The State of Food and Nutrition Insecurity in Liberia

Comprehensive Food Security and Nutrition Survey

2010

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The 2010 State of Food and Nutrition Security in Liberia is available at

http://www.wfp.org/food-security

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The State of Food and Nutrition Insecurity in Liberia

Comprehensive Food Security and Nutrition Survey 2010

Key Messages

Food security

- Food security status is improving compared to 2006 but remains unacceptably high with 41% of the population's food intake below acceptable.
- Liberia remains highly dependent on foreign markets for food (two-thirds is imported). This food import dependency is increasing.
- Structural problems of inequality, poverty, unemployment and food insecurity that led to the 14 years of civil conflict remain largely unaddressed.
- Under- and unemployment, especially among young people, is very high.
- The farm sector which employs two thirds of the 3.5 million population is underperforming due to low investment and impact of the civil war. However, rice production, helped by the 2008 food price crisis, is gradually mounting. Liberia is a cash-crop oriented economy and issues of competitive food imports, limited infrastructure and pressure to keep food prices low for the urban population hinder agricultural food crop production.
- Infrastructure development including roads and bridges remains a key government challenge in order to facilitate access to markets.
- Education achievements are low. Net primary school enrolment is as low as 65%. Secondary school enrolment is even lower at 38%.

Nutrition

- Thirty-five percent of mortality in under-five year old children is related to malnutrition
- The 1,000 days from the beginning of pregnancy to the second year of life of the child is the critical period to intervene for nutrition
- Children under two years of age consume relatively little food, but need nutrient dense food, good caring practices and effective treatment of childhood illnesses to avoid malnutrition
- Improved infant and young child feeding is critical for children's nutrition (exclusive breastfeeding, continued breastfeeding and complementary nutrient dense foods)
- Stunting continues to be a significant huge problem in children
- Acute malnutrition is improving and efforts should be sustained for its effective management in order to see significant impact on child mortality.
- The double burden of malnutrition is increasingly becoming a public health concern with the occurrence of undernutrition among children and overnutrition among older women.
- Malnutrition in children is closely related to malnutrition in women. Greater efforts are needed to improve nutrition in women and delay women's first birth until after completion of adolescent growth.

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List of acronyms

ACF	Action Contre la Faim
BMI	Body Mass Index
CBL	Central Bank of Liberia
CFSAM	Crop and Food Security Assessment
CFSNS	Comprehensive Food Security and Nutrition Survey
CFSVA	Comprehensive Food Security and Vulnerability Assessment
CHT	County Health Team
CMR	Crude Mortality Rate
CRS	Catholic Relief Services
CSI	Coping Strategy Index
CWIQ	Core Welfare Indicator Questionnaire
DFID UK	Department for International Development
EAs	Enumeration Areas
ECHO	European Commission's Humanitarian Aid department
ESF	Emergency School Feeding
EU	European Union
FAO	Food and Agriculture Organization
FCG	Food Consumption Group
FCS	Food Consumption Score
FFE	Food-For-Education
FFT	Food-For-Training
FFW	Food-For-Work
FHHs	Female Headed Households
GAM	Global Acute Malnutrition
GBV	Gender Based Violence
GDP	Gross Domestic Product
GHI	Global Hunger Index
GLM	General Linear Model
GoL	Government of Liberia
GTZ	German Technical Cooperation
HAZ	Height for Age Z-score
HH	Household
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IDP	Internally Displaced Person
IFPRI	International Food Policy Research Institute
IMCIs	Integrated Management of Childhood Illnesses
IYCF	Infant and Young Child Feeding
LASIP	Liberia Agriculture Sector Investment Programme

LD	Liberian Dollars
LFSNS	Liberia Food Security and Nutrition Survey
LISGIS	Liberia Institute of Statistics and Geo-Information Services
LMIS	Liberia Market Information System
LMR	Liberia Market Review
LURD	Liberians United for Reconciliation and Democracy
MAM	Moderate Acute Malnutrition
MCH	Maternal Child Health
MDGs	Millennium Development Goals
MOA	Ministry of Agriculture
MOCI	Ministry of Commerce and Industry
MOE	Ministry of Education
MOF	Ministry of Finance
MOHSW	Ministry of Health and Social Welfare
MPEA	Ministry of Planning and Economic Affairs
MPW	Ministry of Public Works
MUAC	Mid Upper Arm Circumference
NCHS	National Centre for Health Statistics
NPHC	National Population and Housing Census
NGOs	Non-Governmental Organizations
PCA	Principal Component Analysis
PHC	Project Healthy Children
PHCA	Post Harvest Crop Assessment
PRS	Poverty Reduction Strategy
RUF	Revolutionary United Front
SAM	Severe Acute Malnutrition
SC UK	Save the Children United Kingdom
SENAC	Strengthening Emergency Needs Assessment Capacity
SFP	Supplementary Feeding Programme
TFC	Therapeutic Feeding Centre
TFP	Therapeutic Feeding Programme
TOT	Terms of Trade
TLU	Tropical Livestock Units
U5MR	Under-Five Mortality Rate
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNMIL	United Nations Mission in Liberia
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

UW	Under Weight
VAM	Vulnerability Analysis and Mapping
WAZ	Weight for Age Z-score
WB	World Bank
WFP	World Food Programme
WFS	World Food Summit
WHO	World Health Organization
WHZ	Weight for Height Z-score
WVL	World Vision Liberia

Foreword

The number of undernourished people in Liberia remains unacceptably high. Although Liberia adopted the Millennium Development Goals, including that of halving the proportion of hungry people by 2015 and reduction of under-five mortality by two-thirds, the country is nowhere near meeting those targets. Nationally, 41 percent of the population has an unacceptable food consumption level, i.e. consumption is limited or insufficient nutritious foods are consumed which cannot maintain an active and healthy life as per international standard. Of the total population, 13 percent have an extremely one-sided consumption pattern, mainly consisting of only rice, roots and tubers. Although rice production increased from 85,000MT in 2005 to 293,000MT in 2009, it is still far from meeting domestic consumption requirements. Liberia's high and increasing dependency on foreign markets for food coupled with structural problems of inequality and poverty, limited infrastructure to facilitate market access and the underperformance/underdevelopment of the farm sector all contribute to persistent high levels of food insecurity.

Chronic malnutrition also remains exceptionally high, at 42 percent. Under-nutrition in the first five years of life threatens lives and can jeopardize physical, motor and cognitive development. For those who survive, their undernourishment during the first two years of life can cause irreversible, long-term damage. It is therefore of particular importance that we take concerted action to combat hunger, especially of young children. Over-consumption in adults, especially in urban areas, is also increasingly becoming a public health problem.

The underdeveloped agriculture sector and persistent chronic malnutrition is a key theme of the 2010 Comprehensive Food Security and Nutrition Survey (CFSNS), the third nationwide food security survey following those of 2006 and 2008. The 2010 report not only identifies who and where the food insecure are, but also explains what makes Liberians vulnerable to food insecurity and how such vulnerabilities can be addressed. It records the state of food insecurity in the country, focusing attention on counties and regions where action is most needed, thereby supporting both national and regional policy efforts and advocacy work.

The report offers a view of the past and present. It incorporates a significant amount of historical data on food availability and access and triangulates that with the most current information collected during the field phase of the survey. Besides highlighting the chronic food insecurity situation in Liberia's southeastern region, it emphasizes the emerging challenges in the rest of the country, such as the livelihood shifts that have negatively affected families in Rural Montserrado. It reveals that high levels of food and nutrition insecurity tend to go hand in hand with low levels of investment in crop production, low education achievements, poor road networks, high price volatilities and poor health infrastructure. As the report underscores, the structural problems of inequality, poverty, unemployment and other vulnerabilities that led to the 14 years of civil conflict and the relatively precarious state of security in the run-up to next year's election remain largely unaddressed.

We hope that this report will generate discussion and spur renewed countrywide action to overcome food and nutrition insecurity in the country.

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The third countrywide food security and nutrition survey after previous ones in 2006 and 2008, the 2010 CFSNS was an integrated endeavor involving many organizations in its design, the collection of data, and the production of this report.

The food security component of the survey was primarily supported by the Ministry of Agriculture (MOA) and the United Nations World Food Programme (WFP). The primary agencies for the health and nutrition section of the survey were the Ministry of Health and Social Welfare (MOHSW), the United Nations Children's Fund (UNICEF), World Food Programme (WFP) and the World Health Organization (WHO). The sampling methodology was designed by the Liberia Institute of Statistics and Geo-Information Services (LISGIS) and WFP.

In the field, many agencies contributed staff, vehicles and other logistical support that ensured successful implementation of the survey. In particular, the Ministry of Agriculture, Ministry of Health and Social Welfare, LISGIS, FAO, UNICEF, WFP, WHO, Action Contre La Faim (ACF), Action for Family Health and Development (AFAHD), Aid for the Needy Development Program (ANDP) and Project Health Children (PHC) were involved in the field phase of the survey.

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This report was compiled in collaboration with various stakeholders including FAO, UNICEF, WFP and WHO. National stakeholders including representatives from MOA, MOHSW and LISGIS have reviewed the report and provided valuable comments which were incorporated in the final report. For any feedback, clarification or comments, please contact any of the following persons:

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Executive summary

Overview, scope and methods

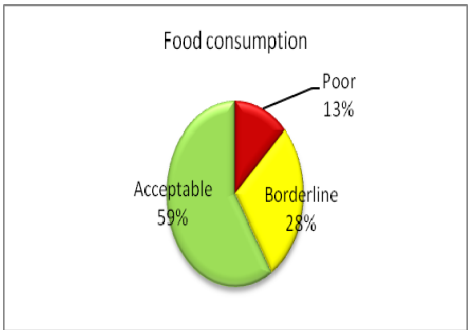
Since the end of conflict in 2003, and helped by the 2008 global food price hike, local rice production is bouncing back. High-potential rice growing areas such as Foya (Lofa County) are now producing marketable surpluses and local rice is available in the market in Monrovia on a seasonal basis. However, rice is still predominantly imported from Asia and America (60%) as are almost two-thirds of Liberia's total domestic food requirements. Given low foreign exchange reserves, this high dependency on food imports makes Liberia extremely vulnerable to global food price fluctuations.

Liberia's agro-climatic conditions would be able to support a vibrant agricultural sector and act as an engine for poverty reduction and hunger eradication. However, the country still faces overwhelming reconstruction and development challenges following half of a century of political instability including two brutal consecutive civil wars. Agricultural production is still the lowest in West Africa and road infrastructure is poorly developed or was destroyed during the conflict. Sixty-four percent of Liberia's 3.5 million citizens are poor and lack access to basic services including education and health facilities. Under-employment is extremely high at over 60 percent. As a consequence, food insecurity and malnutrition are rife.

Within the framework of the Food Security and Nutrition Monitoring System (FSNMS), established in 2008, the Government of Liberia carried out a nationwide Comprehensive Food Security and Nutrition Survey (CFSNS) in 2010, the third CFSNS following those of 2006 and 2008. The survey, which aims to gather information to facilitate decision-making by the Government and the development and humanitarian community, is representative at county level making it ideal for targeting purposes and for designing appropriate sub-national food security and nutrition strategies. It was conducted between May and October 2010 during the hunger period in Liberia, when the rains are heavy and frequent, roads become inaccessible, limiting people's ability to access markets, and food stocks become depleted.

How many people are food-insecure or malnourished?

Nationally, 41% or about 1.2 million people have an unacceptable food consumption, i.e. they consume limited or insufficient nutritious foods to maintain an active and healthy life. Of those, 13% or about 368,000 people have an extremely one-sided consumption pattern, mainly consisting of rice, roots and tubers only. They are classified as having poor food consumption. People with



acceptable food consumption, i.e. their general dietary intake is composed of food items from all the main food groups, constitute 59% of the total population.

While the malnutrition situation has improved significantly since 2006, chronic malnutrition (measured by the number of stunted children) remains among the highest in the world at almost 42%.

Malnutrition status of children (age 6-59 months) [1]

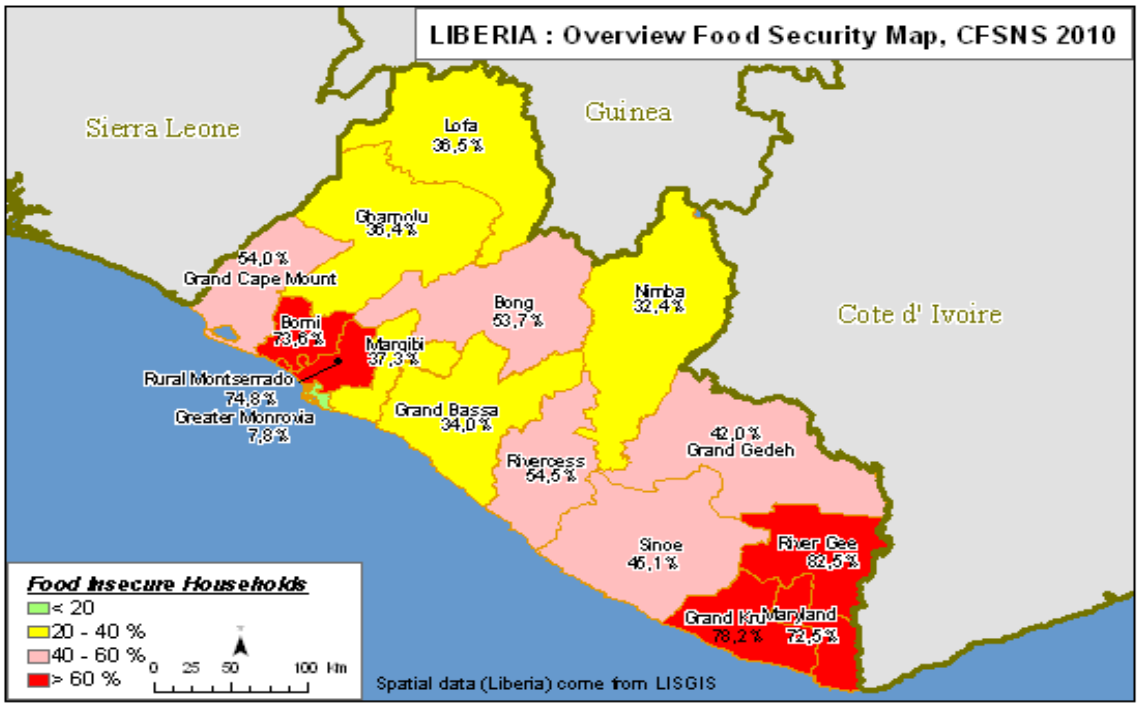
	Wasting	Stunting	Underweight
2006	6.9	39.2	26.8
2010	2.8	41.8	14.9

Where do the food-insecure or malnourished people live?

There is a large disparity in the distribution of food insecurity and malnutrition in Liberia. Food insecurity is more prevalent in rural areas than urban areas with rural residents at least three times more likely to be food insecure (i.e. 57% of rural households have unacceptable food consumption compared with 18% of urban households).[2]

Map: Food security in Liberia

The south eastern counties remain more affected by food insecurity than the rest of rural Liberia with the River Gee and Grand Kru counties the two most food insecure



[1] 2010 survey uses the WHO Reference Standard population while the 2006 uses the NCHS Standard. Therefore, these figures are not totally comparable. For wasting, the comparison is 2% in 2010 vs 7% in 2006; for stunting it is 35% vs 39% and for underweight the comparison is 20% in 2010 vs 27% in 2006.

[2] Urban areas include Greater Monrovia and other major cities within the countryside as categorized by the Liberia Institute of Statistics and Geo-Information Services.

in both 2006 and in 2010. These areas are characterized by poor infrastructure making them almost inaccessible by road during the rainy season, agricultural production is low, access to health and education facilities is limited and the incidences of poverty is very high: about three quarters of the population can be classified as food insecure.[3]

Further west rural Montserrado, which had been relatively food secure in the 2006 survey, has shown an exceptional decline in household food security.[4] This can be chiefly attributed to loss of livelihood by households that rely on rubber cultivation for their main source of income, including charcoal production and rubber tapping, as most of the rubber trees were uprooted at the beginning of the year to allow for replanting. This food insecurity situation is expected to be transitory rather than chronic.

While chronic malnutrition is more prevalent in rural areas, acute malnutrition, although low, is higher in urban areas.

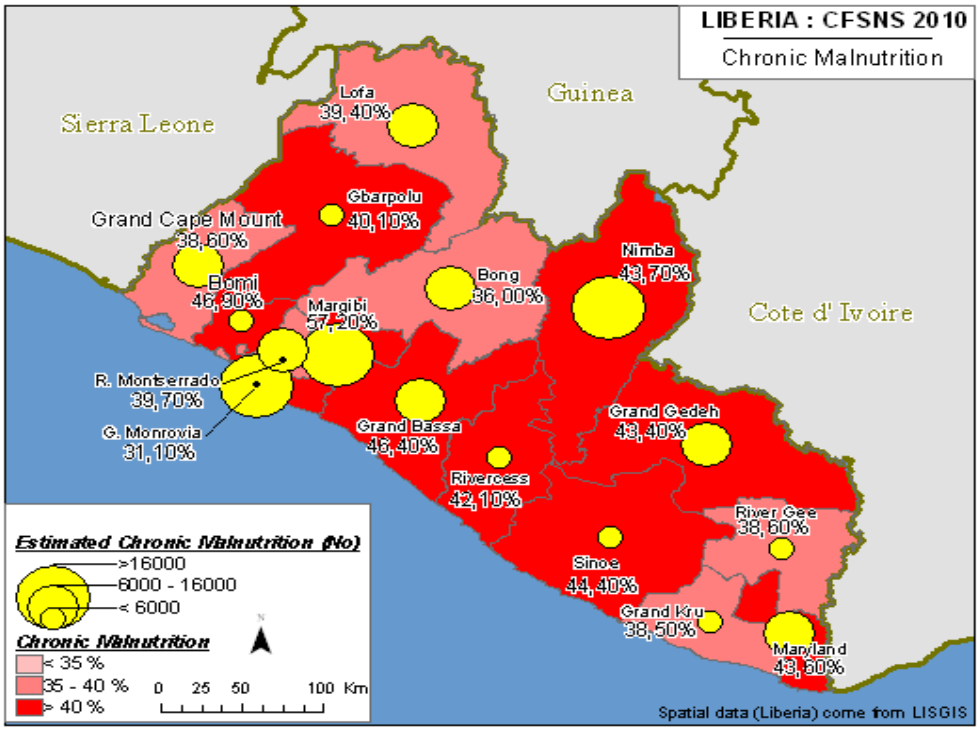
Malnutrition (rural/urban)

	Rural	Urban
Stunting	43	34
Wasting	2.5	3.4
Underweight	15.4	15.3

The following map shows that more than half of the counties have a stunting rate above 40%, a level of severity defined by WHO as 'very high'. The geographic variation in malnutrition was similar to 2006.

[3] 2007 Liberia Core Welfare Indicator Questionnaire (CWIQ)
[4] GOL, 2006 and 2010 CFSNS in Liberia

Map: Chronic malnutrition



Who are the food-insecure?

Most food insecure households depend on crop farming, charcoal production or rubber tapping as their primary income source. Each one of these activities is affected by seasonality. During the lean season (the period during which the 2010 CFSNS was conducted) their income decreases sharply while their dependency on markets increases as food stocks are depleted.

The food insecure spends a higher share of their limited income on food (59%), chiefly on the staple, rice. Their share of total expenditure on essential non-food items is considerably lower than that of food secure households, since they have little to spare after buying essential food items. They are more inclined to use informal credit facilities such as borrowing from friends and relatives, shopkeepers and informal credit clubs *(susu clubs)* to purchase food. They have a low asset base, lacking productive assets and commonly live in non-durable dwellings made of mud walls and grass-thatched roofs.

During the lean season the income of food insecure households decreases sharply, while their dependency on markets increases as food stocks are depleted.

In general, heads of food insecure households are more likely to have little or no education and are also less likely to enroll their children in school.

Poor food intake, limited nutrition awareness, lack of access to safe drinking water and lack of adequate sanitation facilities mean that food insecure households are more likely to have malnourished children.

Why are they food-insecure?

Low agricultural productivity: Crop yields in Liberia are below average for the region and pre and post-harvest losses are extremely high at 40%. Poor seeds and low usage of improved crop varieties, old farming tillage techniques and equipment, pest and animal infestation, inadequate storage facilities, limited market access for local produce, inadequate agricultural extension services, and low fiscal space to allow substantial investment in the sector are all factors contributing to low agricultural productivity.

Poverty*:* Very high levels of under- and unemployment and limited income earning opportunities compel almost two third of Liberia's population to live in poverty. Purchasing power is therefore low and share of expenditure on food high (53%), making poor households particularly vulnerable to food price hikes.

Low human capital: The protracted civil wars severely obstructed skills development among Liberians with swathes of young people never attending school. Unsurprisingly illiteracy is high (53%) with illiteracy among women even higher (65%) compared with 41% among men.[5] Rural areas with few educational facilities have even higher illiteracy levels, such as Grand Bassa (65%), Rivercess (62%), and Gbarpolu (60%). The educational level of the household head has a significant impact on household food security and the nutritional status of the children: households headed by those with no formal education are more likely to be food insecure. They also send fewer children to school and a higher proportion is malnourished. Also, with high levels of chronic malnutrition, Liberia will take longer to overcome the human capital obstacle as stunted children do not have the same intellectual capacity as healthy children—they have lower academic performance, thereby affecting the rate of economic development in the country. The low human capital has a bearing on the long term food security and nutritional situation of the household.

Poor infrastructure (road and market accessibility)*:* Roads are extremely poor in some parts of the country (especially in the south east as well as in parts of Lofa and Gbarpolu counties). Road conditions deteriorate sharply during the rainy season to the extent that they become impassible. Consequently access to markets is curtailed and cost of food increases as traders factor in the additional transportation costs. In fact, the price differentials between Monrovia and some markets in the south east are as high as 90% during this period.[6] With food expenditure of poor households as high as 60%, food price hikes immediately hinder their access to food. In addition,

[5] Liberia NPHC 2008
[6] Liberia Market Price Monitor, August 2010

limited market access prohibits agricultural production, especially of cash crops, as farmers are prevented from procuring essential inputs or bringing their surplus to market.

Vulnerability to price fluctuations: Due to high dependency on food imports, low agricultural production and limited foreign exchange reserves, Liberia is highly vulnerable to variations in the import prices of food, especially of rice. Careful monitoring of the global cereal market is therefore essential to anticipate price shocks. The majority of households do not produce more than five months of food for their own consumption. For several months of the year they are net buyers of food and dependent on markets.

***Poor health status*:** Childhood illness and malnutrition are intertwined, each exacerbating the other. In Liberia, the use of unsafe drinking and poor sanitation is common. Unsafe drinking water and poor sanitation facilities are closely associated with higher prevalence of morbidity and malnutrition amongst children.

Recommendations

The major underlying reasons for high prevalence of food and nutrition insecurity in Liberia are widespread poverty and high levels of unemployment. Low agricultural productivity, limited infrastructure and high food prices exacerbate the situation.

Since Liberia has an agricultural economy it makes sense to approach the food security challenge via the agricultural sector. The Comprehensive Africa Agriculture Development Program (CAADP) rightly proposes budget increases to address the key agricultural sector constraints, which include high pre and post harvest losses, lack of processing and storage facilities, limited use of improved seeds and access to markets.

The findings of the survey also clearly highlight that in order to reduce stunting significantly and in sustained manner, there is a need to improve household food security and as well as child and maternal care practices such as infant and young child feeding, disease prevention and health service utilisation and hygiene and sanitation practices. The high prevalence of malnutrition is depriving children of survival, optimum growth and development. Malnutrition in early years not only increases the risk of death due to ordinary child illnesses, it also associated with higher risk of chronic diseases later in life. From the period of conception to first two years of life the physical growth and cognitive development is most rapid and during this period brain also develops significantly. If a child is malnourished during this critical window of opportunity, it leads to impaired intellectual growth and the damage is irreversible. Compared to children who are not stunted, stunted children often enroll later, complete fewer grades, and perform less well in school. In turn, this underperformance leads to reduced productivity and income-earning capacity in adult life.

Strategy 1: Specific interventions to boost the agricultural sector.

Recommendations include:

- Improving local production of food and cash crops, especially rubber, cocoa and palm oil, and introduce swamp rice farming.
- Strengthening both food and market-based approaches including capacity building on storage, processing and general market analysis in addition to offer markets for local produce through the Purchase for Progress (P4P) initiative.
- Initiating value addition programmes in the agricultural production chain such as improving processing and even food fortification to make local produce more nutritious.
- Improving post-harvest management/storage/preservation of produce.
- Improving agricultural extension services across the country
- Establishing a conducive environment that encourages private sector involvement in the rural economy—specifically encouraging financial institutions to provide loans and credits to farming households.

Strategy 2: Since poverty is widespread, implementation of social protection programmes need to be considered. These include:

- Initiating targeted public works programmes.
- Generating employment opportunities for the poor through public works.
- Improving road infrastructure and market access.
- Providing seasonal income support activities specifically targeting the south eastern part of the country.

Strategy 3: A long term strategy towards the eradication of poverty and food insecurity in Liberia must focus on improving primary and secondary education as well as providing vocational training opportunities. This should include programmes such as:

- Start skills development of young people.
- Encourage enrolment in primary education, with particular focus on girls.
- Re-invigorate adult literacy classes.
- Continue with the provision of free school meals and extending the school feeding campaign to the most food insecure counties.

Strategy 4: Address the malnutrition situation in the country. The following programmes and interventions are recommended:

- Chronic malnutrition should be addressed by focusing on the first 1,000 days with evidence based interventions focused to prevent malnutrition

- The national program for management of acute malnutrition should be integrated into the health system including its prevention, detection and treatment, in order to reduce child morbidity and mortality and accelerate progress towards MDG 4.
- Promotion of exclusive breastfeeding, complementary feeding and breastfeeding up to 24 months.
- Promotion of adequate iron and vitamin A intake.
- Support with feeding the sick and malnourished child and maternal nutrition.
- Increase access to improved water and sanitation facilities for families, coupled with hygiene promotion
- Strengthen and encourage activities to promote child health and prevent child illness, particularly by increasing access to health services at both facility and community level for children and their families.
- Women's nutritional status and delaying the first birth needs to be made a priority in health programming
- Media campaign on healthy eating as well as programmes to prevent overweight and obesity should commence.

Strategy 5: Strengthening institutional capacity of the national government in management of food security and nutrition programs. The following are recommended:

- A proper program monitoring and evaluation system needs to be established to monitor delivery and impact.
- The food and nutrition monitoring system requires further strengthening and the role of the Food Security and Nutrition unit in coordinating food security initiatives must be supported.
- The FSN coordination unit should ensure the inclusion of the above recommendations in sectoral plans and strategies e.g. in the upcoming 10 -year National Health Plan and the Basic Package for Health Services.
- The coordination unit should ensure the promotion of food and nutrition security as a cross-cutting agenda, mainstreaming technical input in issues related to poverty reduction, safety nets, economic development etc.
- The nutrition survey should use SMART methods to improve data quality, improve accuracy of measures and reduce costs.

1. Background and introduction

Liberia is situated on the Atlantic coast of West Africa and has 579 km of coastline and a land mass of approximately 111,370 sq. km. The capital is Monrovia. It borders Côte d'Ivoire in the east, Sierra Leone in the west and Guinea in the north. The climate is tropical, hot and humid. Liberia is among the wettest countries in the world with an average annual rainfall of 4,650mm per year in the coastal areas and 2,240mm in the interior. With the prevailing precipitation, it has two seasons - the rainy season lasts from late April to October (the months of heaviest rainfall are June, July and September) and the dry season begins in November and ends in April. Temperatures range annually from 24°C to 30°C (75°F to 85°F).

Table 1.1 Trends in Human Development Index (2002-2009)	
2009	0.442
2008	0.434
2007	0.427
2006	0.419
2005	0.38
2004	0.325
2003	0.37
2002	0.365
Source: UNDP Human Development Report 2002 – 2009	

The Republic of Liberia has 15 administrative and political units known as counties, which are subdivided into 66 districts. The people consist of both the descendents of settlers from America and indigenous peoples. Currently, there are 16 indigenous ethnic groups, the largest being the Kpelle who are mostly settled in central and western Liberia. A community of around 4,000 Lebanese, many of whom were born in the country, is active in the economy, notably the importation of rice – Liberia's staple food – and other basic commodities and services.

The country's agro-ecology contains four zones:

1. The coastal plains characterized by lagoons and mangroves
2. The hill zone
3. Mountain and plateau regions
4. The northern highland zone with altitude ranging from sea level to 1,440m at Mount Wuteve in Lofa County.

Liberia possesses approximately 40% of West Africa's rainforest which extends inland from the coastal plains. The most densely forested counties are Gbarpolu, Rivercess, Sinoe, River Gee and Grand Gedeh. Though covering large areas, the tropical forest is endangered by deforestation and loss of biodiversity.

The country is rich in natural resources, including water, wildlife, forests (timber), and minerals. Iron ore, gold, and diamonds are present in the plateaus and mountains of the northern region. Gold and diamonds have also been discovered in Sinoe and Grand Kru counties in the south east.

Liberia is one of the world's poorest nations. Per capita gross domestic product (GDP) was US$ 362 in 2009, unemployment is rampant and at least two-thirds of

Liberians (68% of the rural population and 55% of the urban population) are living on less than one dollar a day. The current official population of Liberia is 3.5 million (census 2008) with an estimated one million living in Monrovia.

The fourteen year (1990-2003) civil war left more than 270,000 people dead and 800,000 displaced. The brutal conflict also caused economic collapse – GDP fell 90% between 1987 and 1995 – and by the time of the elections in 2005, average income was a quarter of what it had been in 1987, and a sixth of the 1979 level. Though gradually improving over the past six years, Liberia remains one of the world's least developed countries in terms of human development with a Human Development Index of 0.442 and ranked 169th out of 182 countries in the world *(2009 UNDP Human Development Report).*

The legacy of the conflict still looms large. Although the political situation is improving following the formation of a democratically elected government in 2006, Liberia faces overwhelming reconstruction and development challenges.

The re-establishment of state authority and rule of law throughout the country are still ongoing, many of the structural factors that contributed to the outbreak of violence (i.e. exclusion of large parts of society from governance and ethnic and class animosities) are yet to be fully addressed, and low human development and vulnerability to food insecurity pervade Liberian society.

The hurdles that the country must overcome to meet the development needs of its citizens are evident in the country's relatively poor progress towards the attainment of the Millennium Development Goals (MDGs). In January 2004, Liberia's baseline report revealed that little or no progress had been made in achieving the MDGs while a subsequent assessment in 2008 found that only two of the eight MDGs were likely to be achieved by 2015.[7]

Institutional and governance capacities remain too weak in post-crisis Liberia to allow sustained hunger reduction in the near term because of the absence of productive and social safety nets, technical assistance and robust capacity development. Inadequate food supply, limited market access, and poor food utilization are highlighted as significant dimensions of food insecurity in most parts of Liberia. While domestic production of food has increased in recent years, output is far below potential.

Liberia's recent economic performance has been a bright spot in the country's transition from war to peace. Despite recent difficulties in the global economy, there has been a remarkable turnaround in growth since 2006 largely due to the Government's pursuit of policies aimed at promoting economic revitalization and growth. Real GDP is estimated to have increased by 7.8%, 9.5%, 7.1% and 4.6% per annum between 2006 and 2009 and is projected to grow further by 7.5% in 2010 and

[7] These two MDGs are combating HIV/AIDS, Malaria and other diseases and developing a global partnership for development.

10.5% in 2011. This growth is mainly driven by mining, services, manufacturing, agriculture and forestry.

Overall, the food security situation in Liberia remains weak. The latest report of the International Food Policy Research Institute categorizes the food security situation as 'alarming' with a Global Hunger Index of **24.3**; and that Liberia is highly vulnerable to global economic downturns (IFPRI 2010).

Objectives, scope, methodology and limitations of the survey are discussed in Annex 1.

2. Food consumption in Liberia

Nationally, 41 % or 1,267,000 people have an unacceptable food consumption, i.e. they consume limited or insufficient nutritious foods to maintain an active and healthy life. This tallies with FAO's calculations that 38% are undernourished (2004-6). Of these, 13% or about 368,000 people have an extremely one-sided consumption pattern, mainly surviving solely on rice, roots and tubers. They are classified as having poor food consumption. People with acceptable food consumption, i.e. their general dietary intake is composed of food items from all the main food groups, constitute 59% of the total population.

These consumption groups (acceptable, borderline and poor) were created based on the frequency and variety of consumption of different food items. Technical details are provided in Annex 2.

Between 2006 and 2010 food security in rural Liberia has improved even more markedly than the figures reveal since the latest survey was carried out during the lean season while in 2006 it took place following the harvest of the main crop, paddy.

In 2006, 50% of the population was classified as having an unacceptable food consumption (poor and borderline). By 2010 this has been cut to 41% while the percentage of households with poor food consumption slightly declined by 1% to 13%.

Data for greater Monrovia, where one third of the population resides, allow for better comparison as information for these areas was gathered in 2007, 2008 and 2010 during the same period of the year, namely July and August. Figure 2.1 shows that the food security situation worsened in 2008, attributed mainly to the global food price crisis. However, current analysis indicates significant improvement from the 2008 levels of 23% to the current undernourishment level of 8%.

Figure 2.1: Trends in Food Security Status for Greater Monrovia (2006-10)

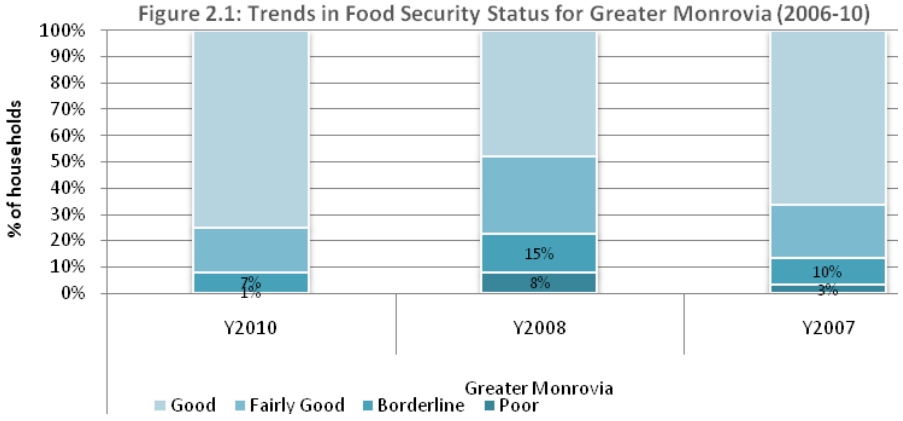


Table 2.1 shows the prevalence and number of acceptable, borderline and poor food consumption households by county. River Gee, Grand Kru, Maryland and Bomi have the highest prevalence of households with poor food consumption, close to or above 30%. In terms of absolute numbers, Bong and Maryland have the highest number of poor consumption households.

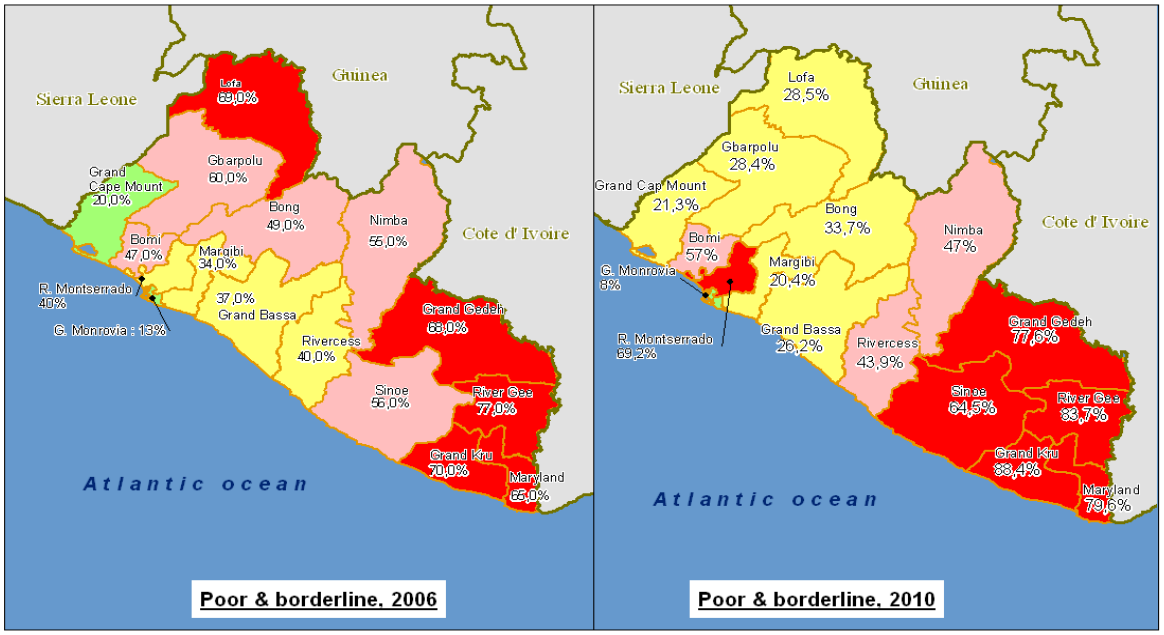
Table 2.1 Proportion and number of undernourished

	Food consumption (%)			Population (no.)	
	Poor	Borderline	Acceptable	Poor	Borderline
Greater Monrovia	1.2	6.6	92.2	11,650	64,074
Lofa	3	33.5	63.5	8,306	92,749
Gbarpolu	4.2	32.2	63.6	502	26,851
Grand Bassa	6.6	27.4	66	14,632	60,744
Margibi	7.2	30.1	62.7	15,114	63,187
Nimba	9.2	23.2	67.6	42,506	107,190
Grand Gedeh	10.8	31.2	58	13,528	39,080
Sinoe	12	33.1	54.9	12,287	33,981
Cape Mount	13.1	41	45.9	16,647	51,974
Rivercess	15.8	38.7	45.5	11,298	27,674
Bong	16.3	37.3	46.4	54,357	124,722
Rural Montserrado	23.4	51.4	25.2	34,496	75,772
River gee	28.1	54.4	17.5	18,768	36,333
Grand Kru	33.6	44.6	21.8	19,459	25,829
Bomi	38.8	34.8	26.4	32,638	29,273
Maryland	43.3	29.3	27.4	58,861	39,694
Liberia	**13**	**27.9**	**59.1**	**368,050**	**899,039**

Map 2.1 shows poor and borderline food consumption households in 2006 and 2010. The south east remains the most food insecure part of the country. Here almost three quarters of households have consumption patterns below what is acceptable. The most remarkable improvement in food consumption has been witnessed in Lofa and Gbarpolu counties in the Northwest and Bong and Nimba in Central Liberia. The most dramatic decline in food security status between 2006 and 2010 - in rural Montserrado - can be attributed to a temporary loss of livelihood by many households as rubber trees were uprooted at the beginning of the year to allow for replanting. The population had depended on rubber trees not only for charcoal production but had also worked in rubber plantations as casual labourers. Since imported food prices are also higher than the pre-2008 levels, rural Montserrado is more vulnerable to food insecurity than in previous years.

In the south east, the most food insecure part of the country, almost three quarters of households have consumption patterns below what is acceptable.

Map 2.1 Poor and borderline food consumption in 2006 and 2010



Proportion of household affected by Food Insecurity

The names and boundaries on this map do not imply acceptance or recognition by the United Nations.

Spatial data come from LISGIS

OD_Dakar
Food Securitu Unit, 2010

< 20 %
20 - 40 %
40 - 60 %
> 60

N

0 25 50 100 Km

3. Vulnerabilities in the post-conflict situation

Liberia is in a protracted post-war recovery period. The rule of law and governance is still weak, posing a major threat to the economic growth that the country has been experiencing since the signing of the 2006 peace agreement. Next year's presidential elections may further threaten the democratic stability of the country.

Widespread food insecurity among the Liberian population was one of the grievances that culminated in civil war. Today, food insecurity is still rife and urgent action is needed to address the key vulnerabilities discussed in this section.

3.1 Increasing reliance on world markets for food

Liberia remains heavily reliant on imports of food to meet domestic requirements with more than two thirds of food requirements being imported. Rice imports are estimated at 280,000mt against local production of only 168,000mt in 2009/10. Imports range from staple foods to vegetables, pulses, chicken, meat and condiments. Figure 3.1.1 shows the decline in the self-sufficiency rate for food grains (rice and wheat).

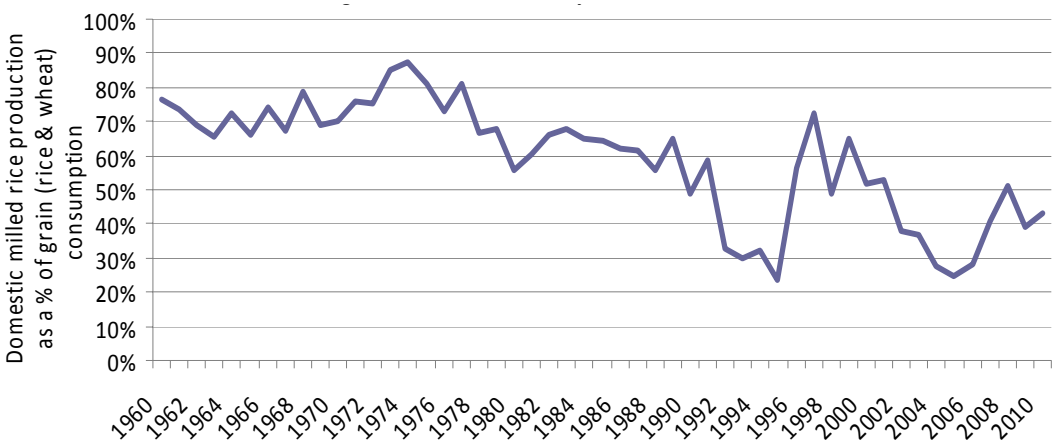
The demand for food is intensifying because Liberia has a population growth rate of 2.1% (2008 population census), which, if maintained, means the population will double by 2041 higher than other sub-Saharan post conflict countries.

Liberia has never been self sufficient in cereal production. The country's most self sufficient year in terms of grain production was 1974 when it produced 87% of its grain consumption requirements. The subsequent decline in self-sufficiency reached a low of 23% in 1995 followed by a brief period of improvement between 1996 and 1999 before plummeting in the 2000s as the war intensified. While production has been on upward trend since 2006 it is still less than half of domestic requirements.

What's more food requirements are intensifying: Liberia has a population growth rate of 2.1% (2008 population census), which is higher than other sub-Saharan post conflict countries, including Sierra Leone (1.8%), Cote d'Ivoire (1.6%) and Sudan (1.9%), but comparable with similar countries that did not experience civil war including Guinea (2.2%), Ghana (2.1%) and Nigeria (2.2%). If this growth rate is maintained, the population will double by 2041.

With the low growth in agricultural productivity (see next section) the import gap is expected to widen further in the future.

Figure 3.1: Rice self-sufficiency ratio



The rice import business in Liberia is concentrated with just seven licensed importers in the country. The largest, Fouta Corporation, has a 40-45% market share. The import business is regulated by the MCI, which approves import requests (consignments that would be too expensive are denied authorization to come into the country) and employs staff to monitor Monrovia's markets to ensure that agreed upon price levels are applied. Wholesalers are allowed a US$ 1/bag margin for butter rice. However, the retail trade in rice (transacted in small containers of varied sizes) is not regulated.

The fact that the Liberian market is dominated by low quality imported rice makes it much harder for local producers to compete on cost, crushing any incentive to invest in local production.

The MCI also monitors private rice stocks in Monrovia, aiming to ensure that a stock level equivalent to six months of consumption (105,000mt) is always available in the country. In June 2008, the level of private rice stocks fell to 50,000mt, during the supply crisis when price increases hit Liberia later than neighboring countries because of to the regulatory measures adopted by national authorities.

Widespread poverty means Liberia is chiefly a market for low-quality rice imports. The cheaper, so-called 'butter rice' – round Chinese rice – accounts for 90% of rice imports. Higher quality, more expensive, parboiled rice, of diverse origins, makes up the remainder of Liberian imports.

With Liberian authorities seeking to secure cheap rice supplies since 2008 new brands of low-quality rice imported from Brazil and India are now being sold in markets.

The fact that the Liberian market is dominated by low quality imported rice makes it much harder for local producers to compete in cost, crushing any incentive to invest

in local production. This is in contrast to other parts of west Africa such as Nigeria where there is a market for high quality long-grain rice, making it much easier for local rice producers to compete on price.

3.1.1 Trade balance and foreign exchange

Liberia is suffering from huge trade deficits with imports far exceeding exports (Ministry of Commerce and Industry). In the first quarter of 2010 total export proceeds were US$ 55.1m and import expenditures were US$ 107.6 leading to a trade deficit of US$ 52.5m. (Source: Central Bank of Liberia).

Food and live animal imports comprise a major share of the country's external trade. In 2009/10, the country was only producing 37% of its local demand for rice, leaving two-thirds to be met mainly through commercial imports predominantly bought from Asia and America (60%). In 2008, when global prices peaked, rice imports accounted for more than half of the country's total import bill for food and live animals and overall food and fuel accounted for 49% of total imports with ongoing support from donors (IMF, World Bank, UNMIL) accounting for the deficit, which stood at US$-1.2bn in 2009

However, the Liberian dollar(Liberty) has been much less volatile than the Guinean Franc or the Sierra Leone Leone and has traded in a stable range against the US dollar in recent years (varying from 69 LD/1 USD to 71 LD per 1 USD).

Other imports include beverages, minerals, crude materials, tobacco, machinery and transport equipment while the export of rubber has declined dramatically.

This acute lack of foreign exchange reserves leaves a country that is so reliant on food imports extremely exposed to global food price fluctuations.

Table 3.1: Food imports

Year	2007	2008	2009
Value of food and live animal imports (US$)	**130.9 million**	**206.8 million**	**162.1 million**
Import bill for rice (US$)	**100 million**	**200 million**	**n/a**
Commercial rice imports (US$)	**60 million**	**105.6 million**	**63.9 million**

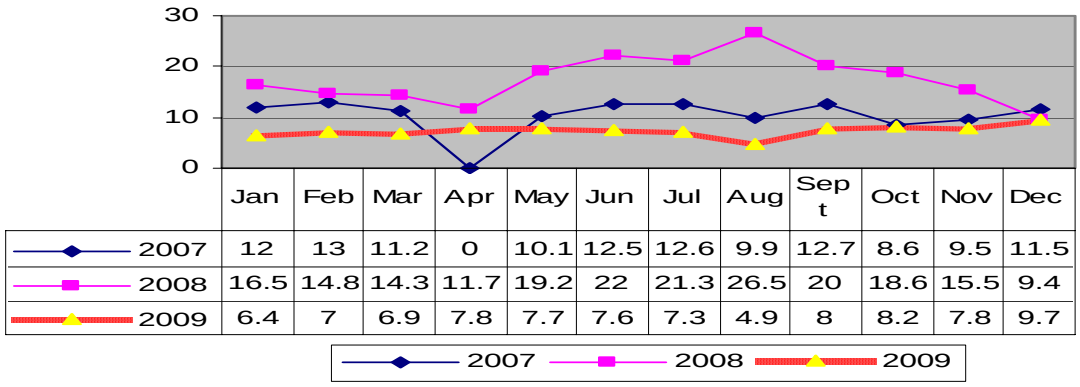
As the table shows the value of imports accounted for by food and live animals peaked at US$ 206.8 million in 2008 before dropping last year (CBL 2009). Commercial rice imports also hit a high in 2008 at US$ 105.6 million, which meant the import bill for the staple doubled from about US$ 100 million in 2007 to approximately US$ 200 million in 2008 for imports of 341,300 MT.

3.1.2 Dependency on markets and price stability

Liberia's reliance on food imports and vulnerability to international market price volatilities transmits down to the local level. This was witnessed in 2007/08 when rice prices affected urban Liberia and Greater Monrovia [8] (2008 Liberia CFSNS).

As Figure 3.2 shows price inflation remained in double digits (average of 17.5 %) throughout 2008. Since then this has slowed to an annual average of 7.4 % in 2009, influenced by the domestic pass-through effects of the relative low oil and high food prices on the world market *(Source: LISGIS and Central Bank of Liberia)*.

Figure 3.2: Price inflation 2007-2009



Source: LISGIS and Central Bank of Liberia

While food prices have decreased since their peak in 2008 they remain higher than pre-crisis levels. High food prices constitute one of the most commonly reported shocks amongst Liberian households (see Section 4.7). Even rural farming households report high dependency on markets due to seasonal deficits in local produce. Although many markets are generally well-stocked, food price volatilities continue to undermine the purchasing power of poor Liberians. The effects of price volatility are exemplified in the south eastern region where the prices in the poorly integrated markets are more unpredictable than in the rest of the country and the people report the highest levels of food insecurity.

According to the survey the overwhelming majority (94%) of households in urban Liberia sourced their rice from markets in the preceding three months while in rural Liberia less than half (45.5%) sourced their rice from markets with the rest depending upon a mixture of market and production. Overall, the proportion of households reliant on markets alone for their rice supply increased from 43% in 2008 to a current level of 65.5% while those that rely on production alone declined from 23% in 2008 to

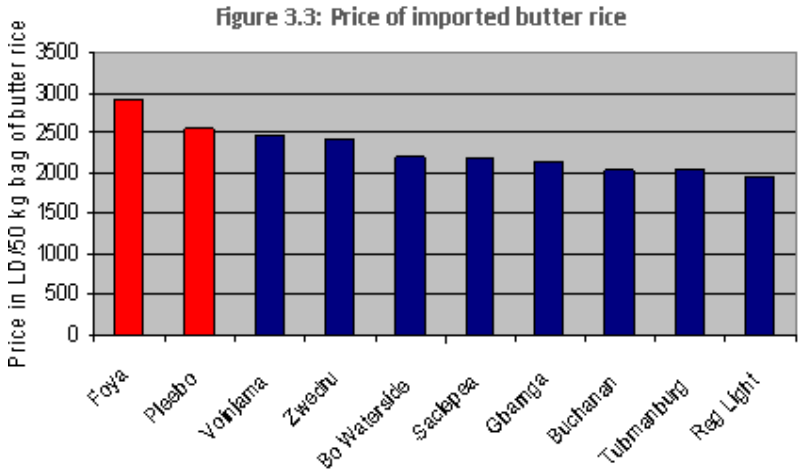
Liberians are highly market dependent. The percentage of households reliant on markets alone for their rice supply has risen dramatically in the last two years and those that rely on production alone has fallen

[8] Impact of High Food Price on Food Security in Liberia, 2008

the current 15 %—a trend that can to some extent be attributed to seasonality as the timing of this survey was during a period when food stock was low or depleted.

Notwithstanding this, it is evident that markets are the main source of food for Liberians. Understanding the market dynamics in the country is therefore crucial in explaining the prevailing food security situation.

The Liberia Market Information System (LMIS) also shows that markets in south eastern counties and parts of Lofa (Pleebo and Foya markets) are the most expensive while the Red Light Market in Monrovia is the cheapest followed by markets in central Liberia as shown in Figure 3.3.



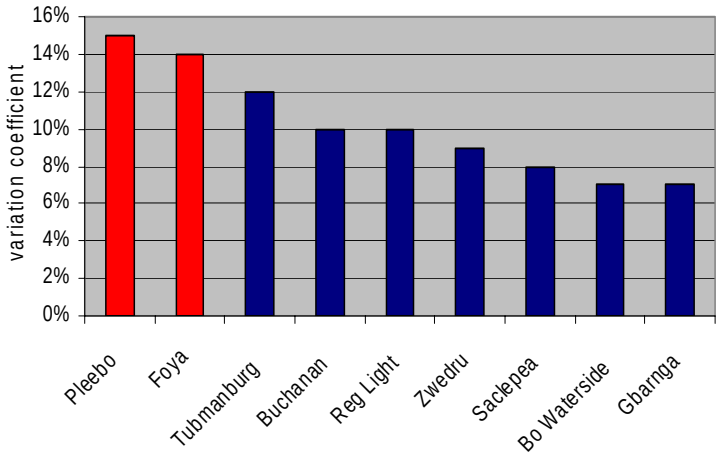
Expensive markets tend to be those in the south east and Lofa County that have poor road transport links and are therefore poorly integrated with the rest of the country. For example communication links between the most expensive markets (Foya and Pleebo) and central Liberia and Monrovia, which serves as the main port of entry for most cereals consumed in the country, are poor (see Table 3.2). In fact, Foya market shows negative correlation which signals substitution from other sources—mainly local rice.

Table 3.2: Price correlations

	Buchanan	Bo Waterside	Pleebo	Red Light	Saclepea	Tubmanburg	Zwedru	Foya	Gbarnga
Buchanan									
Bo Waterside	0.76								
Pleebo	0.13	0.66							
Red Light	0.87	0.76	0.06						
Saclepea	0.64	0.86	-0.18	0.83					
Tubmanburg	0.78	0.79	0.31	0.85	0.78				
Zwedru	0.80	0.70	0.33	0.81	0.80	0.85			
Foya	-0.09	-0.79	0.38	-0.33	-0.80	-0.64	-0.64		
Gbarnga	0.93	0.88	0.14	0.89	0.78	0.86	0.81	0.28	
Voinjama	0.68	0.85	0.52	0.87	0.76	0.78	0.69	0.74	0.76

On the other hand, markets in central Liberia indicate a high degree of integration which could provide a great opportunity for trade exchanges on local rice and cash crops once production improves.

Figure 3.4: Price Variations for imported rice

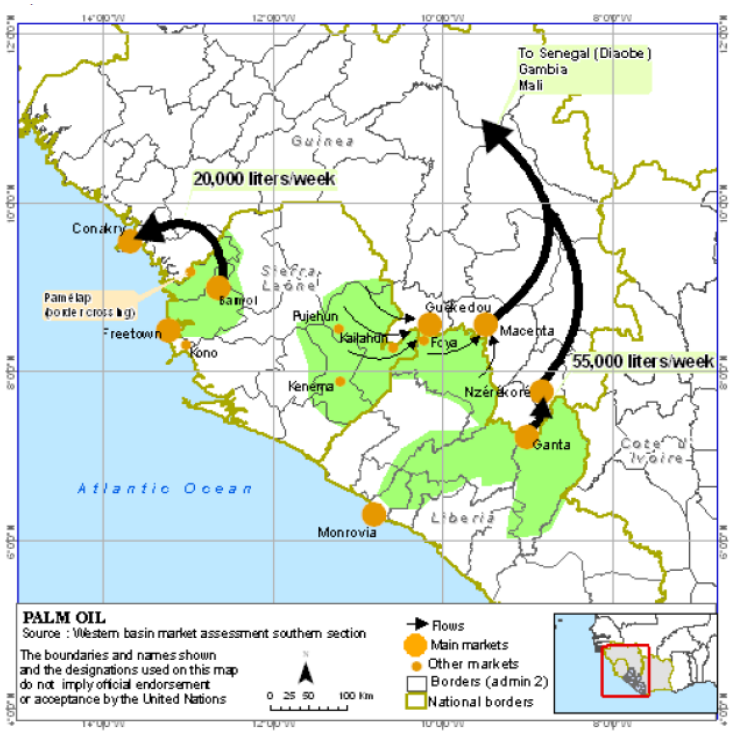


Not only are less integrated markets more expensive but they also have more volatile rice prices. As Figure 3.4 shows the variation co-efficient is 15% for Pleebo market in Maryland County and 14% for Foya market. Meanwhile in central Liberia imported rice prices have been relatively stable with a variation co-efficient below 10%, which is in line with international cereal price stability since 2009.

3.1.3 Cross border trade

Healthy, well functioning cross border trading tends to increase food security. Bong, Lofa and Nimba counties trade palm oil with neighboring countries (it is estimated that 9,000 litres of palm oil pass through Nimba on a weekly basis) and Grand Cape Mount county trades in *gari*. These counties enjoy relative food security compared to Grand Kru and River Gee, which have minimal cross-border trading.

Map 3.1: Palm oil cross border trade



Since the 2008 crisis Liberia has intensified imports of processed cassava products from Sierra Leone, a cheap alternative to rice for the urban poor in Monrovia and cross-border trade with Côte d'Ivoire provides vital imported rice supplies to the chronically food insecure in Liberia's south east. Urban demand emanating from Conakry, Freetown and Monrovia drives cross-border flows of local

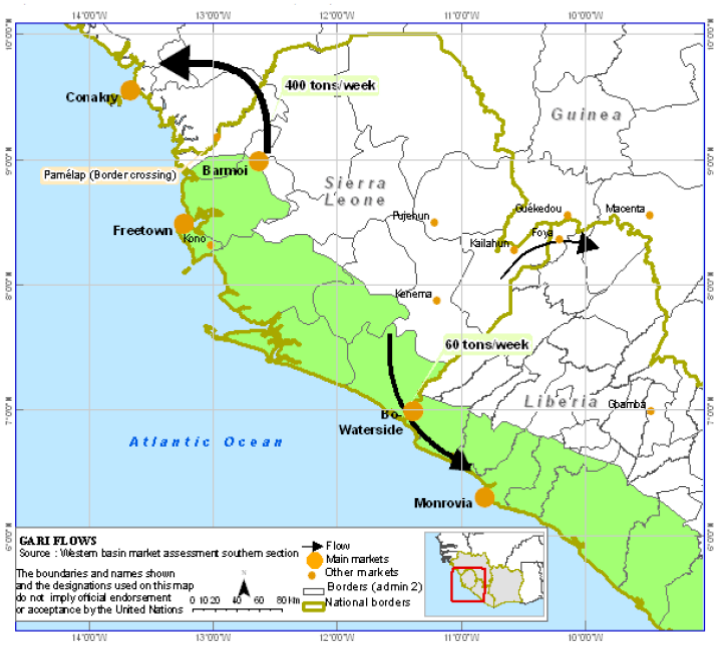
rice, *gari*, palm oil and groundnuts. Liberia's Ganta market (Nimba County) handles some 90,000 litres of palm oil every week, making it one of the region's largest.

Although Liberia depends on overseas markets for much of its formal trade, the country is benefiting from increased access to a buoyant regional market for cash and food crops. A joint Government CILSS FEWS WFP assessment carried out in 2010 identified some of the key implications for cross-border trade and food security in the country.

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

- A high degree of concentration exists in the interdependent imported rice and cocoa market chains
- Three importers handle 75% of the imported rice business in Liberia
- The local rice market is weak
- Local rice prices in Sierra Leone are twice as volatile as those of the imported variety
- Exchange rate variations influence the direction of cross-border trade flows
- Market response capacity suffers from poor transportation, lack of credit and low demand.

Map 3.2: Gari cross border trade



Buoyant market conditions for both palm oil and cocoa have worked to the advantage of producers in Liberia at a key period in post-conflict rehabilitation. Cross-border trade supports food security for Liberian palm oil and cash crop producers. Favorable terms of trade, for instance, sheltered palm oil producers from the increase in international food prices in 2008. With many urban households in Monrovia dependent on Sierra Leone's cheap gari exports instability in neighboring countries would constitute food security risks for Liberia.

3.1.4 Rice subsidies

Following the increase in global rice costs in 2008 the government of Liberia announced the temporary suspension of import duties on rice (US$2.10 per 50kg bag of imported rice) in May 2008, with the aim of limiting price increases for this staple commodity. According to the World Bank, this subsidy came at an annual cost of US$ 8m, equivalent to 0.9% of GDP – translating into a significant source of foregone revenue for Liberian authorities.

As of September 2010, the import duty had yet to be re-imposed, although there seem to be plans to do so until mid -2011, making Liberia one of very few West African countries not to have reestablished import duties on rice.

The absence of a duty on imported rice (combined with the long-standing policy to encourage cheap rice imports) puts local rice production at a competitive disadvantage. In the long term it is likely to make Liberians more reliant on cheap imports and have a profound disincentive effect on local rice farming. This can be contrasted with the case of Nigeria, where until recently there was a 109% tariff on imported rice (recently brought down to 30%). ECOWAS is planning to implement a common external tariff that would imply that all member countries apply a 30% duty on imported rice.

The absence of a duty on imported rice puts local rice production at a competitive disadvantage. In the long term it is likely to make Liberians more reliant on cheap imports and have a profound disincentive effect on local rice farming

3.2 Performance of the crop farming sector

Agriculture is the mainstay of the Liberian economy and accounts for over half of GDP in the post-war period (compared to one-tenth in the late 1970s). A large proportion of the economically active population of Liberia is engaged either directly or indirectly in smallholder subsistence agriculture or fisheries. According to the Ministry of Agriculture 2008[9], more than two-thirds of Liberians are dependent on agricultural production for their livelihoods.

For sustainable food security, the country has to ensure sufficient quantities of food are available through agricultural production and commercial imports. For most rural areas, low and/or variable agricultural production is still a key limiting factor in food and nutrition security.

Production of Liberia's two main staple crops - rice and cassava - is mainly a subsistence activity. Rice is usually harvested between October and December depending on the area (south eastern Liberia starts harvesting in September while northwest starts in November). Cassava can be harvested throughout the year but the main harvest takes place during July and August. Most subsistence farmers sell their surplus produce immediately after the harvest in order to settle accumulated debts.

3.2.1 Rice

Since the conflict ended and helped by the 2008 food price crisis, local rice production has bounced back. Certain high-potential rice growing areas such as Foya (Lofa County) are now producing marketable surpluses that can be bought in local markets post harvest (November-December). Local rice is available on a limited seasonal basis in Monrovia. However, aside from these exceptions, the market for rice in Liberia is largely dominated by imports.

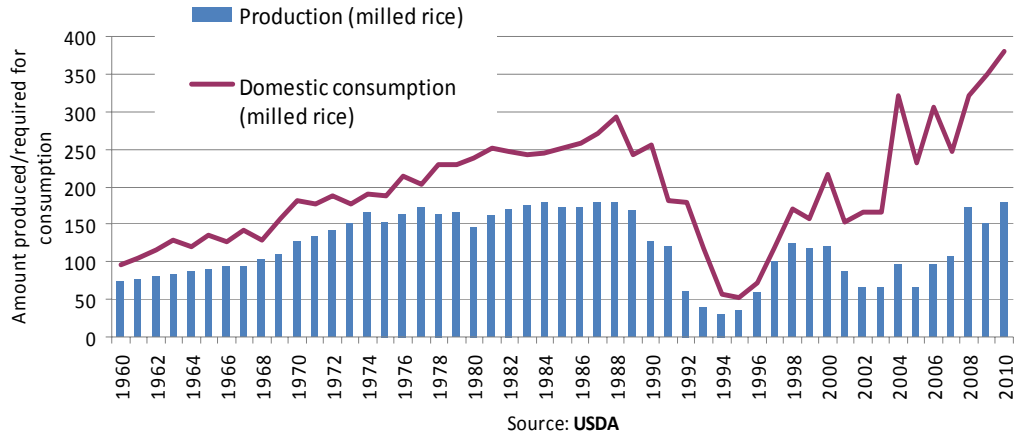
Rice production in Liberia - Key facts

- *In 2009/2010 two thirds of demand is met by imports*
- *Liberia imported an estimated 260,924 metric tons of rice last year*
- *In the 2008/09 agricultural season rice was cultivated by 408,000 farming families*
- *Annual per capita demand is estimated at 127kg or 450,800 metric tons in total*
- *Liberia produces 167,570 metric tons of milled rice and 292,950 metric tons of unprocessed rice*

In 2009/10, the country was only producing 37% of its local demand for rice, leaving two-thirds to be met mainly through commercial imports. [10] The rice production estimates provided by the United States Department of Agriculture (USDA) are more optimistic but still leave a deficit of 53% (2010) as shown in Figure 3.5.

[9] LASIP 2009
[10] MOA/FAO 2010 Estimates

Figure 3.5: Rice production gap



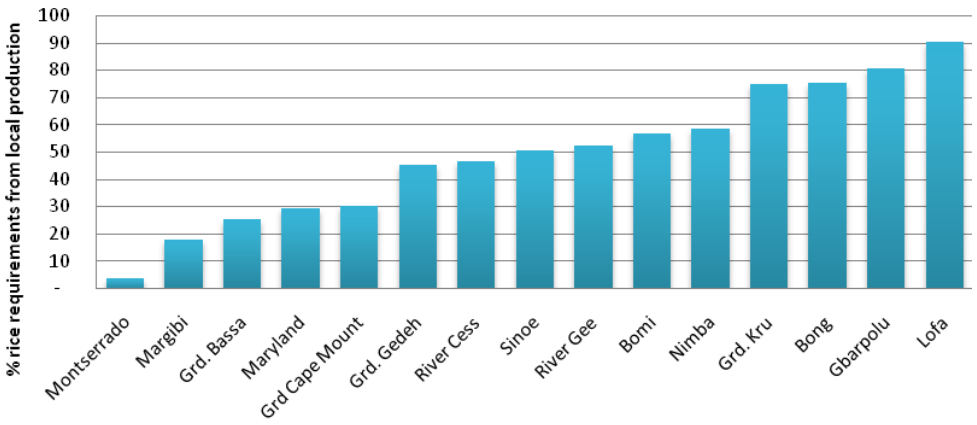
Source: **USDA**

There has been a sharp increase in the production of paddy (unprocessed rice) from 85,000 tons in 2005 to 292,950 metric tons in 2009/10. The per capita yield of paddy is slowly improving from an estimated level of 0.92mt/ha to a current level of about 1.5mt/ha as shown in Figure 1 in Annex 5, (average yield of 0.8Mt/ha in uplands and 1.2 Mt/ha in lowland rain-fed production), it is still extremely low.

With an estimated annual per capita rice consumption of 127 kilograms (MOA estimate, 2010), Liberia's annual demand for the staple is 450,800 metric tons against a local production for milled rice of 167,570 metric tons (see Table 1 in Annex 5).

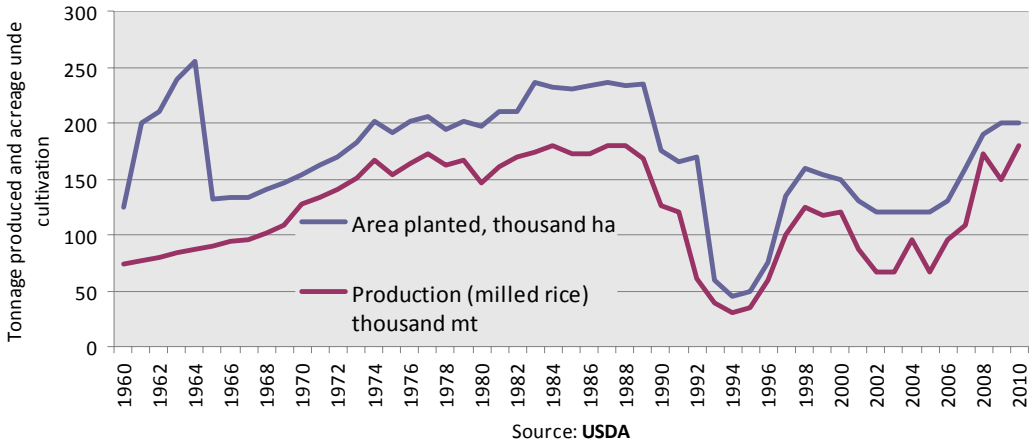
Given rice production estimates by county (MoA, Annual Crop Assessment) for 2009, all counties in Liberia are deficient in rice production compared to requirements (Figure 3.6). Counties that have witnessed substantial investment in agricultural production in the last three years, including Lofa and Bong are now able to meet at least three quarters of local requirements. In contrast, Montserrado (including Monrovia) meets four percent of rice consumption requirements from locally production.

Figure 3.6: Rice self-sufficiency by county, 2009



Source: Liberia MOA, Annual Crop Assessment 2009/10

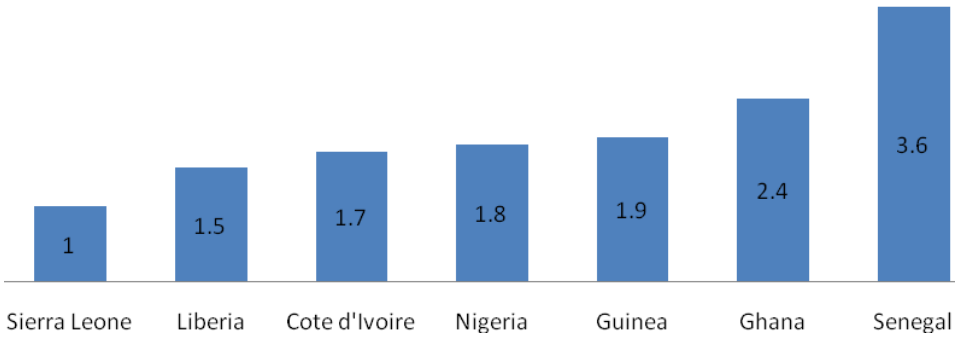
Figure 3.7: Area under rice cultivation



Although the acreage of rice production and amount of domestic milled rice produced is gradually increasing as shown in Figure 3.7, the levels are still far below the pre-war levels, meaning there is great potential for increased rice production in the country to lower the current deficits substantially.

Figure 3.8 compares Liberia's rice yields and those of surrounding counties. Liberia has one of the lowest yields in the region.

Figure 3.8: Rice yields in selected West African Countries, 2009



In Ghana and Senegal, average paddy yields are between 2.4 and 3.6 Mt/ha, much higher than the yield in Liberia. Liberia relies on extensive forms of cropping, such as 'slash and burn' in the uplands, which entail substantial environmental costs. The post-harvest loss rate is also very high at 35-45%. For example, about 52,000 Mt of paddy rice harvested in 2006/2007 was lost due to poor pest management and lower efficiencies in processing[11].

[11] MOA/FAO 2008

3.2.2 Cassava

Cassava is the second most important food crop with 2007 production estimated at 560,000 metric tons and about 500,000 metric tons yearly between 2008 and 2010. In 2008, it was estimated that households on average cultivated 0.5 ha and yields were estimated to be between six and 10 mt/ha on upland farms. According to FAO, per capita consumption of root and tuber products was equivalent to 49 kg in milled rice per person in 2007, underscoring the contribution of those commodities to the Liberian diet.

3.2.3 Other food crops

Other food crops such as vegetables are largely imported as local produce is far below requirements. Pulses (beans, peas etc), onions, tomatoes and even pepper are all imported. Minimal vegetable production occurs in urban and peri-urban Liberia.

3.2.4 Cash crop production

Liberia's main cash crops are palm oil, rubber and cocoa. Cash crop production has grown dramatically since 2006 with the percentage of households producing cash crops doubling from just 28% in 2006 to 46% today. But the sector has been neglected and there is untapped potential for growth.

Other cash crops reported by households are coffee (mainly in Lofa County), kola nuts and sugar cane. Overall, Nimba County is the most active in terms of cash crop production followed by Lofa and Rivercess.

3.2.4.1 Palm oil

The importance of palm oil in terms of contribution to the diet and as an income source for producer households is commonly underplayed.

Palm oil production in Liberia - key facts

- *It is the main source of dietary fat providing 327kcal per person per day in 2007 (FAOSTAT)*
- *It is the country's main cash crop in terms of number of households involved*
- *In 2006 13% of households were involved in its production. The percentage has risen to 18% in the current survey*
- *Nimba county has the highest proportion of households involved in production (34%) followed by Rivercess (30%) and Sinoe (29%) counties*
- *Ganta in Nimba County is one of the largest regional palm oil markets in the basin, handling an estimated 90,000 litres a week in peak season. 60% of this is exported to Guinea.*

There is significant cross-border trade in palm oil between Liberia and neighboring countries. Ganta in Nimba County is one of the largest regional palm oil markets in the basin handling an estimated 90,000 litres of palm oil every week during the marketing season, of which 60% are exported to Guinea. The market system links Liberian producers to urban consumers as far as Dakar, Senegal, where the retail price of palm oil is twice that of Liberia, illustrating the incentive to export the commodity to markets in the north.

As in most agricultural work women are the primary players and can be assumed to support household food security by managing the income they make from processing palm kernels and selling the oil.

Although small scale, its contribution is vital since this income is used to buy food during the dry season. It also provides income for young people who gather wild palm oil bunches and sell them to women processors. According to the 2006 Liberia CFSNS palm oil production was one of the first activities undertaken by returnees: it requires little capital and is therefore accessible to poor households. Furthermore, the terms of trade between palm and rice has been favorable and has benefited palm oil producers in recent years. As the study of the impact of high food prices in Liberia demonstrates, palm oil producing households were, by and large, able to defend their food access thanks to high palm oil prices.

3.2.4.2 Rubber

Despite the recent slump in exports rubber is the number one cash crop in Liberia in terms of importance to the national economy. It accounted for 62.4% of total export earnings in 2009, a sharp decline over the previous year (86.1%) largely attributed to the global financial crisis.

Rubber production in Liberia – key facts

- *The number one cash crop in terms of importance to the national economy*
- *In 2007 it generated approximately $US 218 million in revenues*
- *Export earnings from rubber fell from $US 206.8 million in 2008 to $US 92.4 million in 2009 (Central Bank of Liberia, 2009)*
- *In 2008 it accounted for 86.1% of total export earnings. By 2009 its share of export earnings had crashed to 62.4%*
- *The percentage of households involved in rubber production has remained largely unchanged since 2008 at 15% in 2010, though sharply down on the 2006 figure of 26%*
- *The main plantations are in Nimba, Maryland, Bong and Margibi counties.*

There is however renewed optimism in the sector since rubber futures were up by 22% in September 2010 according to latest global market survey trends[12]. The industry also creates a steady stream of employment and supports the livelihoods of many smallholder farmers.

3.2.4.3 Cocoa

Although cocoa is Liberia's second most important export crop commodity the country has failed to tap the potential for cocoa production or take advantage of favorable international cocoa prices, which reached a 30 year high in early 2010. Production is low and it is currently making very little contribution to livelihoods.

Cocoa production in Liberia – key facts

- *8% of households are involved in cocoa production (CFSNS)*
- *Lofa, Nimba and River Gee counties are the principal areas of production.*

[12] http://rubbermarketnews.blogspot.com/2010/09/rubber-advances-to-five-month-high-on.html

Although official production statistics show a 54.5% rise in production to 5,075 tons in 2009, unofficial estimates place production at 10,000 metric tons from about 30,000 hectares. Mst of the cocoa produced in Liberia may be finding its way to international markets via neighboring countries.

3.2.4.4 Fisheries

Liberia's coastline and extensive continental shelf hold considerable maritime fish resources including the main oceanic pelagic resources such as tuna and tuna-like species. Yet fishing is mainly a subsistence activity. The sector – mainly marine (at both industrial and artisanal levels) as well as inland (exclusively artisanal), and aquaculture practiced in rural areas through fishpond culture – provides about 3% of GDP.

The problems bedeviling the fishing sector include lack of fishing equipment, lack of storage/preservation facilities and inadequate technical know-how in aqua-culture.

Yet fish is part of a typical Liberian diet making an important contribution to nutrition in terms of protein intake. In fact the 2010 CFSNS reveals that fish is the second most purchased food commodity by households after rice. Thus, improved fishing practice will not only ensure nutritious and diversified diet at household level, but also has the potential to earn significant foreign inflows.

Fishing sector in Liberia – key facts

- *The sector accounts for 3% of GDP*
- *It provides employment for 37,000 fishers and processors*
- *About a third of households report some level of fishing*
- *Only 1% report ocean fishing, 19% creek and 9% river*
- *Fish is the second most purchased food commodity after rice.*

3.2.4.5 Livestock

Although the country has an estimated 2 million hectares of pastureland, the livestock sector accounts for only 14% of agricultural GDP and estimates suggest slow growth in aggregate livestock numbers which comprise mainly cattle, poultry and swine. The survey identifies the untapped status of the livestock sector.

Liberia depends on imports of livestock products to satisfy domestic demand. According to the Ministry of Commerce and Industry (MCI), an estimated 26,000 head of live cattle and 15,000–16,000 head of live sheep and goats were imported from neighboring countries while the value of imports of meat and meat products amounted to US$ 6 million in 2005/06, the latest year for which data are available[13].

The MCI estimates the total value of food, live animal and vegetable oil imports at US$ 174.3 million in 2009. This is likely to be a conservative estimate as many animals are sourced from neighoring countries whose statistics may not be captured.

[13] Liberia Agriculture Sector Investment Programme, GOL 2009

Table 3.3 Ownership of livestock (% households)

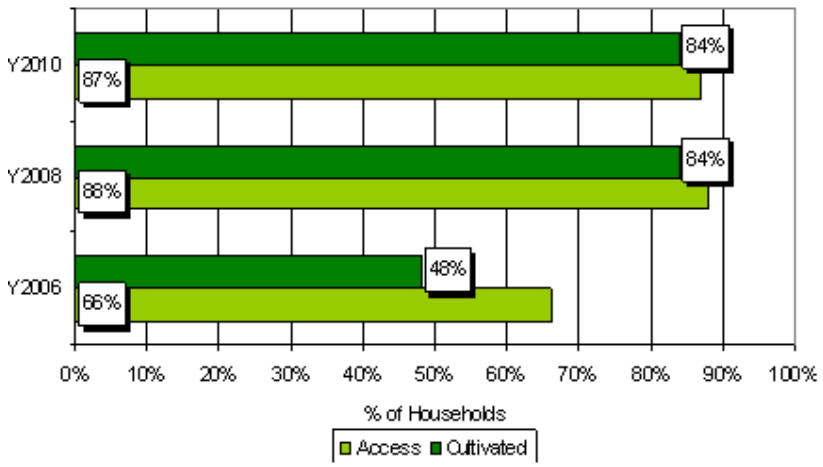
	Chicken	Goat	Duck	Pig	Sheep	Cattle
Bomi	34.4	1.0	3.0	0.2	1.4	0.0
Bong	61.7	13.7	10.4	7.7	3.5	0.2
Gbarpolu	68.8	13.6	5.6	0.4	7.6	0.2
Grand Bassa	56.8	7.4	17.8	4.2	1.8	0.0
Cape Mount	51.2	1.8	2.2	0.0	2.8	0.0
Grand Gedeh	59.6	27.2	11.6	0.6	4.0	1.4
Grand Kru	66.0	16.0	5.6	1.8	3.2	0.6
Lofa	63.7	8.2	4.0	2.4	3.4	0.2
Margibi	57.9	7.4	11.6	4.2	1.8	0.0
Maryland	44.9	23.8	9.2	7.4	8.4	1.4
Monrovia	15.9	0.2	3.6	0.4	0.0	0.4
Nimba	64.6	22.6	14.4	12.0	7.8	0.0
River Gee	72.3	23.6	5.1	1.0	8.6	0.6
Rivercess	64.1	7.8	16.2	6.6	1.0	0.0
Rural Montserrado	46.2	5.0	7.2	5.6	1.6	0.4
Sinoe	63.1	19.4	20.0	1.8	4.6	0.2
Liberia	46.6	8.9	8.6	3.6	2.6	0.3

As Table 3.3 shows chicken remains the dominant ruminant kept by households followed by goats. There are some signs of improvement in restocking livestock with the percentage of households that own goats rising from 5% in 2006 to 10% in 2010. Meanwhile pig ownership remains almost static. Households in counties bordering Cote d'Ivoire (Grand Gedeh, Maryland, River Gee and Nimba counties) in which grasslands are vast remain most likely to own goats, sheep and cattle although the numbers for the latter are negligible. However, poultry ownership is most prevalent in central Liberia especially around Monrovia, probably due to greater demand for chicken and eggs.

3.2.5 Farming at household level

The number of rural households with access to agricultural land increased dramatically from 66% in 2006 to 88% in 2008 after which the proportion stabilized. As shown in Figure 3.9, in 2008, 84% of those with land access cultivated it during the 2007 agricultural cycle compared with 48% in 2006. Access to and cultivation of farmland varied across the country. Lofa and Nimba counties that have been traditionally identified with farming activities indicated the highest proportions of households with access to and/or cultivating farmland at over 90%. Conversely, Bomi (63%) and Margibi (55%) reported the lowest proportions of households with access to farmland (see table 2 in Annex 5).

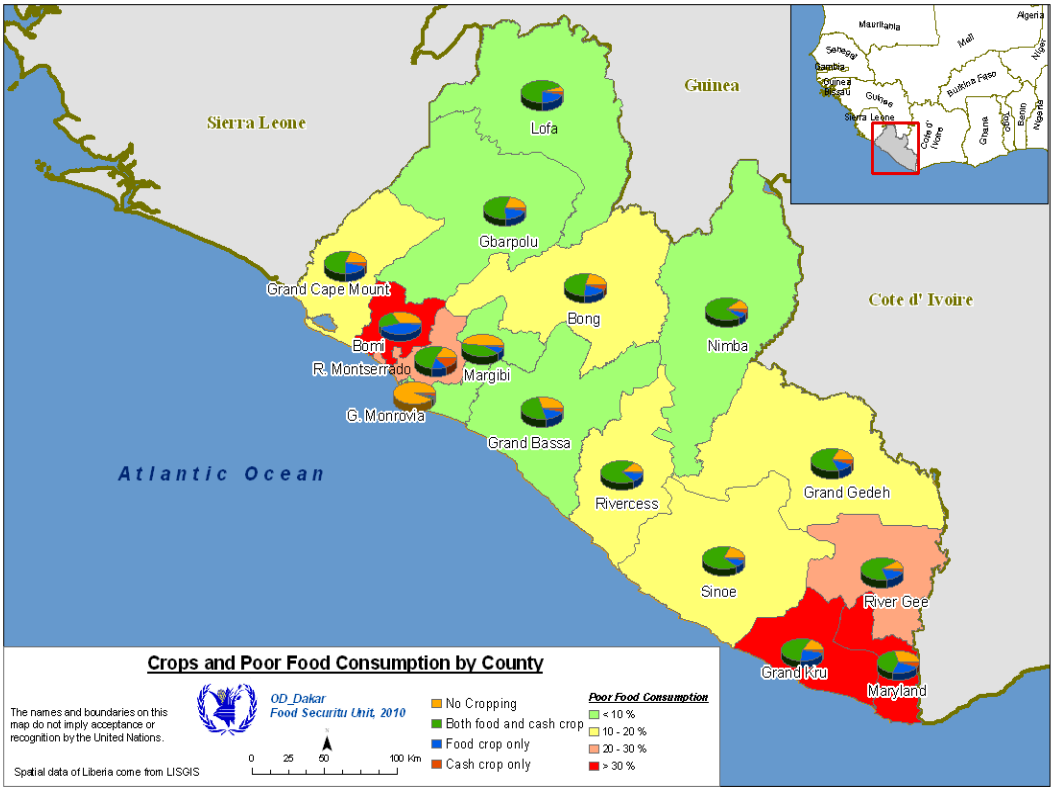
Figure 3.9: Land ownership and cultivation



Overall, 42% of Liberians grow food crop and cash crop, 13% report cultivating food crops alone and 4% cash crops alone. There are disparities in the levels of participation across counties (See table 3 in Annex 5).

Farming households grow, on average, 2.8 main types of food crops, 2.4 types of cash crops and 2.9 different varieties of vegetables. The number of crops grown by households varies across the counties. Gbarpolu and Lofa counties tend to have more food crops (on average 3.3 and 3.7 crop varieties respectively) while Bomi and Maryland counties report the least number of food crops with an average of 1.5 and 1.6 crop types respectively.

Map 3.3: Cash and crop production by country



There was an increase in proportions of households reporting involvement in food crop production from 49 % in 2006 to 55 % in 2010. The most commonly grown food crops in the 2009 agricultural season are: Cassava by 65 % of the households, rice (60%), corn (38%), sweet potatoes/eddoes (24%) and pulses (8%). In 2006, pulses were hardly reported with exception of Lofa County. However, this has changed and pulses are now reported by all counties.

Rice is reportedly grown in all counties with Lofa County recording the highest proportion of households engaged in its production. Lofa also leads in the proportion of households reporting beans, eddoes and corn production. On the other hand, Rivercess reports the highest proportion of those involved in cassava production while Nimba County leads in plantain/banana production. Maryland County reports the least %age of households involved in rice production at only 27 % while Margibi County reports the least proportion of those involved in cassava production. As was reported in 2006, Margibi, Cape Mount Counties reports the lowest crop diversification while counties reporting the most diversified crop cultivation are: Lofa County followed by Nimba, Gbarpolu, Sinoe and Bong Counties in that order.

Major food crop producers (those producing in significant quantities)—namely Lofa, Bong, Gbarpolu and Nimba Counties are relatively more food secure than the rest of Liberia.

3.2.6 Agricultural constraints

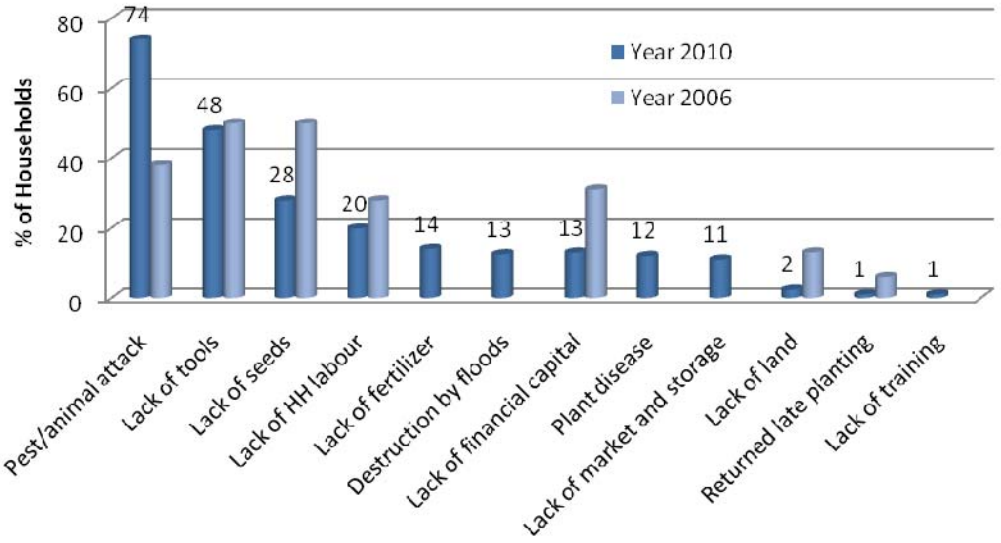
Agricultural constraints ailing the sector immensely contribute to the deficit experienced in domestic food availability. For Liberia to realize significant production to bridge the huge deficits and reduce dependency on food imports, the country has to pragmatically address the constraints impeding the sector and preventing commercial production.

According to previous assessments conducted by the MOA and partners between 2006 and 2009, growth in agricultural productivity is constrained by several factors:

- Limited access to quality inputs (e.g. certified seeds and fertilizers)
- High levels of pests and diseases
- Limited agro-processing capacity, particularly at the smallholder farm level
- Poorly developed agricultural value chains
- Limited road and market infrastructure
- Competition from cheaper imported rice and cassava.

Farming household respondents were asked to mention three agricultural constraints that they encountered in the 2009 agricultural season. As shown in Figure 3.10, the main agricultural constraints are: pest/animal attack (animals mentioned was mainly ground hogs and birds) indicated by almost three quarters of the households (74.7%), followed by lack of agricultural tools (mentioned by 49% of

Figure 3.10: Agricultural Constraints



households) and lack of seeds (28% of households). Other commonly mentioned constraints are lack of household labour (20% of households), lack of fertilizers/pesticides (14%), loss of harvest due to floods as well as financial constraints to improve on agriculture were each mentioned by 12.5 % of households.

Similar constraints were mentioned in 2006, the commonest constraints cited then were: lacks of seeds, lack of agricultural tools, lack of financial capital, farm labour and ground hogs in that order. Although great progress has been made in some parts of the country by government and development partners, the findings reveal that problems affecting the agriculture sector remain significant. As was the case in 2006, the prevalence of animal/pest attack is highest in Bomi, Margibi and Gbarpolu Counties at 55 %, 48 % and 42 % respectively. Lack of agricultural tools seems to be more acute in Lofa, River Gee and Bong Counties respectively at 29 %, 26 % and 24 %. Lack of seeds is commonest in Bong and Grand Kru Counties (22% and 20% respectively while lack of household labour is commonest in Montserrado and Margibi Counties (at 18% and 14% respectively). The constraints not only hinder improved crop production but also deprive households of their already limited produce through huge losses thereby comprising the food security situation.

The high percentages (75%) of households reporting pest attacks in 2009/10 season, lack of agricultural tools as well as lack of seeds (reported by 49% and 28% of households respectively) signals low usage of productivity-increasing inputs. These same constraints were highlighted in the CFSAM 2006 and PHCA 2008 as some of the challenges facing the agricultural sector. The agricultural constraints lead to massive pre and post-harvest losses estimated at 35-40% (PHCA 2008).

Deepening the low agricultural productivity is the low uptake of modern farming methods (LASIP 2009). There are also limited extension services available in the country to assist in up-scaling the uptake of modern farming methods (LASIP 2009). In fact the current findings show that education of the household head has a positive impact (GLM +3.9) on food consumption at household level. Education not only opens opportunities for increased income generation but it allows contributes to better uptake of modern ideas and technologies beneficial to the agricultural sector.

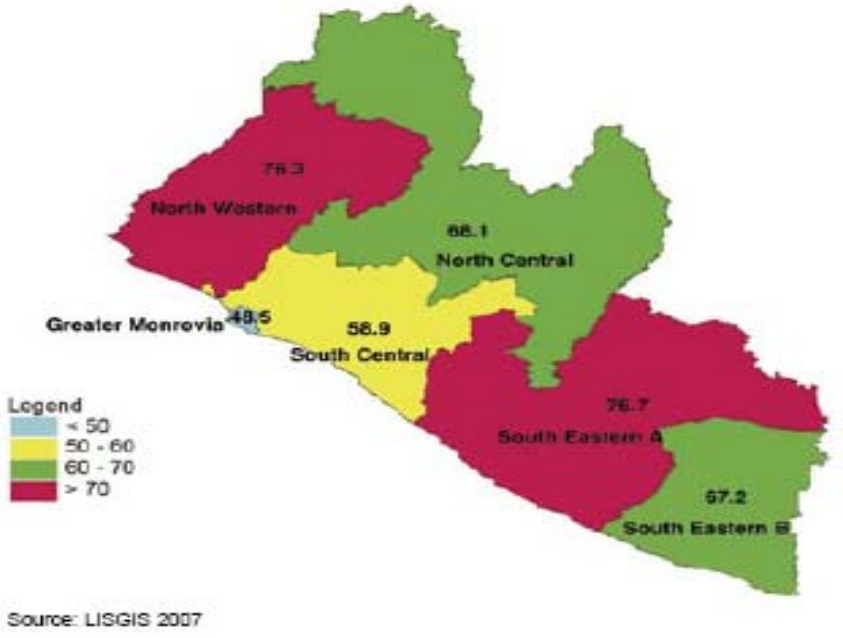
The 2006 CFSAM reported undeveloped diversity of agricultural systems. Despite the massive coastline as well as inland waters, fishing in Liberia is mainly artisanary levels with very low outputs. At the same time the livestock sector still remains in disarray. Investment in these two sub-sectors has potential of improving food security at household level. The 2010 CFSNS shows that households that consume fish have relatively better food consumption scores than those that do not consume fish. It further reveals that Tropical Livestock Units (TLU as calculated from the livestock ownership statistics) have a positive impact (GLM +0.5) on food consumption scores (see table 5 on Annex 5)

The further analysis also reveals that as the number of income generating activities increase, so as the food consumption scores also improve (GLM +2.3) in both rural and urban Liberia. Most of the activities undertaken by households are related to agricultural production.

3.3 Persistent poverty, high levels of unemployment and low educational achievements

3.3.1 Who are the poor?

Map 3.4: Poverty incidences



Some 1.7 million Liberians - 63.8% of the population - live below the national poverty line according to the 2008 Core Welfare Indicator Questionnaire (CWIQ). Of these, about 1.3 million people (48% of the population) are living in extreme poverty. [14] Poverty is higher in rural areas (68%) than in urban areas (55%). Since about 70% of the population lives in rural areas, this implies that about three-quarters (73%) of the poor live in rural areas.

The CWIQ[15] results further pointed out regional disparities in levels of poverty as shown in Map 3.4. The poverty headcount indices are highest in the south eastern A region (77%) and north western region —Gbarpolu, Lofa and Bomi counties (76%), followed by the north central region—Nimba and Bong counties (68%) and the south eastern B region—Grand Gedeh and River Gee counties (67%). The north central region, which contains a much larger share of the population than other regions, has by far the highest number of people living in poverty: 660,000, or about 38% of the national total.

[14] Percentage and number of poor is based on weighted average between urban and rural populations
[15] The regionalization of the country provided here reflects the disaggregation of findings as defined by LISGIS in the 2008 CWIQ Survey.

According to the same 2008 survey the differences in poverty between male and female headed households are slight: 65% of male-headed households and 62% of female-headed households live below the poverty line.

Despite certain perceptions that women have a lower poverty incidence than men, that they have equal employment opportunities or are even favored in the workplace and are better placed to provide food for the family, the reality is that women remain highly vulnerable to poverty in many dimensions. The majority of female labor in Liberia is unpaid and concentrated in the informal sector, and their work is characterized by insecurity and low productivity. They may be very active in the labor market, but the nature of their work may not necessarily lead them to a path of sustained poverty reduction. Moreover, the rate of gender based violence (GBV) is high in Liberia (particularly rape and sexual assault, especially of minors), limiting women's and girls' ability to cope with poverty and lead a safe life.

Households headed by those with a higher level of education and by those who have a second occupation have lower levels of poverty. Poverty levels are highest for those engaged in fishing, crop farming, mining/quarrying and those who are unemployed or inactive. By contrast, poverty levels are lowest for those in the banking and financial sector, followed by employees of utilities.

3.3.2 Household expenditure

Overall, households spend 53% (50% in urban Liberia and 56% in rural Liberia) of their total cash expenditure on food. While the proportion of expenditure on food remained fairly constant between 2008 and 2010, it is significantly lower than the 66% reported in 2006. This reduction in spending could be explained by the fact that in 2005/6 domestic production was very low so households were more reliant on purchases and food aid. Or it could be the result of Liberians having

Overall Liberian households spend 53% of their total cash expenditure on food with poorer households in rural counties and those in more food insecure areas spending an even larger share

Household expenditure survey

It's important to understand how household decision-makers prioritize expenditure on food and non-food items such as education, health, transport, etc., especially when funds are limited. Monthly food and non-food expenditures also serve as proxy indicators of household food access.

During the interviews, respondents were asked to provide estimates of recent expenditures for 24 food categories and 19 itemized non-food categories.

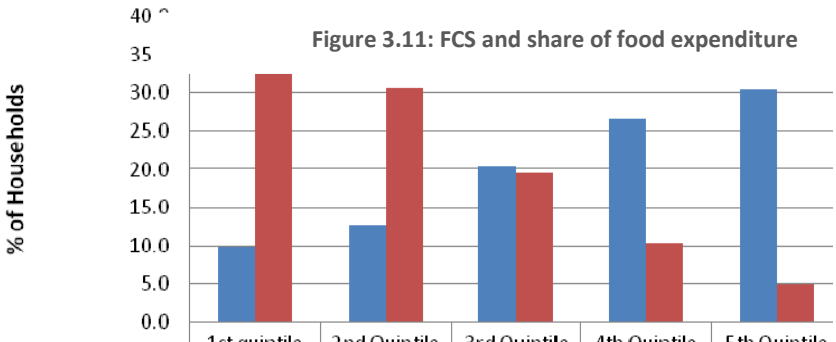
Estimations were based on a two-week recall for short-term expenditures such as food, alcohol, transport, fuel etc. A six-month recall period was applied for medium to longer term expenditure, such as medical care, school fees, etc.

Food and non-food expenditures were computed and converted to a monthly expenditure, but all values are only indicative and should be viewed with caution as household expenditures are often over- or underreported. The analysis focuses on relative measures such as expenditure quintiles.

It should also be noted that some households may have a lower share of food expenditures because they rely on their own production.

higher incomes today as economic prospects improve.

Figure 27: Food Consumption Group by Share of food expenditure



	1st quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
Acceptable FCS	9.9	12.6	20.3	26.7	30.5
Poor FCS	34.6	30.7	19.6	10.3	4.9

On average, households in counties that are more food insecure spend a larger share of their total expenditure on food. Grand Kru, Maryland, River Gee and Bomi counties, which have the highest prevalence of food insecurity all report spending over 60% of total spend on food with River Gee reporting the highest proportion (74%) followed by Bomi (67%). Meanwhile Monrovia and Lofa County, which have a lower prevalence of food insecurity, spend just only 42% and 44% respectively, the smallest shares in the country.

Rural Liberia characterized by high poverty incidences (Liberia Poverty Assessment, CWIQ 2007) also spends a higher proportion on food.

A household's level of wealth appears to be a major determinant of household expenditure on food. Poorer households (using a wealth index as a proxy) report higher expenditure on food than wealthier households. This is consistent with typical observations that limited income households will spend whatever they have on food, buying non-food items only after minimum food needs are met. While the poor are unable to allocate much on non-food items (only 41%), the wealthiest (those in the 5^{th} quintile) can afford to allocate up to 57% of their expenditure on essential non-food items—mainly on education, savings and housing.

Food insecure Liberians have to depend upon market purchases because they are unable to produce enough to take them through the different seasons. Their minimal resource base goes towards ensuring that a minimum level of food is acquired in order to meet household needs.

As Figure 3.11 shows households with a poor food consumption score are significantly found in the two lowest capita expenditure quintiles as compared to food secure households, while 65 percent of the food insecure households spend lowest, (fall within the two lowest quintiles), only 23 percent of the food secure households are in that category.

For all households, urban and rural, rice is the number one food purchase, accounting for the greatest share of expenditure regardless of whether they have

acceptable or poor food consumption scores (see Table 3.4). This is followed by fish and oil. The share of expenditure on fish is slightly higher for the poor food consumption group (12.7%) than households with acceptable food consumption scores (10.5%), but in absolute figures, the acceptable consumption group still spends more on - and consumes more - fish. Condiments (mainly magi cubes) also comprise a significant share of total monthly expenditures (3.1%).

Table 3.4: Share of households' expenditure on food and non-food items

Expenditure on Food Items					
National	**%**	**Acceptable FCSG**	**%**	**Poor FCSG**	**%**
Rice	19.8	Rice	15.0	Rice	26.7
Fish	11.4	Fish	10.5	Fish	12.7
Oil/butter	5.4	Oil/butter	5.0	Oil/butter	6.1
Maggi	3.1	Other meat	3.2	Maggi	4.3
Food eaten outside	2.1	Food eaten outside	2.6	Salt	2.1
Other meat	2.1	Vegetables/greens	2.4	Bush meat	1.8
Bush meat	1.9	Maggi	2.3	Bulgur	1.4
Vegetables/greens	1.8	Bush meat	2.0	Food eaten outside	1.3
Salt	1.5	Bread	1.2	Vegetables/greens	1.2
Cassava/eddoes	1.1	Pulses/peanuts	1.2	Cassava/eddoes	1.0
Pulses/peanuts	1.0	Salt	1.1	Sugar	0.6
Bulgur	1.0	Cassava/eddoes	1.0	Other meat	0.5
Bread	0.9	Milk	0.9	Bread	0.4
Sugar	0.7	Sugar	0.7	Pulses/peanuts	0.6
Milk	0.6	Bulgur	0.6	Other cereals	0.2
Eggs	0.3	Eggs	0.4	Wheat flour	0.1
Other cereals	0.3	Other cereals	0.4	Milk	0.1
Wheat flour	0.1	Fruits	0.2	Eggs	0.0
Fruits	0.1	Wheat flour	0.1	Fruits	0.0
Average on food	**53.3**		**49.7**		**58.5**
Expenditure on Non-Food Items					
National	**%**	**Food Secure**	**%**	**Food Insecure**	**%**
Transport	9.3	Transport	9.6	Transport	9.0
Hygiene care	6.7	Hygiene care	6.3	Hygiene care	7.2
Clothing	4.8	Clothing	4.5	Clothing	5.3
Education	3.5	Communication	4.2	Education	2.8
Communication	3.3	Education	4.0	Lighting	2.8
Lighting	3.0	Savings	3.8	Health	2.2
Savings	2.9	Lighting	3.1	Communication	1.9
Health	2.1	Housing	2.6	Labour	1.7
Housing	2.0	Health	2.0	Debts	1.7
Debts	1.9	Debts	2.0	Savings	1.5
Labour	1.5	Cooking fuel	1.9	Housing inputs	1.1
Cooking fuel	1.4	Labour	1.4	Alcohol	1.1
Alcohol	1.2	Alcohol	1.2	Ceremonies	0.9
Ceremonies	0.9	Ceremonies	0.9	Other long term	1.6
Other long term	1.5	Water	0.6	Cooking fuel	0.7
Agric. inputs	0.5	Agric. inputs	0.5	Agric. inputs	0.6
Water	0.4	Gifts	0.5	Electrical	0.2
Gifts	0.4	Other long term	1.5	Gifts	0.2
Electrical equipments	0.3	Electrical	0.4	Fines/taxes	0.2
Fines/taxes	0.3	Fines/taxes	0.3	Water	0.2
Average on non-food items	**46.7**		**50.3**		**41.5**

Poor food consumption households, however, spend significantly more on rice than food secure (26.7% versus 15%). The acceptable food consumption group spend more on bulgur wheat (common only in urban set ups), bread, vegetables, meat, fruits, pulses, and dairy products, a reflection of a diversified diet, which determines their food security status. From the diet diversity consumed by the food secure, it is a safe bet to assume that they are least affected by micronutrient deficiencies compared to food insecure households.

There are also differences in expenditures on non-food items depending on the food security status of a household. Of the non-food items, transport costs still account for the largest share (9.3%) as they have for the last four years with both food secure and food insecure households spending roughly the same proportion of expenditure on this. Such high costs are largely related to the country's poor road network across the country, which, if improved would free up Liberians to spend money on other household. Counties allocating the largest shares to transport are Lofa (15%), Sinoe (14.3%), Rivercess (13.6%), Grand Gedeh (13.2%) and Gbarpolu (12.6%), which have some of the worst road networks, especially during the rainy season. Monrovian households also report a relatively larger share of expenditure on transport at 8.2%, probably explained by urban commuting.

Transport expenditure is followed by clothing/shoes at 4.8%, education at 3.5% and savings and health expenses at 2.9% and 2% respectively. The food secure households spend significantly more on education, housing/rentals, savings and communications—commodities that increase the quality of life and therefore positively impact on food security at household level.

On the other hand, the food insecure focus spending on essential non-food commodities like clothing, health and transport expenses.

Households in Monrovia also allocate a larger proportion of their monthly spend to communications (mainly mobile phones) than any other county. The considerable benefits of phone usage and other forms of communication include the ability to mobilize quick assistance that can mitigate food insecurity.

Wealth survey

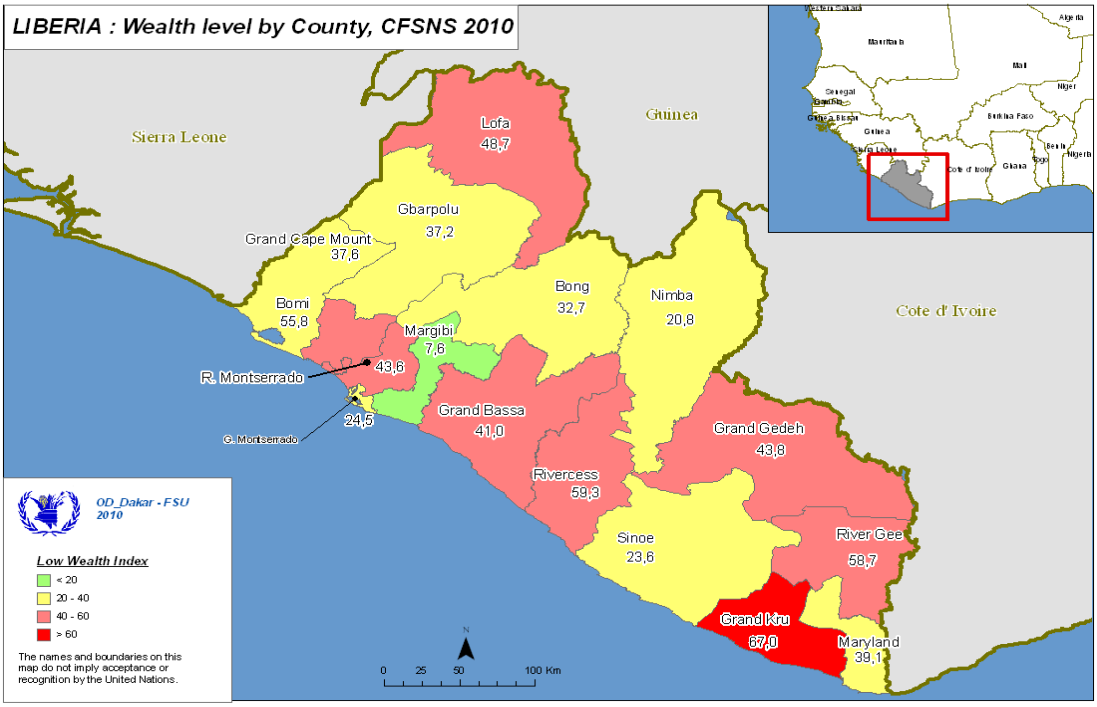
The wealth level at household level (the value of all natural, physical and financial assets) determines the degree of vulnerability and resilience in times of difficulties such as food insecurity. A wealth index (WI) based on key asset ownership variables are used as a proxy indicator of household levels of wealth. The variables selected for the computation of the WI are proxies capable of distinguishing relatively "rich" and relatively "poor". Appropriate variables were identified for the creation of the wealth indices separately for urban and rural Liberia. Details are provided in Annex 3. Following the computation of the wealth indices, quintiles were developed with the first quintile representing the poorest households and the fifth quintile representing the wealthiest households.

3.3.3 Wealth

Nationally, about 37% of households fall into the two lowest wealth quintiles—i.e. the poorest households in terms of wealth indices. There are significant disparities between urban and rural Liberia in terms of incidences of low wealth or poverty indices with 40% of rural households falling into the lowest two quintiles compared with only 29% in urban areas. Vast variation is even clearer at county level. For example Grand Kru—the county worst affected by food insecurity -- has 67% of households falling into the lowest two quintiles while Margibi and Nimba counties (with lowest food insecurity levels in rural Liberia) have only 8 and 20 % respectively within the lowest two quintiles.

Disparities in wealth levels are illustrated in Map 3.5.

Map 3.5: Wealth by County



3.3.4 Livelihoods

Livelihoods are "the capabilities, assets and activities required for a means of living linked to survival and future well-being"[16]. Nationally, an average of two persons in a household is involved in income generating activities. Overall, 48.5% of households reported involvement in food crop production irrespective of the order (main, second, third or fourth activity) followed by petty trading (34.7%),

Dependence on business has risen robustly in urban areas underlining economic progress, but those depending on skilled labor has declined sharply. This lack of skilled manpower hampers steady progress in Liberia and is a great cause for concern.

[16] CFSVA Guidelines, WFP 2009

regular salaried employment (23%), palm oil production (13%), cash crop production (12.8%), unskilled/casual labor (12%) and internal support (10%). Other significant livelihood activities reported by households included hunting/gathering (6.7%), skilled labor (6.6%), fishing (6.5%) and commercial trade/shop owners (6.4%).

Food crop production is predominantly a rural activity (mentioned by 75% of households against only 12% in urban areas) while regular salaried employment is mainly in urban areas (39% in urban area versus 11% in rural).

An overview of the most common livelihoods in Liberia is presented in Table 3.5[17].

Livelihood survey

Households were asked to indicate the main livelihood that provides the largest share of their income and ensures their families' survival and well-being. The percentages of households involved in a given income/livelihood activity was then computed using multiple response analysis.

Using principal component (PCA) and cluster analysis, 13 relatively homogeneous livelihood profiles were created on how much each individual activity contributes to the annual household income. This methodology also captures whether households depend on one or several income activities.

Table 3.5: Livelihood Profiles in Rural and Urban Liberia, 2010

Overall		Urban Liberia		Rural Liberia	
Food Crop Production	23.8%	Salaried Employment	25.2%	Food Crop Production	33.0%
Salaried Employment	18.8%	Petty Trade	21.1%	Salaried Employment	14.3%
Petty Trade	15.8%	Food Crop Production	10.9%	Petty Trade	11.9%
Palm oil production	6.5%	Skilled Labour	7.8%	Palm oil production	8.8%
Cash Crop Production	5.9%	Social Support (External)	6.7%	Cash Crop Production	8.0%
Skilled Labour	4.9%	Business	6.7%	Charcoal production	4.8%
Social Support (internal)	4.7%	Social Support (internal)	6.1%	Others	4.4%
Business	4.4%	Palm oil production	3.2%	Rubber tapping	3.8%
Others	3.7%	Cash crop Production	3.0%	Social Support (internal)	3.7%
Charcoal production	3.7%	Others	2.6%	Business	2.8%
Social Support (External)	3.3%	Rent/landlord	2.0%	Skilled Labour	2.8%
Rubber tapping production	2.9%	Charcoal production	2.0%	Social Support (External)	0.9%
Rent/landlord	1.1%	Rubber tapping	1.6%	Rent/landlord	0.4%
Pensions	0.6%	Pensions	1.1%	Pensions	0.3%

Food crop production is the dominant livelihood group reported by almost a quarter (23.8%) of the families in Liberia followed by regular salaried employment, petty trade and palm oil production.

As expected, the prevalence of livelihood groups varies from urban to rural Liberia. While regular salaried employment is dominant in urban areas (25%), food crop production is by far the dominant livelihood group reported in rural areas (33%). External social support mainly in the form of remittances is significantly high in urban Liberia at 6.7% compared with a meager one percent in rural Liberia.

[17] All households involved in cash crop production, charcoal production, rubber tapping and palm oil production are also reporting significant levels of food crop production. Palm oil production is separated since there is unclear boundary as to whether it is cash or food crop in the Liberian context. Petty traders, majority of whom are in urban areas also double as casual laborers.

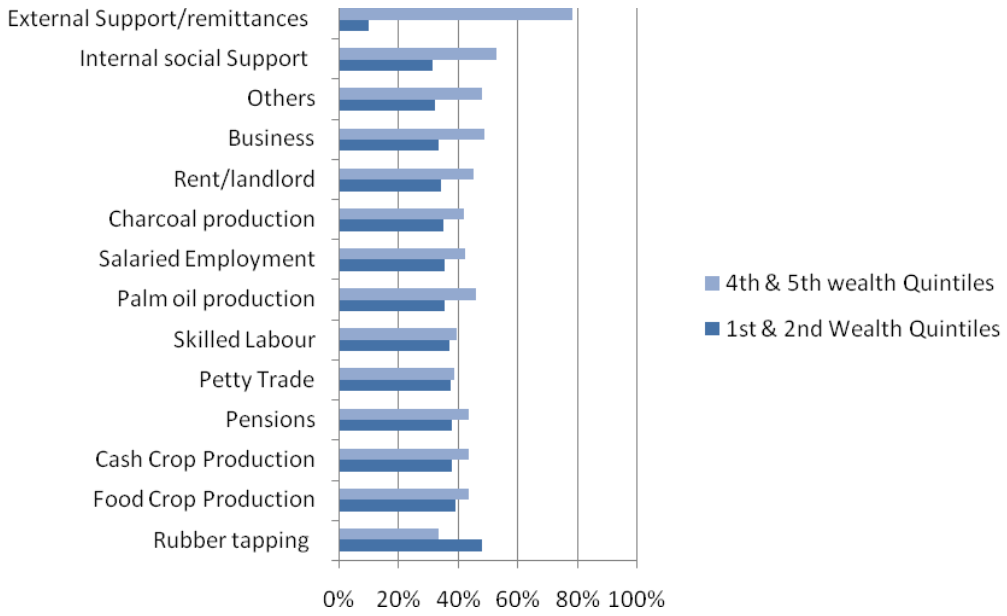
Livelihoods have shifted a lot since 2006 especially in rural Liberia. This is due to the fact that since the end of the war households have been able to restore their traditional livelihoods, in particular food crop and cash crop farming. Activities that dominated in 2006, such as palm oil production and casual labor, were considered to be coping strategies that are less predominant now. The proportion of rural households dependent on food crop production as a livelihood source has more than doubled from 15% in 2006 to 33% today, which confirms the findings of the USDA report and MOA statistics that indicate production to be increasing.

The proportion of rural households dependent on food crop production as a livelihood source has more than doubled from 15% in 2006 to 33% today as households restore traditional livelihoods post conflict.

Changes in urban Liberia are less apparent, although it is remarkable that the number of households relying on business or sizeable trading has steadily increased from 3% in 2006 to a current 6.7 percent, while those depending upon skilled labor continue to decline from 14% in 2006 to 7.8% in 2010. While increased dependence on business shows positive improvement in the economy, decline in skilled labor is a cause for concern. Liberia still lacks skilled manpower which hampers steady progress. Asked if they had experienced any change in the levels of income in the year preceding the survey, an estimated 34% of households reported a perceived decrease in income, 31% said their incomes had remained the same and 26% had perceived an increase. The wealth status of a household varies across the different livelihood profiles. Following the collapse in international rubber prices in the last two years, households that depend on rubber tapping reported the highest (48%) proportions of those who fall within the two lowest wealth quintiles, followed by food producers at 39% as shown in Figure 3.12.

On the other hand, families that depend on support from external sources (remittances) are dominantly (78%) within the two highest wealth quintiles. Liberians receiving remittances are now perceived as better-off, a turn-around from 2008 when their incomes plummeted as a result of the global economic downturn of 2008/9.

Figure 3.12: Wealth and livelihoods



The 2010 survey also shows that all livelihood groups are dependent on markets ranging from about 60% amongst those with farming related livelihoods to 91% amongst remittance receivers. As shown in Table 3.6, livelihood groups involved in some level of food crop production had a significantly higher proportion of households relying on their own production and hunting and gathering as sources of food than those that are not involved in agricultural production.

Table 3.6: Livelihood Group's source of food

	% of households			
	Market purchase	Own production	Hunting & gathering	Gifts
Food Crop Producers	65	18	15	2
Employees	77	11	10	2
Palm Oil Producers	62	19	17	2
Petty Traders	78	10	9	2
Others	69	16	13	2
External Support Receivers	91	3	3	3
Charcoal Producers	63	18	17	2
Rubber Tappers	57	22	19	3
Business/commerce	79	10	9	3
Skilled Labourers	81	9	8	3
Landlord/Rent	88	6	5	1
Cash crop Producers	65	18	15	2
Pensioners	81	8	7	4
Internal Support Receivers	78	10	9	3

3.3.5 Low education and unemployment

The educational status of the household head has a strong impact on the food security status of the household. A good educational status of all, men and women, results in a significant decrease in their vulnerability to food insecurity. Equally, a better food security status is likely to promote a higher educational attainment among the population beginning with early enrolment in schools. In fact, the more limited the educational level of the household head, the less adequate the family's food consumption, the higher the prevalence of malnutrition among children and women, and the lower the likelihood of children attending school.

The more limited the educational level of the household head, the less adequate the family's food consumption, the higher the prevalence of malnutrition among children and women and the lower the likelihood of children attending school.

From the survey findings, 30% of household heads had no schooling, 17% had some elementary education, 26% either completed elementary or had some level of high school, 15% completed high school and only 12% had tertiary level of education and above. There was a clear gender bias in the level of educational attainment by household heads. Whereas 51% of female household heads had no schooling, only 24% of male household heads missed this opportunity. Similarly, only 17% of female household heads attended high school and above compared with 29% of male headed households.

According to the GLM analysis, literacy among household heads was found to lead to improved food consumption scores by up to 3.9 points more than that of households whose head had attained no education. It is also clear that as a household head advances in education the food consumption score also increases. In fact the 2010 findings show that food insecurity amongst households with university levels of education is only 6%: in households with no education it is 57%.

Educational levels remain considerably low, with illiteracy rates reaching 53% at the national level, 41% among men and 65% among women (NPHC 2008). The majority of food-insecure households reside in rural areas, where long distances, poor infrastructure and low availability result in schools being much more difficult to access. Net primary school enrolment is as low as 65%. Secondary school enrolment is even lower at 38%.

Low school enrollment is especially high among food insecure households (See Table 3.7).

Table 3.7: School enrollment

	School enrollment	
	Primary	**Secondary**
National	**66.1**	**40.0**
Rural	**57.4**	**24.6**
Urban	**76.2**	**50.4**
Poor food consumption	**45.4**	**18.9**
Borderline food consumption	**59.2**	**27.5**
Acceptable food consumption	**73.4**	**46.4**

The protracted civil war not only destroyed the economy rendering it incapable of generating adequate employment, it also undermined the skills training of the Liberian people, particularly of young people who for a long time knew nothing other than the weapons of war. To date many Liberian youngsters lack employable skills and experience in technical fields. More than half of the country's youth (18 – 35 years old) are not educated or trained to be absorbed into the labor sector (LISGIS – CWIQ 2007). Thousands of reintegrated ex-combatants form a significant part of the unemployed population.

The level of unemployment continues to increase because of limited employment opportunities in the public sector and a weak private sector. If the agricultural sector were developed it could absorb most of these youths, but it is still lagging and young people tend to shun it as a non prestigious engagement anyway.

The recent economic growth, which has improved public finances, and created a relatively stable Liberian dollar exchange rate, has facilitated a modest agriculture/forestry-led expansion in employment, but the unemployment rate remains particularly high among the under-25s who comprise 63% of the population, and continue to pose significant threats to the consolidation of peace in the country.

The 'informal sector', which includes small scale retailing of general merchandise, petty trading, construction, mechanics, food, janitorial and security services, remains one of the major sources of employment and income, particularly for the urban population in Greater Monrovia and serves as a cushion for the unemployed. These opportunities are however limited and do not reach the majority of young people living in the countryside.

A major challenge affecting the youth is the unclear linkage between the provision of skills training and actual employment opportunities. Often employment interventions do not meet the demands of the informal and formal labor markets. Creating economic opportunities is a prerequisite for sustained economic and social development, especially inclusion of young people in the labor market.

3.4 Limited road infrastructure

The war devastated the country's basic infrastructure and rendered access to most productive inputs, services and output markets impossible. Public and private institutional capacities, at both the national and local levels, were severely disrupted or destroyed.

Although significant progress has been made in repairing dilapidated infrastructure including opening up new road networks all over the country, most Liberians still lack access to electricity, improved water and sanitation facilities, acceptable housing, or road connections. The situation is most severe in south eastern counties.

Map 3.6: Road infrastructure

Source: Ministry of Public Works

Weak infrastructure undermines income earning opportunities, limits access to health and education facilities, raises the price of goods and services and weakens food security.

Weak infrastructure undermines income earning opportunities, limits access to health and education facilities, raises the price of goods and services and weakens food security. Women and children bear the brunt of poor infrastructure as they spend more time carrying water and other goods, are more vulnerable to crime and have poorer access to health facilities, raising the risk of child and maternal mortality.

Perhaps the most critical infrastructure problem is roads, which was rated a priority in the PRS deliberations. By 2007, it was estimated that there were only around 700 km of paved road surface, almost all of which were damaged, and 1600 km of unpaved roads, which were mostly in need of repair. The south eastern counties have the poorest road network. Map 3.6 shows the road network as compiled by the Ministry of Public Works in 2007.

Farm-to-market access is of paramount concern and parts of the country remain cut off during the rainy season. It takes at least an hour for most rural dwellers to access a food market or the nearest potential transport option. Other transportation infrastructure is equally weak. Many bridges were damaged and although good progress has been witnessed in rehabilitating them, gaps remain with some areas

still completely cut off by collapsed or damaged bridges. These challenges are undermining opportunities for rural communities to increase employment and generate higher levels of income to improve their welfare. The impact of poor infrastructure on agriculture is reflected in low productivity and a declined food supply with incidences of rural hunger and malnutrition among children.

Access to markets is critical for all Liberian households, urban and rural, to allow them to purchase food as well as exchange and sell food products. Markets become even more critical during the rainy seasons. As the results of the survey shows, nearly three quarters (72%) of households access their food through purchases — which usually takes place in markets.

Counties whose markets are not integrated, in particular Maryland and the south-east, are more vulnerable to food insecurity. Counties with close connections to Monrovia are less food insecure.

The 2007 Liberia market review indicated that 81% of households have access to weekly markets – however they have to walk for an average of 2½ hours to reach them. While households in Bong and Montserrado only have to walk for 1½ hours, those in Gbarpolu have to walk for nearly six hours and in Grand Gedeh even up to nine hours. Just 29% of households report having access to daily markets. Montserrado enjoys the best market access with 54% of households saying they have daily access while very few or no households in Bomi, Grand Bassa, Grand Kru, Lofa and Gbarpolu report having this daily asset.

The CFSNS reveals that:

- The areas with the poorest road networks are the most food insecure.
- Distance has a significant and negative correlation with food consumption score (GLM -1.3).
- The longer it takes households to reach the capital centre, the lower the FCS and thus the more food insecure the household.

This is not surprising since those markets that are the least integrated are also the most expensive, thereby limiting the poor's access to food.

The critical lack of infrastructure, particularly of the road network, in Liberia is hampering agricultural sector development since farmers are prevented from bringing their surplus production to market. Deprived of a route to market they have no incentive to up production and are therefore locked in a cycle of subsistence production.

3.5 Political stability and security

The series of crises that besieged the Liberian nation over the last quarter century – from war and mismanagement to human rights abuses and deepening poverty – can be blamed largely on poor governance and disrespect for the rule of law. The situation has improved markedly since the end of the war, but Liberia continues to suffer from weak public institutions, corruption, limited justice and a lack of human capacity to remedy these deficiencies quickly. In recognition of these challenges, the government and partners formulated a Poverty Reduction strategy (PRS) in 2007 whose implementation has led to some significant progress.

The origins of the conflict can be traced to two broad factors. Firstly, significant portions of society felt systematically excluded and marginalized from institutions of political governance and barred access to key economic assets. Secondly, economic collapse in 1980s frustrated the population with ruling regimes.

Additionally there are a number of sectoral strategies in place. Although still slow in implementation due to structural challenges, these strategies provide a good launch pad for speedy economic reconstruction. The humanitarian communities are guided by these government strategies and have been assisting in all sectors. For instance, food security and nutrition issues are addressed within the framework of the food security and nutrition strategy, which outlines clear directions and goals to address food insecurity in the country.

Civil war in Liberia claimed the lives of almost 150,000 people - mostly civilians - and led to a complete breakdown of law and order. It displaced thousands of people, both internally and beyond the borders, resulting in some 850,000 seeking refuge in neighboring countries. Fighting began in late 1989, and by early 1990, several hundred had been killed in confrontations between government forces and fighters who claimed membership of an opposition group.

From the outset of the conflict, a sub-regional organization, the Economic Community of West African States (ECOWAS), undertook various initiatives aimed at a peaceful settlement. The United Nations supported ECOWAS in its efforts to end a civil war. These efforts included establishing an ECOWAS observer force, the Military Observer Group (ECOMOG) in 1990. In 1992 the UN Security Council imposed an arms embargo on Liberia and the Secretary-General appointed a Special Representative to assist in talks between ECOWAS and the warring parties.

The origins of the conflict can be traced to two broad factors. Firstly, significant portions of society were systematically excluded and marginalized from institutions of political governance and barred access to key economic assets. The founding constitution was designed for the needs of the settler population, with less consideration and involvement of the indigenous people. Land and property rights of indigenous Liberians were severely limited. Later, marginalization was perpetuated

by the urban-based policies of successive administrations. Political power was concentrated in Monrovia and primarily at the level of the Presidency.

Most infrastructure and basic services were concentrated in Monrovia and a few other cities. Marginalization of youth and women and the mismanagement of national resources were widespread, which contributed to stark inequalities in the distribution of benefits. The over-concentration of power bred corruption, restricted access to the decision-making process, and limited the space for civil society participation in governance processes. As a consequence a high level of resentment towards the ruling elite surfaced, which in part led to the bloody military coup of 1980 and its initial popular support. However, the military and successive governments failed to correct the ills of society and magnified the problems.

Secondly, economic collapse helped to propel the crisis. Liberia's economy posted steady economic growth averaging four to seven percent a year throughout the 1960s, but most of the gains were also concentrated within the elite, and the majority of Liberians saw little benefit. The economy began to unravel in the 1970s with the combination of a sharp increase in world petroleum prices and a decline in the prices of key export commodities. By the latter part of the decade all indicators pointed to a looming crisis. Unemployment and consumer prices, and particularly food prices, all rose at alarming rates, while growth stagnated, and tensions rose sharply.

In November 1997, following the completion of UNOMIL's mandate on 30 September, the UN established the UN Peace-building Support Office in Liberia (UNOL), headed by a representative of the Secretary-General. That first UN post-conflict peace-building support office was tasked primarily with assisting the Government in consolidating peace following the July 1997 multiparty elections.

On 19 September 2003, the Security Council unanimously adopted resolution 1509 (2003) welcoming the Secretary-General's report of 11 September 2003 and its recommendations. It decided that UNMIL would consist of up to 15,000 United Nations military personnel, including up to 250 military observers and 160 staff officers, and up to 1,115 civilian police officers, including formed units to assist in the maintenance of law and order throughout Liberia, and the appropriate civilian component. The mandate of the Mission was established for a period of 12 months. The Council requested the Secretary-General to transfer authority to UNMIL on 1 October 2003 from forces led by ECOWAS, which it commended for its rapid and professional deployment. Among other things, the Council also took note of the intention of the Secretary-General to terminate the mandate of UNOL and to transfer the major functions performed by that office to UNMIL.

A total of 101,495 combatants (22,370 women, 8,523 boys and 2,440 girls) were disarmed; 28,314 assorted weapons, 6,486,136 small ammunitions and 33,604 heavy ammunitions were collected and destroyed. Some 65,000 demobilized combatants

benefited from reintegration and rehabilitation opportunities through projects funded by the UNDP Trust Fund.

One of the major aspects of the entire peace process is ensuring a democratic transition in the coming 2011 presidential and legislatures election. The international community including UNMIL needs to play a critical role in conducting a credible, transparent, free and fair national election by offering logistical support to the National Elections Commission (NEC). In addition to providing maximum security, UNMIL and the international community need to play an advisory role in matters ranging from operational issues, legal concerns and external relations as were done during the 2005 election. During the 2005 election, some 4,000 Liberians were hired and trained by UNMIL for the voter registration exercise and nearly 18,000 were hired as polling staff, to assist during the elections.

4. State of Food Insecurity

4.1 Food availability, access and utilization

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (1996 World Food Summit). The key word is 'access' to food. Access depends on the general food supply and people's ability to acquire food. Together with how this food is utilized, which in turn depends on caring and hygiene practices, health status and overall nutritional awareness of the population, the food security outcome, i.e. nutrition status, is determined.

As reported in Section 2, 41% of Liberians have unacceptable low consumption and 13% have poor food consumption. This is an outcome measure of food security (the nutrition outcome will be discussed in detail in the next chapter).

How much of this is caused by the inability of people to access sufficient food? And how much is caused by factors that determine utilization, such as hygiene practices, health status and nutritional awareness?

4.2 Inability to access sufficient food versus poor utilization of food

Limited data is available on the supply of food at the household level. However, table 4.1 shows that only 59% of households have access to land and 54% have access to a vegetable garden. In rural areas this is much better at 86% and 78%, respectively. However production is not sufficient and 66% report that the market is their main source for rice. Table 4.2 shows the percentage of households that report restricted access to markets as one of their three main problems with regard to food security as well as the average costs to reach the main market of Monrovia.

Table 4.1: access to land

	% of HHs with access	
	Vegetable garden	Farmland
Urban	20	20
Rural	78	86
National	**54**	**59**

Counties where market access and thus food supply are a major concern include Lofa, Margibi, Maryland, River Kru, River Gee and Rivercess. These counties also have the highest food prices and the highest levels of poor and borderline food consumption.

Table 4.2: Market access and costs

County	Cost to reach Monrovia (L$)		Restricted access to markets (% of households)
	Dry season	Wet Season	
Bomi	367	507	0
Bong	376	543	0
Gbarpolu	679	990	3
Grand Bassa	376	543	0
Grand Cape Mount	396	576	5
Grand Gedeh	1,482	2,156	3
Grand Kru	2,198	3,012	0
Lofa	1,322	1,658	11
Margibi	157	209	20
Maryland	1,817	2,776	10
Montserrado	65	71	0
Nimba	718	1,012	0
River Gee	2,026	3,124	31
Rivercess	639	886	11
Rural Montserrado	-	-	0
Sinoe	1,440	1,902	5

Besides physical access to markets, acquiring sufficient food is primarily determined by people's purchasing power. As discussed, poverty is widespread and household expenditure levels are low. Table 4.3 shows average per capita expenditure and average share that is spent on food by expenditure quintiles.

Table 4.3: Per capita expenditure

Expenditure quintiles	Per capita expenditure (L$)	Share on food (%)
1 Very low	519	56
2 Low	1,026	60
3 Medium low	1,581	54
4 Medium high	2,445	49
5 High	6,258	41

As Figure 3.10 showed most poor consumption patterns are found within the lowest expenditure quintiles but there is also a substantial share of poor consumption in the higher expenditure quintiles (10 and 5% respectively in the 4^{th} and 5^{th} quintile). In other words, many of the better-off Liberians also have low variety and frequency in the consumption of food items, which cannot be attributed to insufficient food access but to factors related to utilization, including general nutrition awareness, caring practices, eating habits and cooking routines, or in the case of the more remote areas listed above, to unavailability of food items.

It is clear that food insecurity in Liberia is predominantly caused by the inability of people to access food, especially in rural areas, thereby comprising their food intake frequency and variety below levels needed for an active and healthy life.

4.3 Which groups have the highest food insecurity levels?

- **Households headed by widows/widowers**
- **Polygamous households** (compared with monogamous and single headed-families) which account for 3.3% of all households probably because of low education levels
- **Households headed by the elderly** (those aged 60 years and above) which account for 14.2% in rural Liberia and 7.5% in urban areas. The prevalence of poor food consumption in this age group is estimated at 22% in rural areas.
- **Households with a chronically sick or disabled member**, which account for an estimated 5.8% (6.5% in rural and 4.8% in urban areas) of the households in the survey, which is down on the 2006 proportion (9%). Almost one quarter of households with a chronically ill person have poor food consumption in rural areas.
- **Families residing in poorly constructed houses**. In rural areas about one fifth of households living in un-durable houses have poor food consumption. In urban areas, the likelihood that a household with poor food consumption resides in un-durable housing conditions is three to five times as high as for food secure households. (see Table 4.4)
- **Households within the lower wealth categories**, indicating their limited asset base and resilience to shocks. (see Figure 4.1)

Figure 4.1: Wealth and food consumption

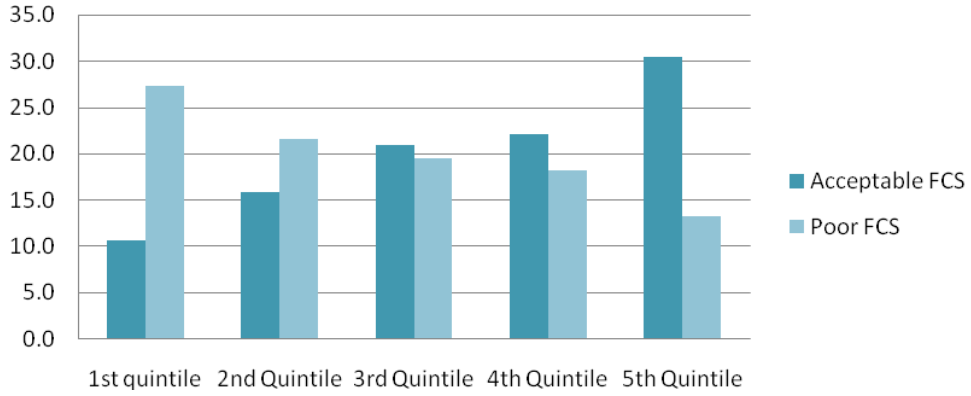
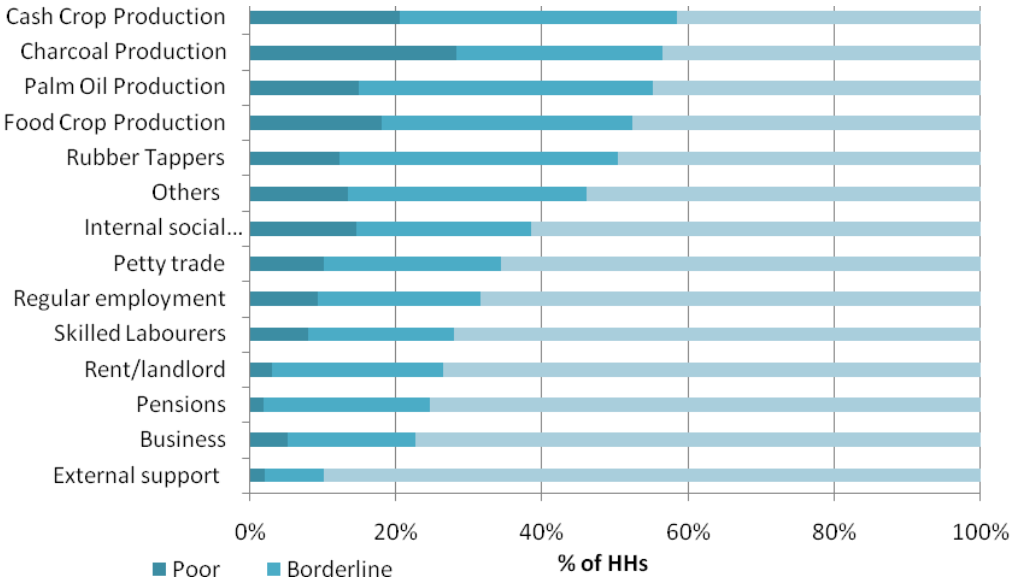


Table 4.4: Demographic and living conditions

	Rural (%) Food consumption		Urban (%) Food Consumption	
	Poor	**Acceptable**	**Poor**	**Acceptable**
Head of households				
Widow/Widower	**25.3**	**36.7**	**5.7**	**72.1**
Male	**17.9**	**44.0**	**4**	**83.1**
Female	**24.4**	**36.7**	**6.2**	**79.4**
Aged <25	**20.4**	**41.3**	**5.7**	**86.0**
Aged 25-60	**18.6**	**43.4**	**4.2**	**82.1**
Aged >60	**21.7**	**38.7**	**8.1**	**81.4**
Member of household chronically ill	**24.0**	**32.9**	**5.5**	**73.8**
Roof conditions				
Durable	**14.9**	**50.5**	**2.9**	**86.1**
Un-durable	**21.0**	**39.1**	**17.9**	**50.1**
Wall conditions				
Durable	**18.8**	**46.6**	**1.9**	**88.3**
Un-durable	**19.2**	**42.0**	**11.7**	**64.8**

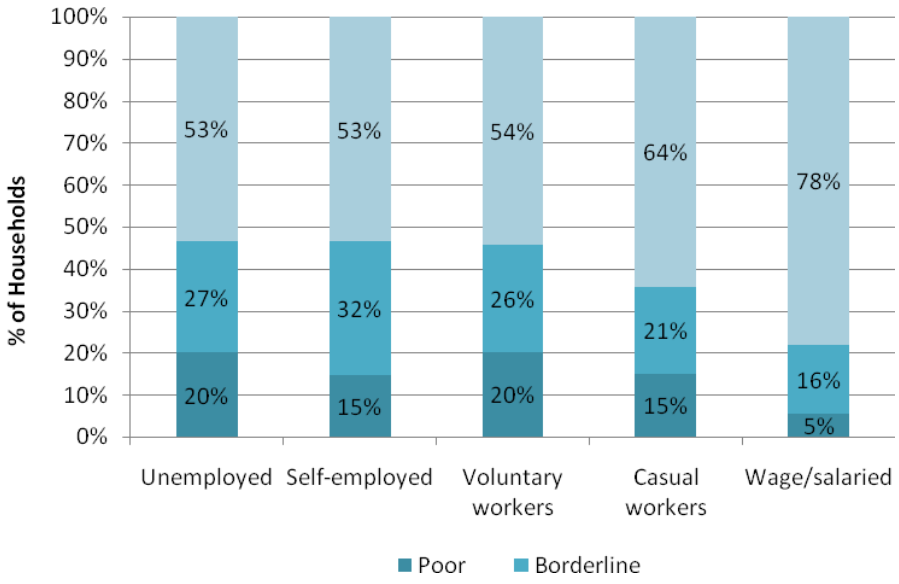
- **Households involved in just one or two income activities rather than several** (on average, households are engaged in two income activities). The prevalence of poor food consumption drops from 15% for households engaged in one or two income activities to only 9% for those with three income activities and to 6% for households involved in four or more.
- **Households in rural areas that depend on agricultural activities** such as crop production, charcoal production, rubber tapping and palm oil production. Generally, more than 20% of these households have poor food consumption.
- **Those with rural livelihoods**. Nearly 60% of cash crop producers have poor or borderline food consumption, compared with only 10% of remittance receivers in urban areas. Similarly 56% of charcoal producers have poor or borderline food consumption as opposed to 23% of those working in urban-based businesses. (see Figure 4.2)
- **Households that experienced a perceived decrease in income in the year preceding the survey**. For the 34% of households that reported this, the commonest reasons were: lower production/output (39%), lower profit/reduced sales (32%), lower wages (11%) and fewer employment opportunities (8%). Rubber tappers and food crop producers, charcoal producers and cash and food crop producers were the most likely livelihood groups to report lower production/output as the main reason for perceived decrease in income (reported by more than 30% of households in each of these livelihoods).

Figure 4.2 Food consumption and livelihoods



- **The unemployed, self employed or casually employed** (Figure 4.3). Nationally, it estimated that at least 60% of employed Liberians work in the informal sector (self-employed working in agriculture sector, casual laborers such petty traders, and those that dependent on contract work and voluntary workers) and 68.4% of household heads are self employed mainly as food crop producers, charcoal producers and palm oil producers, who are particularly vulnerable during the rainy season as their activities are inhibited and they tend to exhaust their stocks during the lean months. Unemployment is reported by 6.3% and unpaid work by 0.5%, which is in keeping with the 2008 survey.

Figure 4.3 Food consumption and employment

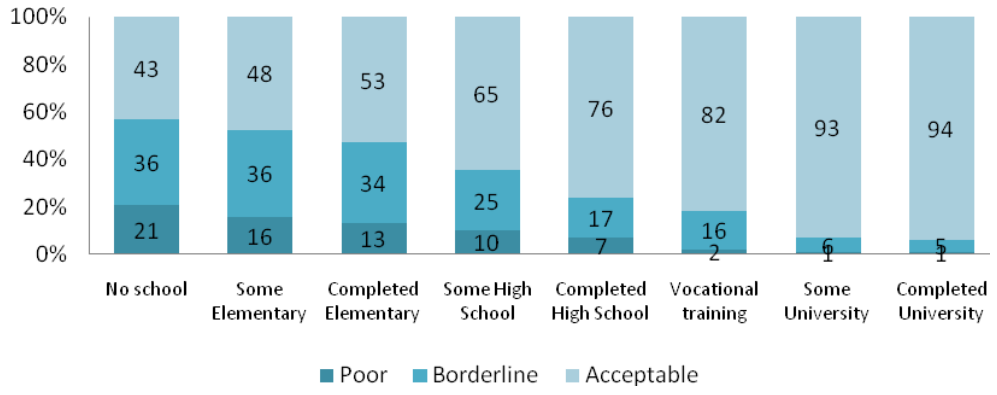


- **Households headed by a person with no or limited education**. As shown in Figure 4.4, prevalence of food insecurity decreases as the educational attainment of the household head improves. 57% of households with below acceptable consumption levels are head by someone with no schooling. Worse is that, households with poor food consumption tend to send fewer children to school irrespective of age and gender of the children (Table 4.5).

Table 4.5: Enrolment in school by food consumption group

	6-11 year old enrolment in primary	12-18 year old enrolled in secondary	6-11 year old boys enrolment in primary	6-11 year old girls enrolment in primary	12-18 year old boys enrolled in secondary	12-18 year old girls enrolled in secondary
Acceptable FCSG	73%	46%	72%	74%	47%	43%
Poor FCSG	55%	25%	54%	54%	23%	25%

Figure 4.4: Education status of head of the household



- **Households that have taken on loans or credit in order to purchase food.** The relatively food secure livelihood profiles (external support receivers and pensioners) were less likely to have taken a loan or purchased a commodity on credit than the other livelihood groups as indicated in Table 4.6. The three main reasons for taking loans or purchasing on credit are: to buy food (21.6%), meet health expenses (17.7%) and pay education expenses

Loans and Credit in Liberia*:*

Access to credit is important insofar as it can help households to make productive investments and/or allow for asset accumulation, but taking on credit—especially for food—can also translate into medium and long-term debt if households are not able to generate sufficient income to repay the loan. Overall, there was a decrease in the proportions of households with an existing loan from 40% in 2008 to 33.3% in 2010. The proportion of households that had taken a loan or purchased on credit in the three months preceding the survey had also declined from 39% in 2008 to 30.5% in 2010. From the focus group discussions, loans or credits were mainly taken from informal sources—in some cases susus but mainly from relatives and family friends or even small scale traders. The amount of credit taken was generally low.

(13.1%). Urban and food secure households are more likely to spend their loans/credit on education expenses than rural and food insecure households.

Table 4.6: Existing and Loans/Credits Taken Within last Three Months

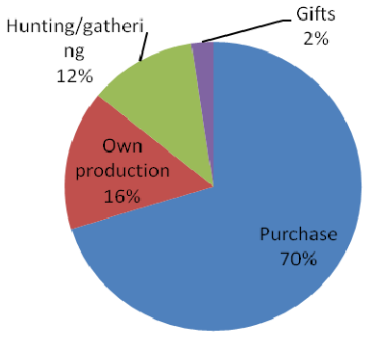
			Five Main Reasons for Loan/Credit (%)				
	Existing Loan	Loan/credit in last 3 months	Buy food	Cover health expensive	Pay education expenses	Buy clothes	Pay rent
Food Crop Production	36.7	29.6	24.8	18.9	10.4	4.9	7.8
Regular employment	32.0	32.2	17.7	23.6	9.9	5.5	7.1
Palm Oil Production	34.2	29.4	27.6	18.0	6.4	6.0	5.2
Petty Trade	31.2	30.9	22.4	13.1	16.5	8.5	7.4
Others	42.6	36.7	16.5	15.1	21.9	2.0	5.8
External Support (remittance)	14.0	13.1	25.1	6.0	19.7	13.7	21.5
Charcoal Crop Production	29.4	28.5	32.1	16.4	6.7	3.8	8.7
Rubber Tappers	34.5	34.0	21.9	19.4	5.8	8.6	5.1
Business	30.0	29.8	4.5	15.2	16.6	13.4	3.1
Skilled Labour	38.1	38.0	9.4	10.6	33.8	6.0	4.4
Rent/Landlord	33.9	31.5	25.6	0.0	21.0	0.0	2.3
Cash Crop Production	33.9	28.0	29.1	22.6	7.3	5.6	6.0
Pensions	24.0	24.0	5.2	0.0	36.8	0.0	0.0
Social Support (internal)	35.1	32.3	26.4	18.8	13.4	3.2	4.1
Urban Areas	32.0	31.3	15.5	15.7	20.3	7.1	6.8
Rural Areas	34.3	30.0	25.8	19.1	8.3	5.2	6.6
Liberia	**33.3**	**30.5**	**21.6**	**17.7**	**13.1**	**6.0**	**6.7**

4.4 Where do Liberians source their food?

More than 70% of Liberians rely on cash purchases (including cash received through credit) as their main means of acquiring food, 16 % on own production, 12 % on hunting and gathering while some 2% are receiving food in form of gifts.

As discussed above, rice is now mainly purchased whereas in 2008 63% was sourced from own production in rural Liberia – a proportion that has dropped to 30% in 2010. This underscores the importance of markets as a major source for the staples even in "normal" times.

Figure 4.5: Sources of food



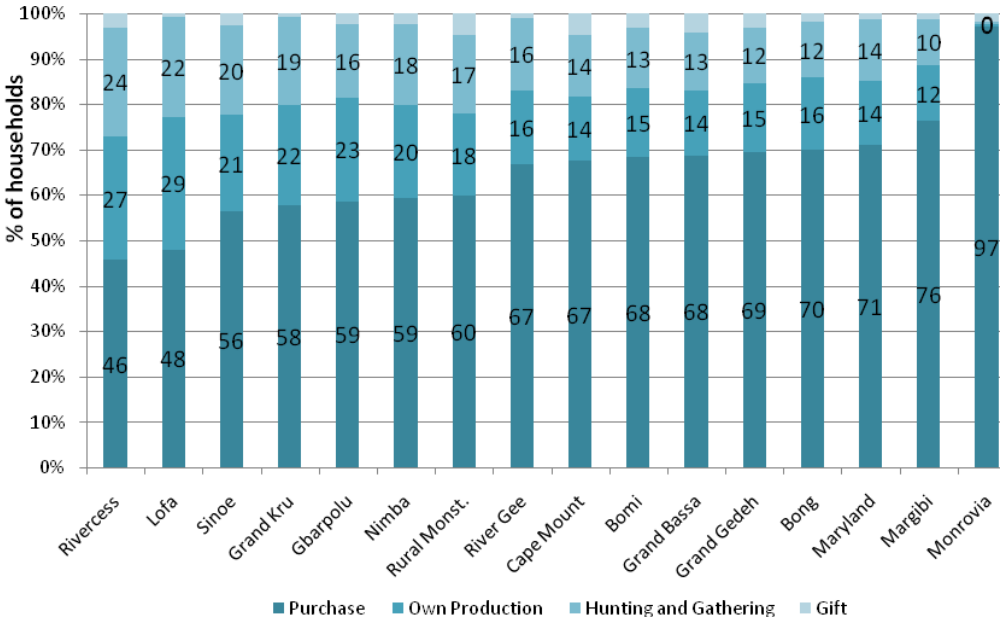
The main rice harvest period in Liberia is between November and January. Most farming households usually consume stocks from their harvested produce until April-May or the latest by June in central and northwest Liberia depending on how good the harvest is. So between May and August trade in

imported rice in rural markets is usually at its highest level especially in the agriculturally productive areas.

Fish - the main source of protein in the population's diets followed by bush meat - is the second most purchased food item and third most consumed food after cereals and oil.

Figure 4.6 shows that families in Greater Monrovia are predominantly (97%) purchasing their food followed by Margibi county (76 %). On the other hand, Lofa and Rivercess counties report the highest proportions (about 30%) of households relying on own production. Hunting and gathering – mainly of fish and bush meat – is commonest in Rivercess, Lofa and Sinoe counties.

Figure 4.6: Food sources by County



4.5 How do the seasons affect food security?

The proportions of food insecure households tend to increase immediately after the onset of the hunger season.

The hunger season begins between April and July each year though it varies from region to region usually beginning in March/April in southeastern counties (Grand Kru, Maryland, River Gee and Sinoe counties) and July in northwest counties (Bomi, Gbarpolu and Lofa). For the rest of Liberia it usually begins June/July and lasts until the beginning of harvest, which tends to be July/August in southeastern counties and October/November in the northwest. The end of the lean season is usually followed by a period of plenty, especially in rural Liberia.

Figure 4.7: Seasonality in rice production and food security

LIBERIA SEASONAL CALENDAR - 2010												
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Season	Peak of dry Season			Dry season ends	Rains begin		Peak of rainy Season			Rains end	Dry season begins	
Rice Farming				Planting (South Eastern)		Planting (rest of Liberia)			Harvesting (South Eastern)		Harvesting (rest of Liberia)	
Hunger period	Generally food secure			Increased food insecurity (Food stocks decline)	Hunger period begins		Peak of the hunger period			Hunger period ends	Generally food secure	

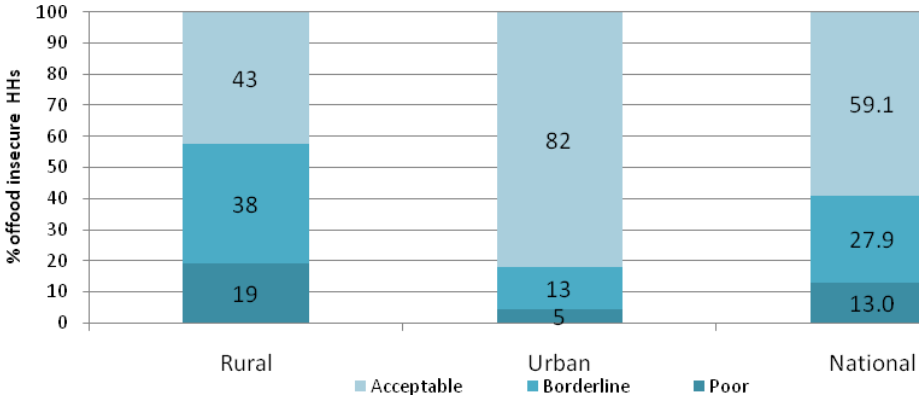
According to the market monitoring data, the supply of local rice, is lowest between June and August while the prices are highest. Although cassava supply tends to improve in the months of May to August, it still does not adequately compensate for the lower levels of local rice.

4.6 Where are the food insecure?

Rural Liberia still bears the greater brunt of food insecurity. As shown in Figure 4.8, rural residents in Liberia are at least three times more likely to consume below acceptable levels than urban residents (19% in rural Liberia versus 5 % in urban areas.[18]) Similarly 38% in rural areas have borderline food consumption versus 13% in urban areas.

[18] Urban areas include Greater Monrovia and other major cities within the countryside as categorized by the Liberia Institute of Statistics and Geo-Information Services.

Figure 4.8: Food consumption (rural vs urban)

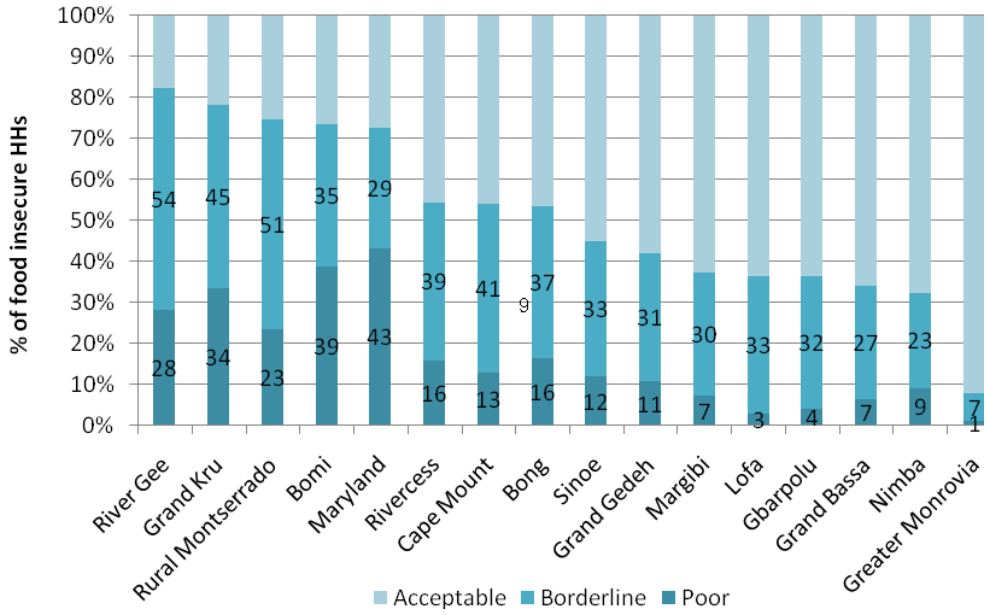


In rural areas, levels of food insecurity vary considerably from one county to the other (see Figure 4.9) with south eastern counties disproportionately more affected.

Since 2006 there have been significant improvements in food security in the country's chief rice producing districts of Gbarpolu, Lofa and Nimba, which were at the epicentre of the protracted civil war and suffered massive destructions of the socio-economic infrastructure. Current findings, especially on levels of participation in agricultural production, indicate that these three counties plus Bong could be on their path to recovery and to regaining their pre-war status, albeit slowly.

Greater Monrovia is the most food secure area in Liberia and appears to be recovering from the impact of the 2008/2009 global recession that had a huge impact on the urban population. It is also notable that food prices have remained relatively stable since late 2009.

Figure 4.9: Food consumption by county



4.7 Coping with food insecurity

Food security is dynamic. This makes it critical to assess a household's vulnerability to risks and shocks. A household's ability to minimize risks and respond and/or absorb shocks defines its vulnerability to food insecurity. Shocks can be natural, economic, political, or social in nature.

Nationally, 51.8 % of the households experienced shocks during 2010. This is significantly lower than in 2008 when 96% experienced a shock, predominantly high food prices, and is similar to 2006 levels (49%). This could mean that the impact of the 2008 food crisis has to some extent been normalized.

The seven most reported shocks include:

- Serious sickness of household member (24.8%)
- Loss of/reduced income (13.3%)
- Death of a household member (11.5%)
- High food prices (9.3%)
- Heavy rains/floods (8.8%)
- Crops and animal pest/birds destroying crops (6.2%
- Crop failure (6.2 %)

This is major shift from 2008 when the main shocks were high food prices and loss of income—mainly reflecting the effects of the economic downturn during that year – and from 2006 when pest/animal attack on crops was the main shock.

Overall, households that had experienced a shock in the six months preceding the survey are 1.5 times more likely to experience poor food consumption than households that had not experienced a shock.

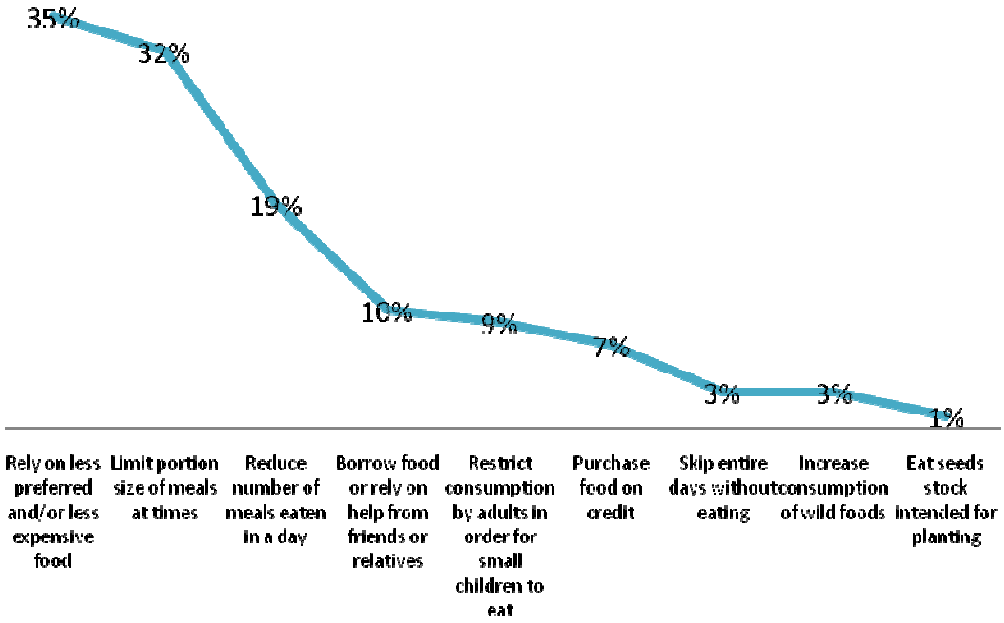
Given that more than a half of households (55.8%) said they had experienced difficulties in accessing food during the week preceding the survey, it is important to assess how they cope in this situation. (see figure 4.10). Over a third (35%) relied on less preferred food, i.e. not rice, 32% limited their food intake by serving smaller portions, 15% reduced the number of meals eaten in one day and 10% borrowed food. Three % of the households went to bed hungry with no meals consumed during the day.

Combining these coping strategies into an index depending on the frequency with which they were applied within a one week period provides the coping strategy index (CSI). The CSI is significantly lower than that of 2008, from 5.3 to 3.0, but the proportion of households that reported using coping strategies in rural Liberia had climbed from 26% in 2008 to 38% today. This underscores the fact that while food security has improved considerably in urban areas only minimal improvements can be reported in rural regions.

Poor food consumption households have proportionately higher coping strategy indices than households with acceptable food consumption scores.

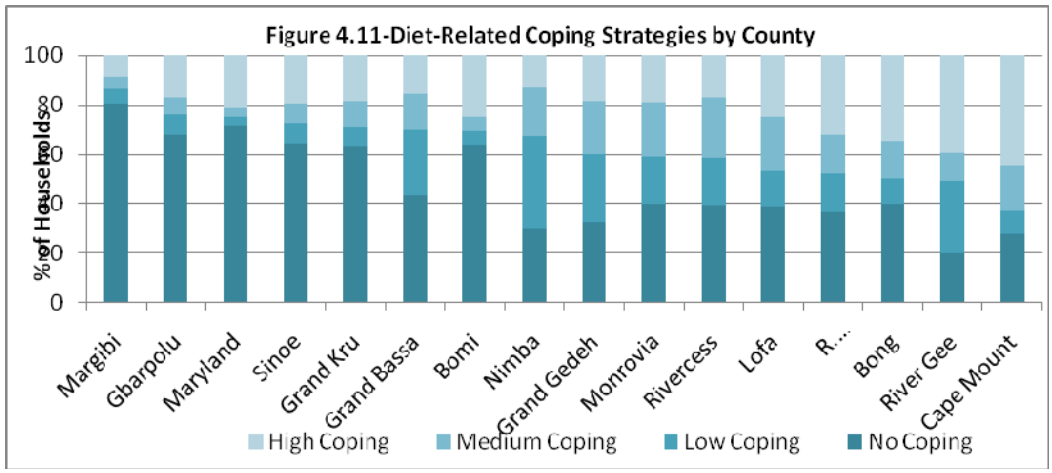
The CSI was also compared across the livelihood profiles. Those with food insecure livelihoods - cash and food crop producers and rubber tappers - report the highest CSI mean scores at 3.7, 3.4 and 3.4 respectively.

Figure 4.10: Consumption coping strategies



The CSI was also analysed at county level. As presented in Map 4.1, Margibi and Gbarpolu counties have the lowest proportions of households with medium to high coping strategies while Cape Mount and River Gee counties have the highest proportions of households coping.

Figure 4.11: Utilization of coping Strategies at county level



4.7.1 Migration and remittances

Money from remittances and support from other families plays a major role in paying for food supplies. While migration from the rural areas to the city deprives the countryside of young, able-bodied people who can play an active role in farming, it often brings much needed income to poor rural families. Rural-urban migration, which stands at 24%, is mainly motivated by the search for access to basic services

(e.g. education and health) and income opportunities. Data show that there is an increased likelihood of populations out-migrating from food insecure households in search of opportunities in urban centres, although households with poor food consumption are less likely to receive remittances than households with acceptable food consumption (1.5% vs 7.7%).

Focus group discussions carried out at rural community level during the survey revealed that out-migration usually turns out to be a boon for remaining families once the émigrés settle and begin sending remittances.

There was a remarkable increase in the proportions of households receiving remittances from abroad, from 3% in 2008 to more than 5% in 2010, while 21% receive support from relatives or friends within the country. Table 4.7 provides a detailed report on the extent of social support across livelihood and food security profiles.

Table 4.7: Support received (% of households)

	Social support (internal)	Remittance	Assisting others with food or cash
Food Crop Production	0.261	0.025	0.426
Salaried employment	0.174	0.013	0.396
Palm Oil Production	0.242	0.032	0.421
Petty Trade	0.171	0.027	0.401
Others	0.295	0.009	0.345
External Support	0.3	0.91	0.567
Charcoal Producers	0.197	0.011	0.345
Rubber Tappers	0.231	0.018	0.462
Business	0.11	0.019	0.364
Skilled Labour	0.138	0.016	0.377
Rent/Landlord	0.019	0	0.275
Cash Crop Production	0.241	0.028	0.394
Pensions	0.242	0	0.4
Internal social Support	0.215	0.044	0.363
Food secure	0.206	0.077	0.463
Food insecure	0.215	0.015	0.32
Overall	**0.21**	**0.052**	**0.404**

4.7.2 External assistance

Overall, 68 % of households received some form of external support in the three months preceding the survey, with 27% reporting one type of assistance, 23% two types of assistance and 18% of households receiving three or more types of assistance. Rivercess and Sinoe counties reported the highest percentages (more than 90%) of households receiving at least one type of support.

Nationally, the three main types of external assistance received by households are:

- Free health care/drugs (51% of households)
- Free education (44% of households)
- School feeding (22% of households).

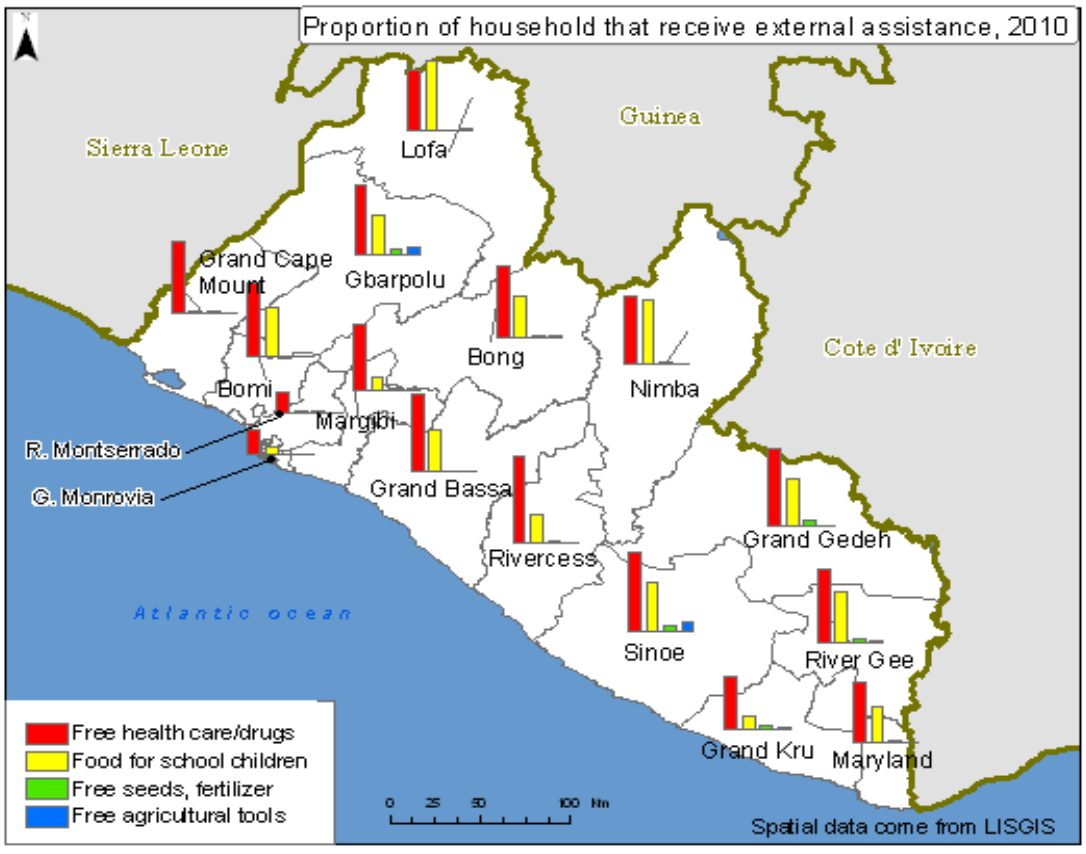
Other less reported types of external assistance include skills training, micro-credit, cash transfers, cash for work and free seeds/fertilizers. With the exception of micro-credit support, more households in rural Liberia than urban areas reported receiving external assistance. Grand Kru and Montserrado (including Monrovia) counties are the least covered by free health services (less than 50%) while households in Greater Monrovia and Bong report the lowest levels of coverage by free education with 10% and 38% respectively.

Grand Kru, which has one of the highest prevalence rates of food insecurity, has only 12% of households benefiting from the WFP school feeding programme, which points to a gap in reaching out to the most disadvantaged.

Grand Cape Mount, Margibi and Montserrado are not covered by the WFP school feeding programme, while Grand Kru, which has one of the highest prevalence rates of food insecurity, has only 12% of households benefiting from school feeding. Although the poor state of roads may explain the lower coverage, this points to a gap in reaching out to the most disadvantaged. Map 4.1 and Table 4 in Annex 5, provides a detailed overview of the households benefiting from different programmes in each county.

Unsurprisingly households with poor food consumption benefited significantly more from school feeding (27% vs 18%), free education (55% vs 35%), free health care (59% vs 45%) and free agricultural tools/seeds distribution (3% vs 2%) than households with acceptable consumption.

Map 4.1: External assistance



5. State of Nutrition Security

For understanding of the nutrition security, UNICEF's conceptual framework on the causes of malnutrition was utilized as integrated in the framework presented in Annex 1. The framework provides practical means for analysing malnutrition its causes in a holistic manner relevant to both development and emergency contexts. As presented in the framework, malnutrition is a complex, intergenerational condition that is caused by a variety of both micro and macro socio-political, economic, and health-related factors. Macro determinants of malnutrition are: generalized poverty, poor governance, and political, ideological and economic instability. Micro causes include inadequate infant and child feeding practices, inadequate hygiene, poor water and sanitation, disease, and inadequate food intake and food insecurity. At the immediate level, malnutrition results from either infection or inadequate food intake. This section presents main nutrition findings of the survey. However, detailed technical report on the nutritional survey results are presented in Annex 4B (the detailed report uses smart outline in presentation of all the findings).

For understanding the stunting levels, it is significant to point out that there was an under-representation of children aged 54-59 months in the sample. An analysis was therefore carried out to determine if this introduced bias into the sample and, if so, how much? After consultation with several international experts in nutrition survey methodology, a simulation was carried out, increasing the number of children in the 54-59 month age group to expected levels and applying the group stunted prevalence and mean as their nutritional status. As the presented on Table 5.1, the adjusted prevalence and adjusted mean are very similar to the original estimates and well within the confidence intervals. This demonstrates that if a bias was introduced into the sample, its effect was negligible. Thus stunting levels presented here are deemed the true picture of the situation.

Table 5.1 Survey stunted prevalence, confidence interval and adjusted prevalence for expected representation of 54-59 month children

	Stunted Prevalence In survey	95% Confidence Interval	Adjusted Prevalence	Mean	95% Confidence Interval	Adjusted Mean
Bomi	39.9%	33.8 - 46.5	39.6%	-1.681	-1.846 - -1.514	-1.687
Bong	28.2%	23.6 - 33.3	28.1%	-1.413	-1.540 - -1.280	-1.417
Gbarpolu	33.3%	27.0 - 40.1	33.9%	-1.540	-1.720 - -1.360	-1.575
Grand Bassa	39.1%	34.7 - 43.7	39.2%	-1.671	-1.790 - -1.570	-1.674
Grand Cape	35.3%	31.1 - 39.8	35.1%	-1.381	-1.496 - -1.264	-1.383
Grand Gedeh	34.0%	28.0 - 40.7	34.3%	-1.589	-1.773 - -1.407	-1.594
Grand Kru	32.0%	26.8 - 37.7	31.7%	-1.459	-1.614 - -1.306	-1.489
Lofa	31.6%	26.1 - 37.7	31.2%	-1.475	-1.646 - -1.294	-1.485
Margibi	49.6%	43.8 - 55.1	49.6%	-1.920	-2.029 - -1.791	-1.920
Maryland	36.6%	31.8 - 41.8	36.4%	-1.529	-1.666 - -1.394	-1.495
Monrovia	26.7%	22.0 - 31.9	26.7%	-1.210	-1.346 - -1.074	-1.213
Nimba	36.2%	30.5 - 42.4	36.5%	-1.648	-1.798 - -1.502	-1.661
River Gee	33.7%	29.4 - 38.1	33.8%	-1.348	-1.467 - -1.213	-1.370
Rivercess	34.7%	28.8 - 41.3	35.0%	-1.505	-1.720 - -1.300	-1.524
Rural	33.3%	28.6 - 38.4	34.4%	-1.643	-1.740 - -1.540	-1.645
Sinoe	35.7%	30.1 - 41.7	37.3%	-1.657	-1.815 - -1.485	-1.686

This section includes:

1. Findings on the nutritional status of children under five years old
2. Findings on the nutritional status of women of reproductive age (15-49 years)
3. Information on child health and its relationship to nutritional status of the child
4. Information on infant and young child feeding patterns
5. Information on inter-linkages between food security and nutrition.

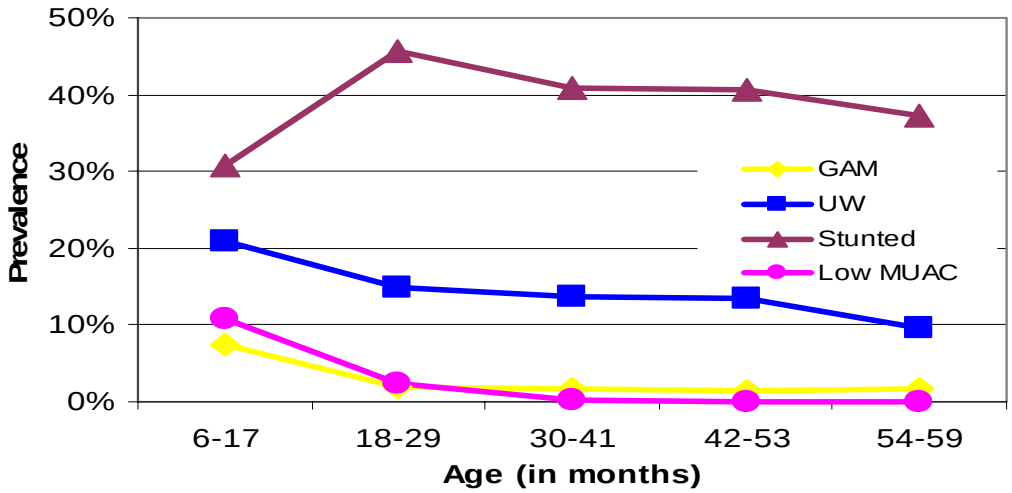
5.1 Malnutrition in children

KEY FINDINGS

- Chronic malnutrition as measured by the prevalence of stunted children is a huge problem in Liberia with an overall stunting prevalence of 41.8% (the WHO cut-off threshold for very high is 40%).
- Rural areas have more stuntedness than urban areas. Margibi County has the highest prevalence with 57.2% followed by Bomi, Grand Bassa and Sinoe with 44-47%.
- Nine counties are above the WHO threshold of 40% with a total of 218,857 children estimated to be stunted.

- Children between 18 and 29 months have the highest level of moderate and severe stunting (45.6%), while far fewer 6-17 month olds are stunted (30.7%). This contrasts with Global Acute Malnutrition (GAM) which is much higher in children aged 6-17 months (7.1%) than in any other age group, where the prevalence is under 2% (see Figure5.1).

Figure 5.1: Malnutrition by age in months (W/A, H/A, W/H, MUAC)



- The level of acute malnutrition as measured by wasting, including presence of oedema (GAM), shows an improvement from previous surveys and is considered normal. It is prevalent in 2.8% of children between 6-59 months old.
- An estimated 16,000 children were acutely malnourished at the time of the survey.
- Overall, very few children participated in feeding programmes for acute malnutrition in the three months preceding the survey. (0.4% participated in Supplementary Feeding Programmes (SFP) for moderate acute malnutrition and 0.2% participated in Therapeutic Feeding Programmes (TFP) for severe acute malnutrition.
- Over the last four years there has been a marked decrease in the percentage of underweight children. Nationwide, 14.9% of children are underweight with Rivercess, Monrovia, Bomi and Grand Gedeh all recording more than 16% of children as underweight. River Gee and Rural Montserrado are the best-off, with fewer than 12% underweight. The changes in underweight mirror those of acute malnutrition.
- More boys are stunted (45.9%) than girls (35.7%) in nearly all counties, with the exception of Grand Gedeh and Monrovia.
- Typically, urban areas have lower rates of malnutrition and illness thanks to better general access to services and markets.

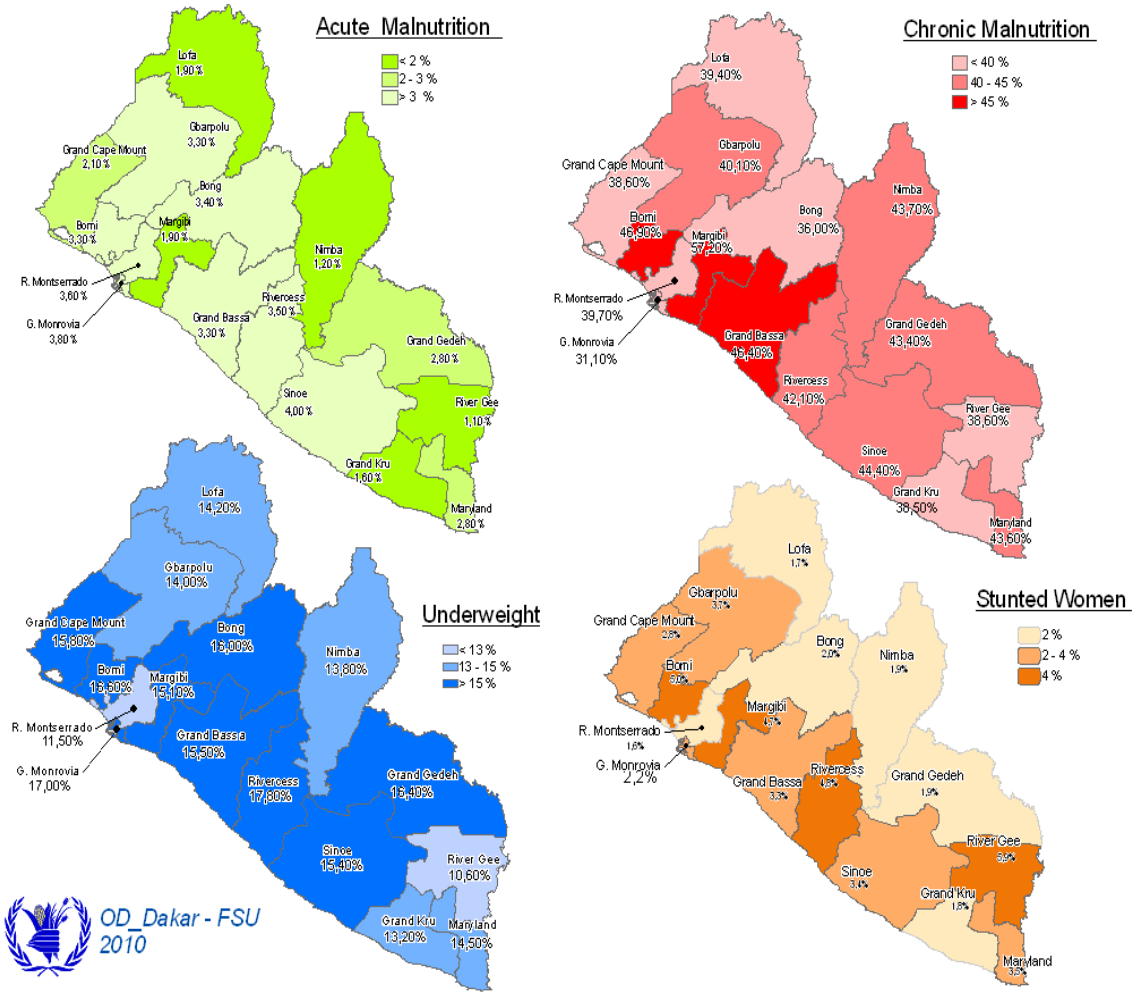
Table 5.1 – Child malnutrition in Liberia

	STUNTING			WASTING			UNDERWEIGHT		
COUNTY	Global	Moderate	Severe	Global	Moderate	Severe	Global	Moderate	Severe
BOMI	46.90%	29.40%	17.50%	3.60%	3.30%	0.30%	16.60%	12.60%	4.00%
BONG	36.00%	22.40%	13.60%	3.40%	3.40%	0.00%	16.00%	13.10%	2.90%
GBARPOLU	40.10%	24.30%	15.90%	3.30%	3.30%	0.00%	14.00%	12.80%	1.20%
GRAND BASSA	46.40%	30.60%	15.80%	3.30%	3.00%	0.30%	15.50%	12.70%	2.80%
GRAND CAPE MOUNT	38.60%	25.70%	12.90%	2.10%	2.10%	0.00%	15.80%	12.20%	3.60%
GRAND GEDEH	43.40%	30.70%	12.70%	2.80%	2.80%	0.00%	16.40%	13.80%	2.70%
GRAND KRU	38.50%	22.00%	16.50%	1.90%	1.40%	0.50%	13.20%	12.30%	0.90%
LOFA	39.40%	25.20%	14.20%	2.10%	1.90%	0.20%	14.20%	12.00%	2.20%
MARGIBI	57.20%	35.60%	21.50%	1.90%	1.90%	0.00%	15.10%	13.20%	1.90%
MARYLAND	43.60%	25.50%	18.20%	2.80%	2.50%	0.30%	14.50%	11.40%	3.10%
MONROVIA	31.10%	18.30%	12.90%	3.80%	3.80%	0.00%	17.00%	14.60%	2.40%
NIMBA	43.70%	31.10%	12.60%	1.20%	1.20%	0.00%	13.80%	12.10%	1.60%
RIVER GEE	38.60%	23.10%	15.50%	1.80%	0.80%	1.00%	10.60%	8.70%	1.80%
RIVERCESS	42.10%	25.80%	16.30%	3.50%	2.80%	0.70%	17.80%	15.10%	2.70%
RURAL MONTSERRADO	39.70%	26.40%	13.30%	3.60%	3.60%	0.00%	11.50%	10.70%	0.80%
SINOE	44.40%	27.80%	16.70%	4.20%	3.50%	0.60%	15.40%	13.00%	2.40%
LIBERIA	41.80%	26.50%	15.30%	2.80%	2.60%	0.20%	14.90%	12.50%	2.30%

Chronic malnutrition as measured by the prevalence of stunted children is a huge problem in Liberia. The overall stunting prevalence was 41.8% as shown in Table 5.1. The stunting prevalence at the county level ranged from 31.1-57.2%. Margibi has the highest stunting prevalence with 57.2% followed by Bomi, Grand Bassa and Sinoe with 44-47% of children stunted, These percentages are considered extremely high according to WHO cut-offs (at a threshold of 40%). In fact nine counties are above this threshold with a total of 218,857 children estimated to be stunted.

With the levels of stunting are very high in Liberia, it is important to understand the consequences of the condition, namely: it causes irreversible brain damage, delays normal growth, increases the risk of death due to ordinary child illnesses and increases the risk of chronic diseases later in life. Malnutrition perpetuates poverty with its adverse effects on survival, productivity and educability. This makes malnutrition one of the most important public health problems in this country. On the positive note, however, stunting is preventable. Children become stunted very early in life, normally before they turn 2 years old – therefore, there is a small window of opportunity for timely preventive measures between conception and a child's second birthday. While Monrovia and Bong are the best-off counties with regard to stunting, they still indicate prevalence greater than 30 % (Map 5.1).

Map 5.1: Acute, Chronic and Underweight among children aged 6 – 59 months



5.2 Nutritional status of women

Women of reproductive age (15-49 years old) were assessed to determine their nutritional status, measuring their weight, height and MUAC. These measurements were used to determine each woman's body mass index (BMI), stuntedness, and low MUAC. Pregnant women were analysed separately for low MUAC and were not included in the BMI analysis.

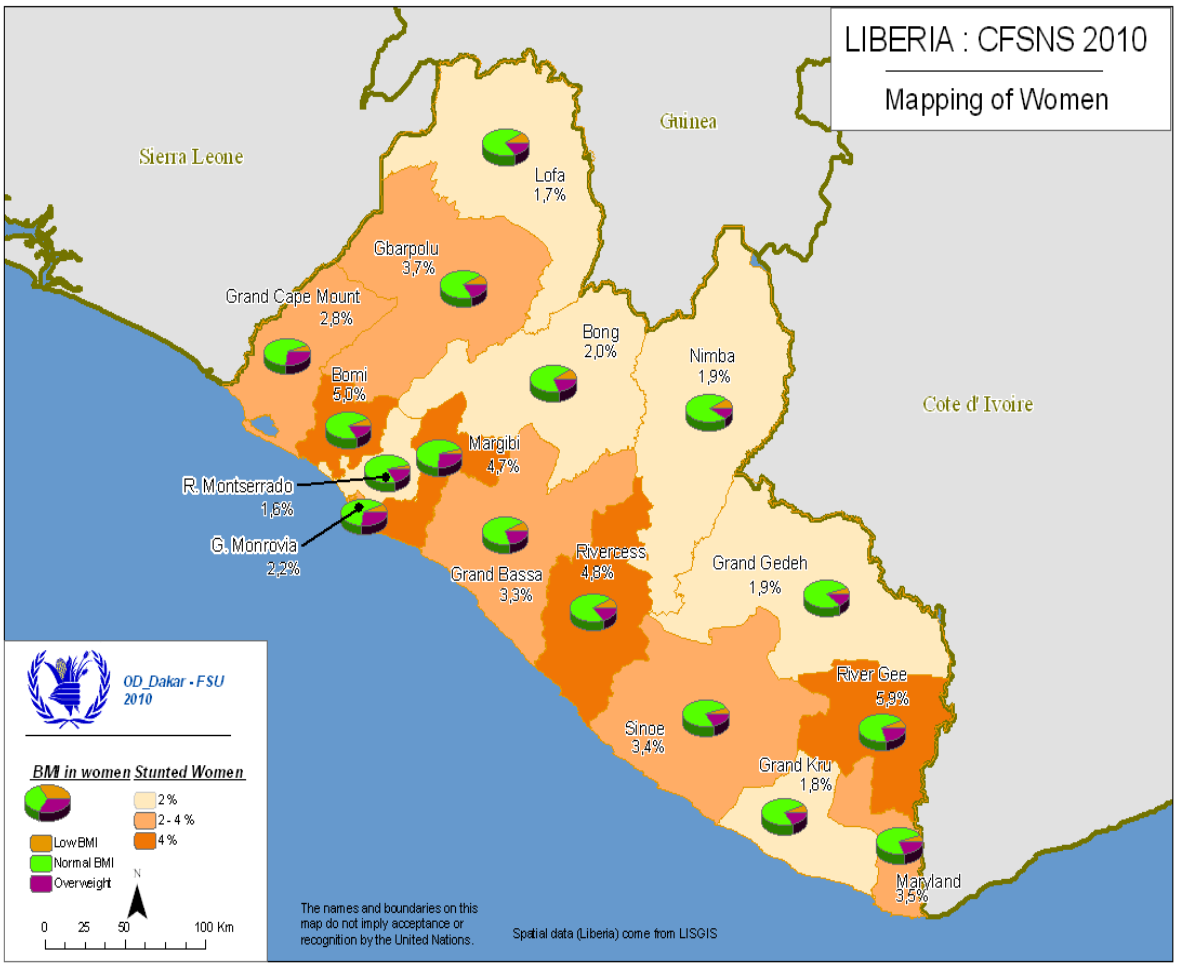
KEY FINDINGS

- Over-nutrition in women in Liberia is more prevalent than under-nutrition although they are occurring simultaneously. The consequences of over-nutrition must be considered as they are often overlooked and are different from those of under-nutrition.
- The overall prevalence of low BMI (or under-nutrition) in non-pregnant women is 7.5%, and the prevalence of high BMI (or over-nutrition) is nearly three times that at 20.3%.
- Counties with the worst under-nutrition rates by BMI were Lofa, Gbarpolu, Bong, Rivercess and Nimba, all with levels above 9%, while those with the least under-nutrition were Margibi and Rural Montserrado, both with less than 5% of women with low BMI (see Table 5.2).
- The counties with the worst over-nutrition were Margibi, Monrovia and Grand Cape Mount, with levels of over-nutrition greater than 21%. Nimba, with high levels of under-nutrition, had the lowest prevalence of over-nutrition, along with Grand Gedeh, both with less than 15% in women of reproductive age as presented in Map 5.2.
- Trends over the past several years indicate that under-nutrition in women of reproductive age has improved.
- Prevalence of under-nutrition is greatest in 15-19 year old women (15%), a worrying trend in Liberia where teenage pregnancy is very common.
- As women get older, they have a higher prevalence of over-nutrition. Just over 5% of 15-19 year olds are over-nourished, while almost 30% of women in their 30s and 40s are over-nourished.

Table 5.2 - Women's malnutrition status

	Low BMI (underweight)			High BMI (overweight)					Low MUAC	
	Low (<18.5)	Severe (<17.0)	Moderate (17.0-18.4)	High (≥25.0)	Overweight (25.0-29.9)	Obese (≥30.0)	Mean BMI	Stunted (Height <145.0 cm)	Non-pregnant	Pregnant
BOMI	6.8%	2.1%	4.7%	16.6%	13.1%	3.5%	22.5	5.0%	2.3%	3.4%
BONG	9.5%	1.8%	7.7%	18.8%	15.8%	3.0%	22.5	2.0%	1.6%	0.0%
GBARPOLU	9.6%	3.0%	6.6%	16.8%	14.3%	2.5%	22.3	3.7%	1.4%	0.0%
GRAND BASSA	7.9%	2.0%	5.9%	20.8%	16.5%	4.3%	22.6	3.3%	3.0%	0.0%
GRAND CAPE MOUNT	5.8%	1.0%	4.8%	26.9%	21.2%	5.7%	23.3	2.8%	1.0%	1.7%
GRAND GEDEH	5.8%	1.7%	4.1%	13.1%	11.4%	1.7%	22.0	1.9%	1.3%	0.0%
GRAND KRU	6.3%	1.2%	5.1%	17.2%	11.6%	5.6%	22.6	1.8%	2.4%	2.5%
LOFA	10.0%	1.3%	8.7%	16.3%	13.5%	2.8%	22.0	1.7%	1.5%	6.4%
MARGIBI	4.7%	0.6%	4.1%	26.0%	21.6%	4.4%	23.4	4.7%	0.4%	0.0%
MARYLAND	5.4%	1.7%	3.7%	19.5%	13.5%	6.0%	23.1	3.5%	5.8%	0.0%
MONROVIA	7.0%	0.9%	6.1%	27.5%	17.9%	9.6%	23.6	2.2%	2.5%	0.0%
NIMBA	9.4%	2.3%	7.1%	10.0%	8.5%	1.5%	21.7	1.9%	2.5%	0.0%
RIVER GEE	7.2%	0.9%	6.3%	20.9%	13.0%	7.0%	23.0	5.9%	2.2%	0.0%
RIVERCESS	9.4%	1.9%	7.5%	15.5%	12.4%	3.1%	22.2	4.8%	2.8%	3.6%
RURAL MONTSERRADO	3.7%	0.4%	3.3%	17.6%	12.9%	4.7%	22.9	1.6%	4.5%	3.8%
SINOE	5.4%	1.1%	4.3%	17.3%	14.1%	3.2%	22.7	3.4%	1.1%	0.0%
LIBERIA	7.5%	1.4%	6.1%	20.3%	15.1%	5.2%	22.8	2.6%	2.3%	0.9%

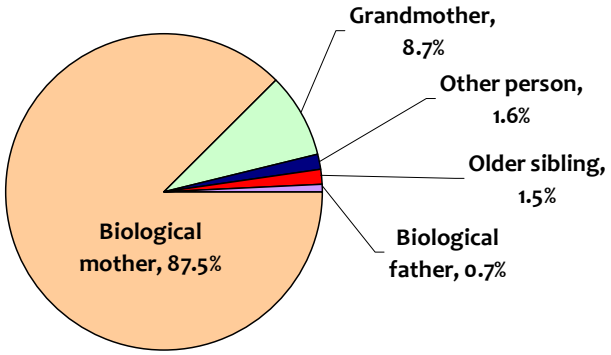
Map 5.2: Under and Overnutrition among Women aged 15 -49 years



5.2.1 How child malnutrition and illness relates to characteristics and nutritional status of mothers/caretakers

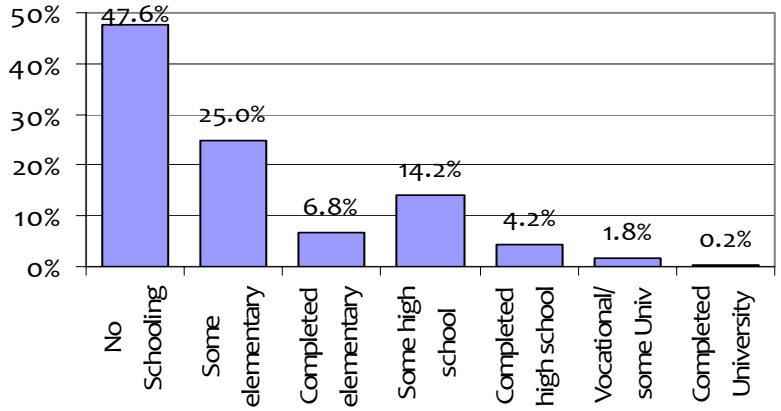
It has been well documented that a child's nutritional status is closely linked to that of their mother. The vast majority of children in the survey (87.5%) are cared for directly by their biological mother while another 9% are cared for by their grandmother (see figure 5.2). Mothers/caretakers range in age from 15 to 74 years with almost half between 20 and 29 years old. Teenage parenthood is high with 6 percent of mothers between 15 and 19 years old.

Figure 5.2: child's main caretaker



Educational status of mothers/caretakers is shown in Figure 5.3, almost half of mothers have no education at all and another 25% have some primary school education.

Figure 5.3: Education level of caretaker

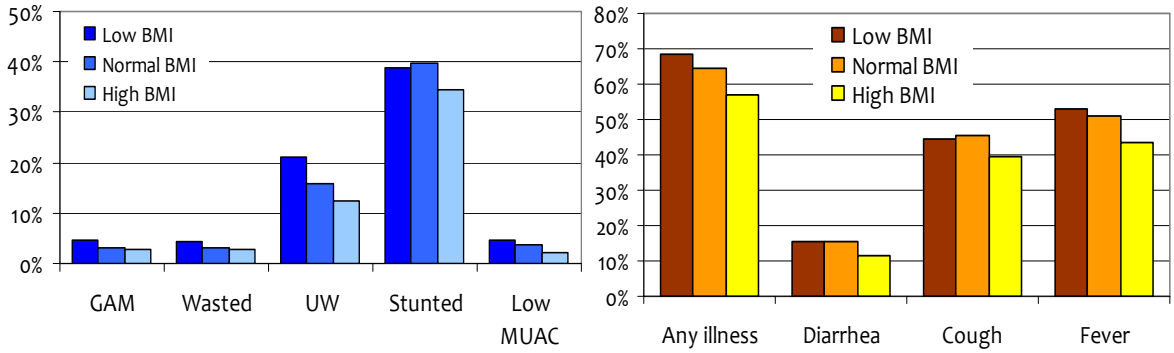


KEY FINDINGS

- Malnutrition and child illness are less common in families where mothers/caretakers are between 20-39 years old
- A higher prevalence of stunted and underweight children appear in the younger (15-19 years) and older (>40 years) mother/caretaker groups.
- Younger and older mothers/caretakers also tend to have more sick children, although this is only for the 50 + age group.
- Fewer children suffer from malnutrition or sickness when their mother has had more education as shown in Figures 5.3.

- A higher proportion of children are underweight when their mother is als0 underweight (based on low BMI) i.e. statistically more under-weight, more stunted and have low MUAC.
- Children of stunted women tend to be more malnourished (GAM, wasted, UW and stunted) than children of mothers with normal stature, but there is no relationship between stunting in mothers and illness in children.
- Children of women with low MUAC tend to be more acutely malnourished (GAM, wasted and low MUAC) than children of women with normal MUAC as shown in figure 5.4.

Figure 5.4: Child health and nutrition situation and mother's nutritional status



5.3 Infant and young child feeding practices (IYCF)

Infant and young child feeding practices (IYCF) affect the health of both mothers and children. Breastfeeding has been shown to have beneficial effects on the nutritional status, morbidity, and mortality rates of young children. Mothers and caretakers of children 0-24 months were interviewed to establish current practices regarding IYCF. The analysis covered 3,305 children, but not all children had complete information so the number included for each indicator varies.

Overall, there appears to be some progress in IYCF practices as demonstrated in Figure 5.5 and Table 5.3, which compares the trends from 2006, 2008 and the current survey.

Figure 5.5: Trends in IYCF practices, 2006, 2008 and 2010

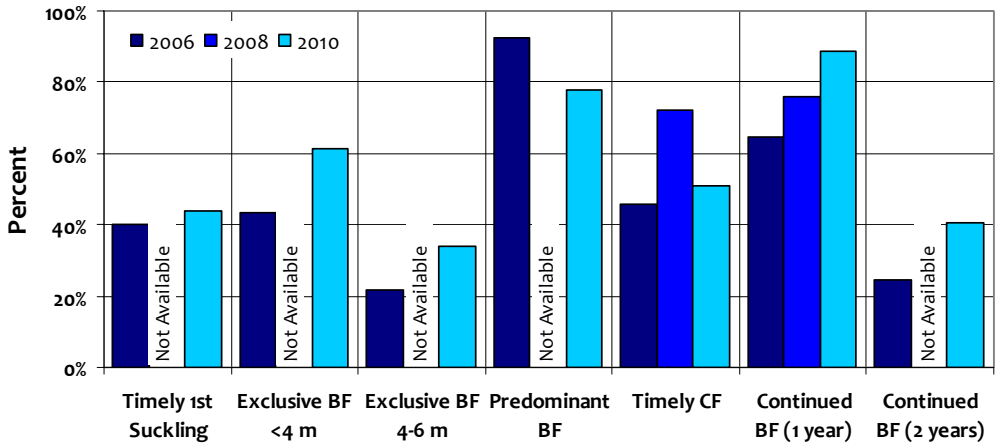


Table 5.3: Prevalence of recommended infant and young child feeding practices

	Age group assessed	2006	2008	2010
Timely first suckling	0-24 months	39.9%		44.1%
Exclusive Breastfeeding Rate <4 months	<4 months	43.3%		61.4%
Exclusive Breastfeeding Rate up to 6 months	4-6 months	21.7%		34.0%
Predominant breastfeeding rate	<6 months	92.6%		78.0%
Timely complementary feeding rate	6-9 months	45.6%	72.3%	50.8%
Continued breastfeeding rate (1 year)	12-15 months	64.4%	76.0%	88.7%
Continued breastfeeding rate (2 years)	20-23 months	24.7%		40.6%

While the full table of IYCF practice estimates is found in Table 5-6 in Annex 5, a summary of the findings are as follows:

Ever breastfed: Almost all young Liberian children breastfeed sometime before they turn two years old. The overall rate of 'ever breastfeeding' is 99.3%, with a very small range between the counties from 98.3-100.0%

Timely first suckling: 44.1 % of Liberian children initiate breastfeeding within one hour of birth, up from 39.9% in 2006, while 89.2% start suckling within their first 24 hours of life. This rate of suckling within the first 24 hours is generally high as most counties fall around 80-100 %.The range between the counties for first suckling within an hour of birth is vast – from 8.1%-73.5%, with Nimba having the best practices, followed by Grand Cape Mount (72.9%) and River Gee (60.5%); Grand Kru, Bong and Rural Montserrado all have less than 20% of children suckling within an hour of birth.

Currently breastfed: Just over three quarters of children two years and younger are currently breastfeeding, with a county range from 66.2-89.4%. Highest rates are in

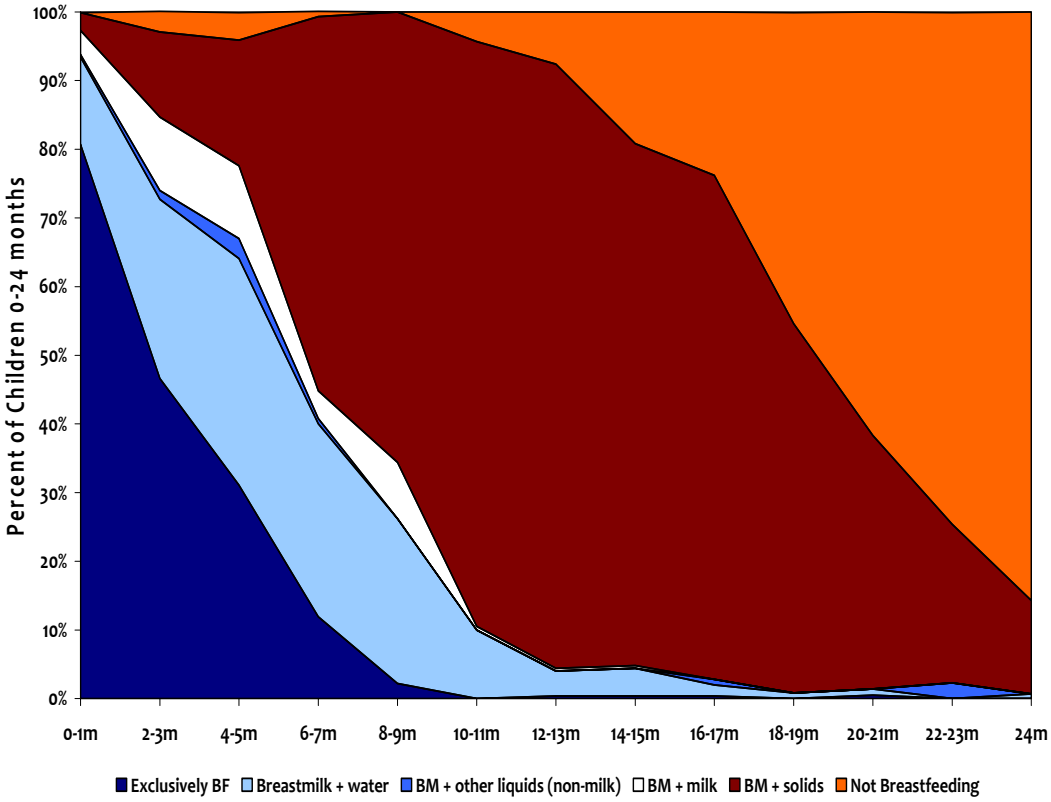
Sinoe, Grand Gedeh, Nimba, Gbarpolu and Margibi all with rates above 80%. Bomi is the only county with rates falling below 70%.

Duration of breastfeeding: On average, children in Liberia breastfeed for 12.4 months. The average breastfeeding duration ranges from 5.9-16.1 months between counties with Sinoe children breastfeeding for the shortest time (5.9 months), and Nimba and Rural Montserrado breastfeeding for the longest time, 15.6 and 16.1 months respectively.

Bottle feeding: Overall, one in eight children (12.4%) used a feeding bottle in the 24 hour period before the survey. At county level it ranged from 0.5-11.6% of children being bottle fed, with one remarkable exception – one third of Monrovia's children received a bottle the day before the survey. Margibi and Grand Cape Mount were among the highest usage of bottles, 11.6 % and 8.1% respectively. Grand Kru, River Gee and Grand Gedeh had exceptionally low rates of bottle feeding, all with 1% or less.

As demonstrated in Figure 5.6, many children are breastfed well into their second year of life, however, few are exclusively breastfed for the full first six months of life as recommended by UNICEF and more than 80% of children have been weaned before their 2nd birthday. A small percentage of children begin complementary feeding nearly from birth (2.6%) but almost one third begin too early, i.e. before six months of age. Conversely, many children initiate complementary feeding too late: just over half of six to seven month olds hadn't started eating complementary foods at the time of the survey, and 33% of eight to nine month olds also hadn't started. By 10-11 months old, just over 85% of children have started eating complementary foods; however, this is too late for the child's nutritional needs and likely impacts on their health and development.

Figure 5.6: Breastfeeding and complementary feeding practices by age



5.4 Health and Environment

Both malnutrition and child illness are adverse outcomes of a wide range of factors, specifically of poor living conditions (i.e. unhealthy environment and poor health services), inadequate care, and food insecurity. The two outcomes are interlinked with each one exacerbating the other i.e. sick children are more likely to get malnourished and malnourished children are more likely to get sick. Children who are malnourished are more likely to die when they fall sick – with malnutrition reported as one of the single biggest contributors to child mortality[19].

5.4.1 Access to safe drinking water and adequate sanitation

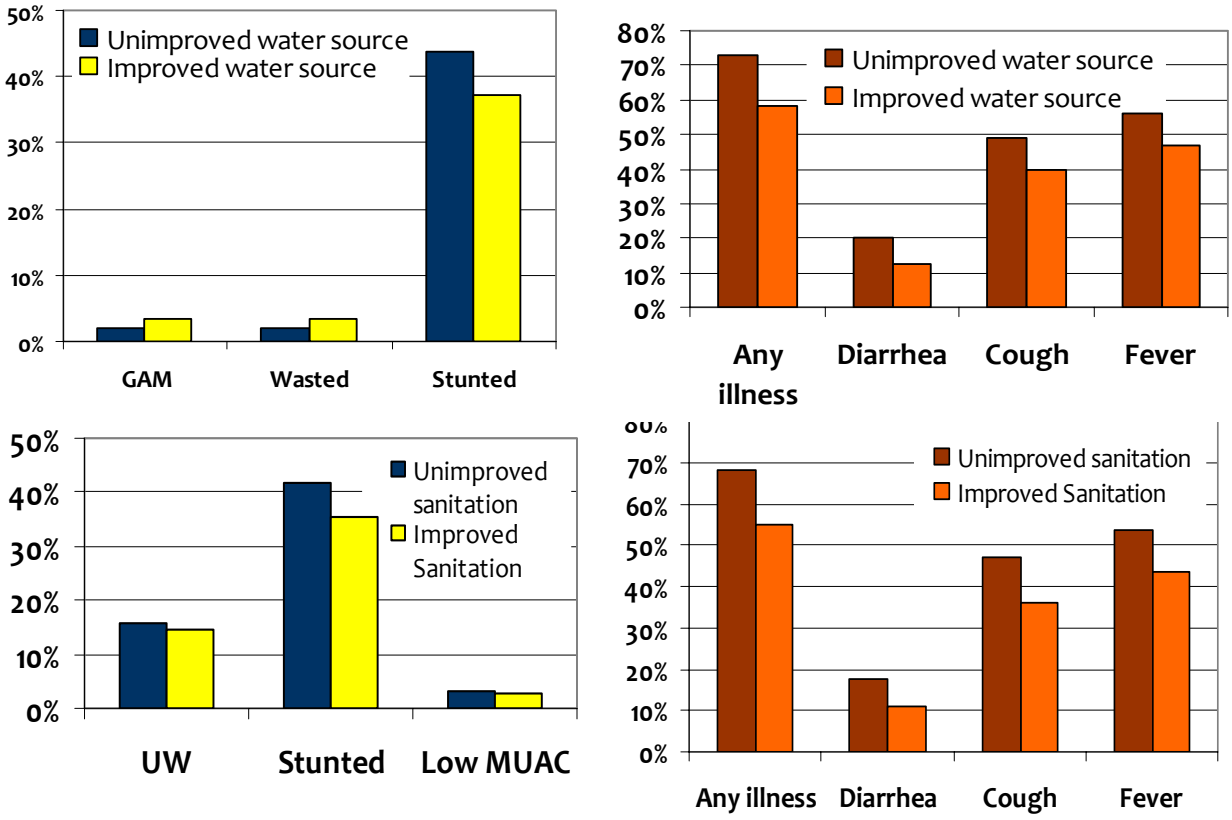
Poor sanitation and lack of clean water have been found to correlate highly with child malnutrition (CFSNS 2006). At national level only 58.5% and 37% have access to improved water and sanitation facilities[20] respectively, which is an improvement on 2006 when access to improved water and sanitation facilities was reported at 34% and 24% respectively. There are also major disparities between rural and urban Liberia in terms of access to these facilities. In rural Liberia, only 40% of the households have access to improved water sources compared to 84% in urban

[19] Lancet Series: Maternal Child Undernutrition
[20] Using the WHO/UNICEF definition of improved water and sanitation facilities

Liberia. Access to improved sanitation is no better either as only 19% of the rural households have access to improved sanitation—with the overwhelming majority (74%) of households defecating in the open. In urban Liberia, 62% report usage of improved sanitation, which is very low for an urban set up.

Drinking water facilities relate to child stuntedness and illness: fewer children with improved water sources are stunted or sick. The same goes for improved sanitation: children with improved sanitation facilities are significantly less stunted than those without and have less illness for all four indicators (See Figure 5.7).

Figure 5.7: Child malnutrition and illness by improved water source and sanitation



5.4.2 Access to health services

It is commonly known that child health and nutrition are interlinked, whereby sick children are more likely to become malnourished and vice versa. In the survey, sick children, whether with diarrhea, cough, fever or any combination of the three (any illness), had statistically higher levels of malnutrition. With the aggravating relationship, all later analyses will look not only at the relationship between malnutrition and various household and family characteristics, but also at their relationships with child illness.

Mothers/caretakers were asked about illness amongst their under five year old children in the two weeks preceding the survey. Overall, morbidity was high – half

the children had fever within that time frame and 43% complained of cough, taken as an indicator of Acute Respiratory Infection (ARI).

Far fewer children, 15.2%, had diarrhea during the recall period (see Table 5.4). Only 28% of children in the survey had no illness in the two weeks preceding the interview. Counties with the highest prevalence of child illness were Rural Montserrado, Nimba, Gbarpolu, Grand Gedeh and Grand Kru, all with more than 80% of children suffering from at least one illness during the recall period. Monrovia and Lofa demonstrated lower levels of child morbidity, with Bomi having the fewest children with diarrhea. Sick children, whether with diarrhea, cough, fever or any combination of the three (any illness), had statistically higher levels of malnutrition as shown in Figure 5.8.

Figure 5.8: Malnutrition by child illness

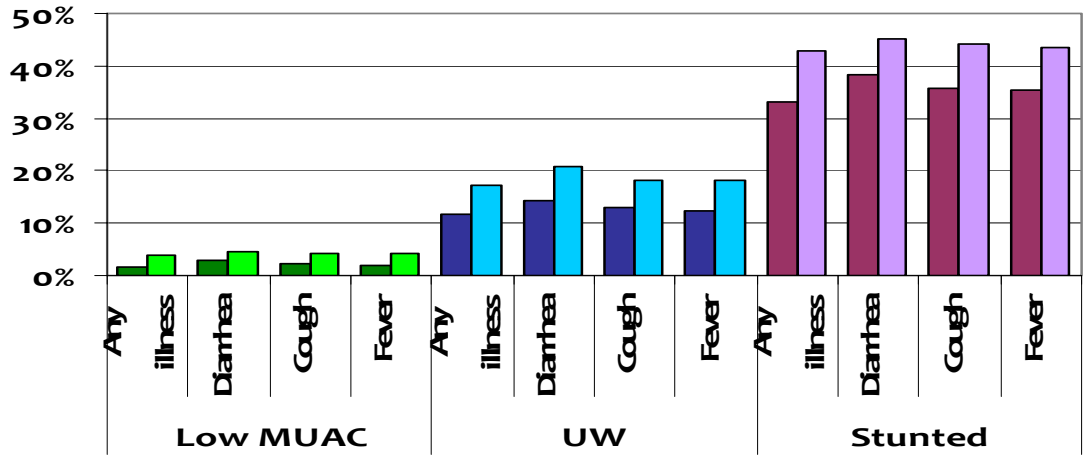


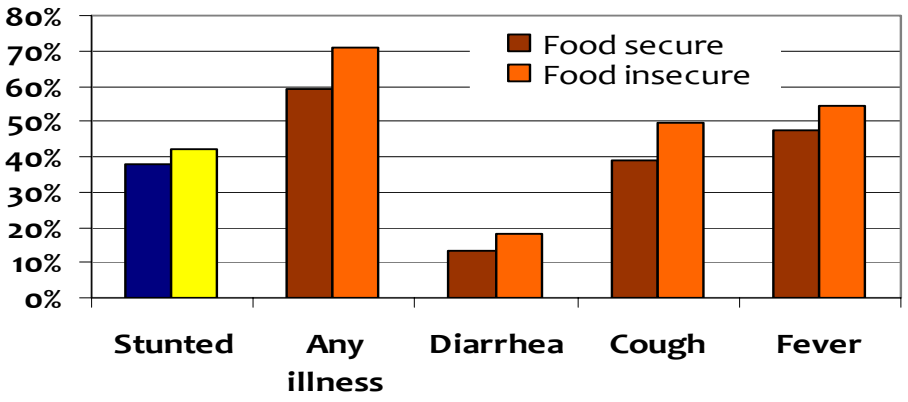
Table 5.4: Child morbidity by county

	Any illness	Diarrhea	Cough	Fever
BOMI	58.1%	7.7%	47.8%	47.5%
BONG	79.9%	31.4%	55.5%	58.0%
GBARPOLU	82.3%	18.9%	57.8%	61.1%
GRAND BASSA	74.9%	16.1%	50.3%	60.7%
GRAND CAPE MOUNT	71.1%	11.8%	53.8%	59.7%
GRAND GEDEH	81.5%	26.6%	62.2%	68.9%
GRAND KRU	81.0%	27.2%	48.4%	52.7%
LOFA	54.4%	3.2%	34.1%	45.9%
MARGIBI	68.8%	12.9%	43.6%	49.3%
MARYLAND	64.3%	10.1%	53.3%	52.5%
MONROVIA	36.3%	1.8%	26.9%	29.9%
NIMBA	84.0%	33.1%	52.1%	70.8%
RIVER GEE	75.8%	20.1%	51.3%	63.8%
RIVERCESS	76.5%	23.8%	42.1%	51.8%
RURAL MONTSERRADO	86.7%	24.9%	50.1%	55.2%
SINOE	67.9%	15.7%	45.7%	52.0%
LIBERIA	**63.5%**	**15.2%**	**43.2%**	**50.1%**

5.5 Linking food insecurity and child malnutrition

Stunted children are likely to develop into stunted adults whose productivity is also likely to be sub-optimal. This in effect perpetuates or even leads to food insecurity. In the same vein, food insecure households have higher chances of not meeting the requirements for adequate nutrition (food, health and care), implying that their children are likely to be malnourished. The inter-play of food insecurity, low education levels, malnutrition and child illnesses complicates the situation and worsens the overall condition of a household. This section examines the relationship between the nutritional status of children and food consumption as captured by the food consumption score.

Figure 5.9: Child malnutrition and illness by household food security



KEY FINDINGS

- Food secure households indicate significantly lower levels of both chronic malnutrition and illness amongst children, as shown in Figure 5.9.
- Fewer children in female-headed households are malnourished than in male households.
- Fewer children suffer coughs in households headed by women. These phenomena could be explained by different spending priorities based on who is in charge of the household or by different care practices for young children when a husband is not around.
- Children in families with high dependency ratios have a statistically significantly higher prevalence of diarrhea and general sickness than children in low dependency ratio families.
- The more households spend the less likelihood that the children are malnourished (underweight, stunted, low MUAC) or ill. The higher the expenditure quintile, the lower the levels of stunting and the common child illnesses.
- House ownership is linked to higher child stuntedness and illness, but lower acute malnutrition. This may be explained by the fact that more homes are

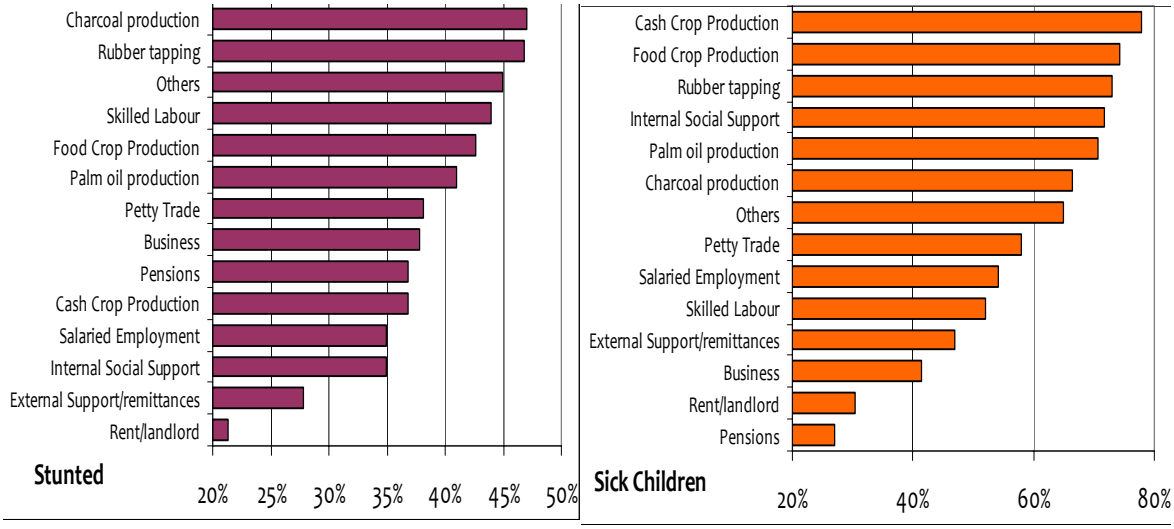
owned by rural residents, whose economies are more compromised than those of urban households, as this report indicates.

- Children living in houses of durable materials have lower levels of stuntedness and illness but higher levels of acute malnutrition.

5.5.1 Linking household livelihoods with child nutrition and sickness

Chronic malnutrition and illness amongst children shows a similar pattern to that witnessed for food security (Section 4). The highest levels of stunting are seen in the children of the skilled daily labourers and subsistence farmers, including charcoal production, rubber tapping, all with prevalence of stuntedness of 44% or more. Stuntedness is lowest in the rent/landlord, internal and external support, and salaried employment groups, with 35% stuntedness or less as shown in Figure 5.10. Surprising is the higher stunting among childen of skilled workers. Child illness is also commonest amongst households dependent on producing food crops, cash crops, palm oil, rubber tapping or receiving internal social support, all with greater than 70% of their children sick during the two weeks before the survey. Livelihood groups with relatively lower incidences of child sicknesses are: those depending on pensions, rent/landlord income, business and external support receivers, all with sickness at levels of less than 50%. Interestingly, children within charcoal production households have among the highest levels of cough, a proxy indicator for ARI, demonstrating that the living conditions for these families is likely to be inappropriate for optimal health.

Figure 5.10: Livelihoods and child health

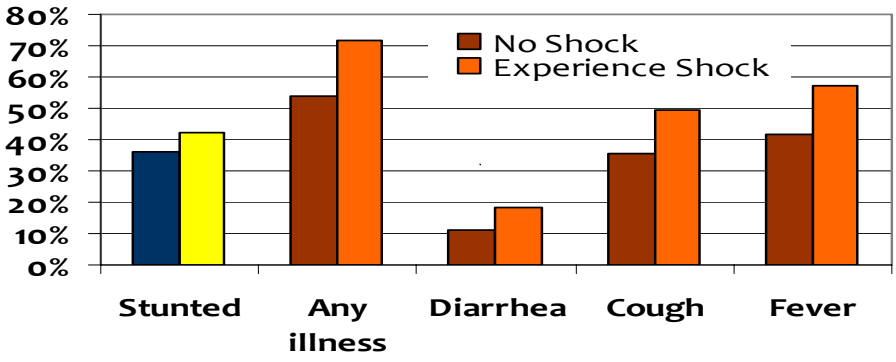


Other indicators that are closely linked to food (in)security such as shocks at household level and coping stategies are also linked to child nutrition reinforcing the intricate linkage between the two as shown in Figure 5.11 and Figure 2 in Annex 5 respectively for shocks and coping stategies. Households that experienced a shock

during the six months prior to the survey demonstrated higher levels of both chronic malnutrition and child illness than families that did not experience a similar shock. These relationships were very strong, showing that families do not have the safety nets they need in order to get through shocks without negatively impacting upon their child's health and nutrition.

Families that reported borrowing food within the week before the survey had significantly higher levels of acute malnutrition by GAM, wasting and low MUAC and child illness than families that did not borrow food. Consumption of wild foods when there is food shortage in the household is also associated with increased incidence of diarrhoea—which could signal that some of those foods are not hygienically optimal food for child intake.

Figure 5.11: Household Shock and child health



6. Towards ensuring food and nutrition security in Liberia: Recommended actions

The major underlying reasons for high prevalence of food and nutrition insecurity in Liberia are widespread poverty and high levels of unemployment. Low agricultural productivity, limited infrastructure and high food prices exacerbate the situation.

Since Liberia has an agricultural economy it makes sense to approach the food security challenge via the agricultural sector. The Comprehensive Africa Agriculture Development Program (CAADP) rightly proposes budget increases to address the key agricultural sector constraints, which include high pre and post harvest losses, lack of processing and storage facilities, limited use of improved seeds and access to markets.

Strategy 1: Specific interventions to boost the agricultural sector.

Recommendations include:

- Improving local production of food and cash crops, especially rubber, cocoa and palm oil, and introduce swamp rice farming.
- Strengthening both food and market-based approaches including capacity building on storage, processing and general market analysis in addition to offer markets for local produce through the Purchase for Progress (P4P) initiative.
- Initiating value addition programmes in the agricultural production chain such as improving processing and even food fortification to make local produce more nutritious.
- Improve post-harvest management/storage/preservation of produce.
- Improve agricultural extension services across the country
- Establishing a conducive environment that encourages private sector involvement in the rural economy—specifically encouraging financial institutions to provide loans and credits to farming households.

Strategy 2: Since poverty is widespread, implementation of social protection programmes need to be considered. These include:

- Targeted public works programmes.
- Generating employment opportunities for the poor through public works.
- Improving road infrastructure and market access.

- Seasonal income support activities specifically targeting the south eastern part of the country.

Strategy 3: A long term strategy towards the eradication of poverty and food insecurity in Liberia must focus on improving primary and secondary education as well as providing vocational training opportunities. This should include programmes such as:

- Skills development of young people.
- Encourage enrolment in primary education, with particular focus on girls.
- Re-invigorate adult literacy classes.
- Continuing with the provision of free school meals and extent the school feeding campaign to the most food insecure counties.

Strategy 4: Address the malnutrition situation in the country. The following programmes and interventions are recommended:

- Implement programmes to prevent acute and chronic malnutrition, especially for pregnant and lactating women and children up to 2 years old. Such programmes include the Essential Nutrition Actions (ENA), supplementary feeding programmes, pre-service and in-service training for teachers, health staff, gCHVs, TTMs and others.
- Integrate the management of acute malnutrition into the health system nationwide (including its prevention, detection and treatment) in order to reduce child morbidity and mortality and accelerate progress towards MDG 4.
- Strengthen and encourage activities to promote child health and prevent child illness, particularly by increasing access to health services at both facility and community level for children and their families.
- Media campaign on healthy eating to address overweight issues in urban areas.
- Promotion of exclusive breastfeeding, complementary feeding and breastfeeding up to 24 months.
- Promotion of adequate iron and vitamin A intake.
- Support with feeding the sick and malnourished child and maternal nutrition.
- Increase access to improved water and sanitation facilities for families, coupled with hygiene promotion.

Strategy 5: Strengthening institutional capacity of the national government in management of food security and nutrition programmes. The following are recommended:

- A proper programme monitoring and evaluation system needs to be established to monitor delivery and impact.

- The food and nutrition monitoring system requires further strengthening and the role of the Food Security and Nutrition unit in coordinating food security initiatives supported.
- The FSN coordination unit should ensure the inclusion of the above recommendations in sectoral plans and strategies e.g. In the upcoming 10 -year National Health Plan and the Basic Package for Health Services.
- The coordination unit should ensure the promotion of food and nutrition security as a cross-cutting agenda including mainstreaming of technical input in issues related to poverty reduction, safety nets, economic development etc.

Appendices

Annex 1: Objective, methodology and limitations

Survey Objectives

The primary aim of the Comprehensive Food Security and Nutrition Survey (CFSNS) is to assess the level of household food insecurity, to identify geographic areas and socio-economic groups that are food insecure and to identify causes of food insecurity and malnutrition. Importantly, this survey aimed at providing county level information that can be utilized for decision-making purposes by the Government, the development and humanitarian community to enhance food security and livelihoods in Liberia. In comparison, the 2008 Comprehensive Food Security and Nutrition Survey was only representative at regional level, thus limited in its usage for programming purposes.

Specifically, the objectives of the 2010 CFSNS are as follows:

- Assess levels of household food insecurity and to identify geographic areas and socio-economic groups (demographics, rural livelihood patterns) that are food insecure;
    - Who are the food insecure?
    - How many are they?
    - Where do they live?
    - Why are they food insecure?
    - How can external assistance (food assistance, agricultural interventions, nutritional interventions, WATSAN and others make a difference?)
- Identify rural and semi-urban livelihood patterns and assess the vulnerability levels of livelihood groups;
- Estimate acute and chronic malnutrition rates among children below 5 and women of reproductive age, and to identify underlying causes;
- Assess agricultural constraints, and analyse how crop production, livestock and fisheries can improve the situation;
- Identify key-indicators that could be measured through a Food Security Monitoring System**.**

Definition of Terms, Food Security and Nutrition Conceptual Framework

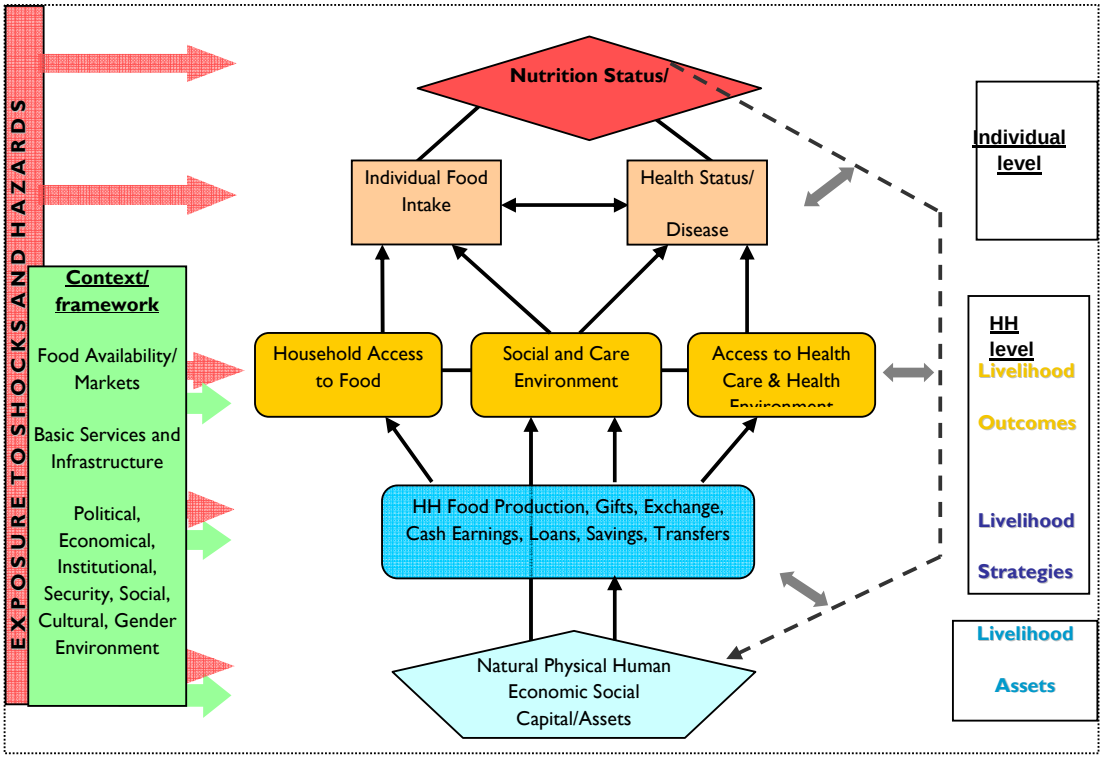
Food security: According to the 1996 World Food Summit, food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.

Food availability: All physical supplies of food in a given area from domestic production, commercial imports, food aid, and national stocks;

Household Food Access: It refers to the provision for all members of the household of sufficient food supplies through home production, through market purchases, or through transfers from other sources,

Utilization: This refers to consumption, transformation and absorption of accessed food supplies to meet the specific dietary and health needs of all individuals within the household.

ANNEX FIGURE 1-1: CONCEPTUAL FRAMEWORK FOR UNDERSTANDING FOOD AND NUTRITION SECURITY IN LIBERIA



Vulnerability: It refers to the probability of decline in food access, or consumption, often in reference to some critical value that defines minimum levels of human well being. In the context of the survey, vulnerable households are those households who are not experiencing significant problems to access and consume sufficient food at the time of the analysis, but who are likely to be brought into a situation of insufficient access to food because of a shock affecting livelihoods. Vulnerability is a result of the households' means of sustenance (including their capacity to cope) and of the exposure to risk factors—such as flooding, extreme price fluctuations, pest and animal attacks etc. To assess vulnerability, one has also to consider the risk to which the household is exposed.

In 2008, Liberia formally adopted a conceptual framework (Annex Figure 1-1) for understanding the food security and nutrition situation in Liberia. This framework was used in the development of the Food Security and Nutrition Strategy (MOA 2008) and for subsequent food security and nutrition monitoring in the country. It is the same framework used in the formulation of this current survey. The Food and Nutrition Security Conceptual Framework considers malnutrition and mortality to be the final outcome or the manifestation of insufficient food intake and/or disease at the individual level. These two immediate determinants of malnutrition and mortality are in turn determined by the household's ability to access food, the care practices used, and the wider health and hygiene environment in which the household lives.

The conceptual framework recognizes that a household's food security situation is subject to change and fluctuates over time. This can be either in response to specific shocks —whether naturally occurring or caused by human intervention— or as a result of seasonal trends during the year, reflecting the agricultural cycle of the lean season and times of plenty. To take into account the dynamic nature of food security, the CFSNS analyses households' vulnerability to future shocks and problems and determines their capacities to withstand them. Capacities to withstand shocks such as floods, high food prices and droughts depend on many factors, including a solid asset base, the ease with which households are able to alternate between and rely on the incomes from different livelihoods, the health and physical strength of individual household members, and the political environment. By assessing future risks and their potential detrimental impact on household food security, the level of vulnerability of households and individuals is determined.

Stakeholders and Implementation Process

The CFSNS was implemented between May and October 2010. The survey was preceded by an extensive review of secondary data including previous food security and nutrition surveys in the country. This secondary data review provided a preliminary overview of the food security situation in the country. This CFSNS aims to update the food security information in order to assess the progress in food security and nutrition interventions.

During the course of the implementation of the survey, regular meetings with main stakeholders were conducted. Consultations with key stakeholders started in January 2010. An all-inclusive stakeholder discussion was held in April 2010. Since standard household and community questionnaires were developed jointly for the previous CFSNS, these were used as the basis for further refinement. Field-testing took place prior to the training of enumerators in May 2010. During the training a second round of pre-testing of the questionnaire was done. Sixty participants from ministries; NGOs (Local and International) and universities were trained out of which 48 were selected to participate in the data collection. Eight teams were established — comprising a team leader, two food security enumerators, two nutritional/anthropometric enumerators, and a supervisor. Overall supervision and coordination of the primary data collection was undertaken by LISGIS with technical support from FAO, UNICEF and WFP. The primary data were collected from 24 May to 4 August. This was followed by data entry and data analysis in August and September 2010. The dissemination of preliminary findings was held on 2nd September 2010.

Under the overall leadership of the Government of Liberia, through the Ministries of Agriculture (MOA), Health and Social Welfare (MOHSW) and Liberia Institute of Statistics and Geo Information Services (LISGIS), many food security and nutrition partners were involved. These partners included FAO, UNICEF, UNMIL, WFP, WHO, ACF, CRS, Merlin, PHC and Save the Children-UK. Both UNICEF and WP particularly provided a leading role in providing technical leadership for the nutrition and food security components of the survey respectively. Annex Table 1-1 summarises the participation of different players in the various components of the survey while Table 7 in Annex 5 summarises team composition during the field phase

Annex Table 1-1: The CFSNS implementation process 2010

Activity	***Agency***
Overall coordination	MOA-FSN-Secretariat, MOHSW in collaboration with WFP
Technical coordination	WFP and UNICEF in collaboration with MOA, LISGIS, MOHSW & FAO
Instrument design	All stakeholders
Sampling design	LISGIS, WFP
Provision of survey staff	LISGIS, MOA, MOHSW, ACF, Africare, CRS, Merlin, SC-UK,
Training of data collection	MOA, MOHSW, LISGIS, FAO, UNICEF, WFP, ACF
Logistical support	LISGIS, MOA,MOHSW, FAO, UNHCR, UNICEF, UNMIL, WFP, WHO, ACF, CRS,
Data collection supervision	GOL, FAO, UNICEF, WFP, ACF, SC-UK
Data entry	WFP, LISGIS
Data analysis	UNICEF, WFP, LISGIS, MOA and MOHWS in collaboration with stakeholders
Mapping	LISGIS, WFP
Dissemination	MOA (FSN Secretariat) & line ministries
Financial Contribution	UNICEF (ECHO), WFP (EC), WHO, ACF and PHC

Survey Instruments

The CFSNS collected quantitative information at the household and individual level, and completed it with qualitative information collected at community level. The household level questionnaire included modules on demographics and education, household status, labour migration, housing and facilities, agriculture, income and access to credit, household expenditures, food sources and consumption,

shocks and coping strategies, external assistance, maternal and child health, nutritional status and child feeding practices. Additional information was collected through key informant interviews at community level which included information on terrain, natural/community assets, demographics, infrastructure and services, availability of external assistance, and major constraints to well-being of the inhabitants. All survey instruments were developed in English. The questionnaires were reviewed during training and translated into Liberian English. Surveyors were assigned to areas depending on dialects understood and spoken.

Scope and Sampling Procedure

The focus of the survey was to compare food security and nutrition indicators across counties. As such each county was treated as a separate stratum. However, in the case of Montserrado County, Greater Monrovia and Rural Montserrado were treated as separate strata, making the total number of strata 16.

First the minimum sample size for each stratum was calculated based on the nutrition indicators—which are more sensitive and tend to need a higher sample size. From the calculation, the minimum sample size was determined at 480 households per county. Taking into account non-responses, it was decided that the minimum sample size was 500 households per stratum.

Sample size calculation for the survey

n = D [(Zα + Zβ)2 * (P1 (1 - P1) + P2 (1 - P2)) /(P2 - P1)2]

n = required minimum sample size per survey round or comparison group

D = design effect (assumed in the following equations to be the default value of 2 -

P1 = the estimated level of an indicator measured as a proportion at the time of the first survey or for the control area

P2 = the expected level of the indicator either at some future date or for the project area

such that the quantity (P2 - P1) is the size of the magnitude of change it is desired to be able to detect

Zα = the Z-score corresponding to the degree of confidence with which it is desired to be

able to conclude that an observed change of size (P2 - P1) would not have occurred

by chance (α - the level of statistical significance), and

Zβ = the z-score corresponding to the degree of confidence with which it is desired to be

certain of detecting

	County-level
D	2
Za	1.645
Zb	0.84
P1	0.090
P2	0.040
Children	594
HH	457
Non-response (5%)	23
Total required no. of HHs	480
Rounded-up sample size	**500**

The survey utilized the sampling frame constructed by LISGIS for the 2008 Liberia census. A two-stage cluster sampling approach was used as follows:

- Stage 1: Thirty enumeration areas (EAs) at the county level were randomly selected, using probability proportional to size, in order to ensure that each household in the population, whether from a small or large village, has an equal probability of being selected;
- Stage 2: Twenty households within each EA were randomly selected.

Due to inaccessibility challenges experienced in previous survey, five additional EAs were randomly selected in each county to serve as alternatives. Alternative EAs were only used when the originally selected ones were completely inaccessible and all possible avenues to reach them were exhausted. The final survey made use of only four alternative EAs. However, an additional 11 alternative EAs were also included due to mix up of EA codes from LISGIS. This accounted for 8% of the total EAs surveyed.

The primary data collection took place between 24 May and 2 August 2010. In total 400 randomly selected rural and urban EAs were visited in which twenty households were randomly sampled for

interviews. A total of 8,002 households were interviewed. Anthropometric measurements were taken of 7,586 (of whom 6,800 were aged 6-59 months) children under 5 years of age and mothers between 15 and 49 years of age

Data Entry and Statistical Analysis

An ACCESS data mask supported by data quality check and control was created for data entry. Data entry was supervised by LISGIS, UNICEF and WFP. Data cleaning and analysis was carried out by the Liberia WFP VAM and UNICEF Nutrition units using SPSS 11.5, ADATTI, Nutrisurvey, and SMART software in collaboration with LISGIS, MOA, MOHWS and partners.

Tests of statistical significance for proportions were done using a chi-square test. A *p*-value <0.05 was considered to be statistically significant. Results are reported both at regional and national level. To obtain results at national level, a weighting system[21] was applied to reflect the population size of each region (see Annex Table 1-2 in this annex).

Annex Table 1-2: Weights for estimating national averages

	total number of HHs	sampled HHs	This County's % of the population in all the counties in the sampling frame	If we have a total sample of, then a proportional sample size would be….	County weights for HH data	County Weights for Children 6-59 months	County Weights for Women	County Weights for Children 0-24 months
Bomi	84,119	500	2%	193.6	0.39	0.472	0.475	0.488
Bong	333,481	500	10%	767.4	1.53	1.342	1.590	1.344
Gbarpolu	83,388	500	2%	191.9	0.38	0.411	0.457	0.394
Grand Bassa	221,693	500	6%	510.1	1.02	1.017	1.163	1.041
Cape Mount	127,076	500	4%	292.4	0.58	0.469	0.607	0.512
Grand Gedeh	125,258	500	4%	288.2	0.58	0.530	0.660	0.554
Grand Kru	57,913	500	2%	133.3	0.27	0.242	0.337	0.223
Lofa	276,863	500	8%	637.1	1.27	1.070	1.232	1.092
Margibi	209,923	500	6%	483.1	0.97	1.024	1.051	1.210
Maryland	135,938	500	4%	312.8	0.63	0.674	0.613	0.595
Montserrado	147,417	500	4%	339.2	0.68	5.168	3.576	4.941
Nimba	462,026	500	13%	1063.2	2.13	1.957	2.148	1.896
Rivercess	71,509	500	2%	164.5	0.33	0.294	0.362	0.290
Rivergee	66,789	500	2%	153.7	0.31	0.285	0.405	0.288
Sinoe	102,391	500	3%	235.6	0.47	0.651	0.789	0.767
G/Monrovia	970,824	500	28%	2234.0	4.47	0.393	0.535	0.363
TOTAL	3,476,608	8000	100%	8000				

The analysis included descriptive analysis and multivariate techniques such as principal component analysis, cluster analysis and regression analysis.

[21] The weighting variables were constructed using 2008 Liberia Nation Population Census data along with population growth estimates to determine the predicted population size (in terms of households) per county/stratum and by urban/rural classification. The weight variables were calculated by first determining the proportion of the total population in each county/stratum and urban/rural classification. This proportion was then multiplied by the total number of households sampled to determine the standardization factor. The standardization factor was then divided by the number of units sampled per county/stratum to determine the weight factor.

Weights were applied during the analysis of data relating to households, children and women. The weighting variables were constructed using 2008 census data (in terms of households, women and children) per county and by urban/rural classification. The weight variable was calculated by first determining the proportion of the total population in each county and urban/rural classification. This proportion was then multiplied by the total number of units (households, women, children) sampled to determine the standardization factor. The standardization factor was then divided by the number of units sampled per county to yield the weight factor used in the analysis of household, child and women indicators as shown in Table 2.

Survey Limitations, Challenges and Lessons Learnt

There are several constraints and limitations that should be considered when interpreting and utilizing the results of this survey. First and perhaps the most important limitation relates to seasonality.

The primary data for this particular survey was collected between May and August. This is a period traditionally identified with hunger. It is arguably the most difficult period when most of the infrastructural systems especially roads nearly collapse. The previous surveys in 2006 and 2008 (except the Greater Monrovia survey that was conducted in August 2007) were conducted either at the end of harvest season or at the late beginning of rainy seasons. At the time of this particular survey, rainfall was at its peak (usually July-September) and most roads had been rendered inaccessible. Furthermore, most rural households had exhausted all stocks from previous harvests.

Specifically, the 2008 survey was conducted in November/December, a period identified with the main harvest in most parts of Liberia. The November/December also marks the early stages of the dry season—meaning better accessibility to even some of the poorest road networks in the county. Thus, movement of food from surplus to deficit areas is usually easier.

The 2006 survey was conducted at the end of the dry season (March/April). At this period, households begin to exhaust stocks from the previous harvests. This is the onset of the hunger season in the southeastern parts of the country although not for the rest of Liberia that usually witnesses onset of hunger in May/June. In summary, this particular survey was conducted during the lean season but due to seasonality the timing complicates the comparison of findings with other surveys. This caveat needs to be kept in mind whenever a comparison is made.

A second limitation relates to the non-inclusion of some key agricultural production questions in anticipation that the findings of the annual crop assessment conducted in 2009/10 would be available for incorporation. However, up to the development of this report, the findings of the crop assessment had not been made available. This makes some key questions that could be used in the recommendation of agricultural interventions inadequate.

There was a challenge related to the difficulty in completing the field work. In some cases, teams had to sleep in the middle of forests for days due to breakages in the means of transport or swelling of the river banks. Team members got fatigued and disturbed which could easily have influenced quality. However, the rigorous supervision mechanisms and quality control measures throughout the data collection exercise helped to arrest most of this challenge.

Lastly, the survey tools were designed to collect data on when hunger season begins and ends. This provides data at two points in a year that does not allow the month to month analysis to bring out the

seasonality in a more succinct manner. This provides a lesson for future assessments that should design the tools in a way to capture all data required for seasonal analysis.

Annex 2: The food consumption score as a Proxy Indicator of Food Security

Food consumption, according to WFP's standard methodology, is defined by the diversity of the diet and the frequency with which staple and non-staple foods are consumed. Food consumption measures the main immediate result of food security: dietary intake. The frequency of food consumption and diet diversity and are considered to be reliable proxy indicators of the access dimension of food security and nutrition intake. Research has demonstrated that diet diversity is highly correlated with caloric and protein adequacy, percentage of protein from animal sources (high quality protein) and household income[22].

ANNEX TABLE 2-1: WEIGHTS FOR COMPUTATION OF FCS

Food groups	Weight	Justification
Main staples	2	Energy dense, protein content lower and poorer quality (PER less) than legumes, micro-nutrients (bound by phytates).
Pulses	3	Energy dense, high amounts of protein but of lower quality (PER less) than meats, micro-nutrients (inhibited by phytates), low fat.
Vegetables	1	Low energy, low protein, no fat, micro-nutrients
Fruit	1	Low energy, low protein, no fat, micro-nutrients
Meat and fish	4	Highest quality protein, easily absorbable micro-nutrients (no phytates), energy dense, fat. Even when consumed in small quantities, improvements to the quality of diet are large.
Milk	4	Highest quality protein, micro-nutrients, vitamin A, energy. However, milk could be consumed only in very small amounts and should then be treated as condiment and therefore re-classification in such cases is needed.
Sugar	0.5	Empty calories. Usually consumed in small quantities.
Oil	0.5	Energy dense but usually no other micro-nutrients. Usually consumed in small quantities

The food consumption is a reflection of food availability and food access at the household level and is used as a proxy indicator of the current food security situation.

The dietary diversity is measured by the number of days in a week a particular food item is being consumed by the household. The survey included 24 different food items, reflecting eight standard food groups of main staples, including cereals, tubers and roots; legumes and nuts; meat, fish, poultry and eggs; vegetables (including green leaves); fruits; oils and fats; milk and dairy products; and sugar and sweets. In addition, the food group, condiments, which has little nutritional value and is mainly used for giving tastes to foods, such as spices and sauces was also considered. In Liberia, meats and fish were sometimes categorized as a condiment, depending on the size and whether it was used as an additive to the cooking process to provide taste.

The Food Consumption Scores (FCS) was computed by grouping together the food items into food groups by adding the frequency of consumption of each item within a food group, up to a maximum of seven days. A weight was assigned to each food group, representing the nutritional importance of that group as detailed in the WFP CFSVA Guidelines 2009. These weights are presented in Annex Table 2-1. The weight of each food group is multiplied by the number of days each food group was consumed over the seven days preceding the survey to calculate the FCS for each household.

[22] WFP (2006), Food Consumption Analysis: Calculation and use of the Food Consumption Score in Food Security Analysis.

Food consumption groups are created on the basis of similar household food consumption characteristics and patterns. The standard food consumption groups are poor, borderline and acceptable. For the grouping, food consumption scores (FCS) were computed to distinguish among those different consumption groups. The underlying idea is that when food consumption is insufficient, the household is food insecure. When it is acceptable, the household is food secure. When it is just less than acceptable (or one is really insufficient where the other is acceptable), the household is moderately food insecure.

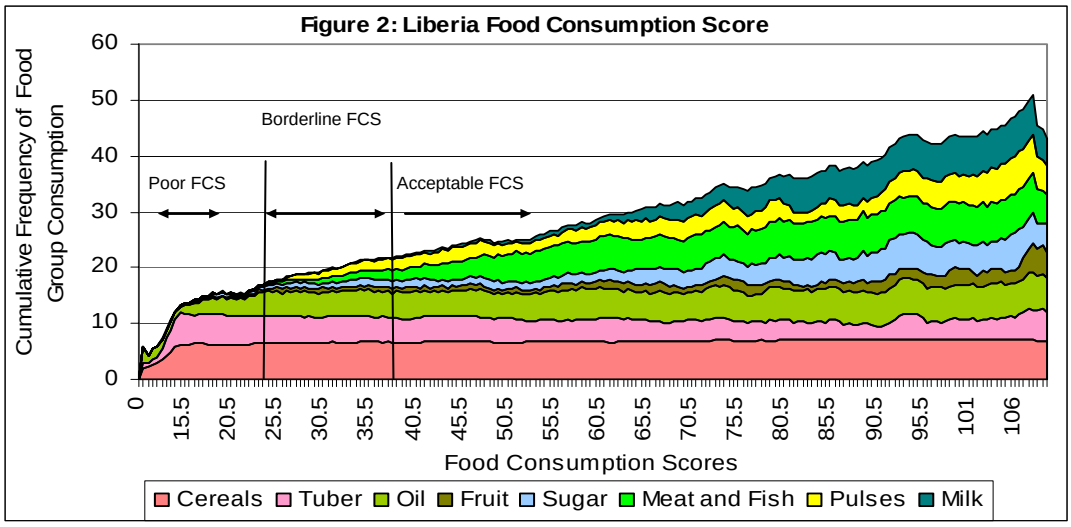
ANNEX TABLE 2-2: FCS STANDARDS FOR LIBERIA

FCS standard thresholds	New standard for Liberia	Profiles
0-21	0- 24	Poor food consumption
21.5-35	24.5-38	Borderline food consumption
>35.5	38.5 and above	Acceptable food consumption

Once the FCS was computed, thresholds were established: guided by those created in 2008 to ensure comparability of data but also taking into account that high consumption of oil and/or sugar usually tends to "artificially" increase the FCS. In Liberia, where consumption of oil is relatively high (usually palm oil), it is recommended to increase the standard thresholds. This was done in 2008, thus instead of using the standard thresholds (21 and 35), Liberian threshold were modified as presented in Annex Table 2-2.

The thresholds were validated by further analysis. Annex Figure 2-1 confirms that below a food consumption of 24, the consumption largely consists only of staples—cereals and tubers eaten on a daily basis complemented by oil and fats. Meats and fish as well as milk products are hardly consumed by households whose FCS is below 24. Between a food consumption score of 24 to 38, households begin to consume meat and fish as well as pulses in small amount. Milk is still rarely consumed at this stage. With a FCS over 38, households start consuming a range of food items from all eight food groups.

Annex figure 2-1: Food consumption score



Thus, a household recording a food consumption score of less than 24 is classified as having poor food consumption. They can be considered severely food insecure. Those recording food consumption scores between 24.5 and 38 have borderline food consumption and can be considered moderately

food insecure. Those households with a FCS more than 38 are regarded as having acceptable food consumption and can therefore be considered food secure.

Computation of the Food Consumption Score

Measurement of food security status is a complex process due to its multi-faceted nature. Thus, no one single indicator is usually considered conclusive when measuring it. Following rigorous studies undertaken jointly between WFP and other organizations, WFP has used food consumption scores (FCS) in most of its comprehensive food security surveys as the preferred food consumption indicator.

The value of FCS as a food consumption indicator lies in its ability to reflect the quantity and/or quality of people's diets, so it represents the dietary diversity and energy, and the macro and micro (content) value of the food people eat. It is based on:

- Dietary diversity (the number of food groups consumed by a household over a reference period)
- Food frequency (the number of times, usually in days, a particular food group is consumed)
- The relative nutritional importance of different food groups.

However, it cannot be considered as a replacement for detailed food consumption studies because it does not provide an indication of the quantity of food items consumed and neither does it give information on intra-household dynamics in food consumption. But FCS correlates well with other food security and vulnerability indicators such as wealth status, expenditure patterns, coping strategy indices and even the share of food in overall expenditures.

Previous food security surveys in Liberia have used FCS as the main indicator for determining food security status at household level. Results have been validated with other proxy indicators which confirm that this is an acceptable means of reflecting food security within the country.

How to calculate FCS

Households are asked to recall the foods they consumed in the seven days preceding the survey. Each food item is given a score of 0 to seven, depending on the number of days during which it was consumed. Food items are then grouped according to the food groups presented in Table 1 and the frequencies of all the food items surveyed in each food group are summed. Any summed food group with a frequency value over seven is recoded as seven. Each food group is assigned a weight (reflected in Table 1) which takes into account its nutrient density.

For each household, the household FCS is calculated by multiplying each food group frequency by each food group weight and then summing these scores into one composite score. The household score can have a maximum value of 112, which implies that each of the food groups was consumed every day for the last seven days.

The household score is compared with pre-established thresholds that indicate the status of the household's food consumption for Liberia as was established in previous surveys (See Annex Table 2-2). Using the thresholds, the following groups were identified and represented by their consumption pattern in Annex Table 2-3.

Poor food consumption (0— 24) in Liberia corresponds to a diet that is dominated by cereals and tubers eaten on a daily basis, complemented by vegetables for 4 days and oil for 3 days per week. Meat, fish, milk, milk products and eggs, essential sources of protein and vitamins, are rarely eaten and neither does this group consume fruits. The mean FCS at the national level for the poor food consumption group is 20.7.

Borderline food consumption (24.5 — 38) remains relatively similar to poor food consumption with diets consisting of mainly cereals, vegetables and oil. However, they are able to eat meat and fish,

pulses and fruits at least once in a week. The mean FCS at the national level for the borderline food consumption group is 30.5.

Acceptable food consumption (above 38.5) consists of a diet with daily consumption of cereals, vegetables, oil and fish/meats. This group consumes other food items at least twice in a week including milk and milk products. Fruits are now eaten at least once a week, a major improvement on previous groups. The national mean FCS for this group is 61.9, a major leap from the other two consumption groups.

Annex Table 2-3: Number of days on which food groups were consumed in a week before the survey

Food Consumption Group	Cereals & Tubers	Vegetables	Oil	Meat & Fish	Sugar	Pulses	Milk & Products	Fruit
Poor FCS	7.0	4.0	3.2	0.1	0.4	0.1	0.0	0.2
Borderline FCS	7.0	5.6	4.6	0.7	0.8	0.7	0.1	0.5
Acceptable FCS	7.0	5.9	5.3	4.8	2.5	2.3	2.0	0.9
Total	**7.0**	**5.6**	**4.9**	**3**	**1.8**	**1.7**	**1.2**	**0.8**

In order to be sure that the FCS is an appropriate and valid proxy indicator of food security in Liberia, it was validated by comparing it with other proxy indicators of food access and food utilization, including 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. The Bivariate correlations and ANOVA tests using those proxy indicators and the FCS show that food consumption is an adequate proxy for measuring the current food security situation in the country.

Validation of the FCS as a proxy indicator of food security

The FCS was validated against other proxy indicators of food security. Several validating cross-tabulations are provided in the body of the report. A correlation analysis is presented Annex table 2-4.

Annex Table 2-4: Spearman's rho: correlation matrix

		Food Consumption Scores	Reduced CSI	Share (%) of food in total expenditure	Wealth Index	Per capita total expenditure	Per capita food expenditure
Food Consumption Score	Correlation Coeff.	1.000	-0.141	-0.218	0.371	0.590	0.524
	Sig. (2-tailed)	.	0.000	0.000	0.000	0.000	0.000
	N	7526	7526	7500	7526	7488	7488
Reduced CSI	Correlation Coeff.	-0.141	1.000	0.168	-0.232	-0.171	-0.111
	Sig. (2-tailed)	0.000	.	0.000	0.000	0.000	0.000
	N	7526	7526	7500	7526	7488	7488
Share (%) of food in total monthly expenditure	Correlation Coeff.	-0.218	0.168	1.000	-0.295	-0.287	0.149
	Sig. (2-tailed)	0.000	0.000	.	0.000	0.000	0.000
	N	7500	7500	7500	7500	7472	7472
Wealth Index	Correlation Coeff.	0.371	-0.232	-0.295	1.000	0.372	0.251
	Sig. (2-tailed)	0.000	0.000	0.000	.	0.000	0.000
	N	7526	7526	7500	7526	7488	7488
Per capita total expenditure monthly	Correlation Coeff.	0.590	-0.171	-0.287	0.372	1.000	0.870
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	.	0.000
	N	7488	7488	7472	7488	7488	7488
Per capita food expenditures-monthly	Correlation Coeff.	0.524	-0.111	0.149	0.251	0.870	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	.
	N	7488	7488	7472	7488	7488	7488

** Correlation is significant at the 0.01 level (2-tailed).

It should be noted that, while the FCS is validated as a proxy indicator of food security, it fails to take into account certain aspects, such as reliability of food sources or seasonality. Therefore results should be interpreted with caution and triangulated with other information and secondary data.

Annex 3: Wealth index

The wealth index is a relative proxy indicator of wealth, constructed using appropriate building material data, household assets, access to water, sanitation and other non-livelihood-specific indicators. It is a proxy for economic wealth, but is not intended or able to replace poverty statistics such as poverty line computation. As it is a comparative indicator, it indicates who (according to this proxy) is 'wealthier' or 'poorer', but not who is 'wealthy' or 'poor' in absolute terms. All non-livelihood-specific assets were considered for use in the wealth index, along with access to safe drinking water, access to adequate sanitation, building materials and savings.

Annex Table 3-1: Rural Areas

	Component
	1
Durable wall material = 1.0	0.463
Durable roofing material = 1.0	0.508
Improved water =1	0.186
Improved sanitation =1	0.267
Asset ownership: Bed frame	0.339
Asset ownership: Sponge mattress	0.587
Asset ownership: Table/chairs	0.462
Asset ownership: Radio	0.621
Asset ownership: Mobile phone	0.629
Asset ownership: Pressing iron	0.514
Asset ownership: Mosquito Net	0.341
Asset ownership: Cash, other savings (jewellery, susu, etc.)	0.488
Extraction Method: Principal Component Analysis.	

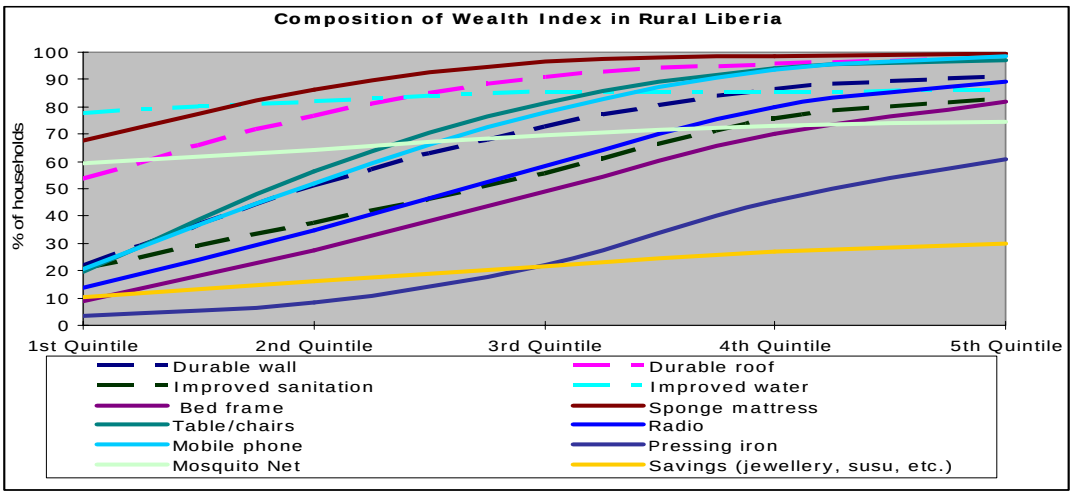
Annex Table 4: Urban Areas

	Component
	1
Asset ownership: Bed frame	0.508
Asset ownership: Table/chairs	0.476
Asset ownership: Radio	0.526
Asset ownership: Television	0.744
Asset ownership: Generator	0.696
Asset ownership: Mobile phone	0.527
Asset ownership: Pressing iron	0.609
Asset ownership: Cooler/Ice Box	0.592
Asset ownership: Cupboard, dresser	0.688
Asset ownership: Bank account	0.596
Improved sanitation =1	0.477
Improved water =1	0.091
Durable wall material = 1.0	0.514
Durable roofing material = 1.0	0.414
Asset ownership: Mosquito Net	0.097
Asset ownership: Cash, other savings (jewellery, susu, etc.)	0.217
Extraction Method: Principal Component Analysis.	

All the data on different variables/indicators of interest were first transformed into a bivariate variable (1/0 variable meaning a household owns the asset or results in positive outcome for the issue of concern like improved sanitation. Zero denoted a negative outcome). The UNICEF/WHO classification was used in classifying the water and sanitation indicator. All bivariate indicators with very low or very high frequencies were excluded or combined. Indicators such as land ownership, livestock ownership and ownership of productive agriculture assets were excluded from the analysis as they are livelihood-specific assets that may be correlated with wealth among households sharing a similar livelihood.

Due to disparities in the ownership of assets identified in previous surveys, it was necessary to construct wealth indices. For the national outlook, the wealth indices for both urban and rural Liberia were merged to provide an overall wealth index for the country.

Annex Figure 3-1: composition of wealth index in rural Liberia



Once the indicators were identified for both urban and rural Liberia, they were entered into a principle component analysis in SPSS, using no rotation and no probability weights. The first component accounts for 29.2% of the variance in the variables included for rural Liberia and 31.4% for urban Liberia.

This first component was saved as the continuous wealth index variable. Results of the component loadings are presented in Annex Table 3-1. The wealth index quintiles were calculated as quintiles of the wealth index variable, taking into account household probability weights. This results in five quintiles, each of which represents 20% of the households in Liberia. The prevalence of all the indicators used to compile the wealth index by wealth index quintile was calculated and plotted on the graph. The figure shows an example of the prevalence for asset ownership in rural Liberia. Physical assets are represented by solid lines while the rest are dotted. With exception of mosquito nets (mainly distributed freely by development partners), prevalence of ownership for other assets increases as the wealth index improves.

Annex 4A: Analysis of age distribution issue

As explained in section 5 and shown in Annex Table 4-1A & B, there was an under-representation of children aged 54-59 months in the sample, so an analysis was carried out to determine if this introduced bias into the sample and, if so, how much. If bias was introduced, the under-representation of this age group would mean that the stunted prevalence could be higher than seen in the survey, while acute malnutrition could be even lower. As the acute malnutrition rates are already within acceptable range, a potential bias on this issue would be inconsequential, but a difference in rates of chronic malnutrition would be important.

The age distribution was normal for a developing country, except that there was a lower than normal representation of children 54-59 months across all counties. As stunted children are commonly found in older age groups, the prevalence of stunted is likely to be underestimated in this survey. This under-representation was taken into account during the analysis and no significant difference was found in the results of stunted children.

After consultation with several international experts in nutrition survey methodology, a simulation was carried out, increasing the number of children in the 54-59 month age group to what had been expected and applying the group stunted prevalence and mean as their nutritional status. The output tables show the original survey results with 95% confidence intervals, followed by the adjusted prevalence. As the tables show, the adjusted prevalence and adjusted mean are very similar to the original estimates and well within the confidence intervals. This demonstrates that if a bias was introduced into the sample, its effect was negligible.

Rigorous plausibility tests were conducted to ensure data quality and results of such tests are presented in Table 8 (Annex 5).

Annex Table 4-1: Number of households surveyed and number of children, women and pregnant women in the completed sample (overall and by county)

County	Number of HH surveyed	Number of children <5 years	Number of children 6-59 months in the sample	Number of children 6-59 months analysed for anthropometry	Number of women	Number of pregnant women	% of Women Pregnant (n=8599)
BOMI	500	366	332	332	462	29	6.3%
BONG*	500	515	463	458	582	56	9.8%
GBARPOLU	500	444	378	369	507	43	8.8%
GRAND BASSA	500	455	406	403	517	31	6.2%
GRAND CAPE MOUNT	498	561	505	497	574	58	10.2%
GRAND GEDEH	500	490	440	440	523	58	11.2%
GRAND KRU	500	500	446	445	501	80	16.1%
LOFA	499	527	482	481	597	47	7.9%
MARGIBI	499	421	382	382	554	69	12.5%
MARYLAND	499	420	376	373	580	33	5.8%
MONROVIA	498	396	350	350	684	27	4.0%
NIMBA	500	487	440	440	595	75	12.6%
RIVER GEE	491	462	423	419	505	46	9.1%
RIVERCESS	499	524	467	466	467	28	6.1%
RURAL MONTSERRADO	500	451	422	420	508	52	10.3%
SINOE	499	546	486	486	537	65	12.2%
Overall	**7982**	**7565**	**6798**	**6761**	**8693**	**797**	**9.3%**

Annex Table 4-1B: Survey stunted prevalence, confidence interval and adjusted prevalence for expected representation of 54-59 month children

	Stunted Prevalence In survey	95% Confidence Interval			Adjusted Prevalence	Mean	95% Confidence Interval			Adjusted Mean
Bomi	39.9%	33.8	-	46.5	39.6%	-1.681	-1.846	-	-1.514	-1.687
Bong	28.2%	23.6	-	33.3	28.1%	-1.413	-1.540	-	-1.280	-1.417
Gbarpolu	33.3%	27.0	-	40.1	33.9%	-1.540	-1.720	-	-1.360	-1.575
Grand Bassa	39.1%	34.7	-	43.7	39.2%	-1.671	-1.790	-	-1.570	-1.674
Grand Cape	35.3%	31.1	-	39.8	35.1%	-1.381	-1.496	-	-1.264	-1.383
Grand Gedeh	34.0%	28.0	-	40.7	34.3%	-1.589	-1.773	-	-1.407	-1.594
Grand Kru	32.0%	26.8	-	37.7	31.7%	-1.459	-1.614	-	-1.306	-1.489
Lofa	31.6%	26.1	-	37.7	31.2%	-1.475	-1.646	-	-1.294	-1.485
Margibi	49.6%	43.8	-	55.1	49.6%	-1.920	-2.029	-	-1.791	-1.920
Maryland	36.6%	31.8	-	41.8	36.4%	-1.529	-1.666	-	-1.394	-1.495
Monrovia	26.7%	22.0	-	31.9	26.7%	-1.210	-1.346	-	-1.074	-1.213
Nimba	36.2%	30.5	-	42.4	36.5%	-1.648	-1.798	-	-1.502	-1.661
River Gee	33.7%	29.4	-	38.1	33.8%	-1.348	-1.467	-	-1.213	-1.370
Rivercess	34.7%	28.8	-	41.3	35.0%	-1.505	-1.720	-	-1.300	-1.524
Rural	33.3%	28.6	-	38.4	34.4%	-1.643	-1.740	-	-1.540	-1.645
Sinoe	35.7%	30.1	-	41.7	37.3%	-1.657	-1.815	-	-1.485	-1.686

Annex 4B: NUTRITION SECURITY

This section includes findings on the nutritional status of children under five years old and women of reproductive age (15-49 years). It also includes information on child health and infant and young child feeding patterns. A total of 7,565 children from 0-59 months and 8,693 women of reproductive age (797 of them pregnant) were included in the survey as shown in annex 3. Only children 6-59 months were measured for nutritional status, including 6,798 children; however, due to the elimination of some cases based on both SMART and EpiInfo 6 flags (as a result of incomplete records or cases with extreme measurements/outside the criteria for inclusion), only 6,761 children aged 6-59 months or measuring 65-110 cm were analysed. The analysis of nutritional status in women of reproductive age included 8,541 women.

Table 1: Overall Age and Sex Distribution

Age group	n	%	Boys		Girls		Sex
0-5	776	10.3%	390	50.3%	377	48.6%	1.03
6-17	1466	19.4%	718	49.0%	757	51.6%	0.95
18-29	1682	22.2%	864	51.4%	818	48.6%	1.06
30-41	1715	22.7%	881	51.4%	834	48.6%	1.06
42-53	1377	18.2%	680	49.4%	697	50.6%	0.98
54-59	298	3.9%	170	57.0%	128	43.0%	1.33
Unknown age	246	3.3%	126	51.2%	120	48.8%	1.05
Total	**7560**	**100%**	**3829**	**50.6%**	**3731**	**49.4%**	**1.03**

Of all the children in the survey, 50.6% of them were boys, while 49.4% of them were girls, giving an overall sex ratio of 1.03, which is within the expected range, indicating that there was no gender bias in the overall selection of children (Table 1). The age distribution was normal for a developing country, except that there was a lower than normal representation of children 54-59 months across all counties. As stunted children are commonly found in older age groups, the prevalence of stunted is likely to be underestimated in this survey. This under-representation was taken into account during the analysis and no significant difference was found in the results of stunted children.

At the county level, the distribution of children by sex was normal in all counties, except that there were slightly more boys in the sample than girls in River Gee, Nimba and Margibi as represented in Table 2. This difference was only significant in Margibi and, therefore, should be considered when interpreting the results. There were slightly more girls in the Sinoe sample, although the difference was not significant.

Table 2: *Distribution of children by sex with unweighted n and sex-ratio by county*

County	Boys	Girls	Unweighted n	Sex-ratio
BOMI	50.3%	49.7%	366	1.01
BONG	49.6%	50.4%	512	0.98
GBARPOLU	51.6%	48.4%	442	1.07
GRAND BASSA	49.7%	50.3%	455	0.99
GRAND CAPE MOUNT	50.6%	49.4%	561	1.03
GRAND GEDEH	51.2%	48.8%	490	1.05
GRAND KRU	50.0%	50.0%	500	1.00
LOFA	49.5%	50.5%	527	0.98
MARGIBI	55.1%	44.9%	421	1.23
MARYLAND	49.8%	50.2%	420	0.99
MONROVIA	52.0%	48.0%	396	1.08
NIMBA	53.0%	47.0%	487	1.13
RIVER GEE	52.8%	47.2%	462	1.12
RIVERCESS	50.8%	49.2%	524	1.03
RURAL MONTSERRADO	48.3%	51.7%	451	0.94

SINOE	47.3%	52.7%	546	0.90
Overall	**50.6%**	**49.4%**	**7560**	**1.03**

4.1.1 How many children and women are malnourished?

Acute Malnutrition

Acute malnutrition is presented in this report using several different indicators: a) Global Acute Malnutrition or GAM which incorporates wasting and the presence of nutritional oedema, b) Wasting, and c) Middle Upper Arm Circumference or MUAC.

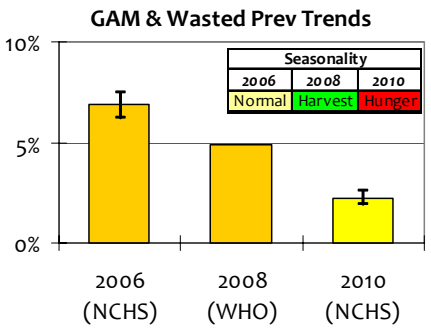
A. *Global Acute Malnutrition*

The overall prevalence of global acute malnutrition was 2.8%, with a range at the county level of 1.2-4.2% as indicated in Table 3. This level of malnutrition is considered normal and shows an improvement from previous surveys. The results show that the global prevalence is largely made up of moderate malnutrition, at 2.6%, with 0.2% severe acute malnutrition. Counties with the highest level of GAM, although still within normal range, are Sinoe, Monrovia, Bomi and Rural Montserrado, all with GAM above 3.5%. Nimba, River Gee, Margibi and Grand Kru have the lowest prevalence of GAM, all below 2%. There is no statistical difference in the prevalence of GAM between the counties. Using county-specific prevalence, an estimated 16,000 children were acutely malnourished at the time of the survey.

Table 3: *Prevalence of Global, Moderate and Severe Acute Malnutrition (Weight/Height Z-score) in children 6-59 months by county (WHO 2006)*

GAM – WHO	# of GAM	GAM Prev	95% Conf. Interval	MAM Prev	95% Conf. Interval	SAM Prev	95% Conf. Interval	n
BOMI	12	**3.6%**	2.0% - 6.5%	3.3%	1.8% - 6.0%	0.3%	0.0% - 2.3%	329
BONG	15	3.4%	1.7% - 6.5%	3.4%	1.7% - 6.5%	0.0%	0.0% - 0.0%	445
GBARPOLU	12	3.3%	1.7% - 6.6%	3.3%	1.7% - 6.6%	0.0%	0.0% - 0.0%	359
GRAND BASSA	13	3.3%	1.9% - 5.7%	3.0%	1.7% - 5.3%	0.3%	0.0% - 1.9%	394
GRAND CAPE	10	2.1%	1.1% - 3.9%	2.1%	1.1% - 3.9%	0.0%	0.0% - 0.0%	480
GRAND GEDEH	12	2.8%	1.6% - 5.0%	2.8%	1.6% - 6.0%	0.0%	0.0% - 0.0%	427
GRAND KRU	8	**1.9%**	0.9% - 3.8%	1.4%	0.6% - 3.4%	0.5%	0.1% - 2.0%	433
LOFA	10	2.1%	1.1% - 4.2%	1.9%	0.9% - 4.0%	0.2%	0.0% - 1.7%	470
MARGIBI	7	**1.9%**	0.9% - 3.7%	1.9%	0.9% - 3.7%	0.0%	0.0% - 0.0%	373
MARYLAND	10	2.8%	1.5% - 5.1%	2.5%	1.4% - 4.6%	0.3%	0.0% - 2.1%	355
MONROVIA	13	**3.8%**	2.1% - 6.6%	3.8%	2.1% - 6.6%	0.0%	0.0% - 0.0%	345
NIMBA	5	**1.2%**	0.5% - 2.6%	1.2%	0.5% - 2.6%	0.0%	0.0% - 0.0%	430
RIVER GEE	7	**1.8%**	0.8% - 3.9%	0.8%	0.2% - 2.2%	1.0%	0.3% - 3.5%	399
RIVERCESS	16	3.5%	2.1% - 5.8%	2.8%	1.6% - 4.9%	0.7%	0.2% - 2.0%	459
RURAL	15	**3.6%**	2.0% - 6.7%	3.6%	2.0% - 6.7%	0.0%	0.0% - 0.0%	411
SINOE	20	**4.2%**	2.5% - 6.9%	3.5%	2.0% - 6.0%	0.6%	0.2% - 1.9%	481
Overall	**185**	**2.8%**	**2.4% - 3.3%**	**2.6%**	**2.2% - 3.0%**	**0.2%**	**0.1% - 0.4%**	**6590**

Comparing the overall results from this survey with those of previous surveys, there is an improving trend. Since the reference standards are different between the surveys (NCHS for the 2006 and 2010 surveys, WHO for the 2008 survey), it is difficult to make a true comparison; however, there is a statistically significant improvement in the GAM/Wasting prevalence between 2006 and 2010. As the 2010 survey was carried out during the hunger gap when acute malnutrition should be at its worst, this improvement is remarkable.



When examining by sex, it seems that boys have a slightly higher prevalence of GAM than girls, although the difference is only significant

in Grand Kru. Table 4 provides results of county level prevalence of GAM by sex of the child.

Table 4: *Prevalence of Global Acute Malnutrition (Weight/Height Z-score) in children 6-59 months by sex and by county (WHO 2006)*

GAM – WHO	Boys			Girls		
	GAM	95% Conf.	n	GAM	95% Conf.	n
BOMI	4.3%	2.3% - 7.9%	164	3.0%	1.4% - 6.5%	165
BONG	3.2%	1.6% - 6.1%	222	3.6%	1.5% - 8.2%	223
GBARPOLU	3.6%	1.8% - 7.4%	192	3.0%	1.0% - 8.8%	167
GRAND BASSA	4.2%	1.9% - 9.1%	190	2.5%	0.9% - 6.3%	204
GRAND CAPE MOUNT	2.1%	0.7% - 5.7%	240	2.1%	0.7% - 5.7%	240
GRAND GEDEH	1.3%	0.4% - 4.2%	223	4.4%	2.1% - 9.2%	204
GRAND KRU	3.9%	1.9% - 7.6%	210	0.0%	0.0% - 0.0%	223
LOFA	3.5%	1.8% - 6.9%	227	0.8%	0.2% - 3.3%	243
MARGIBI	1.0%	0.2% - 3.8%	206	3.0%	1.2% - 7.0%	167
MARYLAND	2.8%	1.2% - 6.1%	180	2.9%	1.1% - 7.4%	175
MONROVIA	2.2%	0.9% - 5.5%	179	5.4%	2.9% - 9.8%	166
NIMBA	1.3%	0.4% - 3.9%	234	1.0%	0.2% - 4.1%	196
RIVER GEE	1.9%	0.7% - 5.0%	216	1.6%	0.5% - 5.1%	183
RIVERCESS	4.7%	3.0% - 7.3%	235	2.2%	0.8% - 6.0%	224
RURAL MONTSERRADO	3.1%	1.1% - 8.3%	195	4.2%	2.0% - 8.5%	216
SINOE	7.1%	3.9% - 12.5%	226	1.6%	0.6% - 4.0%	255
Overall	**3.1%**	**2.6% - 3.8%**	**3339**	**2.5%**	**2.0% - 3.1%**	**3251**

As severe acute malnutrition (SAM) includes both wasting and kwashiorkor (oedematous SAM), it is important to note how much of the SAM is made up of oedema cases and whether they are also wasted. In the survey, a total of 9 children were found with oedema in 8 counties; two of those cases were also severely wasted (Grand Kru and Rivercess). Table 5 demonstrates cross tabulation of severely wasted and/or oedema at county level.

Table 5: *Distribution of Global Acute Malnutrition (Weight/Height Z-score) by presence of bilateral oedema in children 6 to 59 months by county (WHO 2006)*

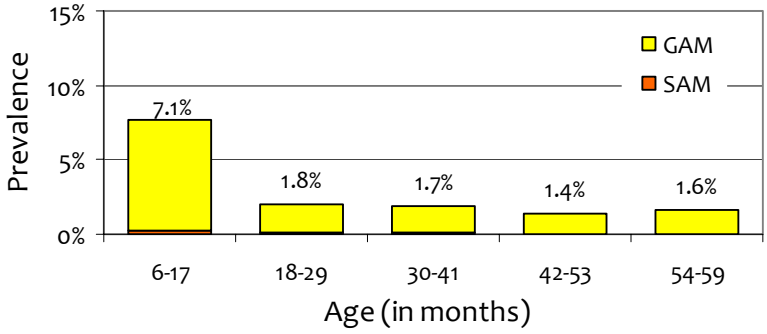
WHO		W/H <-3 z-		W/H ≥-3 z-score	
		#	%	#	%
BOMI	Oedema present	0	0.0%	1	0.3%
	No Oedema	0	0.0%	328	99.7%
GRAND BASSA	Oedema present	0	0.0%	0	0.0%
	No Oedema	1	0.3%	393	99.7%
GRAND KRU	Oedema present	**1**	**0.2%**	1	0.2%
	No Oedema	0	0.0%	431	99.5%
LOFA	Oedema present	0	0.0%	1	0.2%
	No Oedema	0	0.0%	469	99.8%
MARYLAND	Oedema present	0	0.0%	0	0.0%
	No Oedema	1	0.3%	353	99.7%
RIVER GEE	Oedema present	0	0.0%	3	0.8%
	No Oedema	1	0.3%	393	99.0%
RIVERCESS	Oedema present	**1**	**0.2%**	0	0.0%
	No Oedema	2	0.4%	455	99.3%
SINOE	Oedema present	0	0.0%	1	0.2%
	No Oedema	2	0.4%	478	99.4%

	W/H <-3 z-score	W/H ≥ -3 z-score
Oedema present	Marasmus-Kwashiorkor	Kwashiorkor
No Oedema	Marasmus	No SAM

As shown in Figure 1, GAM is much higher at 7.1% in children from 6-17 months than in any other age group, where the prevalence is under 2%. This is a common trend seen in children of weaning age, as

various factors come into play, i.e. the child's nutritional requirement out grows the mothers breast milk, the child is learning to eat foods other than breast milk, the child moves around autonomously and, thereby, is exposed to more infections, among other factors.

Figure 1: Overall GAM by age group

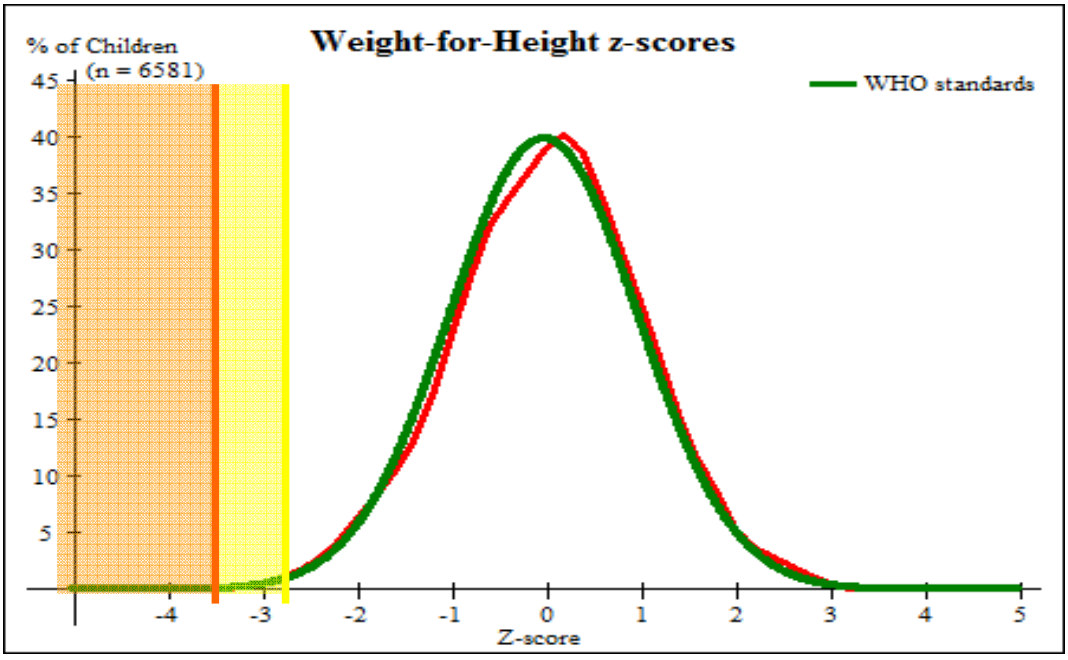


B. *Wasting – Low Weight/Height*

As GAM is made up of wasted children plus those with oedema, when the presence of oedema is low, the prevalence of wasted children mirrors that of GAM very closely. This is the case here where there were only 9 cases found throughout the country.

The Figure 2 shows that the distribution of weight for height follows the natural Gaussian distribution, where it is almost identical to that of the reference population. This demonstrates that the wasting prevalence is at normal levels; otherwise, the red line indicating the Liberian sample would be shifted to the left of the green reference standard line. The yellow and orange sections show the area of the graph that represents children who are moderately and severely wasted, respectively.

Figure 2 *Overall Weight/height distribution compared to the WHO 2006 Growth Reference Standard*



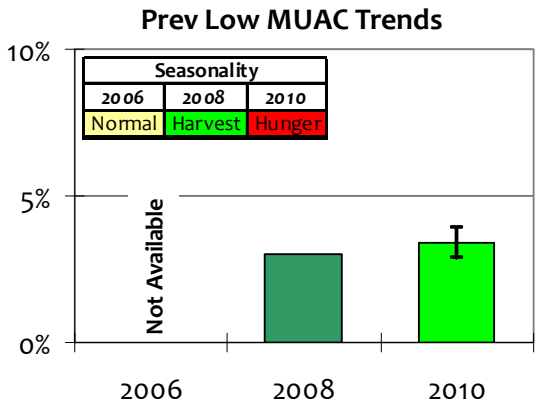
The overall wasted prevalence was 2.7%, with a range from 1.1-4.0%. Again, Sinoe, Monrovia and Rural Montserrado are the worst-off counties, all with wasted prevalence above 3.5%, however, Bomi

drops out of this category. Likewise, the best-off counties remain the same, with Nimba, River Gee, Margibi and Grand Kru all falling below 2% wasted prevalence, but Lofa also joins that category.

By sex, only Grand Kru shows a significant difference in wasting prevalence, where more boys were wasted than girls; otherwise, the situation appears to be similar for both sexes. By age, as was shown with GAM, children from 6-17 months have the highest wasted prevalence, at 7.3%. All the other age groups are between 1.4-1.9%.

C. *MUAC*

Although MUAC is another way to identify acute malnutrition, it is different from the GAM and wasting indicators in that it is closely correlated to risk of mortality. Therefore, it is currently used to admit children to feeding programmes as a simpler way to detect malnutrition and to reduce child mortality. The overall prevalence of low MUAC in the survey was 3.4%, with a range of 0.5-5.2% at the county level as shown in Table 6. Sinoe and Bomi remain in the worst affected counties, while Rivercess, Grand Bassa and Maryland are added to the group with low MUAC prevalence above 4.0%. Rural Montserrado joins Nimba showing the lowest level of acute malnutrition through low MUAC with prevalence below 1.0%.



In 2006, the survey did not collect MUAC measurements; therefore, comparisons can only be made with the 2008 survey. The prevalence of acute malnutrition by MUAC is almost the same as 2 years ago.

Table 6 Prevalence of acute malnutrition according to MUAC in children 6 to 59 months by county

Low MUAC - Programme	# with Low	Low MUAC	95% Conf. Interval	Mod MUAC	95% Conf. Interval	Sev MUAC	95% Conf. Interval	n
BOMI	17	**5.1%**	2.9% - 8.9%	4.2%	2.1% - 8.4%	0.9%	0.3% - 2.6%	332
BONG	17	3.7%	2.2% - 6.2%	3.3%	1.9% - 5.6%	0.4%	0.1% - 1.9%	458
GBARPOLU	10	2.7%	1.5% - 4.9%	2.2%	1.2% - 4.0%	0.5%	0.1% - 2.2%	369
GRAND BASSA	18	**4.5%**	2.9% - 6.8%	3.5%	2.2% - 5.6%	1.0%	0.3% - 3.2%	403
GRAND CAPE	18	3.6%	2.2% - 5.9%	2.8%	1.6% - 4.9%	0.8%	0.3% - 2.1%	495
GRAND GEDEH	13	3.0%	1.8% - 4.9%	1.8%	1.0% - 3.3%	1.1%	0.5% - 2.6%	440
GRAND KRU	15	3.4%	2.0% - 6.5%	2.7%	1.3% - 5.5%	0.7%	0.3% - 2.4%	443
LOFA	15	3.1%	1.4% - 6.6%	2.5%	1.2% - 5.3%	0.6%	0.2% - 1.9%	481
MARGIBI	11	2.9%	1.4% - 5.7%	2.4%	1.0% - 5.4%	0.5%	0.1% - 2.1%	382
MARYLAND	16	**4.3%**	2.3% - 8.0%	2.4%	1.3% - 4.6%	1.9%	0.7% - 4.8%	372
MONROVIA	12	3.4%	1.7% - 6.9%	3.1%	1.5% - 6.5%	0.3%	0.0% - 2.2%	350
NIMBA	4	**0.9%**	0.3% - 2.4%	0.7%	0.2% - 2.2%	0.2%	0.0% - 1.8%	440
RIVER GEE	12	2.9%	1.7% - 4.8%	2.4%	1.3% - 4.4%	0.5%	0.1% - 2.0%	419
RIVERCESS	24	**5.2%**	3.2% - 8.2%	3.4%	1.9% - 6.3%	1.7%	0.9% - 3.1%	466
RURAL	2	**0.5%**	0.1% - 3.6%	0.5%	0.1% - 3.6%	0.0%	0.0% - 0.0%	420
SINOE	21	**4.3%**	2.9% - 6.9%	3.5%	2.3% - 5.8%	0.8%	0.2% - 2.7%	486
Overall	225	**3.4%**	2.9% - 3.9%	**2.6%**	2.2% - 3.0%	**0.8%**	0.6% - 1.0%	6756

The Figure 3 demonstrates the distribution of children in the sample based on their sex by MUAC. Children that fall in the orange zone are considered to have severe acute malnutrition, while those in the yellow area have moderate acute malnutrition. In Table 6, girls appear to have slightly higher prevalence of low MUAC, although this difference is only statistically significant in Rural Montserrado.

This finding has been seen internationally, where girls tend to have slightly lower MUAC values than boys of the same age, leading to the development of new standards of MUAC by age by WHO; these standards are not yet in common use.

Figure 3: MUAC distribution curve

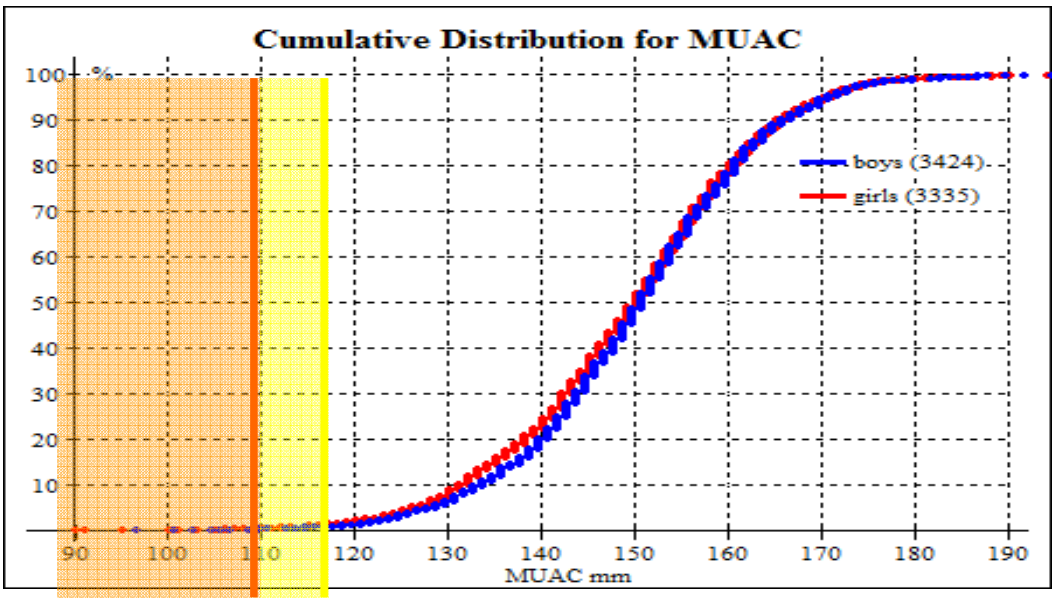


Table 7: Prevalence of acute malnutrition according to MUAC in children 6 to 59 months by sex and by county

Low MUAC - Programme Criteria	Boys				Girls			
	Low	95% Conf.		n	Low	95% Conf.		n
BOMI	4.2%	1.9%	9.2%	165	6.0%	2.7%	12.8%	167
BONG	2.2%	0.8%	6.1%	224	5.2%	2.8%	9.2%	234
GBARPOLU	3.0%	1.4%	6.5%	197	2.3%	0.7%	7.5%	172
GRAND BASSA	4.1%	2.0%	8.3%	195	4.8%	2.7%	8.5%	208
GRAND CAPE MOUNT	2.8%	1.4%	5.5%	248	4.5%	2.3%	8.3%	247
GRAND GEDEH	2.2%	0.9%	5.0%	230	3.8%	1.9%	7.6%	210
GRAND KRU	4.6%	2.4%	10.4%	218	2.2%	0.9%	5.3%	225
LOFA	2.6%	0.9%	6.8%	234	3.6%	1.5%	8.8%	247
MARGIBI	0.9%	0.2%	3.8%	212	5.3%	2.7%	10.3%	170
MARYLAND	2.7%	1.0%	6.9%	186	5.9%	3.1%	11.1%	186
MONROVIA	3.3%	1.2%	8.5%	183	3.6%	1.5%	8.4%	167
NIMBA	0.8%	0.2%	3.4%	239	1.0%	0.2%	4.2%	201
RIVER GEE	1.8%	0.6%	5.6%	224	4.1%	2.1%	8.0%	195
RIVERCESS	5.1%	2.8%	9.1%	237	5.2%	2.9%	9.2%	229
RURAL MONTSERRADO	0.0%	0.0%	0.0%	199	0.9%	0.1%	6.9%	221
SINOE	5.7%	3.7%	9.9%	230	3.1%	1.4%	6.8%	256
Overall	**2.9%**	**2.4%**	**3.6%**	**3421**	**3.8%**	**3.2%**	**4.6%**	**3335**

Participation in programmes for acute malnutrition

Overall, there were very few children that participated in feeding programmes for acute malnutrition in the 3 months preceding the survey with 0.4% that participated in Supplementary Feeding Programmes (SFP) for moderate acute malnutrition and 0.2% that participated in Therapeutic Feeding Programmes (TFP) for severe acute malnutrition. Participation was not more than one percent in any of the counties with six counties recording a zero participation in SFP and seven counties reporting zero participation in TFP.

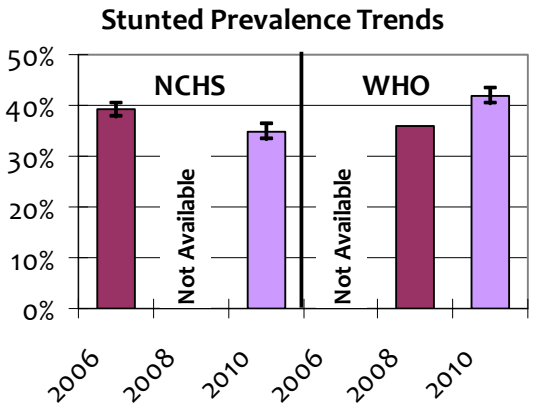
Chronic Malnutrition - Stunted

Stunting is a measure of long-term or chronic malnutrition. The overall stunting prevalence was 41.8 percent, as shown in Table 8. The stunting prevalence at the county level ranged from 31.1-57.2 percent. Margibi has the highest stunting prevalence with 57.2 percent followed by Bomi, Grand Bassa and Sinoe with 44-47% of children stunted, These prevalences are considered extremely high according to WHO cut-offs (at a threshold of 40%). In fact, 9 counties are above this threshold with a total of 218,857 children currently estimated to be stunted. The chronic malnutrition situation should be considered critical as the long-term impact of prolonged malnutrition has serious implications for the country in terms of potential educational attainment of the population, economic development and growth. While Monrovia and Bong are the best-off counties for prevalence of stunting, they still indicate prevalence greater than 30 percent. There are statistically significant differences between some of the counties, as shown in Table 8.

The situation in Margibi is likely to be slightly overestimated, as it was found that there were more boys in the sample than girls, and there are more boys stunted (62.2%) in Margibi than girls (50.9%), although not significantly different. Notwithstanding, Margibi would remain the worst-off county in Liberia since their girls are more stunted than Bomi's population (46.9%, the next worst-off county).

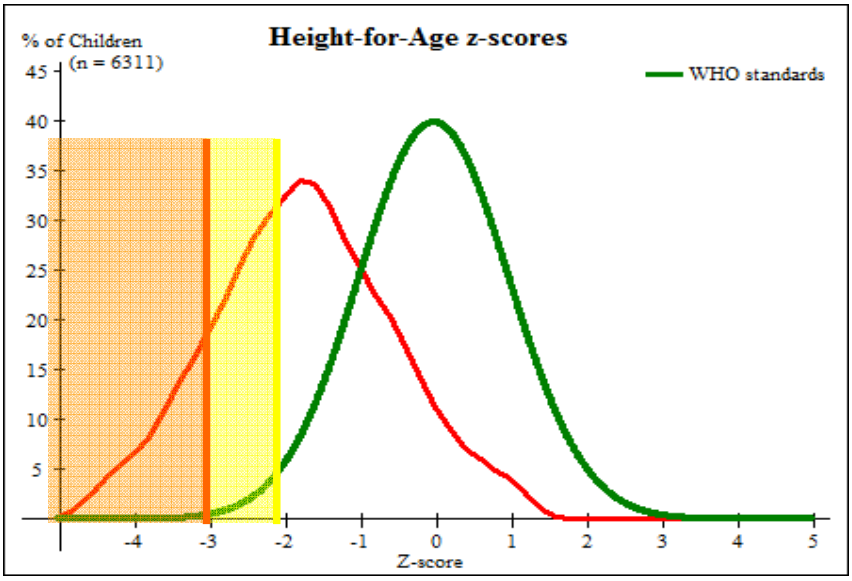
Table 8: *Prevalence of Global, Moderate and Severe Chronic Malnutrition (Height-for-Age Z-score) in children 6 to 59 months by sex and by county (WHO 2006)*

Stunted - WHO	# Stunte	Stunted Prev	95% Conf. Interval	Mod Stunted	95% Conf. Interval	Sev Stunted	95% Conf. Interval	n
BOMI	142	**46.9%**	40.0% - 53.9%	29.4%	23.2% - 36.4%	17.5%	13.2% - 22.8%	303
BONG	151	**36.0%**	31.0% - 41.2%	22.4%	19.3% - 25.8%	13.6%	9.2% - 19.7%	420
GBARPOLU	134	40.1%	32.6% - 48.1%	24.3%	18.6% - 30.9%	15.9%	12.3% - 20.3%	334
GRAND BASSA	179	**46.4%**	41.1% - 51.7%	30.6%	26.1% - 35.4%	15.8%	12.2% - 20.2%	386
GRAND CAPE	177	38.6%	34.0% - 43.3%	25.7%	21.6% - 30.3%	12.9%	10.8% - 15.2%	459
GRAND	181	43.4%	37.3% - 49.7%	30.7%	26.3% - 35.4%	12.7%	9.6% - 16.7%	417
GRAND KRU	161	38.5%	32.9% - 44.3%	22.0%	17.3% - 27.4%	16.5%	12.8% - 21.0%	419
LOFA	178	39.4%	33.4% - 45.7%	25.2%	20.9% - 30.0%	14.2%	10.3% - 19.2%	452
MARGIBI	207	**57.2%**	51.1% - 63.1%	35.6%	31.0% - 40.6%	21.5%	16.9% - 27.0%	362
MARYLAND	144	43.6%	38.3% - 49.1%	25.5%	21.0% - 30.5%	18.2%	14.6% - 22.4%	330
MONROVIA	104	**31.1%**	25.6% - 37.2%	18.3%	14.6% - 22.6%	12.9%	9.3% - 17.6%	334
NIMBA	187	43.7%	37.1% - 50.5%	31.1%	26.3% - 36.3%	12.6%	9.8% - 16.1%	428
RIVER GEE	147	38.6%	33.8% - 43.6%	23.1%	19.4% - 27.3%	15.5%	12.1% - 19.7%	381
RIVERCESS	186	42.1%	35.4% - 49.3%	25.8%	20.9% - 31.2%	16.3%	12.5% - 21.4%	442
RURAL	149	39.7%	34.7% - 44.9%	26.4%	21.7% - 31.7%	13.3%	9.8% - 17.9%	375
SINOE	208	**44.4%**	39.5% - 49.5%	27.8%	23.7% - 32.3%	16.7%	12.6% - 21.7%	468
Overall	**2635**	**41.8%**	**40.3% - 43.2%**	**26.5%**	**25.3% - 27.7%**	**15.3%**	**14.3% - 16.3%**	**6310**



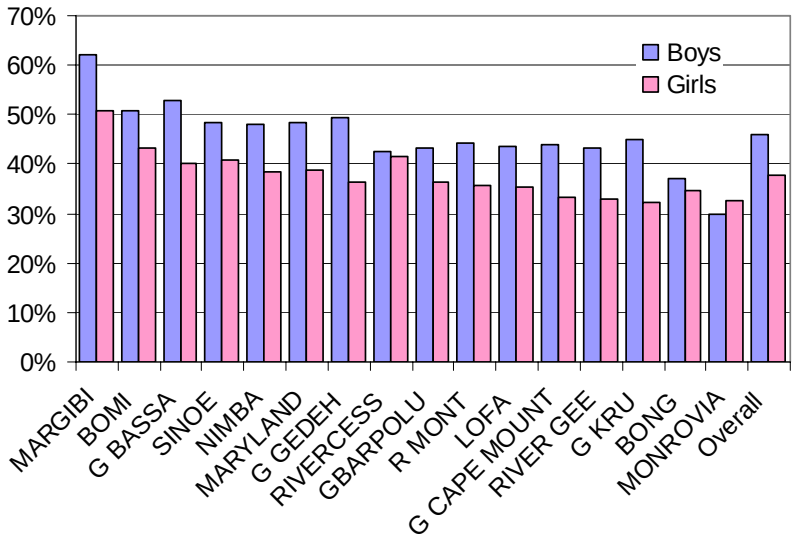
Looking at year on trends in chronic malnutrition is more complicated since different standards were used for each survey. Comparing the 2006 survey, there is a statistically significant improvement in child stuntedness from 39.2% to 34.9%. However, when examining the situation using the WHO 2006 reference standards, an increase has been seen in chronic malnutrition from approximately 36% to 42%; no confidence intervals are available to check if this difference is significant.

Figure 4: Overall Height/Age distribution curve compared to the WHO 2006 Growth Reference Standard



The distribution of low height/age is skewed to the left of the standard population and is somewhat flattened. The flattened appearance is due to poor age estimation in months and/or poor height measures. As can be seen in Figure 4, nearly half of the 6-59 month population falls into the yellow and orange shaded areas, representing moderately and severely stunted, respectively.

Figure 5 *Stunted Prevalence by sex and by county (WHO 2006)*

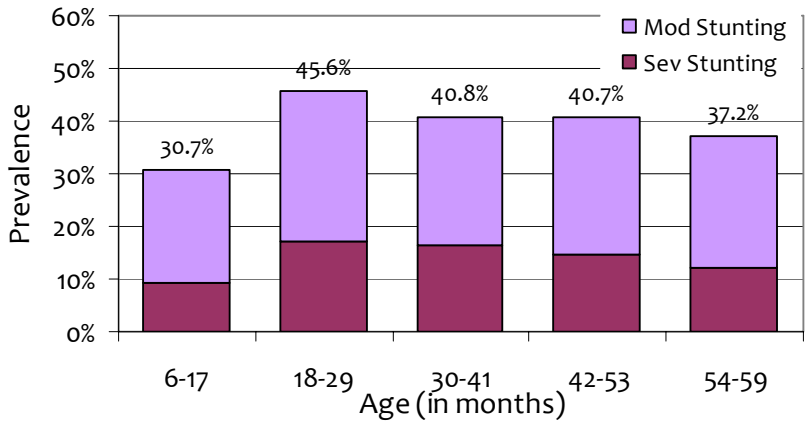


In every county, except the Monrovia area, more boys are stunted than girls (Figure 5), although this difference is only significant at the national level (Table 9).

Table 9: Prevalence of Global Chronic Malnutrition (Height-for-Age Z-score) in children 6 to 59 months by sex and by county (WHO 2006)

Stunted - WHO	Boys			Girls		
	Stunted	95% Conf. Interval	n	Stunted	95% Conf. Interval	N
BOMI	50.7%	43.2% - 58.1%	150	43.1%	34.2% - 52.5%	153
BONG	37.2%	28.5% - 47.0%	204	34.7%	27.8% - 42.4%	216
GBARPOLU	43.4%	34.9% - 52.4%	175	36.5%	26.7% - 47.5%	159
GRAND BASSA	53.0%	45.6% - 60.2%	185	40.3%	33.6% - 47.4%	201
GRAND CAPE MOUNT	43.8%	36.8% - 51.0%	233	33.2%	26.9% - 40.1%	226
GRAND GEDEH	49.5%	41.9% - 57.2%	220	36.5%	29.7% - 43.9%	197
GRAND KRU	44.8%	38.0% - 51.9%	203	32.4%	25.1% - 40.7%	216
LOFA	43.6%	37.1% - 50.4%	220	35.4%	27.5% - 44.0%	232
MARGIBI	62.2%	54.0% - 69.7%	201	50.9%	42.7% - 59.1%	161
MARYLAND	48.5%	39.9% - 57.1%	167	38.7%	31.0% - 47.0%	163
MONROVIA	29.9%	21.9% - 39.4%	174	32.5%	24.8% - 41.2%	160
NIMBA	48.1%	39.5% - 56.8%	235	38.3%	30.5% - 46.9%	193
RIVER GEE	43.4%	35.9% - 51.2%	205	33.0%	27.9% - 38.4%	176
RIVERCESS	42.7%	34.5% - 51.7%	225	41.4%	32.7% - 50.8%	217
RURAL	44.1%	36.9% - 51.7%	179	35.7%	28.3% - 43.8%	196
SINOE	48.4%	42.4% - 54.5%	221	40.9%	34.3% - 47.8%	247
Overall	**45.9%**	**43.9% - 47.8%**	**3197**	**37.6%**	**35.7% - 39.5%**	**3113**

Figure 5: Stunting Prevalence, moderate and severe, by age group (WHO 2006)



By age, a different pattern is seen with chronic malnutrition as compared with acute malnutrition. Children from 18-29 months have the highest level of low height/age (45.6%), while the youngest children, those from 6-17 months, have far fewer stunted children (30.7%) as shown in Figure 5. Stunting prevalence is slightly better for children 30-59 months, decreasing gradually between the age groups as children return to the normal growth pattern but do not seem to completely catch up.

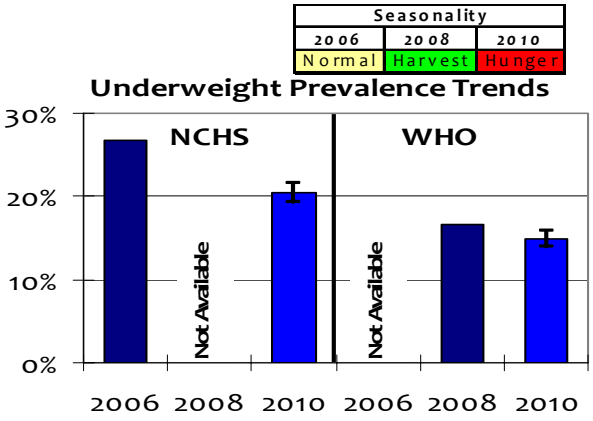
Underweight

Underweight reflects a combination of chronic and acute malnutrition, combining into a medium-term indicator of malnutrition. Nationwide, underweight was estimated at 14.9%, ranging from 10.6-17.8% between the counties. Counties with the highest underweight prevalence are Rivercess, Monrovia, Bomi and Grand Gedeh, all greater than 16% as represented in Table 10. River Gee and Rural Montserrado are the best-off, with less than 12% underweight. Differences between counties are not statistically significant. Using county specific prevalence, there were approximately 85,000 children underweight in Liberia at the time of the survey.

Table 10: *Prevalence of Global, Moderate and Severe Acute Underweight status (Weight-for-Age Z-score) in children 6 to 59 months by county (WHO 2006)*

Underweight – WHO	# Under-	Under-weight	95% Conf. Interval	Prev of Mod	95% Conf. Interval	Prev of Sev	95% Conf. Interval	n
BOMI	50	**16.6%**	12.1% - 22.2%	12.6%	9.0% - 17.3%	4.0%	2.4% - 6.5%	302
BONG	67	16.0%	12.5% - 20.3%	13.1%	10.2% - 16.7%	2.9%	1.6% - 5.1%	419
GBARPOLU	47	14.0%	10.5% - 18.4%	12.8%	9.5% - 17.0%	1.2%	0.5% - 3.0%	336
GRAND BASSA	60	15.5%	11.7% - 20.3%	12.7%	9.2% - 17.2%	2.8%	1.5% - 5.3%	387
GRAND CAPE	71	15.8%	12.6% - 19.5%	12.2%	9.3% - 16.0%	3.6%	1.9% - 6.6%	450
GRAND GEDEH	68	**16.4%**	12.3% - 21.6%	13.8%	10.2% - 18.4%	2.7%	1.2% - 5.9%	414
GRAND KRU	56	13.2%	9.7% - 17.8%	12.3%	8.8% - 17.0%	0.9%	0.4% - 2.5%	423
LOFA	64	14.2%	10.0% - 19.9%	12.0%	8.2% - 17.3%	2.2%	1.2% - 4.1%	449
MARGIBI	55	15.1%	10.5% - 21.2%	13.2%	9.3% - 18.3%	1.9%	0.8% - 4.5%	365
MARYLAND	47	14.5%	10.9% - 18.9%	11.4%	8.6% - 14.9%	3.1%	1.8% - 5.1%	325
MONROVIA	56	**17.0%**	13.0% - 22.0%	14.6%	10.9% - 19.3%	2.4%	1.1% - 5.2%	329
NIMBA	59	13.8%	10.4% - 18.0%	12.1%	8.6% - 16.9%	1.6%	0.7% - 3.5%	428
RIVER GEE	40	**10.6%**	7.8% - 14.1%	8.7%	6.5% - 11.6%	1.8%	0.8% - 4.5%	379
RIVERCESS	79	**17.8%**	13.8% - 23.0%	15.1%	11.3% - 19.7%	2.7%	1.7% - 5.0%	445
RURAL	43	**11.5%**	8.9% - 14.8%	10.7%	8.3% - 13.7%	0.8%	0.2% - 3.5%	374
SINOE	71	15.4%	12.6% - 19.0%	13.0%	10.5% - 16.4%	2.4%	1.3% - 4.3%	463
Overall	**933**	**14.9%**	**13.9% - 15.9%**	**12.5%**	**11.7% - 13.5%**	**2.3%**	**2.0% - 2.7%**	**6288**

As with chronic malnutrition, trends must be examined separately for the different reference standards on the underweight prevalence. In both cases, improvements have been seen in levels of underweight in the overall population. Using the NCHS standards, underweight improved from 26.8% to 20.4% over the 4 year period. With WHO reference standards, there was nearly a 2 percentage point change over the 2 year period, from 16.6% down to 14.9%. Neither the 2006 nor the 2008 reports present confidence intervals, therefore, it is not known if these improvements are significant.



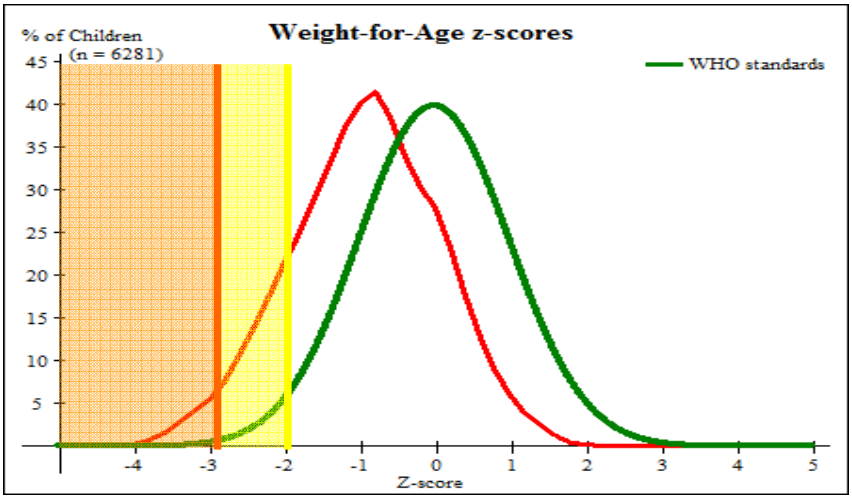


Figure 6: Weight/Age Distribution Curve compared to WHO reference standards

The distribution of children by weight/age mirrors that of the WHO reference standard; however, it is shifted to the left substantially (see Figure 6). The orange and yellow areas represent the children who are severely and moderately underweight, respectively.

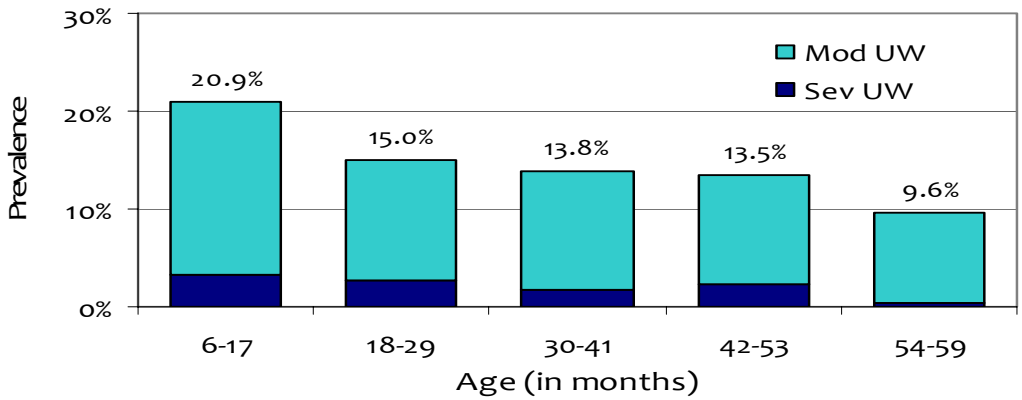
As shown in Table 11, by sex, more boys are underweight (16.5%) than girls (13.2%). The difference is statistically significant at the national level. Though not significant, nearly all counties, with the exception of Grand Gedeh and Monrovia, demonstrate the same situation – higher underweight prevalence for boys than for girls.

Table 11: *Prevalence of Global, Moderate and Severe Acute Underweight status (Weight-for-Age Z-score) in children 6 to 59 months by sex and by county (WHO 2006)*

Underweight – WHO	Boys				Girls			
	UW	95% Conf.		n	UW	95% Conf.		n
BOMI	19.5%	13.1%	28.0%	149	13.8%	9.4%	19.5%	153
BONG	16.5%	12.2%	21.9%	206	15.5%	10.6%	22.1%	213
GBARPOLU	16.5%	11.1%	23.8%	176	11.3%	7.5%	16.6%	160
GRAND BASSA	17.0%	11.8%	24.0%	188	14.1%	9.6%	20.2%	199
GRAND CAPE	18.9%	14.8%	23.9%	227	12.6%	8.4%	18.4%	223
GRAND GEDEH	15.2%	10.1%	22.2%	217	17.8%	12.9%	24.0%	197
GRAND KRU	16.3%	10.8%	23.8%	203	10.5%	7.2%	14.9%	220
LOFA	16.9%	10.9%	25.3%	219	11.7%	7.7%	17.5%	230
MARGIBI	17.2%	11.8%	24.5%	203	12.3%	7.0%	20.7%	162
MARYLAND	16.4%	10.6%	24.5%	165	12.5%	7.3%	20.6%	160
MONROVIA	16.5%	11.0%	23.9%	170	17.6%	11.5%	25.9%	159
NIMBA	14.8%	9.8%	21.6%	230	12.6%	8.2%	19.0%	198
RIVER GEE	10.7%	7.2%	15.5%	206	10.4%	6.7%	15.8%	173
RIVERCESS	19.1%	14.3%	25.9%	225	16.4%	10.7%	24.3%	220
RURAL	13.0%	9.1%	18.2%	177	10.2%	6.8%	14.9%	197
SINOE	18.9%	14.5%	25.2%	217	12.2%	9.3%	15.9%	246
Overall	**16.5%**	**15.2%**	**18.0%**	**317**	**13.2%**	**12.0%**	**14.5%**	**311**

Breakdown of underweight prevalence by age shows a similar pattern to that of acute malnutrition, with the youngest age group worst off (20.9%) and gradual improvements are seen in the older age groups. The oldest age group is the best off (9.6%) with prevalence of approximately half that of the youngest children. Figure 7 depicts this trend in underweight by age group.

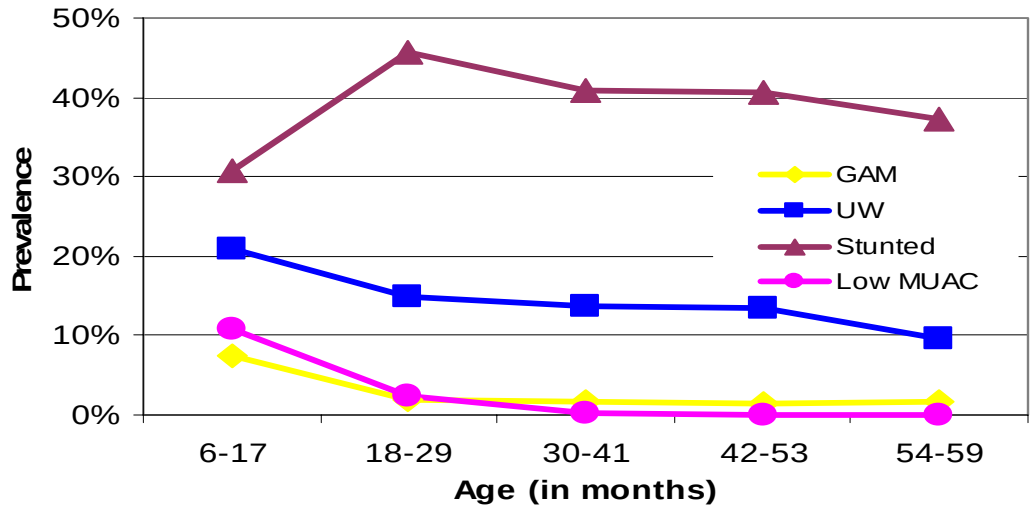
Figure 7: Overall prevalence of Moderate and Severe Underweight by age



Chronic and Acute Malnutrition Trends by Age

As discussed above and shown in Figure 8, chronic and acute malnutrition have different patterns based upon a child's age. With the acute malnutrition indicators (GAM and Low MUAC), children from 6-17 months are the most affected, with a decrease that remains stable from 18 months through to 59 months. Chronic malnutrition, measured by stuntedness, shows the reverse scenario for the youngest two age groups - approximately one in three children have low height/age in the 6-17 months group increasing up to almost one in two children in the 18-29 months group. Underweight closely follows acute malnutrition from 6-29 months and then takes the pattern of chronic malnutrition for the older children (30-59 months).

Figure 8: Malnutrition by age in months (W/A, H/A, W/H, MUAC)



4.1.2 Infant and Young Child Feeding Practices

Infant and young child feeding practices (IYCF) affect the health of both mothers and children. Breastfeeding has been shown to have beneficial effects on the nutritional status, morbidity, and mortality of young children. Mothers and caretakers of children 0-24 months were interviewed to establish current practices regarding IYCF. 3,305 children were included in this analysis, although not all children had complete information so the number of children included for each indicator varies.

Overall, there appears to be some progress in IYCF practices as demonstrated in Figure 9 and Table 12, which compares the trends from 2006, 2008 and the current survey.

Figure 9: Trends in IYCF practices, 2006, 2008 and 2010

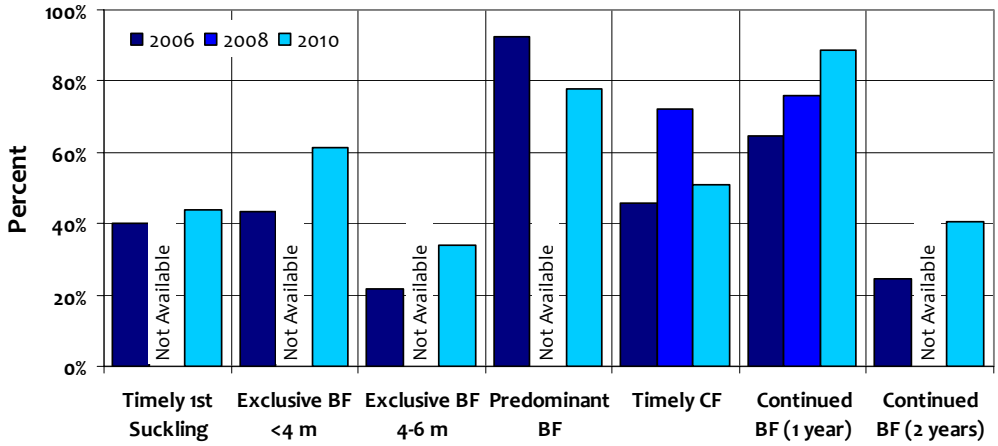


Table 12: Prevalence of Recommended Infant and Young Child Feeding Practices

	Age group	2006	2008	**2010**
Timely first suckling	0-24 months	39.9%		**44.1%**
Exclusive Breastfeeding Rate <4 months	<4 months	43.3%		**61.4%**
Exclusive Breastfeeding Rate up to 6 months	4-6 months	21.7%		**34.0%**
Predominant breastfeeding rate	<6 months	92.6%		**78.0%**
Timely complementary feeding rate	6-9 months	45.6%	72.3%	**50.8%**
Continued breastfeeding rate (1 year)	12-15 months	64.4%	76.0%	**88.7%**
Continued breastfeeding rate (2 years)	20-23 months	24.7%		**40.6%**

A summary of the findings are as follows:

Ever breastfed: Almost all Liberian young children breastfeed sometime before they turn two years old. The overall rate of 'ever breastfeeding' is 99.3percent, with a very small range between the counties from 98.3-100.0percent; Monrovia, Bomi and Rural Montserrado are the counties with the lowest 'ever breastfed' rate. However, other IYCF practices are not quite as universal.

Timely first suckling: 44.1 percent of Liberian children initiate breastfeeding within one hour of birth, up from 39.9percent in 2006, while 89.2percent suckle the first time within their first 24 hours of life. The range between the counties for first suckling within an hour of birth is vast – from 8.1-73.5percent, with Nimba having the best practices, followed by Grand Cape Mount (72.9%) and River Gee (60.5%); Grand Kru, Bong and Rural Montserrado all have less than 20% of children suckling within an hour of birth. The rate of suckling within the first 24 hours is generally high, most counties fall around 80-100 percent; there are two exceptions where the results hover around 30percent but they are suspected to be erroneous and therefore will not be highlighted.

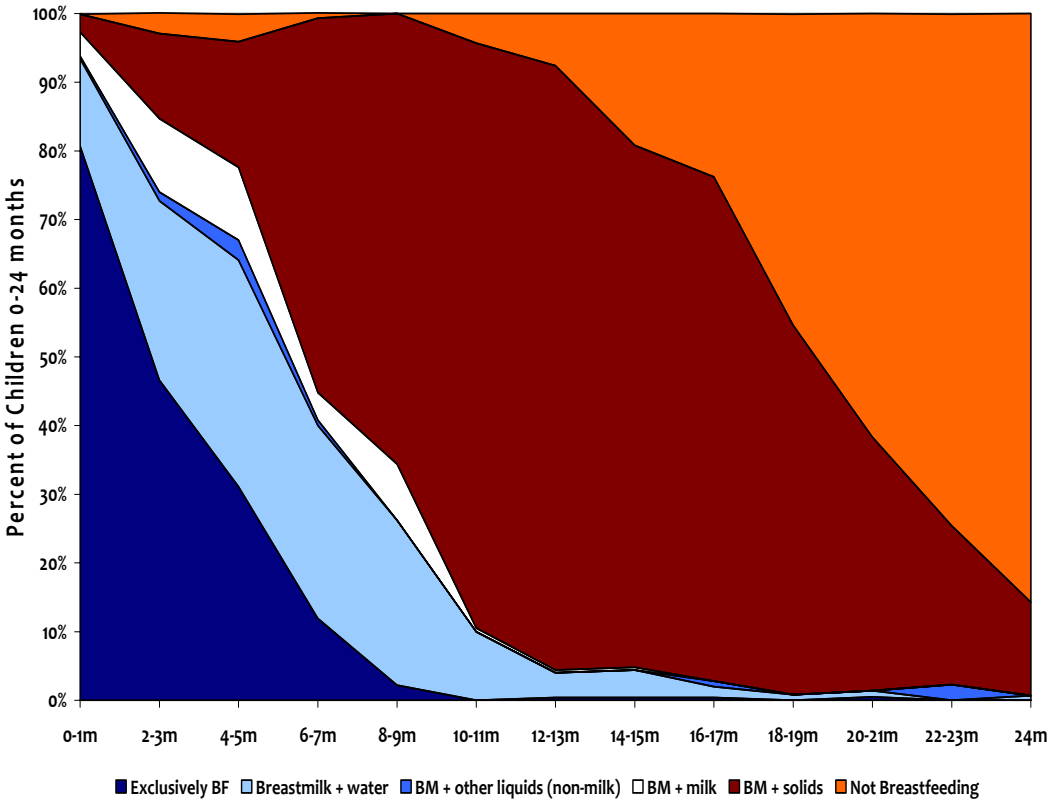
Currently breastfed: Just over three quarters of children two years and younger are currently breastfeeding, with a county range from 66.2-89.4percent. Highest rates are in Sinoe, Grand Gedeh, Nimba, Gbarpolu and Margibi all with rates above 80percent. Bomi is the only county with rates falling below 70 percent.

Duration of breastfeeding: On average, children in Liberia breastfeed for 12.4 months. Counties mean breastfeeding duration ranges from 5.9-16.1 months with Sinoe children breastfeeding for the shortest time (5.9 months), and Nimba and Rural Montserrado breastfeeding for the longest time, 15.6 and 16.1 months respectively.

Bottle feeding: Overall, one in eight children (12.4%) used a feeding bottle in the 24 hour period before the survey. At the county level, 0.5-11.6percent of children were bottle fed, with one remarkable exception – one third of Monrovia's children received a bottle the day before the survey. Margibi and Grand Cape Mount were among the highest usage of bottles, 11.6 percent and 8.1percent respectively. Grand Kru, River Gee and Grand Gedeh had exceptionally low rate of bottle feeding, all with 1percent or less.

As demonstrated in Figure 10, many children are breastfed well into their second year of life, however, few are exclusively breastfed for the full first 6 months of life and more than 80% of children have been weaned before their 2nd birthday. A small percentage of children begin complementary feeding nearly from birth (2.6%) but almost one third begin too early, i.e. before 6 months of age. Conversely, many children initiate complementary feeding too late: just over half of 6-7 month olds hadn't started eating complementary foods at the time of the survey, and 33% of 8-9 month olds also hadn't started. By 10-11 months old, just over 85% of children have started eating complementary foods; however, this is too late for the child's nutritional needs and likely impacts on their health and development.

Figure 10: Breastfeeding and Complementary Feeding Practices by Age



Although the survey collected information on the number of times children were fed the previous day, the quality of the data is debatable as it seems that the question was not sufficiently standardized to obtain comparable data. The overall mean feeding frequency was found to be 2.33,

with breastfed children being fed slightly less often (2.29 times) than those that have already been weaned (2.42 times).

4.1.3 Children's Health

Mothers/caretakers were asked about illness amongst their children under 5 years old in the two weeks preceding the survey. Overall, morbidity was high – half the children had fever within that time frame and 43% complained of cough, taken as an indicator of Acute Respiratory Infection (ARI); far fewer children, 15.2%, had diarrhea during the recall period (see Table 13). Only 28% of children in the survey did not have any illness in the two weeks preceding the interview. Counties with the highest prevalence of child illness were: Rural Montserrado, Nimba, Gbarpolu, Grand Gedeh and Grand Kru, all with greater than 80% of children suffering from at least one illness during the recall period. Monrovia and Lofa demonstrated lower levels of child morbidity, with Bomi also having the fewest children with diarrhea.

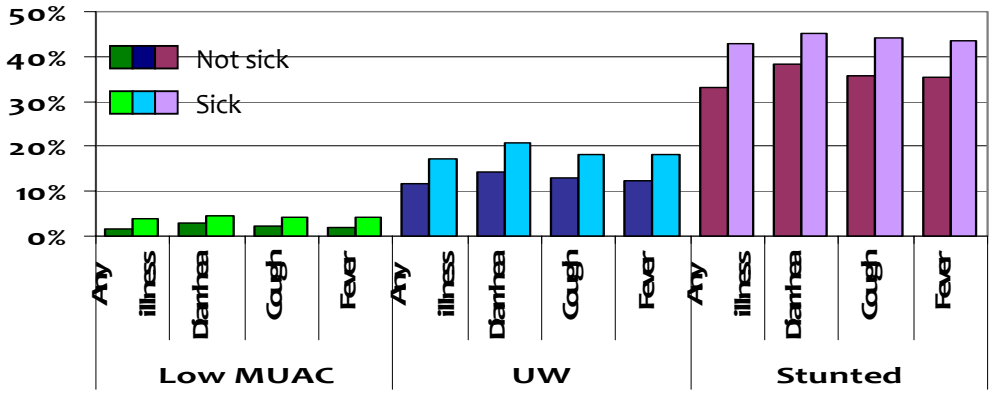
Table 13: Child morbidity by county

	Any illness	Diarrhea	Cough	Fever	n
BOMI	**58.1%**	**7.7%**	47.8%	47.5%	364
BONG	79.9%	**31.4%**	**55.5%**	58.0%	510
GBARPOLU	**82.3%**	18.9%	**57.8%**	**61.1%**	438
GRAND BASSA	74.9%	16.1%	50.3%	**60.7%**	453
GRAND CAPE MOUNT	71.1%	11.8%	53.8%	59.7%	559
GRAND GEDEH	**81.5%**	**26.6%**	**62.2%**	**68.9%**	489
GRAND KRU	**81.0%**	**27.2%**	48.4%	52.7%	497
LOFA	**54.4%**	**3.2%**	**34.1%**	45.9%	525
MARGIBI	68.8%	12.9%	43.6%	49.3%	420
MARYLAND	64.3%	10.1%	53.3%	52.5%	415
MONROVIA	**36.3%**	**1.8%**	**26.9%**	**29.9%**	394
NIMBA	**84.0%**	**33.1%**	52.1%	**70.8%**	486
RIVER GEE	75.8%	20.1%	51.3%	**63.8%**	461
RIVERCESS	76.5%	23.8%	42.1%	51.8%	523
RURAL MONTSERRADO	**86.7%**	24.9%	50.1%	55.2%	449
SINOE	67.9%	15.7%	45.7%	52.0%	540
Overall	**63.5%**	**15.2%**	**43.2%**	**50.1%**	**7523**

Children's Health and Nutrition

It is commonly known that child health and nutrition are interlinked, whereby sick children are more likely to become malnourished and vice versa. In the survey, sick children, whether with diarrhea, cough, fever or any combination of the three (any illness), had statistically higher levels of malnutrition as shown in Figure 11. With the importance of aggravating relationship, all later analyses will look not only at the relationship between malnutrition and various household and family characteristics, but also at their relationships with child illness.

Figure 11: Malnutrition by child illness (all differences are statistically significant)



4.1.4 Nutritional Status of Women

All women of reproductive age (15-49 years old) were assessed to determine their nutritional status, measuring their weight, height and MUAC. These measurements were used to determine each woman's body mass index (BMI), stuntedness, and low MUAC. Pregnant women were analysed separately for low MUAC and were not included in the BMI analysis.

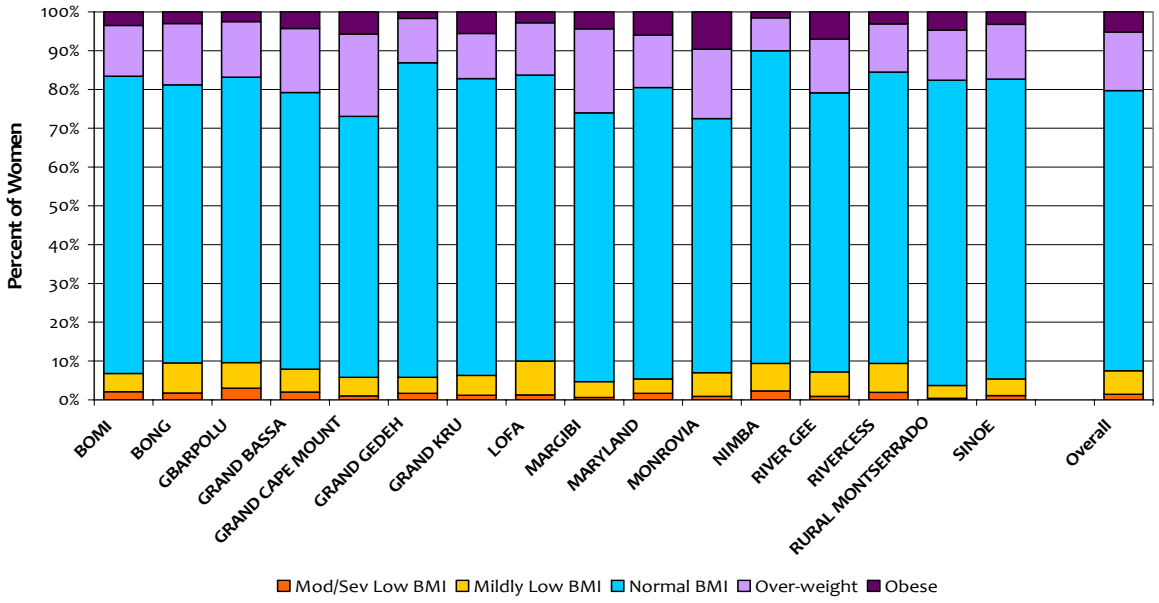
Body Mass Index

Among non-pregnant women, the overall prevalence of Low BMI (or under-nutrition) was 7.5%, while the prevalence of High BMI (or over-nutrition) was more than double under-nutrition, at 20.3%. Counties with the worst under-nutrition by BMI were Lofa, Gbarpolu, Bong, Rivercess and Nimba, all with levels above 9%; on the contrary, counties with the least under-nutrition were Margibi and Rural Montserrado, both with less than 5% of women with Low BMI (see Table 14). While Margibi had low under-nutrition, it was among the worst counties for over-nutrition, along with Monrovia and Grand Cape Mount, with levels of over-nutrition greater than 21%. Nimba, with high levels of under-nutrition, had the lowest prevalence of over-nutrition, along with Grand Gedeh, both with less than 15% over-nutrition in women of reproductive age. It must be emphasized that over-nutrition in women in Liberia is more prevalent than under-nutrition; although they are occurring simultaneously. The consequences of over-nutrition must be considered as they are often overlooked and are different from those of under-nutrition.

Table 14: *Low and high BMI in women of reproductive age (by county & national)*

	n	Total	Mod/Sev	Mildly	Total	Over-weight	Obese	Mean
BOMI	427	6.8%	2.1%	4.7%	16.6%	13.1%	3.5%	22.53
BONG	506	**9.5%**	1.8%	7.7%	18.8%	15.8%	3.0%	22.47
GBARPOLU	440	**9.6%**	3.0%	6.6%	16.8%	14.3%	2.5%	22.27
GRAND BASSA	460	7.9%	2.0%	5.9%	20.8%	16.5%	4.3%	22.63
GRAND CAPE	505	5.8%	1.0%	4.8%	**26.9%**	21.2%	5.7%	23.25
GRAND GEDEH	458	5.8%	1.7%	4.1%	**13.1%**	11.4%	1.7%	22.03
GRAND KRU	414	6.3%	1.2%	5.1%	17.2%	11.6%	5.6%	22.63
LOFA	542	**10.0%**	1.3%	8.7%	16.3%	13.5%	2.8%	22.03
MARGIBI	482	**4.7%**	0.6%	4.1%	**26.0%**	21.6%	4.4%	23.38
MARYLAND	535	5.4%	1.7%	3.7%	19.5%	13.5%	6.0%	23.09
MONROVIA	655	7.0%	0.9%	6.1%	**27.5%**	17.9%	9.6%	23.64
NIMBA	519	**9.4%**	2.3%	7.1%	**10.0%**	8.5%	1.5%	21.74
RIVER GEE	445	7.2%	0.9%	6.3%	20.9%	13.0%	7.0%	22.96
RIVERCESS	426	**9.4%**	1.9%	7.5%	15.5%	12.4%	3.1%	22.18
RURAL	451	**3.7%**	0.4%	3.3%	17.6%	12.9%	4.7%	22.93
SINOE	462	5.4%	1.1%	4.3%	17.3%	14.1%	3.2%	22.67
Overall	**7727**		**1.4%**	**6.1%**		**15.1%**	**5.2%**	**22.79**

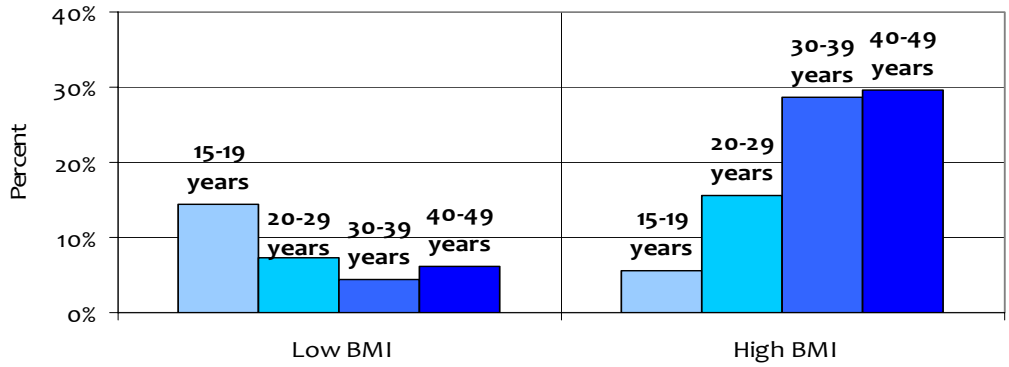
Figure 12: Low and high BMI in women of reproductive age (by county & national)



Trends over the past several years indicate that under-nutrition in women of reproductive age has improved. In both the 2006 and the 2008 survey, approximately 13% of women had low BMI, as compared to 7.5% of women currently. The prevalence of low BMI by county is presented in Figure 12.

By age, there is an interesting although intuitive relationship between under and over-nutrition as shown in Figure 13. Prevalence of under-nutrition is greatest in younger women (~15%), decreasing up to women in their 30's (<5%), and then increasing slightly when women are in their 40s. In Liberia where teen-age pregnancy is very common, the under-nutrition seen in the 15-19 year old age group is worrying, particularly given that the nutritional status of women before pregnancy is linked to the future nutritional status of her child. Over-nutrition, likewise, is in the intuitive direction – as women get older, they have a higher prevalence of over-nutrition. Women from 15-19 years have just over 5% over-nourished, while almost 30% of women in their 30's and 40's are over-nourished.

Figure 13: Overall low and high BMI in women by age group



Stuntedness amongst Women

Stuntedness was only found in 2.6% of women nationally, with a range from 1.6-5.9%. Bomi and River Gee Counties had the highest prevalence of stuntedness in women, with ≥5percent as shown in Table 15. Rural Montserrado, Lofa, Grand Kru, Nimba and Grand Gedeh all had less than 2% of women stunted. The stunted prevalence is highest in women from 15-19 years (6.3%), while

prevalence is only at 2.2% amongst 20-29 yearrs age group, 1.3% for those aged 30-39 years and 2.1% for the age group 40-49 years.

Table 15: Stunted Prevalence in women of reproductive age by county

	Stunted	n
BOMI	**5.0%**	458
BONG	2.0%	562
GBARPOLU	3.7%	484
GRAND BASSA	3.3%	490
GRAND CAPE MOUNT	2.8%	565
GRAND GEDEH	**1.9%**	518
GRAND KRU	**1.8%**	495
LOFA	**1.7%**	590
MARGIBI	4.7%	553
MARYLAND	3.5%	568
MONROVIA	2.2%	683
NIMBA	**1.9%**	593
RIVER GEE	**5.9%**	493
RIVERCESS	4.8%	457
RURAL MONTSERRADO	**1.6%**	503
SINOE	3.4%	529
Overall	**2.6%**	**8541**

Low MUAC amongst Women

As was the case with acute malnutrition in children, low MUAC in women was not common, with only 2.3% of non-pregnant women and 0.9% of pregnant women presenting with low MUAC. The range for low MUAC prevalence was 0.4-5.8% in non-pregnant women and 0-6.4% in pregnant women. In non-pregnant women, Maryland and Rural Montserrado faired the worst, both with a prevalence of low MUAC greater than 4.0%, while Margibi and Grand Cape Mount had 1% or fewer women with low MUAC. As the nutritional status of women before and during pregnancy is closely tied to that of their children, under-nutrition in pregnant women has long-term implications and therefore should be eradicated; six counties presented pregnant women with low MUAC: Lofa, Rural Montserrado, Rivercess, Bomi, Grand Kru and Grand Cape Mount.

As with the other indicators of malnutrition in women, low MUAC is more prevalent in teenage women than in any other age group, with 7% malnourished by MUAC. In older non-pregnant women, all age groups have 1-2% of women with low MUAC. As shown in Table 16, the same finding is true with pregnant women, where 3.7% of pregnant teenage women have low MUAC, while pregnant women in the older age groups all have less than 1% low MUAC.

Table 16: Low MUAC in non-pregnant and pregnant women by county

***Note:** As the number of pregnant women in the sample is very low, the actual prevalence of Low MUAC is not a meaningful way to compare the counties; the figures should be used with caution. Therefore, presence of Low MUAC in pregnant women has been used to highlight where malnutrition occurs in this population.*

	Non-pregnant		Pregnant Women	
	Low	N	Low MUAC	n
BOMI	2.3%	430	**3.4%**	29
BONG	1.6%	505	0.0%	55
GBARPOLU	1.4%	442	0.0%	42
GRAND BASSA	3.0%	460	0.0%	29
GRAND CAPE	**1.0%**	506	**1.7%**	58
GRAND GEDEH	1.3%	459	0.0%	58
GRAND KRU	2.4%	415	**2.5%**	80
LOFA	1.5%	542	**6.4%**	47
MARGIBI	**0.4%**	482	0.0%	69
MARYLAND	**5.8%**	536	0.0%	33
MONROVIA	2.5%	652	0.0%	27
NIMBA	2.5%	519	0.0%	75
RIVER GEE	2.2%	447	0.0%	45
RIVERCESS	2.8%	426	**3.6%**	28
RURAL	**4.5%**	449	**3.8%**	52
SINOE	1.1%	465	0.0%	65
Overall	**2.3%**	**7735**	**0.9%**	**792**

Low MUAC in non-pregnant and pregnant women				
	Non-pregnant		Pregnant Women	
	Low	n	Low	n
15-19	**7.0%**	1184	**3.7%**	98
20-29	1.4%	2655	0.8%	363
30-39	1.0%	2531	0.4%	275
40-49	1.6%	1353	0.0%	54
Overall	2.3%	7723	1.0%	790

4.1.5 Linkage Between Mother & Child Nutrition

It has been well documented that a child's nutritional status is closely linked to that of their mother. While all women of reproductive age were assessed for their nutritional status, some basic information was obtained specifically regarding the mothers/caretakers of children in the survey. In this section, first the characteristics of mothers/caretakers will be presented, followed by an analysis relating her demographic information with the nutritional and health status of her child.

a) Characteristics of Mothers/Caretakers

The vast majority of children in the survey (87.5%) are cared for directly by their biological mother while another 9% are cared for by their grandmother. Figure 14 and 15 display details on children's main caretaker. Mothers/caretakers ranged in age between 15 and 74 years old with almost half of them between 20-29 years old. Educational attainment of mothers/caretakers is shown in Figure 16, with almost half of mothers having no education at all and another 25% with some primary school.

Figure 14: Childs main caretaker

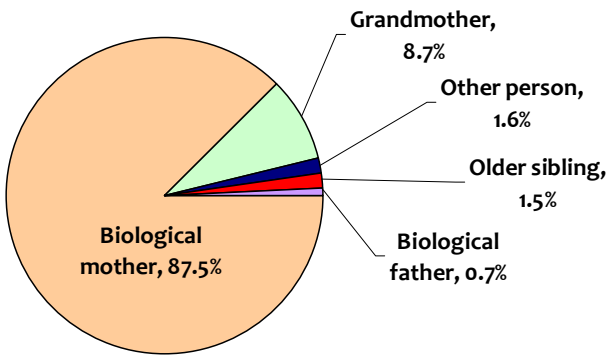


Figure15 Mothers/Caretakers Age

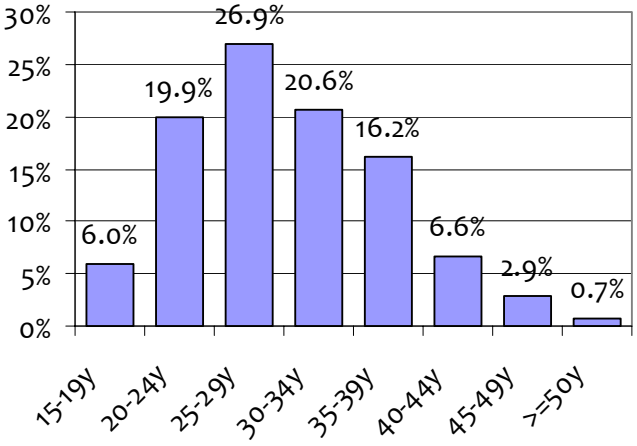
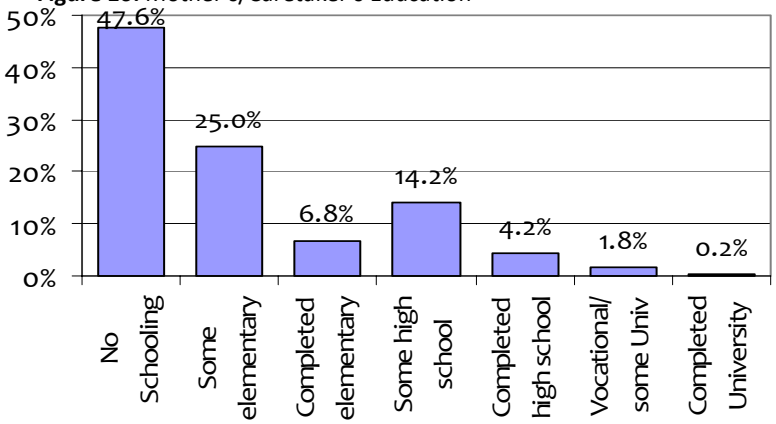


Figure 16: Mother's/Caretaker's Education

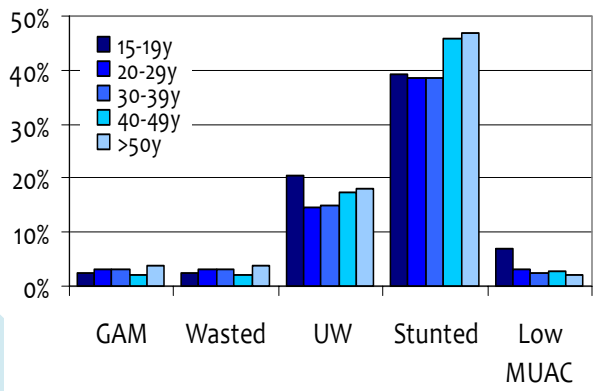


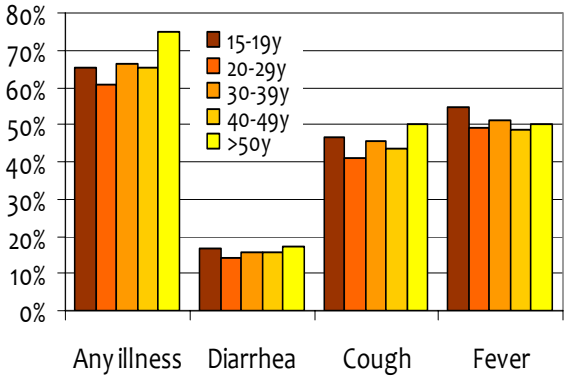
(b) Child Malnutrition and illness related to Mother's/Caretaker's Characteristics and Nutritional Status

Mother's/Caretaker's Age

Malnutrition and child illness are less common in families where mothers/caretakers are between 20-39 years old; a higher prevalence of stunted and underweight children appear in the younger (15-19 years) and older (>40 years) age mother/caretaker groups. Younger and older mothers/caretakers also tend to have more sick children, however, this is only for the 50 or older age group.

Figure 17: Child Malnutrition and Illness by Mother's/Caretaker's Age





Mother's/Caretaker's Education

It is commonly accepted that maternal/caretaker's education is strongly linked to child health and nutrition. In this survey, the finding confirmed that there are statistically significant differences in acute and chronic malnutrition as well as child illness, with fewer children malnourished or sick when their mother has had more education as shown in Figures 18 and 19.

Figure 18: Child malnutrition by mother's/caretaker's level of education

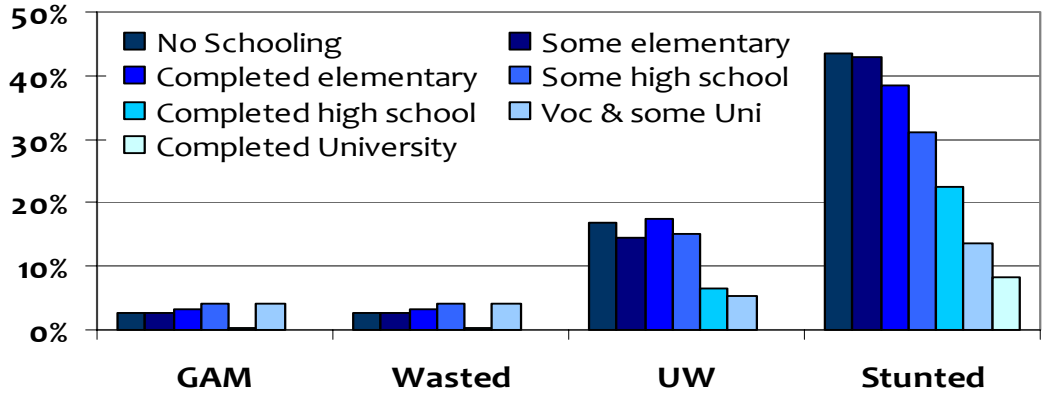
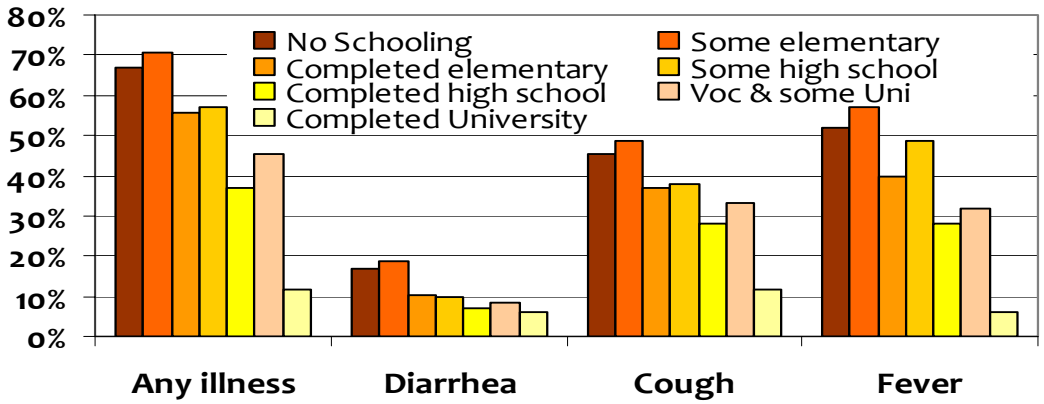


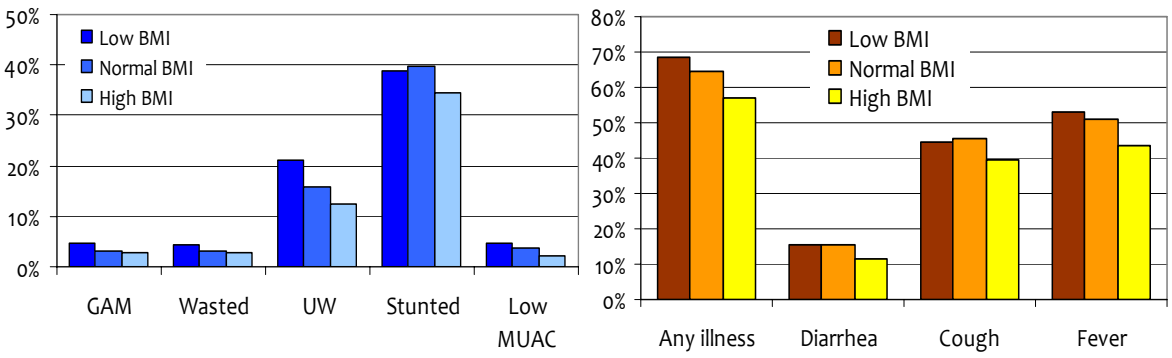
Figure 19: Child illness by mother's/caretaker's level of education



Mother's BMI

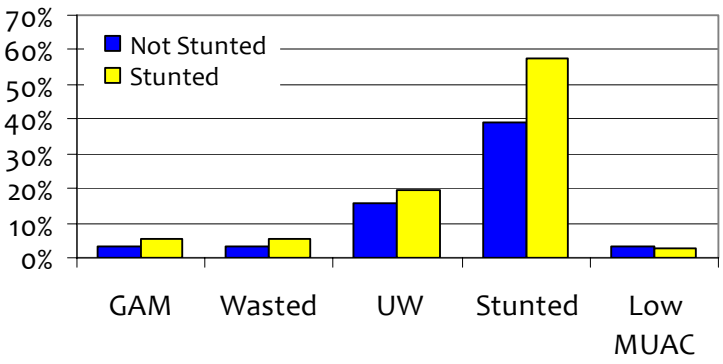
More children are malnourished when their mother is underweight based on low BMI (see Figure 20). These kids are statistically more under-weight, more stunted and have low MUAC. Children of overweight women are less malnourished, while children of normal weight women tend to be somewhere in between.

Figure 20: Child malnutrition and illness by mother's/caretaker's BMI (statistically significant differences for underweight, stunted, low MUAC and all illness variables)



Mother's Stuntedness

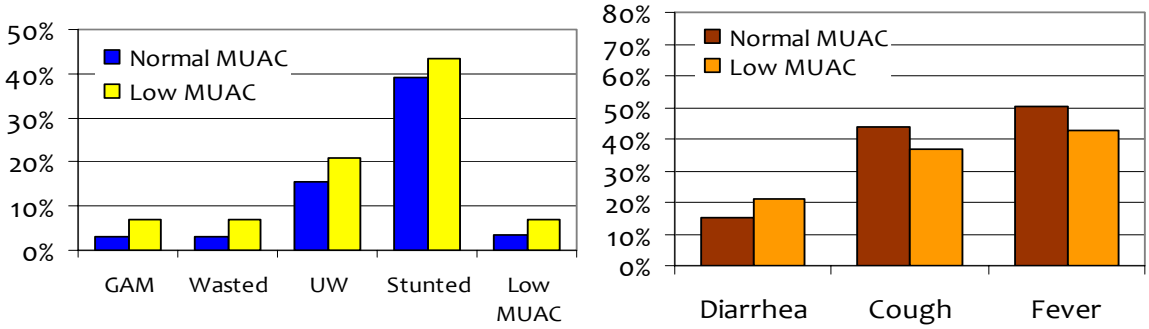
Figure 21: Child malnutrition by mother's/caretaker's stature



In the survey, children of stunted women tended to be more malnourished (GAM, Wasted, UW and Stunted) than children of mothers with normal stature. However, mothers' stuntedness only showed significant relationships with the stuntedness of her child. There was also no relationship seen between stunting amongst mothers and illness in children. This finding confirms the inter-generational cycle of malnutrition amongst Liberian children.

Mother's Low MUAC

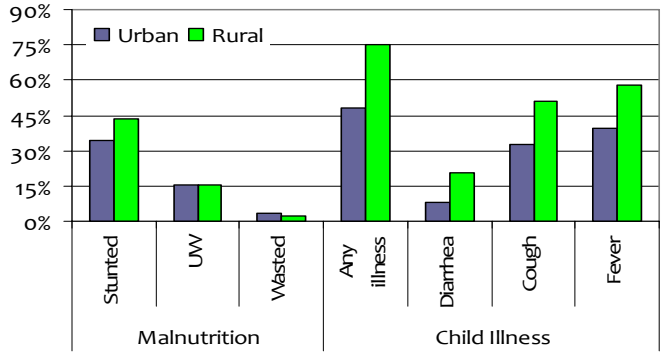
Figure 22: Child malnutrition and illness by mother's/caretaker's MUAC



Children of women with low MUAC tended to be more malnourished than children of women with normal MUAC as shown in Figure 22 The relationships were significant only for acute malnutrition (GAM, Wasted and Low MUAC). With child illness, there were no significant differences found in relation to the mother's/caretaker's MUAC; however, there was a tendency for children of low MUAC mother's to have more diarrhea but less cough and fever.

4.2 Where are the malnourished children?

Figure 23: Malnutrition and child illness by rural/urban



Up to this point, the analysis has covered the question of 'where are the malnourished?' from the county perspective. To highlight, Sinoe and Bomi were among the highest for both acute and chronic malnutrition; Monrovia and Rural Montserrado join them in the worst for acute malnutrition, while Margibi and Grand Bassa are included for chronic malnutrition.

In this section, 'where' will be covered from the urban/rural perspective, as detailed in Table 17. By overall chronic malnutrition, the rural area has more stuntedness than the urban areas; this difference is statistically significant. There is statistically more child illness in the rural areas than in urban areas. These differences are displayed in Figure 23. Typically, urban areas have lower rates of malnutrition and illness, as people living in urban areas generally have better access to services and markets. Additionally, as the survey was carried out during the rainy season, a time when child illness and malnutrition are higher, this could have a higher impact on families living in rural areas, as they are more involved in agricultural activities.

Table 17: Chronic and Acute Malnutrition by Urban/Rural Status and by County

	Stunted				Underweight				Wasted			
	Urban	**N**	**Rural**	**n**	**Urban**	**n**	**Rural**	**n**	**Urban**	**n**	**Rural**	**n**
BOMI	47.4%	38	46.8%	265	15.8%	38	16.7%	264	**10.0%**	40	**2.4%**	289
BONG	**27.5%**	109	**38.9%**	311	**9.0%**	111	**18.5%**	308	1.7%	117	4.0%	328
GBARPOLU	38.8%	31	40.2%	303	14.7%	34	13.9%	302	3.0%	33	3.4%	326
GRAND BASSA	42.2%	109	48.0%	277	**19.3%**	109	**14.0%**	278	**6.4%**	110	**2.2%**	284
GRAND CAPE	25.9%	58	40.4%	401	12.5%	56	16.2%	394	1.7%	59	2.1%	421
GRAND GEDEH	**37.4%**	115	**45.7%**	302	15.0%	114	17.0%	300	4.2%	119	2.3%	308
GRAND KRU	29.4%	17	38.8%	402	11.1%	18	13.3%	405	0.0%	17	1.6%	416
LOFA	**16.3%**	55	**42.6%**	397	**1.8%**	57	**16.1%**	392	0.0%	57	2.2%	413
MARGIBI	54.7%	108	58.3%	254	14.7%	109	15.2%	256	1.8%	109	1.9%	264
MARYLAND	**31.4%**	86	**48.1%**	243	14.3%	84	14.6%	240	2.3%	87	3.0%	267
MONROVIA	31.2%	334	-	-	17.0%	329	-	-	3.8%	345	-	-
NIMBA	**56.6%**	76	**40.9%**	352	9.2%	76	14.7%	352	0.0%	76	1.4%	354
RIVER GEE	**30.1%**	80	**40.9%**	301	7.7%	78	11.3%	301	0.0%	81	1.2%	318
RIVERCESS	41.1%	17	42.1%	425	11.8%	17	18.0%	428	0.0%	17	3.6%	442
RURAL	44.6%	83	38.4%	292	11.9%	84	11.3%	290	4.5%	88	3.4%	323
SINOE	43.1%	72	44.7%	396	15.3%	72	15.3%	391	4.0%	75	3.9%	406
Overall	**34.2%**	**1388**	**43.4%**	**4921**	**15.3%**	**1386**	**15.4%**	**4901**	**3.4%**	**1430**	**2.5%**	**5159**

4.3 Who are the malnourished and sick children?

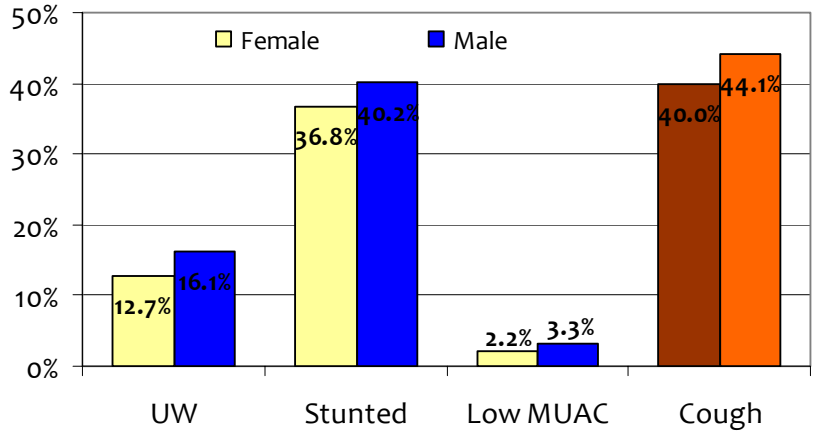
Both malnutrition and child illness are adverse outcomes of a wide range of factors, specifically of poor living conditions, inadequate care, and food insecurity. The two outcomes are interlinked and each one exacerbates the other; in other words, sick children are more likely to get malnourished and malnourished children are more likely to get sick. Therefore, this analysis looks at both malnutrition and child illness in relation to household and family characteristics.

Examining household and family characteristics in relation to malnutrition and child illness can aid in understanding of the underlying relationships between them. ***It is important to emphasize that these relationships do not mean that the characteristic causes malnutrition or illness***, but that they are somehow linked – relationships are very complex and this analysis only shows that malnutrition and illness exist when a certain characteristic is present. For example, malnutrition is higher in households that received food aid – this does not mean that receiving food aid is bad or that it causes children to become malnourished or sick; it could simply reflect that households were selected to receive this assistance based on these vulnerability criteria.

4.3.1 Household Demography and Nutrition

Sex of Head of Household

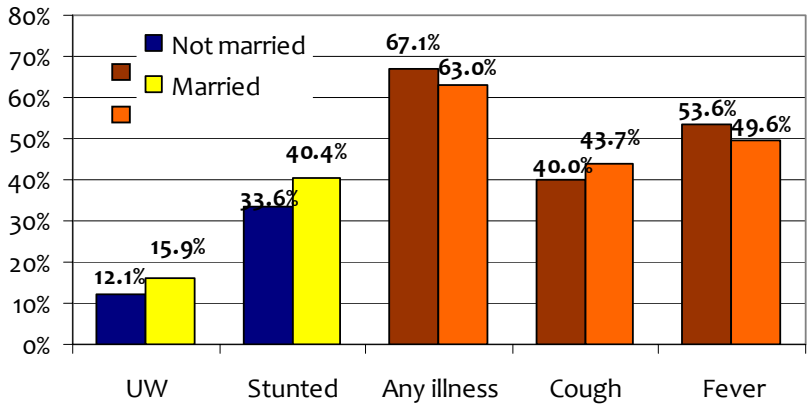
Figure 24: Child malnutrition and illness by sex of head of the household



Although female headed households are considered more vulnerable, in Liberia, fewer children in female-headed households are malnourished than in male headed households; likewise, fewer children had cough in households headed by women than those headed by men (see Figure 24). This finding could be explained by different spending priorities based upon who is in charge of the household or by different care practices for young children when a husband is not around.

Marital status of Head of Household

Figure 25: Marital Status of Head of HH and child malnutrition and illness

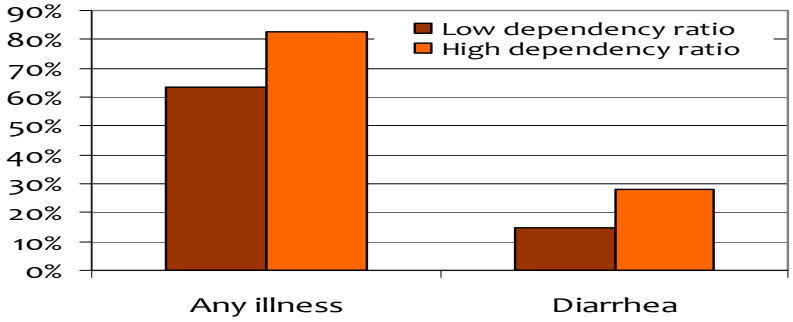


The relationship between child malnutrition and illness and the marital status of the head of the household is not clear: children in households where the head is married have higher malnutrition and higher prevalence of ARI than in households where the head is not married. However, fewer children were sick, and specifically with fever, in households with a married heads than households with an unmarried head. The differences presented in Figure 25 are statistically significantly different.

Dependency Groups

Children in families with high dependency ratios have a statistically significantly higher prevalence of diarrhea and general sickness than children in low dependency ratio families.

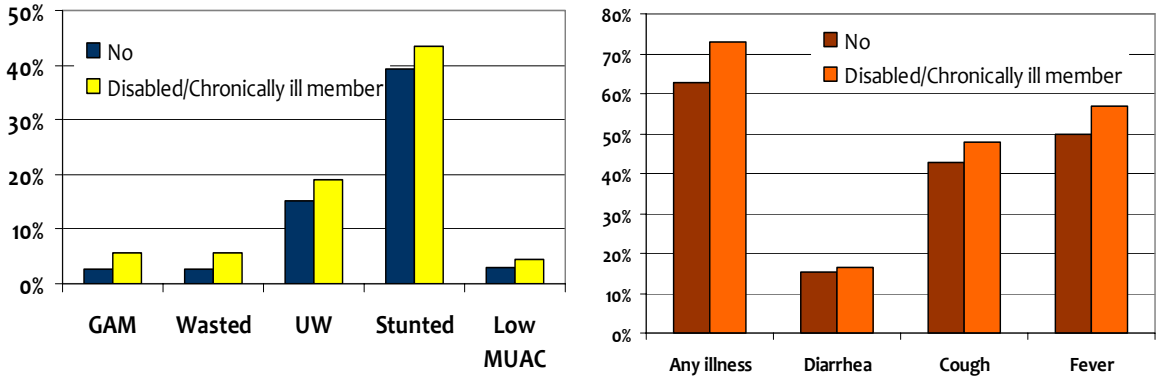
Figure 26: Child illness by dependency ratio (SS differences)



Chronically ill member or disabled member of the household

There was a strong relationship seen between child malnutrition/illness and the presence of a chronically ill or disabled person in the household. There are significantly more children acutely malnourished, underweight and/or sick children in households with chronically ill/disabled members than those without as shown Figure 27.

Figure 27: Child malnutrition and Illness by chronic illness/disability in the household

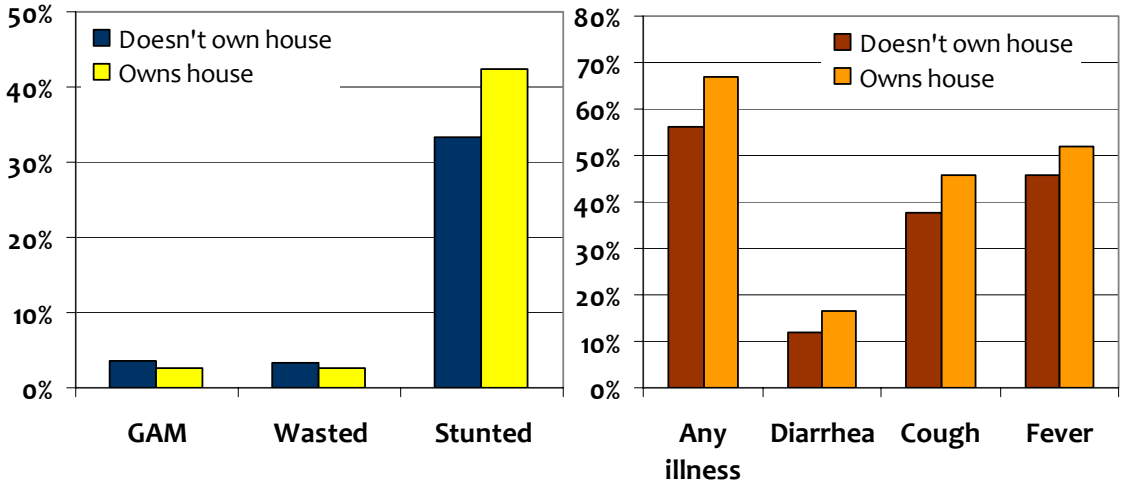


4.3.2 Housing & Living Conditions and Nutrition Status of Children

House ownership

The relationship with household ownership is contrary to expectations. It is seen that house ownership is linked to higher child stuntedness and illness, although it is also linked to lower acute malnutrition as shown in Figure 28. The whole report also indicates that the economies of the rural households are more compromised than urban households. Therefore this particular finding is not surprising given the context.

Figure28: Child malnutrition and illness by house ownership



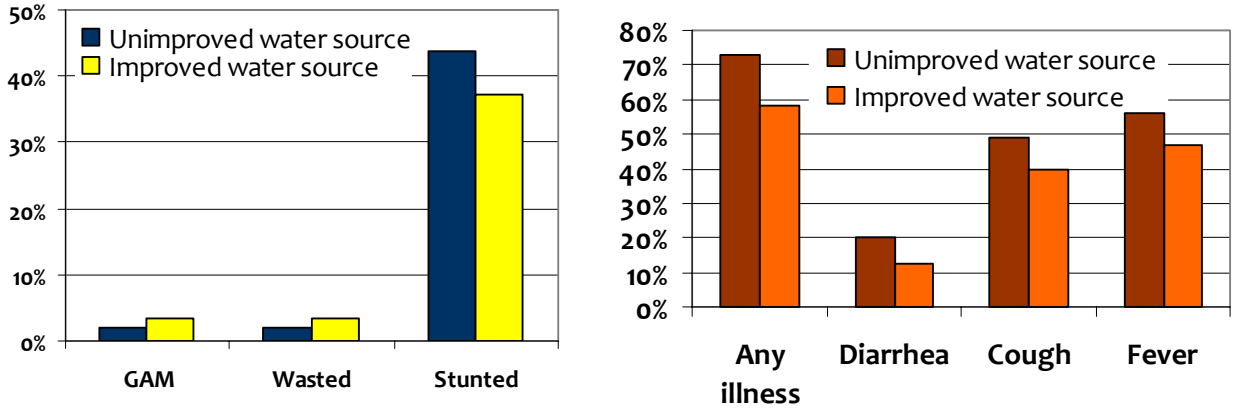
On the other hand the wall and roof conditions, show the reverse situation of that of house ownership, whereby children living in houses of durable materials have lower levels of stuntedness and illness but higher levels of acute malnutrition. This is also in uniformity with the food security findings that indicated higher prevalence of food insecurity amongst families residing in structures whose wall and rood condition are un-durable in section 4 of the main report.

4.3.3 Access to Water & Sanitation Services

Improved water source

Source of drinking water is related to child stuntedness and illness as would be anticipated – fewer children with improved water sources are stunted or sick than those without an improved water source. However, the relationship demonstrates the opposite relationship with acute malnutrition, with a higher prevalence of GAM in children with improved water sources than those with un-improved sources. It has been shown that acute malnutrition is higher in urban areas, where families also have higher access to improved water sources; therefore, the relationship shown between acute malnutrition and water source could simply reflect this urban/rural difference.

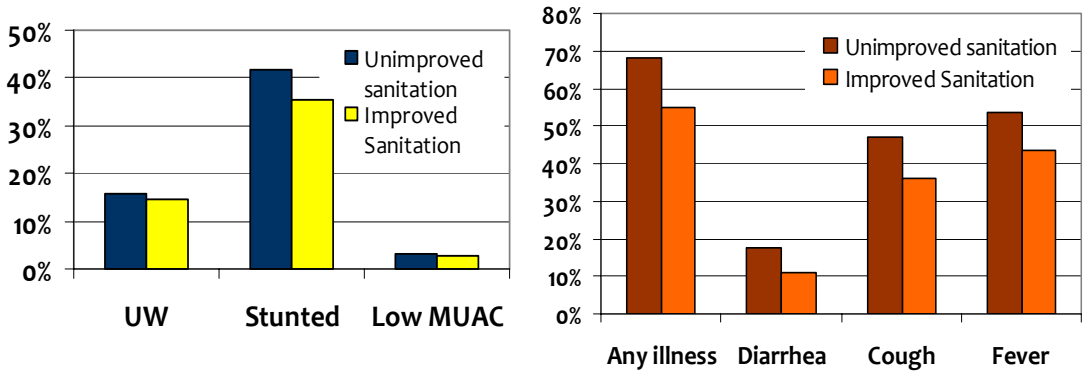
Figure 29: Child malnutrition illness by improved water source



Improved sanitation

Children with improved sanitation facilities have significantly less stuntedness than children without these improved facilities; there are also fewer children underweight and with low MUAC but not significantly so. Improved sanitation facilities showed statistically significant differences in recent child illness for all four indicators. Similar findings were seen in relating food security to sanitation. This may signal that poor sanitation is not only a risk to malnutrition to also food insecurity with an intricate web of viciousness in the indicators.

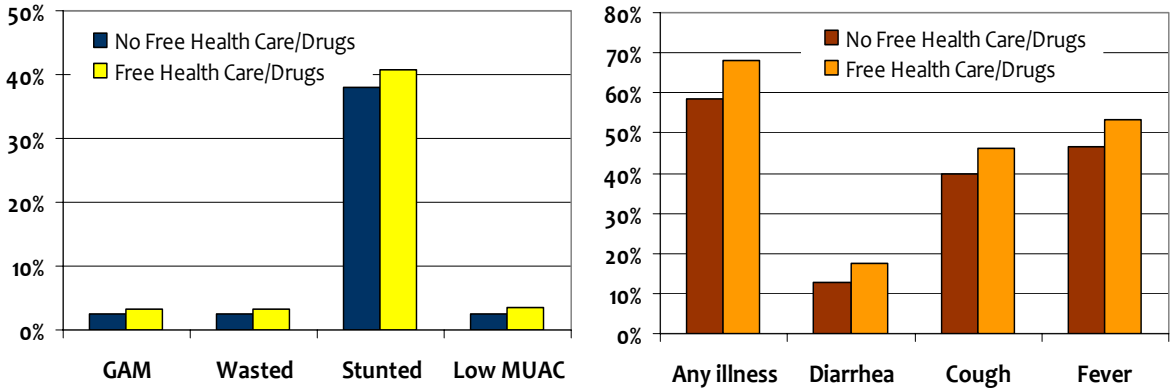
Figure 30: Child malnutrition by use of improved sanitation facilities



4.3.4 Free Health Care and Child Malnutrition & Sickness

Families that have accessed free health care and drugs during the 3 months prior to the survey have significantly more malnourished and sick children ($p<0.05$). This finding is not surprising as those that have sick and/or malnourished children would more often go to the clinic than those with healthier children. It may also mean that this specific assistance is targeting the correct people—in fact those who actually need such assistance.

Figure 31: Child malnutrition and illness by free health care/drugs for the household

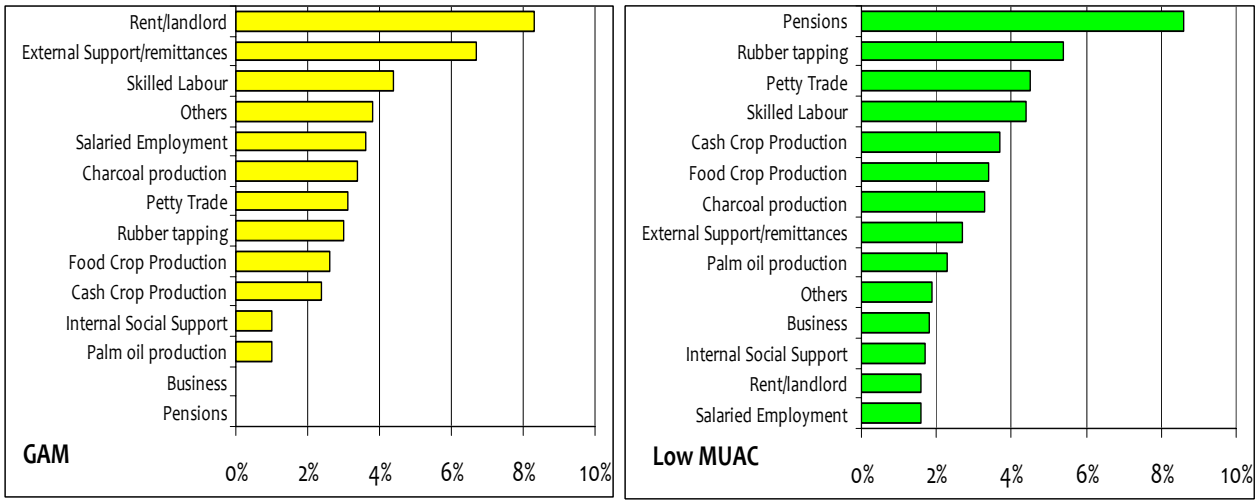


4.3.5 Child Nutrition & Sickness and Household Livelihoods

Acute malnutrition by GAM is lowest in the livelihood groups that produce any type of food, as well as those that receive internal support. Households that rely on businesses and pension did not record acutely malnourished children Other the other hand households that depend on Rent/Landlord, External Support/Remittances, and Skilled Labour indicated that highest prevalence of GAM, greater than 4%. It is notable that livelihoods with relatively high GAM prevalence showed relatively better household food security status and vice versa, contrary to expectation. From the survey, food insecurity, a key determinant of malnutrition showed no relationship to GAM, probably due to the lag between the two indicators although more related to chronic malnutrition.

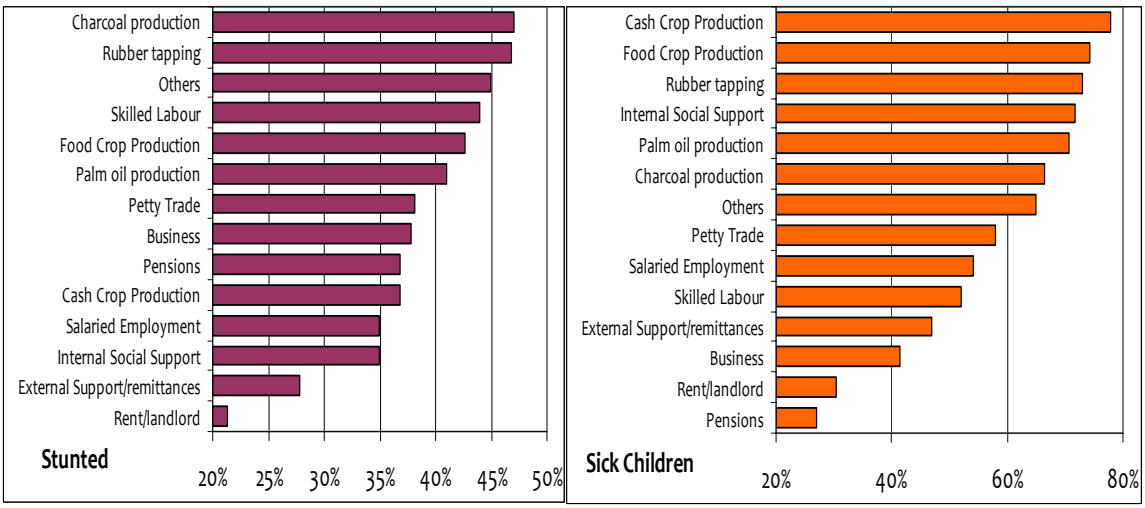
However, looking at the livelihood groups where children have higher prevalence of low MUAC, and therefore increased risk of mortality, it comes out that the following groups are worse off: Pensions, Rubber Tapping, Petty Trade, and Skilled Labour. The children living in households dependent upon Salaried Employment, Rent/Landlord, Internal Social Support, Business or Other have lower prevalence of low MUAC.

Figure 32: Acute malnutrition (GAM and Low MUAC) in children by livelihood groups



On the other hand, relating chronic malnutrition and illness amongst children to livelihoods showed similar pattern to that witnessed for food security and livelihoods (section 3.3.8). The highest levels of stunting have been seen in the children of the following livelihood groups: Charcoal Production, Rubber Tapping, Others and Skilled Labour, all with prevalence of stuntedness of 44% or more. Stuntedness is lowest in the Rent/Landlord, Internal and External Support, and Salaried Employment groups, with 35% stuntedness or less as shown in Figure 33.

Figure 33: Chronic malnutrition and child illness by livelihood groups



Child illness is also commonest amongst the following households dependent on producing Food Crops, Cash Crops, Palm Oil, Rubber Tapping or receiving internal social support, all with greater than 70 percent of their children sick during the two weeks before the survey. Livelihood groups with relatively lower incidences of child sicknesses are: those depending on Pensions, Rent/Landlord, Business, and External Support receivers, all with sickness at levels of less than 50 percent. Interestingly, children within Charcoal Production households have among the highest levels of cough, a proxy indicator for ARI, demonstrating that the living conditions for these families is likely to be inappropriate for optimal health.

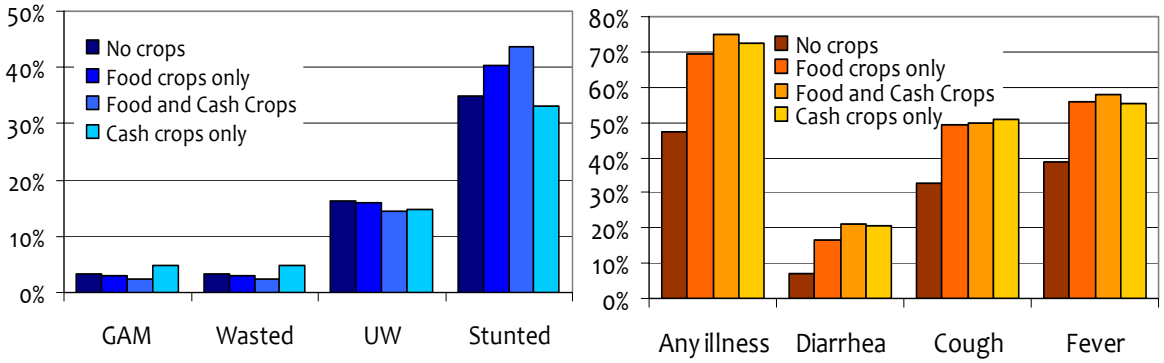
Child malnutrition and sickness was also related to agricultural production patterns reported. While families have many different livelihoods, many are also involved in agriculture as well, either growing crops or raising animals. Relationships related to agricultural production and child nutrition and health are likely to be quite complex given the season of the survey –rainy season and/or hunger gap which should be borne in mind while interpreting the findings.

Households that were not involved in any type of crop production had fewer malnourished and sick children than households involved in any type of crop production. This finding is to likely reflect wealth and geography (urban/rural) more than whether or not a family is in crop production –wealthier families and urban families are less involved in farming activities. These families are also relatively more food insecure (section 3.3).

Of the families that produce crops, the levels of child illness are very similar, with all groups remaining within a few percentage points of each other, differences that are unlikely to be significant. The high level of illness seen in all the crop production groups (Figure 34) is likely a reflection of seasonality, as the survey was carried out in the rainy season when most families were working on their farms.

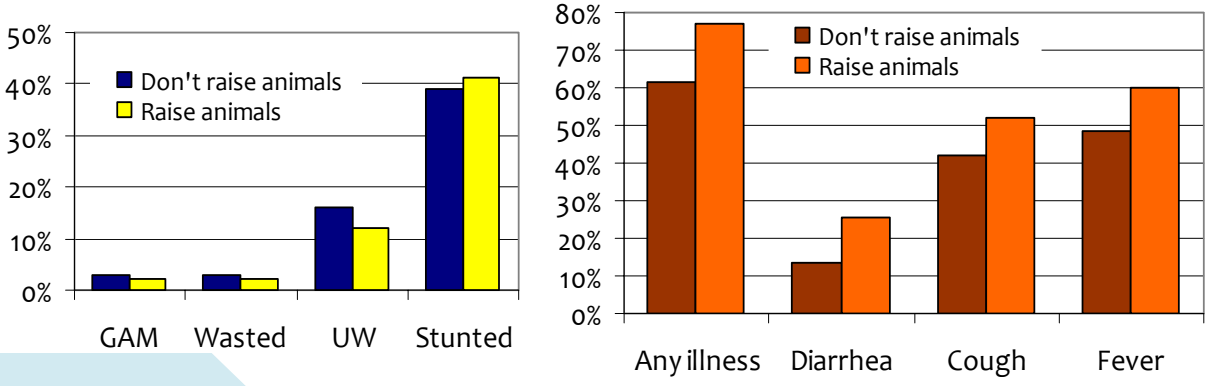
Families that produce only cash crops report higher levels of acute malnutrition than any other group and also the least stunted. Stunting was the worse among the children of families that produced both food and cash crops.

Figure 34: Child malnutrition and illness by crop production



Raising animals also has an interesting effect on child malnutrition and illness as illustrated in Figure 35. While it shows statistically higher rates of illness in children, it also shows better levels of underweight. Logically, raising animals can have positive effects on food security and income; however, it can also have a negative impact upon the living environment.

Figure 35: Child malnutrition and illness by raising animals



Annex 5: Tables and Figures

Figure 5-1: Yields/Hectare-1960 to 2010

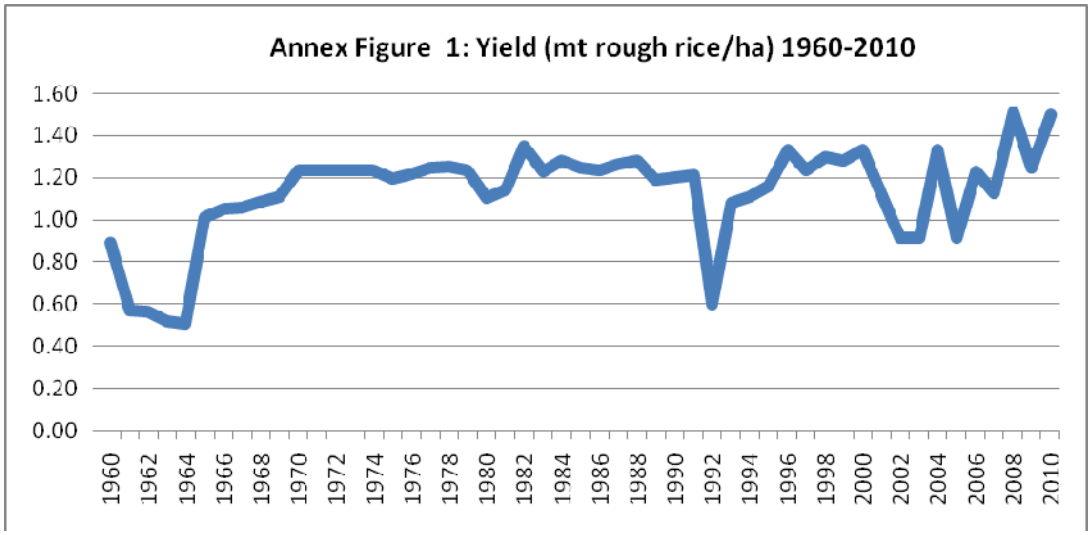


Table 5-1: Estimated rice production and needs in 2009/10

ITEMS	UNIT	2009/2010
Population	Number	3, 549,617
DISPOSITION		
Total Production (Paddy)	Metric tons	292,950
Losses (10%)	Metric tons	29,290
Seed- Rice Retention (2 %)	Metric tons	5.860
Paddy available for consumption	Metric tons	257,800
Local rice milled (65%)	Metric tons	167570
Per Capita Consumption	Kilograms	127
Needs - Requirement	Metric tons	450.800
Deficit (62.8 %)	Metric tons	283,230
IMPORTATION		
Opening stock	Metric tons	59,514.5
Commercial	Metric tons	254,605.77
Non-commercial	Metric tons	6,319.15
Closing stock	Metric tons	37,209.42

Source: MOA, FAO, CILSS & FEWSNET estimations, September 2010

Table 5-2: Agricultural production in Liberia-main food and cash crops grown in 2009

	Main Food Crops						Main Cash Crops					
	Rice	Cassava	Corn	Beans/ Beans	Eddoes	Plantain Banana	Palm oil	Rubber	kolanut	Cocoa	Coffee	Sugar-cane
	% HHs	% HHs	% HHs	% HHs	% HHs	% HHs	% HHs	% HHs	% HHs	% HHs	% HHs	% HHs
Bomi	40	58	19	7	13	16	2	2	4	2	1	4
Bong	60	52	50	6	17	25	14	20	8	9	4	14
Gbarpolu	71	72	54	41	36	43	9	6	6	6	2	6
Grand Bassa	50	61	27	1	13	44	12	9	12	2	0	12
Cape Mount	50	70	32	8	12	38	24	6	31	6	1	3
Grand Gedeh	66	55	39	2	19	57	18	2	22	12	2	4
Grand Kru	75	75	29	3	38	47	10	3	26	4	0	6
Lofa	85	56	71	62	50	31	26	2	3	27	38	13
Margibi	42	46	40	14	15	38	17	19	5	3	0	3
Maryland	27	62	17	3	22	24	4	24	11	5	1	8
Nimba	75	78	57	7	36	71	34	35	10	25	13	14
River Gee	80	77	60	7	20	53	4	11	45	21	1	4
Rivercess	79	81	31	2	34	68	30	22	22	8	1	7
Montserrado	45	64	25	12	20	48	7	9	25	3	1	6
Sinoe	74	73	66	5	45	62	29	2	19	5	1	4
National	60	65	38	9	24	45	18	15	16	8	3	8

Table 5-3: Food or Cash crop production by County

Table 3: Percentage of households food or cash crops

	Food Crop only	Food & cash crop	Cash crop only	No cropping
Bomi	43.4	21.0	1.6	34.0
Bong	20.0	52.7	6.2	21.2
Gbarpolu	20.4	57.8	3.0	18.8
Grand Bassa	16.8	50.2	3.8	29.2
Grand Cape Mount	20.5	54.8	4.8	19.9
Grand Gedeh	13.2	63.4	5.2	18.2
Grand Kru	23.8	57.2	3.2	15.8
Lofa	22.0	68.7	3.0	6.2
Margibi	7.6	43.1	1.6	47.7
Maryland	25.7	40.3	5.4	28.7
Monrovia	2.8	2.0	2.4	92.8
Nimba	7.6	76.6	4.4	11.4
River Gee	17.3	68.8	3.1	10.8
Rivercess	11.4	75.4	1.4	11.8
Rural Montserrado	14.6	55.0	13.8	16.6
Sinoe	9.4	70.5	2.6	17.4
National	**12.9**	**42.2**	**3.6**	**41.3**

Table 5-4: External assistance programmes received by households

	Free health care/drugs	Free education	Food for school children	Micro-credit	Skills Training	Other e.g bed nets, boreholes	Cash transfers	Cash-for-work	Food for the malnourished	Food-for-work/training	Free seeds, fertilizer	Free agricultural tools
Urban	32.9	21.9	14.5	3.4	2.9	1.9	1.1	0.8	0.4	0.4	0.4	0.2
Rural	63.6	59.2	27.1	2.7	4.5	0.5	1.8	2.5	0.7	1.2	2.3	1.7
National	**50.8**	**43.6**	**21.9**	**3.0**	**3.8**	**1.1**	**1.5**	**1.8**	**0.6**	**0.8**	**1.5**	**1.1**
Bomi	65.2	49.4	43.4	3.0	1.4	0.0	1.6	0.4	2.0	0.4	0.4	0.0
Bong	64.2	37.8	36.5	5.8	4.4	0.4	1.2	1.5	0.2	1.3	2.3	1.7
Gbarpolu	61.8	49.6	35.4	3.2	11.2	1.4	1.4	1.2	0.0	0.2	5.0	6.4
Grand Bassa	67.8	44.4	35.8	2.6	2.6	0.0	1.0	3.2	0.0	0.0	0.2	0.0
Cape Mount	65.1	56.6	2.2	1.0	6.4	0.6	2.0	0.4	0.0	0.2	2.0	0.0
Grand Gedeh	68.6	62.8	41.4	3.8	4.0	0.0	2.0	3.4	0.6	1.6	5.2	0.8
Grand Kru	46.8	74.6	12.4	2.2	5.2	0.4	1.4	6.0	3.4	1.0	2.8	2.4
Lofa	53.9	56.1	62.7	2.4	4.4	1.6	2.4	1.2	0.6	9.0	1.2	2.0
Margibi	58.1	52.1	11.2	7.2	8.0	0.8	0.8	1.4	0.6	0.4	0.8	1.6
Maryland	54.5	53.7	31.3	2.6	3.8	0.0	2.8	1.8	1.4	0.6	1.2	0.8
Monrovia	21.5	9.6	6.6	2.0	0.2	2.6	0.8	0.0	0.0	0.0	0.0	0.0
Nimba	60.2	66.4	56.8	1.4	4.0	0.0	1.8	0.6	0.0	1.0	1.0	0.0
River Gee	65.4	64.8	46.0	2.6	10.8	1.8	2.6	1.4	1.2	1.2	3.9	3.1
Rivercess	78.2	71.3	25.1	3.0	4.4	0.2	2.6	4.4	0.2	1.6	2.4	0.8
Rural Montserrado	19.0	43.2	1.8	1.0	3.0	1.8	0.4	1.0	1.2	0.6	1.4	1.0
Sinoe	69.9	69.9	42.5	2.0	7.0	0.4	4.2	11.4	5.4	2.6	3.6	8.4

Table 5-5: Final food consumption scores

	Estimates				
Parameter	**Unstandardized Coefficients**	**Standardized Coefficients**		**t**	**Sig.**
	B	Std. Error	Beta		
(Constant)	32.31	7.61		4.24	0.00
Reduced CSI	-0.14	0.03	-0.04	-4.72	0.00
Possession of animal	0.52	0.31	0.01	1.37	0.17
Improved sanitation	3.75	0.44	0.08	8.61	0.00
Bomi	-20.42	1.35	-0.14	-15.10	0.00
Bong	-15.99	0.84	-0.22	-19.13	0.00
Grand Bassa	-10.98	1.32	-0.08	-8.30	0.00
Grand Cape Mount	-12.40	1.02	-0.14	-12.13	0.00
Grand Gedeh	-15.23	1.17	-0.13	-13.06	0.00
Grand Kru	-22.52	1.20	-0.19	-18.75	0.00
Lofa	-9.09	1.56	-0.05	-5.81	0.00
Margibi	-13.50	0.88	-0.17	-15.34	0.00
Maryland	-26.83	0.99	-0.29	-27.13	0.00
Rural Montserrado	-21.27	1.11	-0.19	-19.23	0.00
Nimba	-9.96	1.14	-0.09	-8.75	0.00
Rivercess	-14.85	0.87	-0.23	-16.99	0.00
Sinoe	-15.30	1.44	-0.10	-10.66	0.00
River Gee	-23.68	1.50	-0.15	-15.80	0.00
Gbarpolu	-9.59	1.28	-0.07	-7.50	0.00
Urban vs Rural 1/0	6.75	0.60	0.15	11.16	0.00
HH head sex 1/0	0.34	0.46	0.01	0.74	0.46
Chronic member or HH	-0.88	0.77	-0.01	-1.13	0.26
Per capita total expenditure monthly	0.00	0.00	0.18	20.91	0.00
Out-migration (1/0)	5.32	1.18	0.05	4.49	0.00
wall condition-1-Durable 0=Non durbale	2.93	0.52	0.06	5.63	0.00
Number of income activities	2.29	0.26	0.08	8.73	0.00
Livelihood food crop production	16.70	7.56	0.32	2.21	0.03
Livelihood regular employees	16.26	7.55	0.29	2.15	0.03
Livelihood palm oil production	16.69	7.58	0.19	2.20	0.03
Livelihood petty trading	17.00	7.56	0.28	2.25	0.02
Livelihood other sources	16.53	7.61	0.14	2.17	0.03
Livelihood external support receivers	20.35	7.68	0.17	2.65	0.01
Livelihood charcoal production	18.13	7.61	0.15	2.38	0.02
Livelihood rubber tappers	17.75	7.63	0.13	2.33	0.02
Livelihood commercial traders	18.74	7.59	0.17	2.47	0.01
Livelihood skilled labourers	15.35	7.58	0.15	2.03	0.04
Livelihood renting or landlord	21.30	7.74	0.10	2.75	0.01
Livelihood cash crop production	14.80	7.59	0.16	1.95	0.05
Livelihood pensioners	19.43	7.88	0.07	2.47	0.01
Livelihood internal support receivers	15.26	7.59	0.15	2.01	0.04
Shock	-2.38	0.38	-0.05	-6.20	0.00
% growing cash crops only	1.56	0.97	0.01	1.19	0.23
% Growing food crops only	-0.86	0.60	-0.01	-1.43	0.15
HH education 1 yes 0 no	3.86	0.42	0.08	9.12	0.00
Distance from capital	-1.31	0.87	-0.01	-1.38	0.05

Dependent Variable: FINAL FOOD CONSUMPTION SCORES

Table 5-6: ***Prevalence of recommended Infant and Young Child Feeding Practices by county***

	Ever breastfed		Duration of Breastfeeding		Timely first suckling				Currently breastfed		Bottle fed	
	%	n	Mean	n	<60 minutes	>1 hour but <24 hours	>24 hours	n	%	N	%	n
BOMI	98.6%	144	11.7	54	48.2%	39.0%	12.8%	141	66.2%	142	4.2%	143
BONG	99.5%	209	10.6	69	8.7%	84.5%	6.8%	207	76.3%	207	3.3%	209
GBARPOLU	99.4%	173	14.1	36	20.9%	74.4%	4.7%	172	83.1%	172	2.9%	173
GRAND BASSA	99.5%	182	12.1	40	45.6%	53.8%	0.5%	182	76.4%	182	3.3%	182
GRAND CAPE MOUNT	100.0%	209	13.1	67	72.9%	24.2%	2.9%	207	73.7%	209	8.1%	209
GRAND GEDEH	100.0%	197	10.4	51	46.2%	41.6%	12.2%	197	84.3%	197	1.0%	197
GRAND KRU	100.0%	221	14.8	65	8.1%	19.5%	72.4%	221	76.0%	221	0.5%	220
LOFA	99.5%	221	13.9	54	50.2%	43.1%	6.7%	209	78.6%	220	3.6%	220
MARGIBI	100.0%	146	9.9	42	21.2%	64.4%	14.4%	132	80.7%	145	11.6%	146
MARYLAND	99.5%	188	9.0	68	50.5%	41.4%	8.1%	186	74.3%	187	4.3%	188
MONROVIA	98.3%	175	13.0	47	48.5%	45.6%	5.8%	171	73.3%	172	33.7%	175
NIMBA	100.0%	215	15.6	46	73.5%	19.1%	7.4%	215	83.3%	215	1.4%	215
RIVER GEE	100.0%	195	9.8	54	60.5%	34.9%	4.6%	195	79.0%	195	1.0%	193
RIVERCESS	99.0%	210	10.5	57	30.4%	65.7%	3.9%	204	72.1%	208	1.9%	209
RURAL MONTSERRADO	98.8%	166	16.1	36	16.5%	15.2%	68.3%	164	79.9%	164	5.4%	166
SINOE	100.0%	246	5.9	55	25.2%	54.6%	20.2%	238	89.4%	246	2.8%	246
Overall	99.3%	3097	12.4	841	44.1%	45.1%	10.8%	3041	77.4%	3082	12.4%	3091

Annex Figure 5-2: Coping strategies and child health

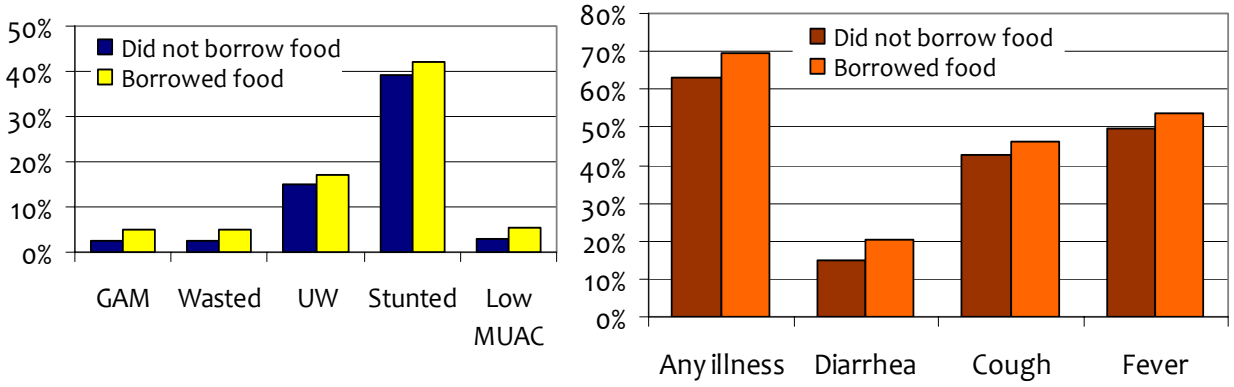


Table 5-7: Composition of survey team

Supervisors	Team Leaders	Enumerators	Enumerators Designation
1.Antony Wilson		Simeon Willie	Food Security
2. Abraham Zharm	Wellington Stryker	Comfort Ughweri	Food security
		Mohammed Kabah	Nutrition
		Hawa Sandimanie	Nutrition
	Catherine K. Worgee	Stephen Tenneh	Food Security
		Helen Toe	Food security
		E. Teah Klay	Food security
		Victor Carter	Nutrition
		Macdonald P. Louis	Nutrition
1. Boima M. Sonii-	Abdul Hafiz Koroma	John White	Food Security
2. Helena Bedell		Macdella O. Bettie	Food security
		Melvin Miller	Nutrition
		Augustine O. S. Feekpeh	Nutrition
	Nyamehto Kiepeeh	Tamba Mason	Food Security
		Baron O. Batuah	Food security
		Eunice F. Bowah	Nutrition
		Emmanuel Mulbah	Nutrition
1. Maria Zayzay	Cleopatra Gibson-Jallay	James W. Gonglegay	Food Security
2. Hillary P. Debah-		Otis Kyne	Food security
		O'George Stephens	Nutrition
		Lorpu T. Fajue Massaley	Nutrition
	Varnie Fully	Soeghen E. Willie	Food Security
		Adella T. Harmon	Food security
		Matthew Togba	Nutrition
		Moses Sumo	Nutrition
1. Bunchie T. Harb	Gania Flomo	Roland E. Ballah	Food Security
2. Augustine Musah		Rosa Nana Wilson	Food security
		James Crawford	Nutrition
		Francis Kardar	Nutrition
	Norris Glao	Edwin J. Williams	Food Security
		Abraham Siaffa	Food security
		Famatta Williams-Innis	Nutrition
		Henry Bundor	Nutrition

Coordinators	Organizations
Francis Wreh	GOL Coordinator - LISGIS
Tarnue Koiwou	GOL Coordinator- MOA
Bernard Owadi	Survey Coordinator-WFP
Andi Kendle	Nutrition Coordinator-UNICEF Consultant
Benjamin Flomo	Alternative Food Security Coordinator-WFP
Emmanuel Anderson	Alternate Food Security Coordinator- WFP

Annex Table 5-8: Plausibility checks – summary table from ENA for SMART

Criteria	Flags*	Unit	Good	Accept	Poor	Unacceptable	Score
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	0 (0.1 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	0 (p=0.355)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	10 (p=0.000)
Dig pref score - weight	Incl	#	0-5	05-Oct	Oct-20	> 20	
			0	2	4	10	0 (2)
Dig pref score - height	Incl	#	0-5	05-Oct	Oct-20	> 20	
			0	2	4	10	0 (5)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	0 (1.01)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	0 (-0.06)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	0 (-0.06)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	1 (p=0.021)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			**0-5**	**5-10**	**10-15**	**>15**	**11%**

Table 5-9: Standardization exercise compared to group means (<5 mm height and MUAC) – precision & accuracy by person - OK

Comprehensive Food Security & Nutrition Survey - May-July 2010 - Standardization Test

Name	Test group	Selected	Total Acc & Precision	Accuracy - compared to gold							Precision - compared to group							Accuracy - compared to group		
				Height	Score (1-4)	Weight	Score (1-3)	MUAC	Score (1-3)	Total Accuracy	Height	Score (1-3)	Weight	Score (1-3)	MUAC	Score (1-3)	Total Precision	Height	Weight	MUAC
Eunice Bowah	1	*	7	0.62	2	0.15	1	0.39	1	4	0.43	1	0.18	1	0.20	1	3	0.59	-0.02	-0.06
Moses Sumo	2	*	9	0.74	3	0.33	2	0.36	1	6	0.44	1	0.18	1	0.22	1	3	0.30	-0.03	0.07
Mohammed Kabah	1	*	7	0.47	1	0.09	1	0.39	1	3	0.55	2	0.11	1	0.27	1	4	-0.14	0.02	-0.03
James G Crawford	4	*	7	0.40	1	0.11	1	0.37	1	3	0.56	2	0.14	1	0.21	1	4	0.11	0.04	0.05
Victor Carter	4	*	7	0.40	1	0.12	1	0.36	1	3	0.64	2	0.11	1	0.24	1	4	-0.20	0.05	-0.14
Melvin Miller	1	*	8	0.42	1	0.12	1	0.61	2	4	0.30	1	0.14	1	0.42	2	4	-0.32	0.03	-0.04
O'George Stephens	1	*	8	0.64	2	0.13	1	0.28	1	4	0.42	1	0.16	1	0.40	2	4	-0.15	0.03	-0.21
Hilary Debah	1	Sup	8	0.47	1	0.09	1	0.56	2	4	0.46	1	0.17	1	0.31	2	4	0.15	-0.02	0.01
James Gonglegay	1		8	0.47	1	0.17	1	0.53	2	4	0.50	1	0.20	1	0.33	2	4	-0.18	0.03	-0.34
Lorpu Faijue Massaley	4	*	9	0.60	2	0.10	1	0.52	2	5	0.46	1	0.09	1	0.38	2	4	0.10	0.05	-0.08
Famatta W Innis	1	*	9	0.71	3	0.12	1	0.40	1	5	0.56	2	0.17	1	0.24	1	4	0.41	-0.02	-0.09
Vanney Folley	4	TL	10	0.77	4	0.15	1	0.28	1	6	0.67	2	0.15	1	0.21	1	4	0.15	0.02	-0.11
Harry TF Bality	4		11	0.75	4	0.13	1	0.57	2	7	0.46	1	0.15	1	0.44	2	4	0.18	0.07	-0.05
Esther Young	2		11	0.74	3	0.48	3	0.34	1	7	0.47	1	0.30	2	0.21	1	4	0.10	0.05	0.05
Matthew Togba	4	*	9	0.63	2	0.12	1	0.39	1	4	0.53	2	0.12	1	0.33	2	5	-0.38	0.05	-0.08
MacDonald Louis	2	*	10	0.58	2	0.37	2	0.35	1	5	0.45	1	0.31	3	0.09	1	5	0.14	-0.02	0.12
Abdul H Koroma	2	TL	10	0.48	1	0.37	2	0.51	2	5	0.46	1	0.21	2	0.34	2	5	-0.05	-0.03	0.13
Cleopatra	1	TL	10	0.72	3	0.14	1	0.47	1	5	0.57	2	0.16	1	0.31	2	5	-0.27	0.01	-0.01
Augustine Feekpeh	4	*	11	1.95	4	0.07	1	0.40	1	6	2.00	3	0.10	1	0.28	1	5	0.20	0.08	0.03
Wellington Stryker	3	TL	12	0.95	4	0.38	2	0.31	1	7	1.18	3	0.17	1	0.27	1	5	0.27	0.21	-0.03
Henry S Bundor	3	*	10	0.67	2	0.18	1	0.25	1	4	0.68	2	0.47	3	0.19	1	6	0.20	0.07	-0.07
Bonah Lackay	3		11	0.47	1	0.59	3	0.48	1	5	0.29	1	0.72	3	0.34	2	6	-0.33	-0.08	0.19
Emmanuel T Mulbah	3	*	12	0.67	2	0.49	3	0.35	1	6	0.41	1	0.67	3	0.31	2	6	0.08	-0.09	0.16
Hawa Sandimanie	4	*	12	0.64	2	1.96	3	0.47	1	6	0.44	1	1.96	3	0.35	2	6	0.17	-0.55	-0.03
Catherine Worgee	2	TL	12	0.61	2	0.49	3	0.40	1	6	0.71	3	0.26	2	0.23	1	6	0.24	0.06	0.00
Francis Kardar	4	*	12	0.83	4	0.17	1	0.39	1	6	0.98	3	0.19	1	0.33	2	6	-0.27	0.10	0.12
Paul Z Willowu	1		13	1.00	4	0.14	1	0.57	2	7	0.96	3	0.18	1	0.32	2	6	-0.02	0.00	0.21
Stephen M Kamara	2		13	1.63	4	0.37	2	0.39	1	7	1.61	3	0.10	1	0.32	2	6	0.44	-0.08	-0.12
Abraham Siaffa	2		14	2.61	4	0.40	3	0.44	1	8	2.75	3	0.14	1	0.35	2	6	-0.80	-0.07	0.09
Norris Glao	3	TL	12	0.43	1	0.42	3	0.42	1	5	0.56	2	0.69	3	0.31	2	7	-0.09	-0.08	-0.10
Tamba Mayson	3		13	0.70	2	0.51	3	0.30	1	6	0.62	2	0.87	3	0.35	2	7	0.22	-0.14	0.11
Mambu	2		14	0.93	4	0.36	2	0.47	1	7	1.02	3	0.24	2	0.41	2	7	0.09	0.05	0.12
Soeghen E Willie	2		14	1.02	4	0.33	2	0.41	1	7	1.03	3	0.24	2	0.39	2	7	-0.18	-0.04	-0.07
Anthony Wilson	1		15	0.85	4	0.11	1	0.97	3	8	0.85	3	0.18	1	0.74	3	7	-0.18	-0.01	0.17
Nyamento Kiepeeh	4	TL	15	0.85	4	0.12	1	1.04	3	8	1.08	3	0.13	1	1.01	3	7	0.05	0.05	0.14
Musulyn Sanor	3		16	0.82	4	0.58	3	0.53	2	9	0.63	2	0.40	3	0.40	2	7	-0.48	0.08	-0.04
Simeon	3		12	0.70	2	0.19	1	0.38	1	4	0.73	3	0.67	3	0.31	2	8	-0.13	-0.01	-0.12
Gania Flomo	3	TL	14	1.16	4	0.19	1	0.47	1	6	1.27	3	0.61	3	0.40	2	8	-0.04	0.01	0.04
Rosa Nana Wilson	3		15	0.76	4	0.34	2	0.34	1	7	0.75	3	0.80	3	0.32	2	8	0.19	-0.08	-0.13
Doris Wallo	2		15	0.71	3	0.36	2	0.62	2	7	0.83	3	0.23	2	0.60	3	8	-0.37	-0.01	-0.61
Facilitator - Cherie	4										0.55		0.09		0.23			-0.20	0.05	0.12
Facilitator - AB	2										0.36		0.34		0.29			0.08	0.11	0.21
Facilitator - Stella	3										0.38		0.50		0.19			0.08	0.06	-0.05
Facilitator - Bernard	1										0.44		0.15		0.38			-0.18	-0.01	0.17

Key for Column Selected	
*	Nutrition Enumerator
TL	Team Leader
Sup	Supervisor

Annex Figure 5-3: Calendar of local events

Calendar of Local Events – May-July 2010
Bomi, Bong, Grand Cape Mount, Grand Bassa, Gbarpolu, Lofa, Margibi, Montserrado, Nimba and Rivercess

Seasons	Holidays	Other events	Local Events	Months	In May 2010 Age (months)	In June 2010 Age (months)	In July 2010 Age (months)
	Independence Day			July 2010			0
Planting				June 2010		0	1
Planting	National Unification Day		**President Sirleaf Visited Nimba County**	May 2010	0	1	2
Burning & Cleaning	Fast & Prayer Day			April 2010	1	2	3
Burning & Cleaning	JJ. Robert & Decoration Day	Bomi & Montserrado superintendent Jail Beauty Bacon & Mohammed Massaley	New City Major was appointed and inducted in office in Kakata City	March 2010	2	3	4
Brushing	Arm Forces Day	Mandingo & Lorma crisis	Valentine Day	February 2010	3	4	5
Brushing	New Year's Day			January 2010	4	5	6
Harvesting	Christmas			December 2009	5	6	7
Harvesting	President Tubman Birthday; Thanksgiving Day	Senatorial by-Elections Geraldine and Urey	William VS Tubman Technical University	November 2009	6	7	8
Harvesting	United Nations Day			October 2009	7	8	9
Harvesting	Ramadan (ends 19 Sep)			September 2009	8	9	10
	Flag day Ramadan (starts 22 Aug)			August 2009	9	10	11
	Independence Day		President Sirleaf first visit to Bong / July 26 celebration	July 2009	10	11	12
Planting				June 2009	11	12	13
Planting	National Unification Day		New Superintendent for Maryland county was appointed	May 2009	12	13	14
Burning & Cleaning	Fast & Prayer Day		Land dispute between Rolland Kahn & Charles Bennie in Margibi	April 2009	13	14	15
Burning & Cleaning	JJ. Robert Birthday & Decoration Day	Armed Worm Invaded Lofa, Bong Counties		March 2009	14	15	16
Brushing	Arm Forces Day			February 2009	15	16	17
Brushing	New Year's Day	Senate protemp removed Isaac Nyanabo		January 2009	16	17	18
Harvesting	Christmas			December 2008	17	18	19
Harvesting	President Tubman Birthday; Thanksgiving Day	Obama elected President of the USA		November 2008	18	19	20
Harvesting	United Nations Day			October 2008	19	20	21
Harvesting	Ramadan (1-29 Sept)			September 2008	20	21	22
	Flag Day			August 2008	21	22	23
	Independent Day	LISGIS Establish (CSIO) in the 15 counties		July 2008	22	23	24
Planting		Supporters killed at football match at SKD stadium in Monrovia		June 2008	23	24	25
Planting	National Unification Day			May 2008	24	25	26
Burning & Cleaning	Fast & Prayer Day			April 2008	25	26	27
Burning & Cleaning	JJ. Robert Birthday & Decoration Day	National Census conducted		March 2008	26	27	28
Brushing	Arm Forces Day	President George Bush visits Liberia		February 2008	27	28	29
Brushing	New Year's Day			January 2008	28	29	30
Harvesting	Christmas			December 2007	29	30	31

Seasons	Holidays	Other events	Local Events	Months	In May 2010 Age (months)	In June 2010 Age (months)	In July 2010 Age (months)
Harvesting	President Tubman Birthday; Thanksgiving Day	Old bridge at water-side collapsed; UN helicopter crashes in northern Liberia		November 2007	30	31	32
Harvesting	United Nations Day Ramadan (ends 11 Oct)		George Bush bridge was delegated	October 2007	31	32	33
Harvesting	Ramadan (starts 13 Sep)			September 2007	32	33	34
	Flag Day			August 2007	33	34	35
	Independence Day			July 2007	34	35	36
Planting		C Taylor boycotts his trial at the Hague		June 2007	35	36	37
Planting	National Unification Day	Restart of diamond trade as UN embargo is lifted		May 2007	36	37	38
Burning & Cleaning	Fast & Prayer Day			April 2007	37	38	39
Burning & Cleaning				March 2007	38	39	40
Brushing	Arm Forces Day	US government plans to cancel part of Liberia's debt		February 2007	39	40	41
Brushing	New Year's Day	Edwin Snowe resigned as Speaker of the House of Representative; First all woman Indian UN peacekeeper force arrives		January 2007	40	41	42
Harvesting	Christmas			December 2006	41	42	43
Harvesting	President Tubman Birthday; Thanksgiving Day			November 2006	42	43	44
Harvesting	United Nations Day Ramadan (ends 22 Oct)	First public testimony in truth commission		October 2006	43	44	45
Harvesting	Ramadan (starts 23 Sep)			September 2006	44	45	46
	Flag Day			August 2006	45	46	47
	Independence Day	Fire outbreak at Executive Mansion		July 2006	46	47	48
Planting		Women start to be recruited in the army; world refugee day celebrated with 1st official return of refugees who fled to Sierra Leone		June 2006	47	48	49
Planting	National Unification Day	10000 children march against hunger as part of international event		May 2006	48	49	50
Burning & Cleaning	Fast & Prayer Day	C. Taylor appears in UN-backed court in Sierra Leone		April 2006	49	50	51
Burning & Cleaning		Request to Nigeria to extradite Charles Taylor, he fled but was found in southern Nigeria		March 2006	50	51	52
Brushing	Arm Forces Day	Sirleaf fires top official from Min of Finance; Truth & Reconciliation Commission formed		February 2006	51	52	53
Brushing	New Year's Day	Pres. Ellen Johnson Sirleaf Inaugurated as Africa first female president		January 2006	52	53	54
Harvesting	Christmas	Firestone rubber company accused of child & slave labour		December 2005	53	54	55
Harvesting	President Tubman Birthday; Thanksgiving Day	Run off Presidential election, Sirleaf wins		November 2005	54	55	56
Harvesting	United Nations Day Ramadan (4 Oct-2 Nov)	1st round - National presidential general election		October 2005	55	56	57
Harvesting				September 2005	56	57	58
	Flag Day			August 2005	57	58	59
	Independence Day			July 2005	58	59	60
Planting				June 2005	59	60	
Planting	National Unification Day			May 2005	60		

Calendar of Local Events – May-July 2010
Grand Gedeh, Grand Kru, Maryland, River Gee, Sinoe

Seasons	Holidays	Other events	Local Events	Months	In May 2010 Age (months)	In June 2010 Age (months)	In July 2010 Age (months)
Harvesting	Independence Day			July 2010			0
Harvesting				June 2010		0	1
	National Unification Day	President Sirleaf Visited Nimba County		May 2010	0	1	2
Planting	Fast & Prayer Day		Vice President Joseph N. Boakai Visited Grand Kru County	April 2010	1	2	3
Planting	JJ. Robert & Decoration Day	Bomi & Montserrado superintendent Jail Beauty Bacon & Mohammed Massaley	Ritualistic killing in Maryland county	March 2010	2	3	4
Planting	Arm Forces Day	Mandingo & Lorma crisis		February 2010	3	4	5
	New Year's Day			January 2010	4	5	6
Brushing	Christmas			December 2009	5	6	7
Brushing	President Tubman Birthday; Thanksgiving Day	Senatorial by-Elections Geraldine and Urey		November 2009	6	7	8
	United Nations Day		Prs. Ellen Johnson celebrated birthday in Sinoe county	October 2009	7	8	9
Harvesting	Ramadan (ends 19 Sep)			September 2009	8	9	10
Harvesting	Flag day Ramadan (starts 22 Aug)			August 2009	9	10	11
Harvesting	Independence Day		Tribal crisis in Maryland county	July 2009	10	11	12
Harvesting				June 2009	11	12	13
	National Unification Day			May 2009	12	13	14
Planting	Fast & Prayer Day			April 2009	13	14	15
Planting	JJ. Robert Birthday & Decoration Day	Armed Worm Invaded Lofa, Bong Counties		March 2009	14	15	16
Planting	Arm Forces Day			February 2009	15	16	17
	New Year's Day	Senate protemp removed Isaac Nyanabo		January 2009	16	17	18
Brushing	Christmas			December 2008	17	18	19
Brushing	President Tubman Birthday; Thanksgiving Day	Obama elected President of the USA		November 2008	18	19	20
	United Nations Day			October 2008	19	20	21
Harvesting	Ramadan (1-29 Sept)			September 2008	20	21	22
Harvesting	Flag Day			August 2008	21	22	23
Harvesting	Independent Day	LISGIS Establish (CSIO) in the 15 counties		July 2008	22	23	24
Harvesting		Supporters killed at football match at SKD stadium in Monrovia		June 2008	23	24	25
	National Unification Day			May 2008	24	25	26
Planting	Fast & Prayer Day			April 2008	25	26	27
Planting	JJ. Robert Birthday & Decoration Day	National Census conducted		March 2008	26	27	28
Planting	Arm Forces Day	President George Bush visits Liberia		February 2008	27	28	29
	New Year's Day			January 2008	28	29	30
Brushing	Christmas			December 2007	29	30	31
Brushing	President Tubman Birthday; Thanksgiving Day	Old bridge at water-side collapsed; UN helicopter crashes in northern Liberia		November 2007	30	31	32
	United Nations Day Ramadan (ends 11 Oct)			October 2007	31	32	33
Harvesting	Ramadan (starts 13 Sep)			September 2007	32	33	34
Harvesting	Flag Day			August 2007	33	34	35
Harvesting	Independence Day			July 2007	34	35	36
Harvesting		C Taylor boycotts his trial at the Hague		June 2007	35	36	37
	National Unification Day	Restart of diamond trade as UN embargo is lifted		May 2007	36	37	38
Planting	Fast & Prayer Day			April 2007	37	38	39
Planting				March 2007	38	39	40

Seasons	Holidays	Other events	Local Events	Months	In May 2010 Age (months)	In June 2010 Age (months)	In July 2010 Age (months)
Planting	Arm Forces Day	US government plans to cancel part of Liberia's debt		February 2007	39	40	41
	New Year's Day	Edwin Snowe resigned as Speaker of the House of Representative; First all woman Indian UN peacekeeper force arrives		January 2007	40	41	42
Brushing	Christmas			December 2006	41	42	43
Brushing	President Tubman Birthday; Thanksgiving Day			November 2006	42	43	44
	United Nations Day Ramadan (ends 22 Oct)	First public testimony in truth commission		October 2006	43	44	45
Harvesting	Ramadan (starts 23 Sep)			September 2006	44	45	46
Harvesting	Flag Day			August 2006	45	46	47
Harvesting	Independence Day	Fire outbreak at Executive Mansion		July 2006	46	47	48
Harvesting		Women start to be recruited in the army; world refugee day celebrated with 1st official return of refugees who fled to Sierra Leone		June 2006	47	48	49
	National Unification Day	10000 children march against hunger as part of international event		May 2006	48	49	50
Planting	Fast & Prayer Day	C. Taylor appears in UN-backed court in Sierra Leone		April 2006	49	50	51
Planting		Request to Nigeria to extradite Charles Taylor, he fled but was found in southern Nigeria		March 2006	50	51	52
Planting	Arm Forces Day	Sirleaf fires top official from Min of Finance; Truth & Reconciliation Commission formed		February 2006	51	52	53
	New Year's Day	Pres. Ellen Johnson Sirleaf Inaugurated as Africa first female president		January 2006	52	53	54
Brushing	Christmas	Firestone rubber company accused of child & slave labour		December 2005	53	54	55
Brushing	President Tubman Birthday; Thanksgiving Day	Run off Presidential election, Sirleaf wins		November 2005	54	55	56
	United Nations Day Ramadan (4 Oct-2 Nov)	1st round - National presidential general election		October 2005	55	56	57
Harvesting				September 2005	56	57	58
Harvesting	Flag Day			August 2005	57	58	59
Harvesting	Independence Day			July 2005	58	59	60
Harvesting				June 2005	59	60	
	National Unification Day			May 2005	60		

Calendar of Local Events – May-July 2010
Monrovia

Holidays	Other events	Local Events	Months	In May 2010 Age (months)	In June 2010 Age (months)	In July 2010 Age (months)
Independence Day			July 2010			0
			June 2010		0	1
National Unification Day	President Sirleaf Visited Nimba County		May 2010	0	1	2
Fast & Prayer Day			April 2010	1	2	3
JJ. Robert & Decoration Day	Bomi & Montserrado superintendent Jail Beauty Bacon & Mohammed Massaley		March 2010	2	3	4
Arm Forces Day	Mandingo & Lorma crisis		February 2010	3	4	5
New Year's Day			January 2010	4	5	6
Christmas			December 2009	5	6	7
President Tubman Birthday; Thanksgiving Day	Senatorial by-Elections Geraldine and Urey		November 2009	6	7	8
United Nations Day			October 2009	7	8	9
Ramadan (ends 19 Sep)			September 2009	8	9	10
Flag day Ramadan (starts 22 Aug)			August 2009	9	10	11
Independence Day			July 2009	10	11	12
			June 2009	11	12	13
National Unification Day			May 2009	12	13	14
Fast & Prayer Day			April 2009	13	14	15
JJ. Robert Birthday & Decoration Day	Armed Worm Invaded Lofa, Bong Counties		March 2009	14	15	16
Arm Forces Day			February 2009	15	16	17
New Year's Day	Senate protemp removed Isaac Nyanabo		January 2009	16	17	18
Christmas			December 2008	17	18	19
President Tubman Birthday; Thanksgiving Day	Obama elected President of the USA		November 2008	18	19	20
United Nations Day			October 2008	19	20	21
Ramadan (1-29 Sept)			September 2008	20	21	22
Flag Day			August 2008	21	22	23
Independent Day	LISGIS Establish (CSIO) in the 15 counties		July 2008	22	23	24
	Supporters killed at football match at SKD stadium in Monrovia		June 2008	23	24	25
National Unification Day			May 2008	24	25	26
Fast & Prayer Day			April 2008	25	26	27
JJ. Robert Birthday & Decoration Day	National Census conducted		March 2008	26	27	28
Arm Forces Day	President George Bush visits Liberia		February 2008	27	28	29
New Year's Day			January 2008	28	29	30
Christmas			December 2007	29	30	31
President Tubman Birthday; Thanksgiving Day	Old bridge at water-side collapsed; UN helicopter crashes in northern Liberia		November 2007	30	31	32
United Nations Day Ramadan (ends 11 Oct)			October 2007	31	32	33
Ramadan (starts 13 Sep)			September 2007	32	33	34
Flag Day			August 2007	33	34	35
Independence Day			July 2007	34	35	36
	C Taylor boycotts his trial at the Hague		June 2007	35	36	37
National Unification Day	Restart of diamond trade as UN embargo is lifted		May 2007	36	37	38
Fast & Prayer Day			April 2007	37	38	39
			March 2007	38	39	40

Holidays	Other events	Local Events	Months	In May 2010 Age (months)	In June 2010 Age (months)	In July 2010 Age (months)
Arm Forces Day	US government plans to cancel part of Liberia's debt		February 2007	39	40	41
New Year's Day	Edwin Snowe resigned as Speaker of the House of Representative; First all woman Indian UN peacekeeper force arrives		January 2007	40	41	42
Christmas			December 2006	41	42	43
President Tubman Birthday; Thanksgiving Day			November 2006	42	43	44
United Nations Day Ramadan (ends 22 Oct)	First public testimony in truth commission		October 2006	43	44	45
Ramadan (starts 23 Sep)			September 2006	44	45	46
Flag Day			August 2006	45	46	47
Independence Day	Fire outbreak at Executive Mansion		July 2006	46	47	48
	Women trart to be recruited in the army; world refugee day celebrated with 1st official return of refugees who fled to Sierra Leone		June 2006	47	48	49
National Unification Day	10000 children march against hunger as part of international event		May 2006	48	49	50
Fast & Prayer Day	C. Taylor appears in UN-backed court in Sierra Leone		April 2006	49	50	51
	Request to Nigeria to extradite Charles Taylor, he fled but was found in southern Nigeria		March 2006	50	51	52
Arm Forces Day	Sirleaf fires top official from Min of Finance; Truth & Reconciliation Commission formed		February 2006	51	52	53
New Year's Day	Pres. Ellen Johnson Sirleaf Inaugurated as Africa first female president		January 2006	52	53	54
Christmas	Firestone rubber company accused of child & slave labour		December 2005	53	54	55
President Tubman Birthday; Thanksgiving Day	Run off Presidential election, Sirleaf wins		November 2005	54	55	56
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			September 2005	56	57	58
Flag Day			August 2005	57	58	59
Independence Day			July 2005	58	59	60
			June 2005	59	60	
National Unification Day			May 2005	60		