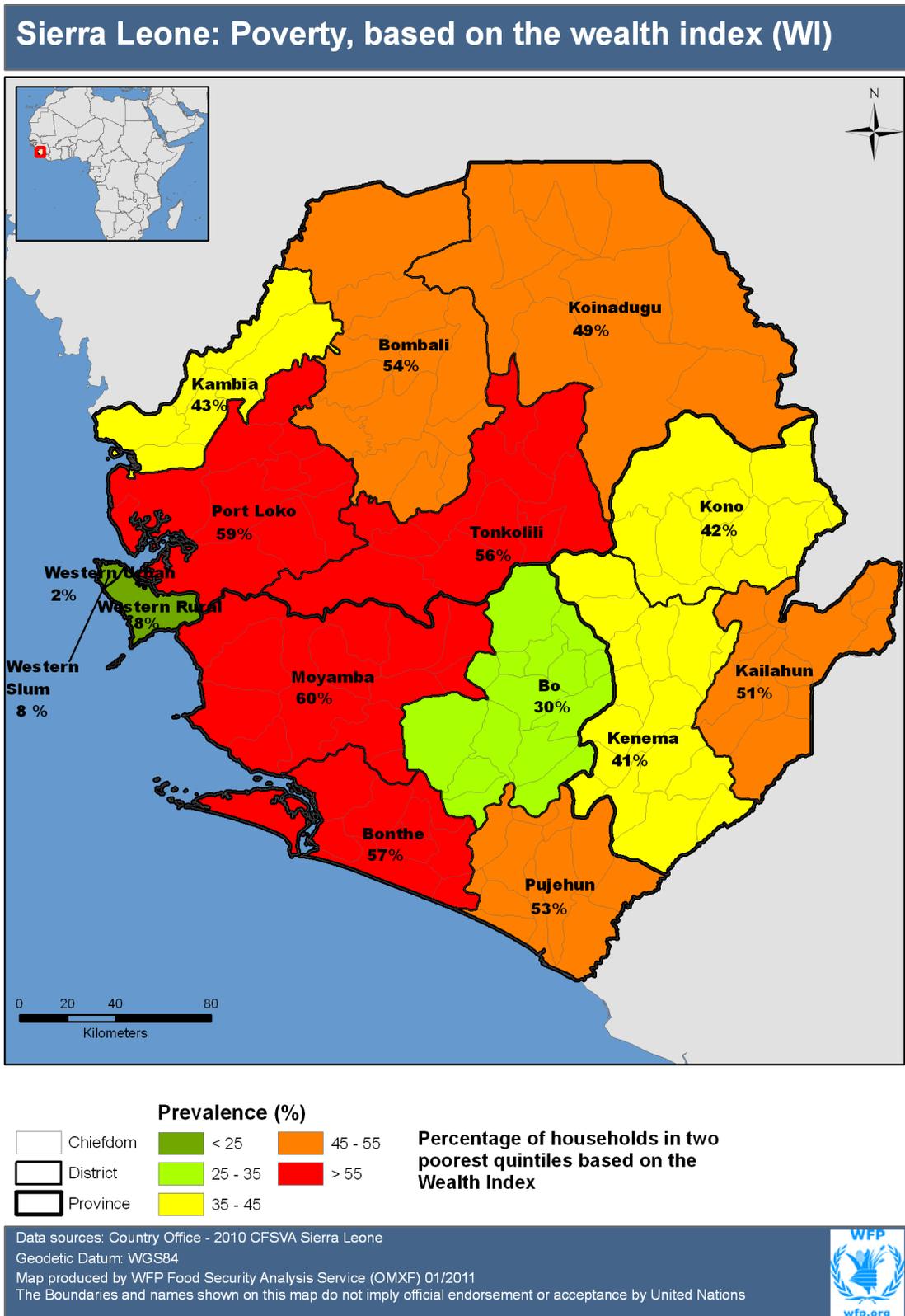
**Mining is an important livelihood in Sierra Leone**

In terms of livelihood zones, the 'crops, livestock, rice, cassava, sweet potato' zone has the highest incidence of poverty with 64% of households in the lowest two quintiles. This is followed by the 'rice and secondary gold mines' zone (61%) and the 'fish and food crops' zone (57%). 'Rice and secondary gold mines' has the highest proportion of households in the poorest quintile (39%), followed by the 'rice bowl' area and 'fish and food crops' (30%).

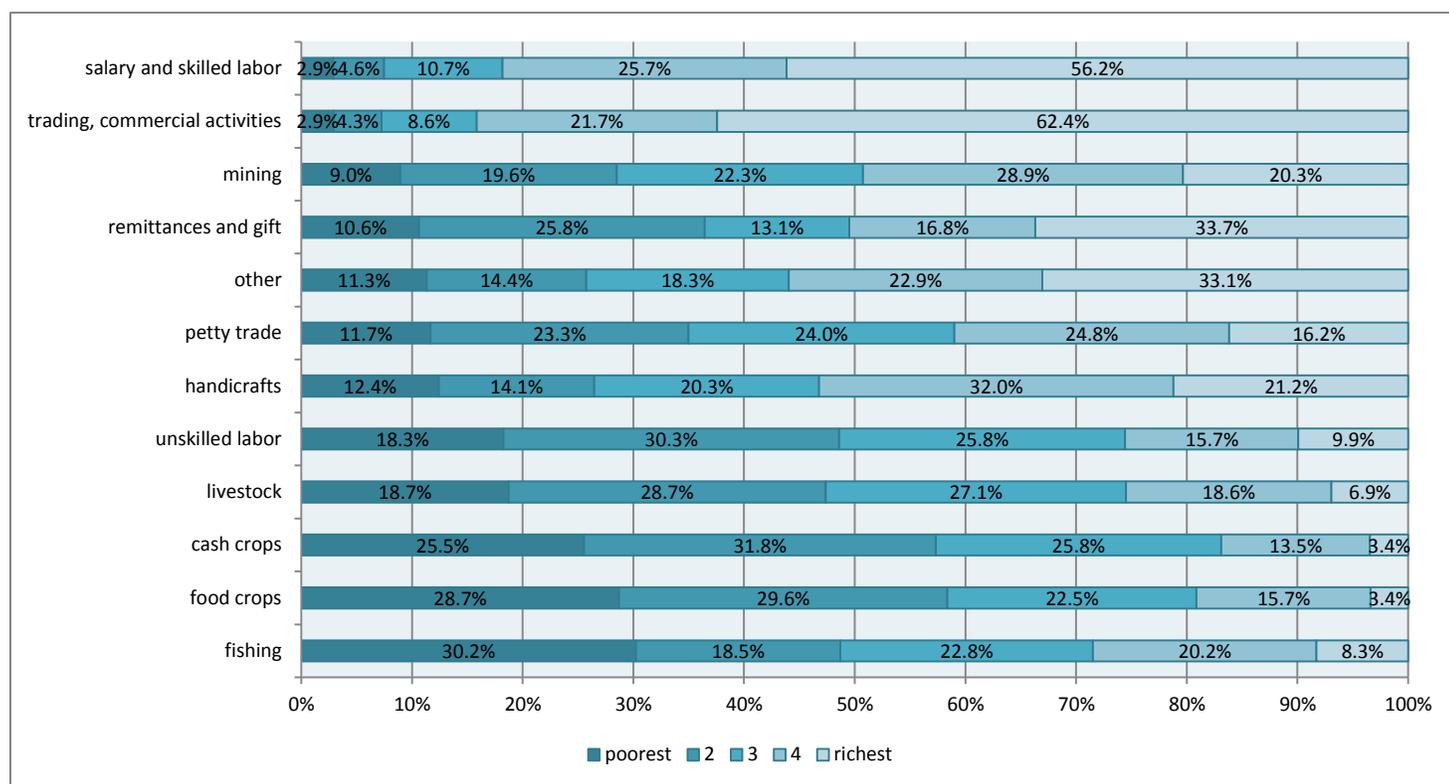
Graph 15 shows the wealth quintiles by livelihood groups as defined above. Households that are predominantly dependent on food-based agriculture are the least wealthy. One third of fishing-dependent families are also among the poorest in the country. The wealthiest households are those engaged in commercial trade or those with regular income, mostly living in urban areas.

Livelihoods with the lowest wealth profile have the highest prevalence of food insecurity. These include food-based agriculture, fishing and livestock-rearers.

<sup>11</sup> Sierra Leone Integrated Household Survey, 2003/04



Map 11: Wealth distribution

**Graph 15: Wealth index and livelihoods**

### Income and expenditure

Average annual income in Sierra Leone is reported at 5.8 million Leones.<sup>12</sup> At 10 million Leones income in urban areas is reportedly almost three times that of rural areas (3.6 million Leones). The lowest average annual income is in Kailahun and Tonkolili (2 million Leones) (see Graph 16).

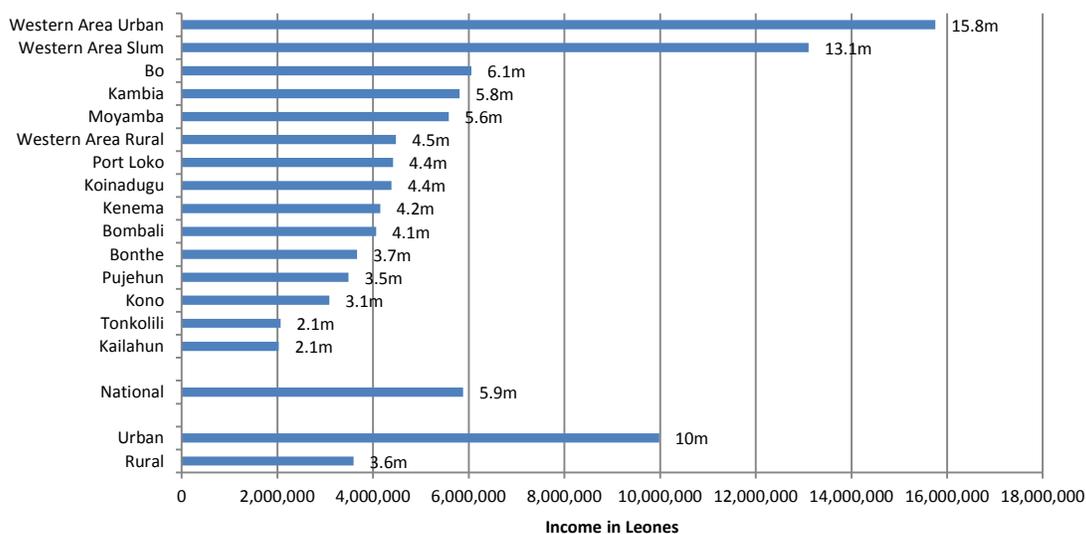
Table 6 shows the average and median annual income by food consumption group. Those with poor food consumption have an income of less than half of those with acceptable food consumption scores.

*Income in urban areas is almost three times those in rural areas.*

**Table 6: Household income**

Food Consumption Group	Annual household income in Leones (millions)	
	Average	Median
Poor	3.5	2.2
Borderline	4.1	3.0
Acceptable	7.4	4.1

<sup>12</sup> Household income data within this survey should be interpreted carefully. The survey captured income earned from only the 3 main livelihoods and households had to put an annual monetary value on these activities. As such they are likely to under-estimate actual household income.

**Graph 16: Total reported incomes in Leones****Table 7: Expenditure**

		Total expenditure (monthly)	Percent of expenditure on food (monthly)	Food expenditures (monthly)	Non-Food expenditures (monthly)	Per capita expenditure (monthly)
WI quintiles	poorest	268,185	65	169,875	36,638	49,187
	2	272,049	68	179,886	39,258	56,029
	3	347,399	66	224,119	59,796	62,739
	4	433,911	62	256,106	94,658	80,594
	richest	1,045,138	52	484,351	301,512	275,116

Per capita total monthly expenditures is, on average, 102,141 Leones. But at 58,397 Leones per capita food insecure households spend less than half that of food secure households (138,028 Leones per capita).

Table 7 shows the expenditure levels by wealth quintiles. The poorest households spend a quarter of that spent by the wealthiest 20%. On average households spend 63% of total expenditure on food (Graph 17) with rural households spending an even higher portion (65%) and urban households 58%. This percentage surges as high as 77% in Kailahun, 73% in Koinadugu, and 70% in both Moyamba and Western Area Rural. Besides food, transport and hired labour are the highest (5% respectively) expenditure items for households, followed by clothes and celebrations (4%), medical expenses and education (3% respectively). It is striking to

see that households spend the same portion on health and education as they do on soap (3%) and phone and internet charges (3%) though it is more than they spend on housing maintenance and rent (2%).

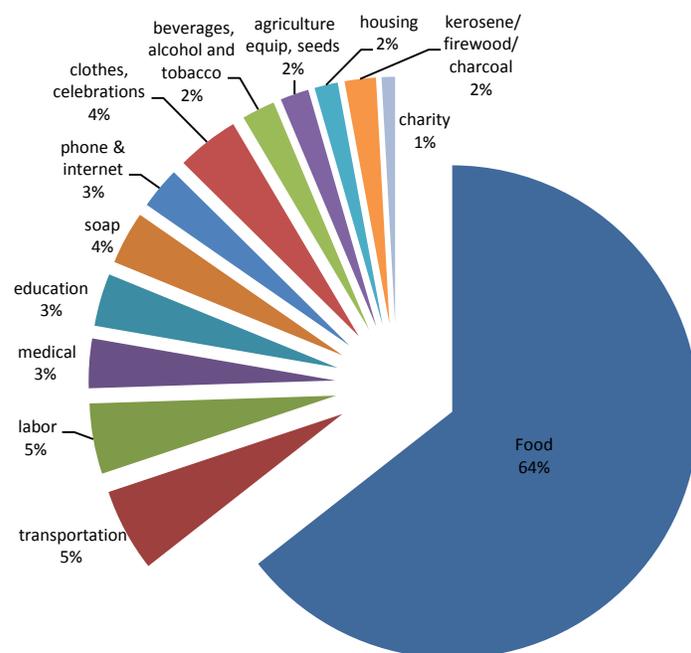


**94% of food crop farmers employ men and women. Photo: WFP**

Table 8 shows the expenditure by livelihood group. Cash crop producers and livestock holders have the lowest food expenditure as well as the lowest non-food expenditure. Food crop farmers and those depending on unskilled labour have little more. Better-off households with livelihoods depending on commercial trade activities and salary workers as well as households receiving remittances from abroad have greater purchasing capacity, spending, per capita, more than four times that of households depending on agriculture as their primary income source.

**On average, households spend 63% of total expenditure on food.**

**Graph 17: pattern of household expenditure**



**Table 8: Expenditure by livelihoods**

Livelihoods	Total expenditure (monthly)	per capita expenditure (monthly)	percent of expenditure on food (monthly)	Food Expenditures (monthly)	Non-Food Expenditures (monthly)
cash crops	269,669	46,527	63	165,794	42,334
livestock	283,030	40,484	63	179,145	42,878
food crops	324,730	56,123	66	211,280	47,855
unskilled labor	385,498	76,498	63	226,167	73,515
petty trade	391,119	72,987	66	240,476	75,902
mining	435,487	75,856	63	255,360	86,527
handicrafts	479,195	144,219	64	280,138	113,718
fishing	487,580	83,710	57	245,311	116,124
remittances and gift	664,364	172,698	62	327,573	164,517
other	665,843	140,962	65	339,789	194,944
salary and skilled labor	758,991	182,110	56	373,087	231,954
trading, commercial activities	993,751	248,299	55	475,822	255,512

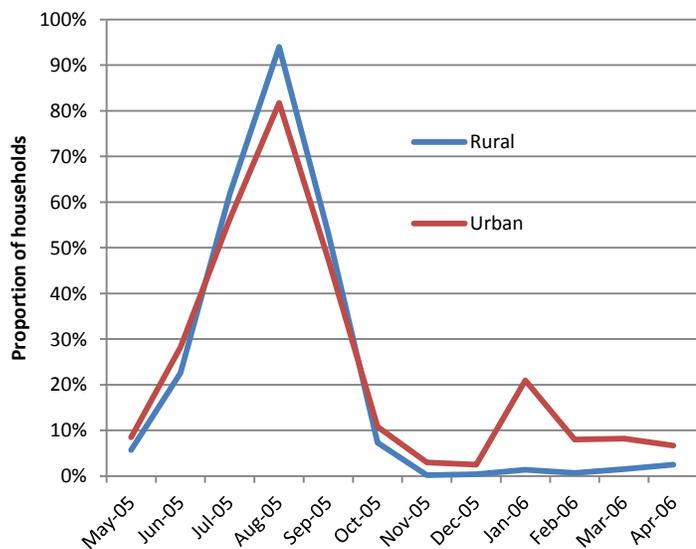
## CAUSES OF FOOD INSECURITY AND MALNUTRITION

### Seasonality

With most livelihoods agriculture-based, the state of food insecurity varies according to the agricultural production cycle. August is the peak of the lean season as shown in Graph 18. It is interesting that in urban areas, hunger increases in January, following a period of overspending during the Christmas festivities in December. This is because most urban workers depend on commercial trade, which is generally slow in January, or on wages which are paid at the end of the month, so their purchasing power is dented.

This CFSVA was conducted during the lean season in June-July when the percentage of households unable to access sufficient food surges. Hence the large number of people identified as being food insecure in Sierra Leone. In subsequent months food insecurity drops sharply to below 4% in rural areas.

**Graph 18: Seasonal hunger**



### Agriculture

The agricultural season is the main driving force behind this cyclical food insecurity pattern.

According to the survey results, 67% of households have access to agricultural land rising to 89% in rural areas and 28% in urban areas. The average area cultivated per household during the last agricultural season is 4.5 acres.<sup>13</sup> Table 9 plots the food consumption groups against the average amount of land cultivated for households engaged in agriculture (cash and food crop livelihoods).

**Table 9: Area cultivated (acres)**

	poor	
Food Consumption Groups	borderline	4
	acceptable	4.9

Access to sufficient land ensures a certain degree of self-sufficiency, but it does not guarantee food security.

Agricultural output is rainfall-dependent with only 19% of farming households practising irrigation during the last dry season. The Western Area Rural has the highest proportion of households using irrigation (90%). Other districts where irrigation facilities are more developed include Bombali (36%), followed by Moyamba (31%).

Households with access to agricultural land cultivated an average of 5.2 crops during the last agricultural season with the most common being rice. Upland rice is cultivated by 46% of households and low-land by 35%. Half of households grow cassava, 38% leafy vegetables, 34% maize and 33% okra. Beans and groundnuts,

<sup>13</sup> The last agricultural season to which it is referred at throughout the report is February 2009 - February 2010.

which are important elements of the household's diet, are grown by 29% and 27% of households respectively.

Households that grow cash crops such as cocoa or coffee are less prone to food insecurity than food crop farmers. Cocoa is the most common (10%) cash crop, followed by coffee (7%). Other cash crops, including sugar cane, cotton, tobacco, cashew nuts and ginger are cultivated by 1% or fewer households at country level.

In the past, Kailahun, Kono and Kenema districts relied heavily on revenues from cocoa and coffee, but international price fluctuations reduced the number of growers. Nevertheless, as the results of the 2010 CFSVA show (Table 10), a large proportion of households in these areas persisted with coffee and cocoa farming resulting in their food insecurity dropping thanks to current high prices for these crops. Kailahun, with the highest percentage of cocoa and coffee growers, has the lowest proportion of food insecurity in the country.

**Table 10: Coffee and cocoa producers**

	Coffee	Cocoa
Kailahun	44%	54%
Kono	27%	22%
Kenema	19%	28%

Some 56% of farming households kept part of their land uncultivated during the last agricultural season. The main reasons given for this include:

- Lack of inputs (seeds, fertilizers, pesticides, etc)
- Lack of labour in the community
- To replenish soil fertility/leave fallow
- Lack of tools and equipment.

*Lack of inputs:* Most households used no inputs during the last agricultural season. Natural/organic fertiliser or compost was used by 8% of farming households, followed by improved seed variety (6%) and chemical fertiliser (5%). Pesticides and herbicides were used by just 1%.

*Lack of labour:* Paying people in cash or in kind to help with agricultural activities is commonly practised by 90% of farm households. However, 58% of the households report difficulties in finding enough workers to hire. This is particularly difficult in the districts of Tonkolili, Bo, Moyamba and the Western Rural and non-slum areas.

*Lack of tools and equipment:* Mechanization of agricultural activities is low. Access to a power tiller or hand tractor is reported by only 4% of households and a thresher by fewer than 1%. Overall 10% of households have use of a rice mill and 7% a cassava grater by 7%, but differences between districts are significant, especially regarding more specialized installations. A third of households report having access to a drying floor in the community while only 19% have use of a communal store for cereals.

The majority of households (62%) store the harvest indoors in baskets or bags while 14% openly store it inside without using a container. Other storage methods such as outside storage huts (6%) and communal storage (4%) are less commonly used.

Almost half (46%) of households have a vegetable or backyard garden and 54% have grown vegetables in the uplands during the last agricultural season. Although those households with a vegetable garden in general eat vegetables more frequently, this difference is small (six days a week as opposed to five). The impact on overall food consumption variety is not significant.

Producing food does not guarantee sufficient access to it. Sixty five percent of households that cultivate rice do not produce enough to feed their family. Only 5.5% of rice cultivators rely on their own production for the full year, leaving the remaining households to be reliant on markets for the purchase of rice for at least part of the year.

More households rely on their own production of cassava, which was grown by 77.2% of agricultural households in the past year. Nearly a quarter of these households (24.1%) rely on their own harvest throughout the whole year. In the seven days leading up to the survey, 64.1% of cassava growers listed their own production as their source for consumption.

### Markets and infrastructure

1. During the time of the survey (June-July 2010), three quarters of the population relied on markets as their main source of food. Almost all (95%) of households say that they have good access to markets throughout the year and that the market availability of essential food items, including rice, cassava, palm oil, groundnuts, fish, gari, vegetables and beans, is good.
2. However, high, increasing and fluctuating food prices (and fuel costs which also lead to food price rises because of increased *transportation costs*) pose a serious threat to a household's ability to purchase sufficient food since an average household is already spending some 63% of its total expenditure on food.

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***The food and fuel price rise has eroded purchasing power, thereby obstructing food access.***

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As discussed previously, markets are not very well integrated across Sierra Leone, mainly because poor road infrastructure hampers essential transportation of goods and agricultural products. As Map 12 shows, the network of primary and secondary roads is limited. Many tertiary roads are not in good condition and a four wheel drive vehicle is often needed, especially during the rainy season. The roads suffer from lack of maintenance, and urgent repairs are needed on 20% of the network to improve access to markets and social services.<sup>14</sup>

While 85% of the communities surveyed are accessible by vehicle,<sup>15</sup> access varies widely from district to district. Bonthe is the least accessible with 32% of communities having no vehicle access, but the district is unique in that it includes a main island among other smaller islands with few roads.

It takes an average of two hours or more to reach a main road from those communities not accessible by vehicle.

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<sup>14</sup> GoSL, MAFFS (2009)

<sup>15</sup> The following results are extracted from the CFSVA 2010 community questionnaire. Even though the results are not statistically representative at district level as the survey sampling was done based on the household and not the communities surveyed, it provides an interesting qualitative insight into the situation of transport and accessibility in the country.

# Sierra Leone: Road network



- Capital
- Province Capital
- District Capital City
- ▭ Province
- ▭ District
- Roads Classes**
- Primary
- Secondary
- Tertiary
- Track

Data sources: Gadm.org, USGS, UNSDIT

Geodetic Datum: WGS84

Map produced by WFP Food Security Analysis Service (OMXF) 11/2010

The Boundaries and names shown on this map do not imply official endorsement or acceptance by United Nations



**Map 12: Road infrastructure**

Limited storage facilities (see page 39) force farmers to sell the majority of their harvest immediately, when prices are at their lowest. They are then obliged to purchase food during the lean season when prices are highest. Farmers predominantly sell their produce in distant markets where demand and prices are higher. The key problems farmers face when marketing their produce include (in order of importance):

1. Low prices
2. Lack of transportation
3. Long distance to selling point
4. Lack of storage
5. Local taxes (official or not)
6. Lack of buyers
7. Lack of money
8. Theft and looting

#### Unemployment and migration

About 70% of young people are unemployed.<sup>16</sup> Employment opportunities in mining have decreased significantly.<sup>17</sup> In and around urban areas, young people

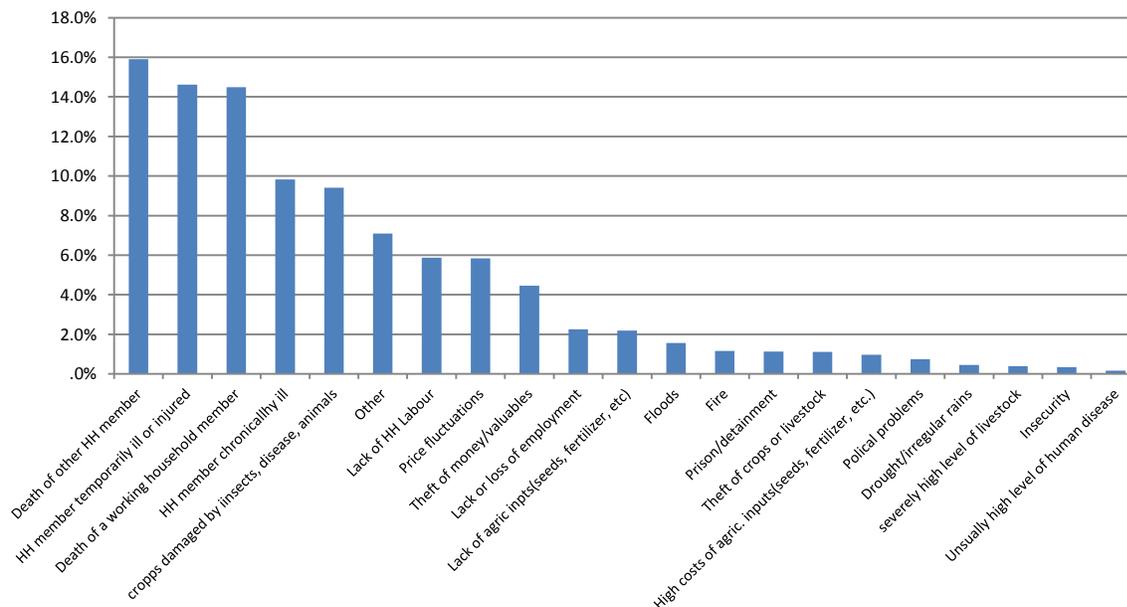
adopt negative coping mechanisms including prostitution and crime. This poses a serious risk for the stability of the country during the upcoming national elections in 2012.

At national level 14% of households have at least one migrating member with the proportion peaking in Kenema (29%) and Pujehun (23%). On the other hand, Western Area Rural has only 1% of households with migrating members.

#### Hazards and shocks

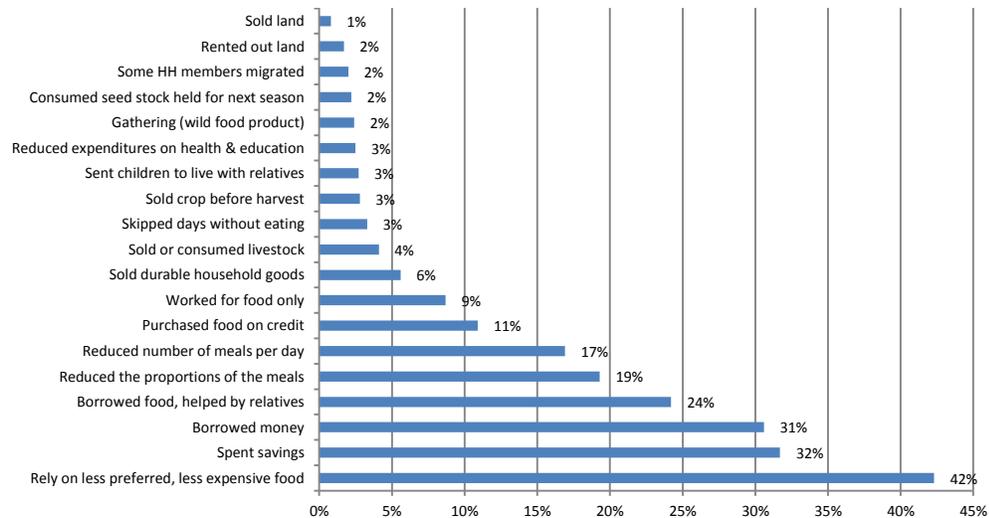
Households were asked to mention up to three shocks that they experienced over the past twelve months. They were also asked to list the coping strategies that they employed to overcome the negative impact of such shocks. Overall, the overwhelming majority (83%) of households reported experiencing at least one shock during that period with the percentage slightly higher in rural areas (85%) than urban (80%).

**Graph 19: Percentage of households that experienced shocks by shock types**



<sup>16</sup> GoSL (2005)

<sup>17</sup> WFP (2009b)

**Graph 20: Coping strategies used by households that faced at least one shock in the past year**

From June to September the main national disaster risk is flooding. However, individual household shocks such as death and sickness or unemployment of a household member are far more important in terms of assessing the risk to the household of becoming food insecure. Graph 19 shows the type of shock experienced by households during 2010.

The most used coping strategy in response to shocks include reliance on less preferred and less expensive food (42%), spent savings (32%) and borrowing money (31%). Use of irreversible coping strategies such as sale of land and productive assets is low (see Graph 20).

A very high proportion of households (from 77% to 100%) reported that the need to cope with their particular shock impeded their ability to produce or purchase sufficient food.

The Coping Strategy Index (CSI) combines the use and frequency of five of the above listed responses: reliance on less preferred

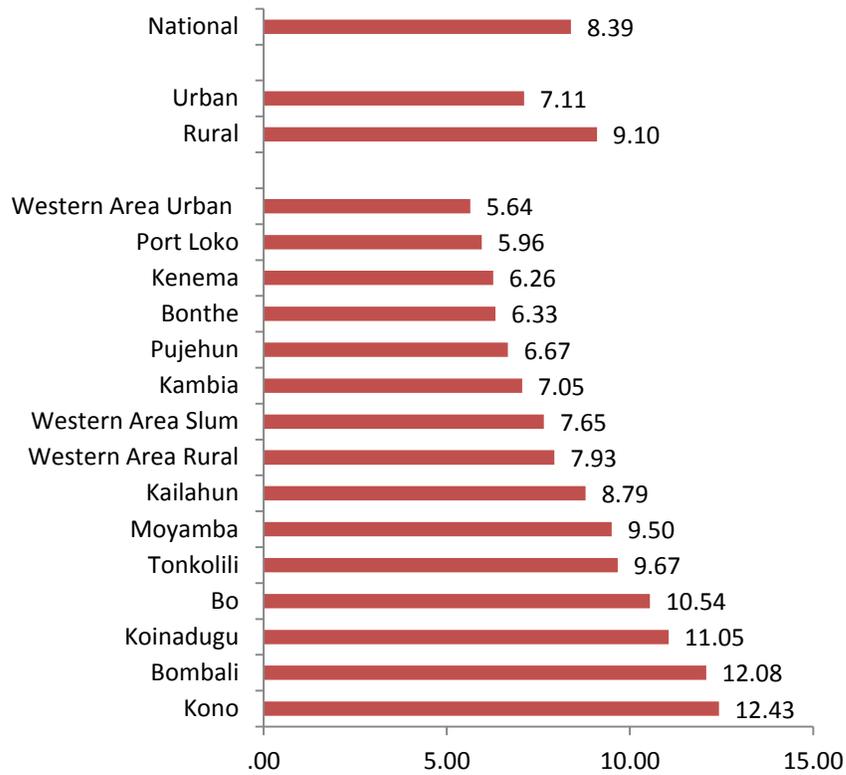
food, borrowing food, limiting meal size portions, restricting adult consumption and reducing the number of meals eaten in a day.<sup>18</sup> The severity of each strategy is given a weight and then summed to create an index. The higher the resulting CSI, the more vulnerable the household.

The average CSI is 8.39. Rural areas have a higher CSI (9.10) than urban areas (7.11). Looking more specifically at districts, the highest CSIs are found in Kono (12.43), Bombali (12.08), Koinadugu (11.05) and Bo (10.54).

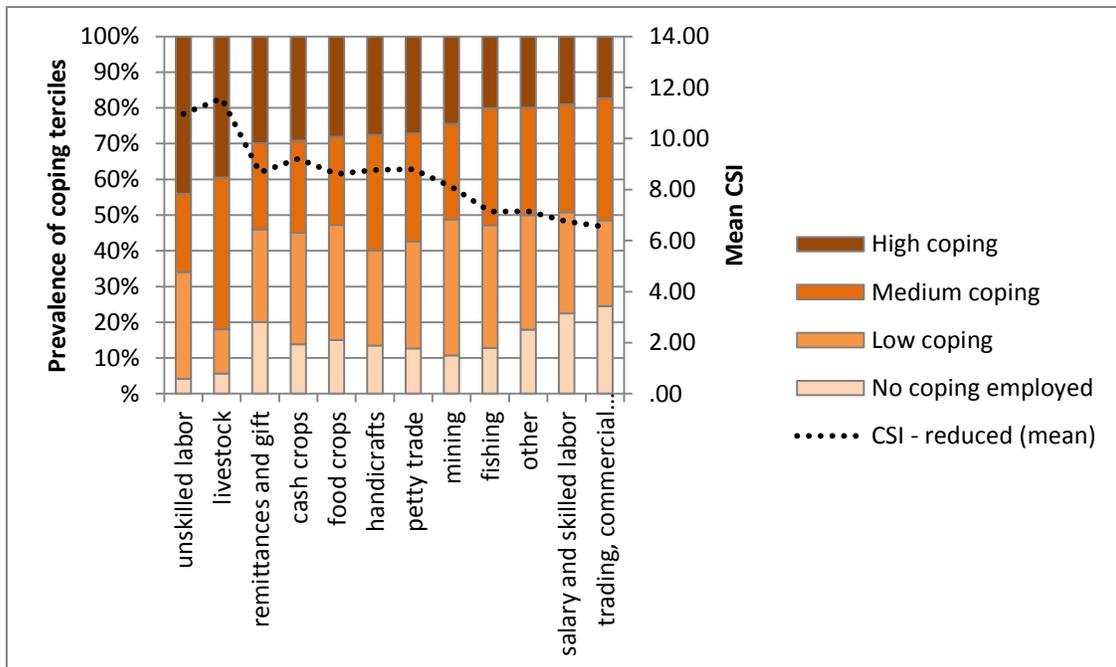
Graph 22 shows the CSI by livelihood groups. Households predominantly dependent on unskilled labour make most use of coping strategies while agricultural households including livestock farmers and food and cash crop farmers make more frequent use of them than other livelihood groups.

<sup>18</sup> For detailed explanation on the CSI, please refer to the Annex and to Maxwell, Daniel and Caldwell, Richard (2008)

Graph 21: Coping strategy index



Graph 22: CSI by livelihood group



### **Borrowing**

Borrowing money is common in Sierra Leone with more than half of households borrowing money in the past year. It is more common in rural areas where 60% do so compared to 38% in urban areas. A third of households that borrowed money in the past year reported that it was mainly to purchase food, a practice that was slightly more common in rural households than urban (35% vs. 26%).

The main source for credit is relatives and friends (68% rather than a formal credit facility. The second main source is a local lender (13%) followed by cooperatives (*Osusu*) (8%). Banks are only used by 2% of households. The average amount borrowed is about 540,000 Leones, with a higher amount in urban areas (about 940,000 Leones) than rural (about 400,000 Leones). A household's ability to repay loans varies with 12% having already repaid it and 36% considering repaying within the next 12 months. However, 8% do not think they will be able to repay and 19% will repay less than half of what they borrowed.

### **Wealth and food insecurity**

As stated in the chapter on poverty and livelihoods, wealth is an important determinant of food security. However, a number of districts identified as poor in terms of wealth are nonetheless food secure. This includes Bonthe, Kailahun and Bombali where 47%, 36%, and 35% of households are in the two poorest wealth quintiles but where food consumption is generally more acceptable.

In Bonthe, the consumption of rice as the key staple is the lowest in Sierra Leone at 4.3 days per week, but is supplemented by cassava products 4.2 days a week. With its long coastline, Bonthe also has a high level of fish consumption at 2.2 days per week (the national average is 0.6 days), making it

the highest consumer of high quality protein in Sierra Leone with the exception of the western district where meat consumption is more common. In Bonthe, 36% of the fish consumed in the seven days running up to the survey was caught by the household.

In Kailahun and Bombali, the most notable difference in diet composition is in the higher consumption of pulses which households eat on more than five days a week on average compared with a national average of just over three days a week. In Kailahun, the majority of pulses come in the form of beans or lentils which are 33% from own production and 59% from markets. In Bombali, it is groundnuts which are 22% home-grown and 77% purchased.

Households that are able to diversify their diet beyond rice, cassava and oil need not necessarily be wealthy if they have sufficient access to high-protein foods; in this case fish or pulses.

### **Demographics**

More than a fifth of Sierra Leonean households are headed by women and in 39% of these cases it is the death of her husband that has compelled a woman to take up the position of household head. Households headed by a widow are more likely to be food insecure. In urban areas the percentage of households headed by women is higher (26%). At district level the highest proportion is found in Western Area Urban, where three out of 10 households are headed by women.

Households with a high dependency ratio are significantly more prone to food insecurity. The average household size in the country is 6.2<sup>19</sup> members though this varies across districts from Pujehun with 7.9 members to Kailahun with 5.2.

The dependency ratio measures the proportion of a household's members who are dependent i.e. too young (under 15 years) or too old (over 60 years) to work or it represents the ratio of disabled non workers to able-bodied workers. The average dependency ratio across the country is 45% though for about 11% of households it exceeds 70% and in Port Loko for 18% of households it is more than 70%. Conversely in Western Area Rural and Western Area Urban only 4% of households are in this situation.

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***Nationally, 13% of households have at least one member who is chronically sick or disabled. In Bombali and Kenema this is the case for more than 20% of households***

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Chronically sick household members place a very high burden on households and make them more prone to food insecurity than those without. Nationally, 13% of households have at least one chronically sick member though again the variation is significant from district to district. For Bombali more than a quarter has chronically sick members and Kenema 22%.

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<sup>19</sup> As mentioned in the limits of the survey, the number of members in some of the households surveyed mentioning 12 members might not have been all recorded as part of the survey. However, it seems that this factor did not influence greatly the results as other recent survey results have a national household size average of 5.9 members (SSL (2007) & SSL (2009)).

## Education

Households whose head has a low level of education are more prone to food insecurity. Almost half of all household heads (46%) have never been to school. About 12% have completed at least some primary education, 23% have completed at least some secondary education, or trained at a vocational or technical institute. The percentage that has never been to school peaks in Tonkolili (67%) and Koinadugu (63%).

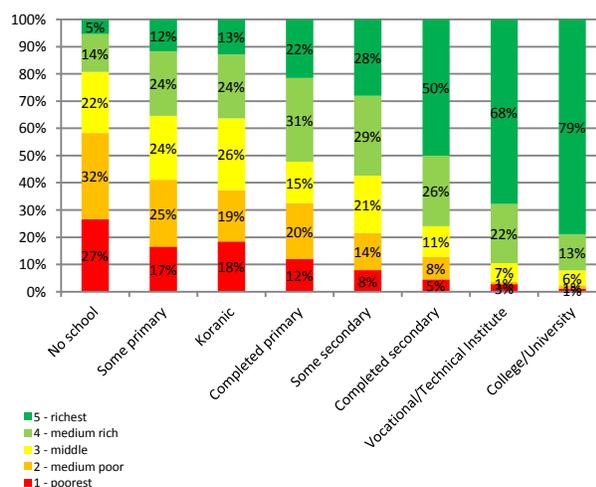
Graph 23 demonstrates the strong correlation between the poverty level and the household head's level of education. Some 58% of households whose heads did not go to school belong to the two poorest quintiles of the population.

There is great gender disparity as women are less educated. While 46% of men over the age of 36 have never gone to school, 78% of women above this age have never attended. For 16 to 35 year men the proportion of non attendees almost halves to 27% and while the percentage of unschooled woman is also lower it is still double that of men at 53%.

The education level of the spouse/partner has an important impact on many aspects of the household. Indeed, a recent Government campaign to promote female education had the tagline *"If you educate a women, you educate a nation"*.

No significant differences have been found between food secure and food insecure households with regard to sending their children to school. This is encouraging as it means that the household food insecurity status has not influenced the enrolment of children in school.

Graph 23: Wealth and education



Overall primary school enrolment is 81%<sup>20</sup> with more girls (82%) than boys (79%) signing up. This indicates the effectiveness of the recent Government campaign to promote girls' education. In urban areas, 91% of boys and 92% of girls have been enrolled though the percentage drops to 74% for boys and 77% for girls (Table 10) in rural areas.

Table 11: Primary school enrolment (%)

	Boys	Girls
Nationally	79	82
Urban	91	92
Rural	74	77

There are marked differences between districts. Bonthe is by far the worst off with only 55% of boys and 63% of girls enrolled in primary school.

Attendance rates are good with 92% of boys and 91% of girls regularly attending school. In urban areas, school attendance is 95% compared with 89% in rural areas. In terms of districts, the lowest is Kambia with 78% of boys and 79% of girls attending school in 2009-2010.

<sup>20</sup> This includes children up to age of 15 to take account of late starters.

These percentages show a clear positive trend towards primary education for all.

Main reasons for not enrolling a child in school include:

1. Lack of money for school fees and other school related costs (48%)
2. No school in the village/area or school is too far (14%)
3. Child lacks any interest in going to school (10%)
4. Parents lack interest in child going to school (8%)

These reasons are similar for boys and girls.

The main reasons why children drop out of primary school are similar although early marriage also plays a role in early drop-out rates for boys and girls as does teenage pregnancy for girls (16%).

In 76% of the communities surveyed there is a functioning primary school. Bombali, Bonthe and Port Loko have the lowest percentage of local schools, with around four in 10 communities having no village primary school. In these cases the average distance to the nearest primary school is 3.6 miles or a bit more than an hour's walk. But in Bonthe pupils have to walk for more than three hours since the nearest school is on average 9.6 miles away.

### **Water and sanitation**

More than a third of households rely on unprotected sources of drinking water, including rivers, streams or ponds (26%) and unprotected wells (7%). The remaining two thirds use improved sources including tube well or borehole with pump (26%), protected dug well (18%), public tap (13%), piped water (9%) and protected spring (1%). The variations between districts are great: in Moyamba about seven households in 10 use an unimproved source of drinking water while for Kambia and Bonthe the

percentage is 57% and Tonkolili, 54%. To some extent this explains the higher wasting and underweight nutrition measurements found in these districts. Food insecure households are more likely to obtain their water from these unprotected sources than food secure households (56% as compared to 44%).

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***Well over half of households in Kambia, Bonthe and Tonkolili rely on unprotected water sources for drinking, explaining the higher acute malnutrition rates found there***

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Sixty four percent of households have access to adequate sanitation facilities. This includes traditional pit latrines for 49% of households, followed by ventilated improved pit (VIP) latrines (10%) and a flush latrine or a toilet with water (6%). For unimproved sanitation facilities, which are used by 36% of households, 23% defecate in the open while 10% use an open pit and 2% communal latrines. In Pujehun, Bonthe, Moyamba and Kailahun between 56% and 75% of households have no access to adequate sanitation. Again, these are also the districts with the highest acute malnutrition rates. Analysis shows that households without access to adequate sanitation are significantly more prone to food insecurity than households using improved sanitation facilities.

### Health environment

For children under the age of five years old, the three most common health problems were identified as:

1. Malaria (33%)
2. Respiratory infections (21%)
3. Diarrhoea (20%).

The distribution of mosquito nets is the primary health intervention for reducing malaria transmission and morbidity in communities at risk of malaria. More than half of households own a mosquito net.

Acute Respiratory Infection (ARI) is one of the main causes of childhood morbidity and mortality throughout the world. Early diagnosis and treatment can prevent a large proportion of deaths.<sup>21</sup>

Dehydration resulting from severe diarrhoea is a major cause of morbidity and mortality among young children. Exposure to diarrhoea-causing agents is frequently related to the use of contaminated water and to unhygienic practices in food preparation and disposal of excreta.

For six to 18 year olds and adults (above 18 years old), malaria is also the most common health risk.

The prevalence of malnutrition (MUAC <12.5) was higher in children under five who had experienced illness in the fortnight leading up to the survey than in those who had no illness in that period (7.9% vs 4.3%). Children reporting having repeated cough/breathing difficulties have a higher prevalence of malnutrition than those without breathing problems (15.6% vs 6.9%). No significant differences were found for children experiencing diarrhoea during the past two weeks. 92% of children suffering from diarrhoea were given Oral

Rehydration Solution (ORS), which 91% of mothers are aware of according to the 2008 Demographic and Health Survey (DHS).

The proportion of malnourished children (MUAC < 12.5 cm) taken to a health centre because of sickness in the past fortnight is slightly lower than for non-malnourished children but not significant. Overall 78% of children who had been sick in the two weeks preceding the survey were taken to a health service, an encouraging development attributable to the recent national health policy of giving free health care to under-fives (see below). For the 22% not taken to a health facility the reasons were:

1. Illness was not considered serious (37%)
2. Lack of money (29%)
3. Health service was too far away or there was a lack of transport (16%)
4. Alternative treatment was used (13%)

The health system in Sierra Leone is characterised by a lack of appropriately qualified health care workers, insufficient supplies of drugs and equipment, poor co-ordination and management and, until recently, charges levied at point-of-service delivery<sup>22</sup>. Based on the community survey, the main issues in the provision of basic health care include the following<sup>23</sup>:

1. Lack of medicines and supplies (24%)
2. Lack of infrastructure (16%)
3. Distance to health centres (12%)
4. Lack of qualified professional staff (12%).

There is no health facility in 58% of the communities or villages surveyed. For the majority (31%) of communities, health

<sup>21</sup> SSL, MoHS, ICF Macro (2009)

<sup>22</sup> GoSL (2009); WFP (2010a)

<sup>23</sup> The communities were asked to give 3 main problems/needs with regards to the health sector in their village/community. These figures are the combined results of the 3 answers.

centres are the nearest facility, followed by community health centres (22%), hospitals (17%), Maternity Child Health Aid (MCHA) posts (14%) and Peripheral Health Units (PHU) (11%). In 91% of the cases the nearest facility functions regularly and is about 3.3 miles away (one hour's walk).

More than half (53%) of communities report that a basic health consultation is free of charge with the other half having to pay an average of 4,782 Leones (little more than USD 1.00). But the discrepancies between districts are rather important. In Western Area Urban and Western Area Slum, around 80% of communities report having to pay a fee as high as 9,632 Leones and 8,450 Leones respectively. Meanwhile in Kambia, Moyamba, Bombali and Bonthe 80% to 92% report free basic consultations.

In line with the Agenda for Change, Sierra Leone has recently launched a National Policy of free healthcare services for pregnant women, lactating mothers and children under five. It focuses on an essential package of healthcare services<sup>24</sup> that will be delivered free of charge at the point of service to ensure a significant improvement in maternal and child health, and reduce the high maternal and child (under five) mortality rates. Ninety percent of communities report that this type of consultation is indeed free of charge.

Almost 100% of mothers with children under five sought some type of ante natal care during their pregnancy. The great majority of mothers sought the advice of a health professional. For 78% of mothers, the nurse was the person they saw most often, followed by the doctor (7%), traditional birth attendant (TBA (7%)), mid-wife (4%) and community health officer (2%).

Mothers of malnourished children (MUAC < 12.5 cm) are more likely to have sought antenatal care and advice from a TBA and less likely from doctors than mothers of non-malnourished children (14.8% of malnourished children had a TBA versus 6.4% of non-malnourished children).

A number of other health campaigns took place in the surveyed communities during 2010. These include: de-worming for school children (75%), anti-malaria campaign HIV/AIDS sensitization campaign (62%), and

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***The under-five mortality rate is among the highest in the world at 162 per 1,000 live births. A quarter of children die before the age of five, usually in their first year of life.***

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sensitization campaign against teenage pregnancy (52%).

### **Caretakers and caring practices**

Child and maternal mortality rates in Sierra Leone are among the highest in the world compounded by very high levels of anaemia, poor access to health services and endemic malaria. The under-five mortality rate is among the highest in the world at 162 per 1,000 live births. A quarter of children die before the age of five, usually in their first year of life<sup>25</sup>. Only 40% of children 12 to 23 months are fully immunized, i.e., receive BCG, measles vaccinations and three doses each of DPT and polio vaccines. Sixteen percent of children have received no vaccination at all<sup>26</sup>. Anaemia resulting from malaria, dietary deficiencies and parasitic infections affects 76% of children aged six to 59 months<sup>27</sup>.

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<sup>25</sup> UNICEF (2009)

<sup>26</sup> SSL, MoHS, ICF Macro (2009)

<sup>27</sup> *Ibid.*

<sup>24</sup> The Basic Package of Essential Health Services (BPEHS)

Severely malnourished mothers (MUAC < 214 mm) are more likely to have malnourished children compared with non-malnourished mothers (22.7% compared with 5.5%). They are also more likely to give birth to small babies, who in turn are more likely to grow up malnourished (Table 11).

**Table 12: Size at birth and malnutrition**

		Malnourished child (MUAC<12.5)	
		No	Yes
Size of baby	Large	95.4	4.6
	Normal	94.9	5.1
	Too small	88.0	12.0

Sixteen percent of children were assessed to be very small when they were born. Children (six to 59 months) who were very small at birth as assessed by their mother are significantly more likely to be currently malnourished (MUAC < 12.5 cm): 12% compared with 4.6% and 5.1% for large and normal size babies.

Mother/caretaker's hygiene practices are an important factor in preventing the spread of diseases in young children. Mothers who do not wash their hands after using the toilet are more likely to have malnourished children (14.4% of malnourished children have mothers who do not wash their hands after using the toilet, compared with 8.3% of non-malnourished children).

Poor breastfeeding and infant feeding practices has damaging consequences for the health and nutritional status of children. Exclusive breastfeeding is recommended for the first six months of life because the mother's antibodies in breast milk provide the child with immunity to diseases, breast milk is uncontaminated (unlike milk powder which could be mixed with water from an unsafe source) and it contains all the essential nutrients that children need in

their first six months of life<sup>28</sup>. Introduction of supplementary food in the diet of

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**Only 11% of infants under 6 months of age are exclusively breastfed.**

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children below the age of six months is discouraged because it exposes the child to pathogens and increases the risk of infections and diseases. Also, in developing countries, supplementary foods often have a lower nutritional value than breast milk<sup>29</sup>.

But only 11% of children under six months old are exclusively breastfed. This concurs with the 2008 DHS survey which found that while 85% of children under six months are breastfed, only 11% are exclusively breastfed.

From six to 24 months or more, in addition to breastfeeding, the child should be given solid or semi solid complementary foods as breast milk is not sufficient to allow optimal growth. During this transition phase the prevalence of malnutrition often increases because the risk of infections is higher and feeding practices are inadequate<sup>30</sup>. According to the survey 83% of children aged between 12 and 15 months continued breastfeeding and 84% of children had complementary food introduced into their diet between six and eight months.

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<sup>28</sup> SSL, MoHS, ICF Macro (2009)

<sup>29</sup> *Ibid.*

<sup>30</sup> *Ibid.*

## TOWARDS ENSURING FOOD AND NUTRITION SECURITY IN SIERRA LEONE: RECOMMENDED ACTIONS

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The analysis shows that food security deteriorates drastically during the lean season from June to August when more than 2.5 million people (45%) become food insecure. The most important reason is widespread poverty, which leaves people financially unable to acquire sufficient food. A seasonal livelihoods-based programme targeted at subsistence farmers, the unemployed and petty traders could prevent much of this seasonal hunger pattern.

As shown by the high stunting rates, food insecurity is not just a seasonal phenomenon. Poverty rates are very high, 70% of the youth is unemployed and the urban/rural wealth difference is large, attracting many young people from rural areas to the city. As a consequence in some rural areas labour has become scarce and farmers are unable to cultivate as much as they like. Other reasons for leaving agricultural land fallow include lack of inputs (seeds, fertilizers, pesticides, etc) and lack of tools and equipment. The latter two issues can be addressed through improved marketing of these agricultural inputs, setting up agricultural cooperatives and through internationally-supported livelihood recovery programmes.

Food crop production does not prevent the household from being food insecure. This is because of low yields, difficult marketing channels and improper storage facilities that force many farmers to sell immediately after harvesting when prices are at their

lowest. Improving storage facilities, yields, crop diversification and market infrastructure would address these problems.

Regional trade opportunities need to be exploited by improving infrastructure to facilitate such trade.

There is a strong case for nutrition awareness programmes, delivering positive messages on the benefits of breast feeding, hygiene practices and dietary habits. Sierra Leone's health indicators are deplorable and education campaigns addressing some of the issues would have huge pay-offs. In several districts, better access to safe water and improved sanitation will save costs in health provisions and decrease the number of children suffering from acute malnutrition.

The Government's campaign to promote girls' education is proving to be effective. However, there are several districts in which primary school achievements remain behind. Targeting WFP's school feeding to those districts with low enrolment rates such as in the district of Bonthe could assist the government in reaching its targets.

The number of households with a chronically ill member is very high – more than a fifth in some districts. These households suffer more than others from food insecurity. Programmes, such as WFP's HIV and TB programmes are important tools in preventing further suffering.

WFP has been present in Sierra Leone since 1968. WFP supports vulnerable communities with a view to enhancing their capacity to meet their food and nutritional needs while addressing gender imbalances and the risk of HIV/AIDS.

The **Development Programme** (Jan 2011—Dec 2012) targets 314,500 beneficiaries, and has the following strategic objectives:

- Increase basic education, reduce gender disparities in primary schools and improve attendance and retention rates
- Improve nutrition and health of people living with HIV/AIDS (PLHIV), including pregnant and nursing women and tuberculosis patients

These objectives are implemented through the following activities:

- School meals: Daily hot meals for primary school students help to increase enrolment rates and stabilize attendance and completion rates as well as improve the concentration of students during class. Take-home rations for girls help to reduce the gender disparity in primary education.
- Nutritional support to PLHIV: Food assistance to PLHIV and TB patients provides nutrition that is essential for effective treatment and mitigates the impact of illness on food-insecure households.

The **Protracted Relief and Recovery Operation** (July 2010—Dec 2012) targets 961,000 beneficiaries, and has the following strategic objectives:

- Help communities suffering from the residual impacts of conflict to rehabilitate their livelihoods
- Provide support to youths engaged in employment and skills training activities
- Support improvements in the nutritional and health status of children under five and pregnant and nursing women

These objectives are implemented through the following activities:

- Food for Work: WFP provides food rations in exchange for activities that act to rehabilitate productive and social assets and protect livelihoods.
- Food for Training: WFP provides food rations in exchange for training activities that increase basic literacy and life skills, particularly for adolescent girls and unemployed youths.
- Supplementary feeding: Food assistance improves the nutritional status of pregnant and nursing women and moderately malnourished children under five.
- Cash for Work: Cash for Work activities engage the most vulnerable youths in short-term projects such as road maintenance, drain clearing and tree-planting. In exchange for their work, participants receive cash to buy food for their families.

The **Purchase for Progress – P4P** (June 2009—June 2010) initiative helps to connect farmers to markets and enhance agricultural production. In 2009/2010, some 2,000 smallholder farmers sold 162 metric tonnes of high quality rice directly to WFP. The purchased rice was distributed to over 100 primary schools under the WFP-assisted school meals programme. In 2010/2011, WFP plans to buy more rice and 50 metric tonnes of pulses<sup>31</sup>.

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<sup>31</sup> WFP (2010c)

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## ANNEX

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### I. Study objectives, concepts and methodology

#### I.1 Objectives

The 2010 CFSVA is a nationally representative survey designed to provide information on food security and vulnerability in Sierra Leone. It is the first survey of this type carried out in both rural and urban areas. Previous WFP surveys, mostly known in-country as Vulnerability Analysis and Mapping (VAM) surveys, were conducted in 2003, 2005 and 2007. However, these surveys were limited to rural areas. New challenges faced by Sierra Leone, such as rising food prices, and the ever-evolving context of post-conflict recovery have highlighted the need to re-examine food security in urban and rural areas.

The objectives of the 2010 Sierra Leone CFSVA are:

- To produce reliable baseline data in a post-war context which changes rapidly and needs regular situation monitoring;
- To compare rural and urban areas;
- To identify districts and livelihoods more affected by poverty and food insecurity to refine programme targeting accordingly;
- To produce an updated reference document for agencies and institutions working on food security issues in Sierra Leone.

The 2010 CFSVA was designed to capture statistically representative data at the district level for urban and rural areas. Further sub-stratification was included in the Western Area where the capital city of Freetown is located. The Western Area constitutes one-fourth of the national population and is comprised of varying types of settlements including rural areas and a substantial number of urban slums. In order to assess the situation more accurately in these varying conditions, the Western Area has been split into three distinct strata: Western Area Urban, Western Area Rural and Western Area Slum.

#### I.2 Food security concepts

There is no single measure to analyse the level of food security of a population, a community or an individual. Food security is highly complex in that it is determined by a range of interrelated agro-environmental, socio-economic and biological factors, all of which must be addressed to ascertain whether or not food security exists. The complexity of food security can be simplified by focusing on three distinct, but also highly interrelated dimensions of food security:

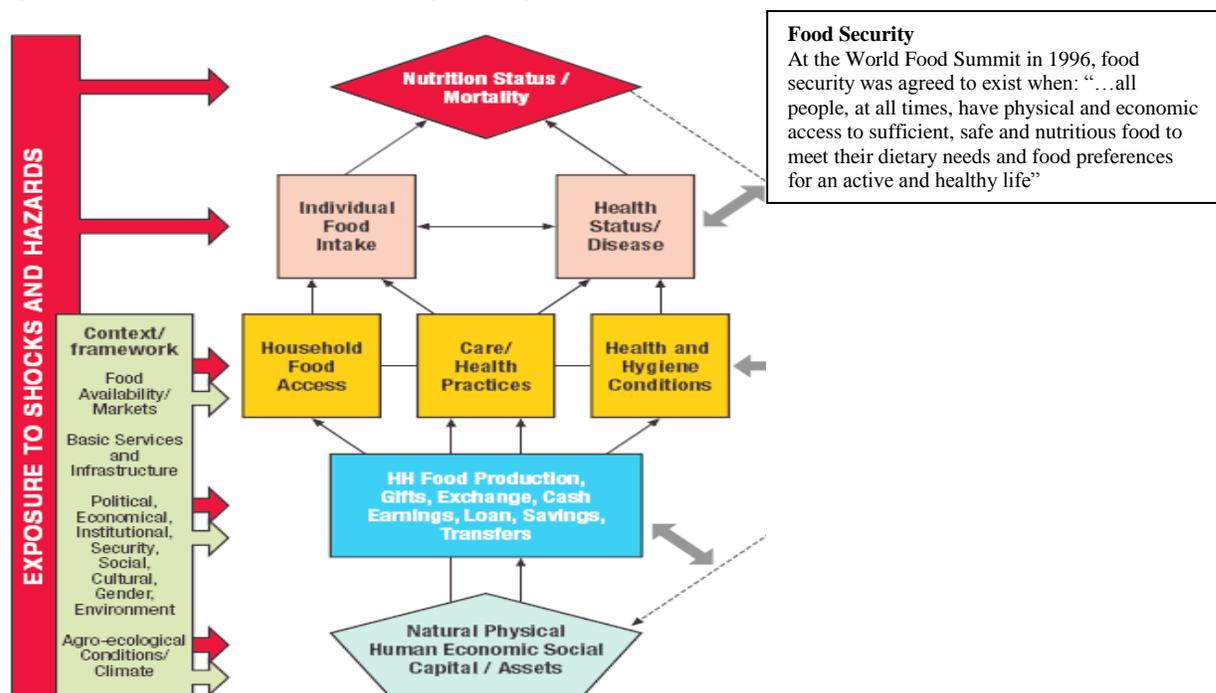
**Food availability** represents the aggregate availability of physical supplies of food in the area of study, through all forms of domestic production, commercial imports, food aid, and national stock. This may be aggregated at the regional, national, district or community level.

**Food access** represents a household's ability to regularly acquire adequate amounts of food, through a combination of its own production and stocks, market purchases, barter, gifts, borrowing or food aid.

**Food utilization** refers to a household's use of the food to which it has access, and an individual's ability to absorb and metabolize food-derived nutrients. It also includes behavioural elements such as the preparation of food, the distribution of food among the household members, and hygienic practices.

The **Food and Nutrition Security Conceptual Framework** (figure below<sup>32</sup>) illustrates the relationships between all factors influencing food security and vulnerability.

**Figure 1: Food and Nutrition Security Conceptual Framework**



Food security is often an outcome of the livelihood strategies adopted by households. Livelihood strategies are the behavioural practices and choices adopted by households to make a living (including how people access food; earn income; allocate labour, land and resources; their patterns of expenditure; the way they manage and preserve assets; how they respond to shocks; and the coping strategies they adopt). Livelihood strategies are based upon the assets available to households, which include human, social, natural, physical and capital resources. A livelihood strategy is considered to be sustainable when it can cope with and recover from

<sup>32</sup> WFP (2009c)

stresses and shocks, while maintaining its capabilities and assets both now and in the future, while not undermining the natural resource base.

## **I.3 Methodology**

### **I.3.1 Sample design**

A two-stage stratified cluster sample design was applied in the CFSVA. The strata of investigation are the 13 districts (with the Western Area is split into three separate strata) and ten livelihood zones. Livelihood zones have been defined by collaborative efforts led by FEWSNET, the Government of Sierra Leone and other partners including WFP in May of 2010. The first stage of the two-stage cluster design was the selection of Enumeration Areas (EAs) in each stratum using PPS (Probability Proportional to Size). The second stage is the random selection of households within each selected EA. The EAs were selected from a list of Enumeration Areas provided by Statistics Sierra Leone (SSL) which is based on the 2004 Population and Housing Census. Households in each EA have been selected after a listing exercise done by the enumeration team during the actual data collection.

#### **Sample size determination**

The required minimum sample size for each stratum is determined by using the following formula:

$$n = z^2 \times \frac{p(1-p)}{d^2} \times k$$

Where:

- n = Required minimum sample size
- z = Z-Score corresponding to the degree of confidence
- p = Estimate prevalence of the outcome being measured (food insecurity and/or malnutrition)
- k = Design effect (required for two-stage cluster sampling)
- d = Minimum desired precision or maximum tolerable error

Assuming:

- ⇒ 95% degree of confidence (z=1.96);
- ⇒ 50% will yield the largest required sample size which is desired for analysis of multiple indicators of varying prevalence (p);
- ⇒ A design effect (k) of 2 has been shown to adequately address effects of intra-cluster correlation in previous CFSVA studies;
- ⇒ 10% minimum desired precision (d) has been applied based on previous studies and budgetary constraints on sample size

Based on the values and formula above, and taking into account a 10% non-response rate among selected households, each stratum must include a minimum of 214 households. Previous CFSVA experience and determination of the cost-effectiveness of sampling within EAs

led to the decision to interview 12 households per cluster. However, as MUAC data was also collected in the CFSVA, the proportion of children under five had to be factored into the sample determination. Ultimately, a decision to include 25 clusters per strata was determined to give sufficient child counts and meet the previously calculated minimum sample size. This created a need for 300 households per strata.

In total, there are 34 strata in the sample design. This is based upon urban and rural representative data for each district, the three strata from the Western Area, and the 10 livelihood zones. Therefore the overall sample size of Sierra Leone 2010 CFSVA is 4,896 households.

In collaboration with SSL, weights were calculated based upon the most up to date population statistics available and areas applied during the analysis.

### **1.3.3 Data collection**

Data collection took place in parallel in all districts beginning on the 8<sup>th</sup> of June 8 and completing on the 15<sup>th</sup> of July 15. Enumeration teams were composed of one supervisor and four enumerators. Sixteen enumeration teams were sent each in a district except for Koinadugu which had two teams to ensure the different livelihood zones were captured and in the Western Area where three teams were sent to cover each of the unique strata there. A team of supervisors comprised of staff from the Ministry of Agriculture Forestry and Food Security (MAFFS), SSL and WFP. These teams worked with enumeration teams to ensure data quality during the collection period.

### **1.3.4 Data entry and analysis**

All questionnaires were transported to the SSL office in Freetown. Data entry was performed by SSL data entry clerks. Double data entry was performed to minimize the risk of errors.

Data analysis has been done by data analysts experienced in processing CFSVA data. The data analysis process has been an opportunity to strengthen stakeholders' capacities in food security indicators analysis.

## **2. Construction of key indicators**

### **2.1 Wealth Index**

Household wealth is not easily attained through self-reported data. A method employed in CFSVAs which follows techniques used in DHS surveys involves Principal Component Analysis (PCA) of variables relating to ownership of assets and housing conditions. The PCA method is a form of data reduction which attempts to describe the underlying relationship between a series of variables. This underlying relationship is a continuous variable which can be used as a proxy for household wealth. As the continuous variable alone is not easily interpreted, it is used to

rank households and divide them into quintiles which are more easily describable. These wealth quintiles allow for descriptive analysis of relative poverty.

The selection of variables was based up on a low level of both under and over correlation between variables; a sufficient distribution of households with the presence of the attribute (> 5% of households); a relatively low amount variance added to the model from each factor.

In the 2010 Sierra Leone CFSVA, a series of iterations of the wealth index was run until an appropriate model was found. The variables used in the final model are listed below.

Asset ownership	Housing conditions
Television	Electricity as main source of lighting
Watch	Improved wall construction
Radio	Use of improved drinking water
Mobile phone	Use of sanitary toilet facilities

## 2.2 Food Consumption Score

Food consumption is a reflection of food availability and food access at the household level. It is frequently used as a proxy indicator of the current food security situation. The Food Consumption Score (FCS) is a composite score based on the dietary diversity, food frequency, and relative nutritional importance of various food groups consumed by a household. A higher FCS therefore is related to the higher the dietary diversity, frequency and nutritional value of a household's diet.

Households were asked on how many days in the past week prior to the survey they had eaten a food item from a list of 26 various food items eaten commonly in Sierra Leone. These food items are divided into eight standard food groups: main staples, such as cereals, tubers and roots; legumes and nuts; meat, fish, poultry and eggs; vegetables (including green leafy vegetables); fruits; oils and fats; milk and other dairy products; and sugar.

Once the items are categorized into the appropriate food groups, the nutritional value of each group (see table below) and the frequency of consumption (with a maximum of seven days per group) are used to calculate the FCS using the following formula:

$$FCS = a_{\text{cereals}} \times \text{cereals} + a_{\text{pulses}} \times \text{pulses} + a_{\text{veg.}} \times \text{veg.} + a_{\text{fruits}} \times \text{fruits} + a_{\text{animal}} \times \text{animal} + a_{\text{dairy}} \times \text{dairy} + a_{\text{sugar}} \times \text{sugar} + a_{\text{oil}} \times \text{oil} .$$

Where:

$a_i$  = Relative nutritional weight of food group

$x_i$  = Number of days of consumption for each food group ( $\leq 7$  days)

**Table 1: Grouping of food items and their relative nutritional weight**

Food item	Food group	Weight
Rice, cassava products (gari, fufou, tho), maize, bulgur, millet, bread	Cereals and Tubers	2
Tubers products (potato, yam)		
Beans, peas, lentils, nuts (groundnuts, beniseeds)	Pulses	3
Vegetables and leafy greens	Vegetables and leafy greens	1
Fruits	Fruits	1
Meat, fish, eggs	Animal protein	4
Milk, dairy products	Dairy products	4
Sugar	Sugar	0.5
Oil, palm oil, butter	Oil	0.5
Condiments	Condiments (*)	0

(\*) Condiments are not given a weight as they are consumed in small quantities as a flavouring agent with little nutritional value.

The FCS is therefore a continuous variable with a range from 0 to 112. To provide more meaningful descriptive analysis of food consumption than reporting average scores, households are categorized into food consumption groups based on their FCS. The standard food consumption groups are poor, borderline and acceptable.

The standard thresholds of 21 and 35 are used to define the 3 household food consumption groups (poor, borderline and acceptable). The measure of quantities consumed is not included in the score. However, foods consumed in very small quantities are counted as condiments (except for oil and sugar), in order not to overestimate the consumption of some food such as fish or meat.

The household FCS is categorized using standard thresholds that indicate the status of the household's food consumption. WFP finds the following thresholds to be applicable in a wide range of situations:

- Poor food consumption: 0 to 21
- Borderline food consumption: 21.5 to 35
- Acceptable food consumption: > 35

To ensure that the FCS is an appropriate and valid proxy indicator of food security in Sierra Leone, it was tested for correlations with other proxy indicators of food access and food utilization. These other indicators include the Wealth Index, the Coping Strategies Index (CSI), per capita monthly food expenditure, per capita total expenditures, and the share of monthly expenditures on food. Bivariate correlation analysis showed expected coefficients with statistical significance. Based on these results, the FCS was considered an adequate proxy for measuring the current food security situation in Sierra Leone. Therefore households in the poor food consumption group are considered severely food insecure, households with borderline food consumption are considered moderately food insecure and households with acceptable food consumption are considered food secure.

### **2.3 Coping strategies index (CSI)**

The Coping Strategies Index (CSI) is a standard indicator used in food security analysis. Its essential objective is to measure the frequency and severity of negative coping behaviours employed by households when they do not have enough food. The indicator is created by asking households what they do when they do not have enough food and how often they have done so in the past week. Two forms of the CSI exist: the context-specific CSI and the reduced CSI. The reduced CSI allows for comparison across surveys by standardize the strategies and the weight measuring their severity. The reduced CSI was implemented in the 2010 Sierra Leone CFSVA.

Households were first asked if there were times in the past seven days when they did not have enough food. If they said yes, they were then asked how many times in the past seven days they employed one of five standard coping strategies. The five standard coping strategies and their severity weightings are:

- Eating less-preferred foods (1.0),
- Borrowing food / money from friends and relatives (2.0),
- Limiting portions at mealtime (1.0),
- Limiting adult intake (3.0), and
- Reducing the number of meals per day (1.0).

Based on the frequency reported and the severity weight of the coping strategy used, households CSI scores are calculated. Standard thresholds for describing CSI scores do not exist. For descriptive analysis, those households who reported having used a coping strategy were divided into terciles based on their ranked CSI. The CSI groups are therefore described as no coping, low coping, medium coping and high coping.



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