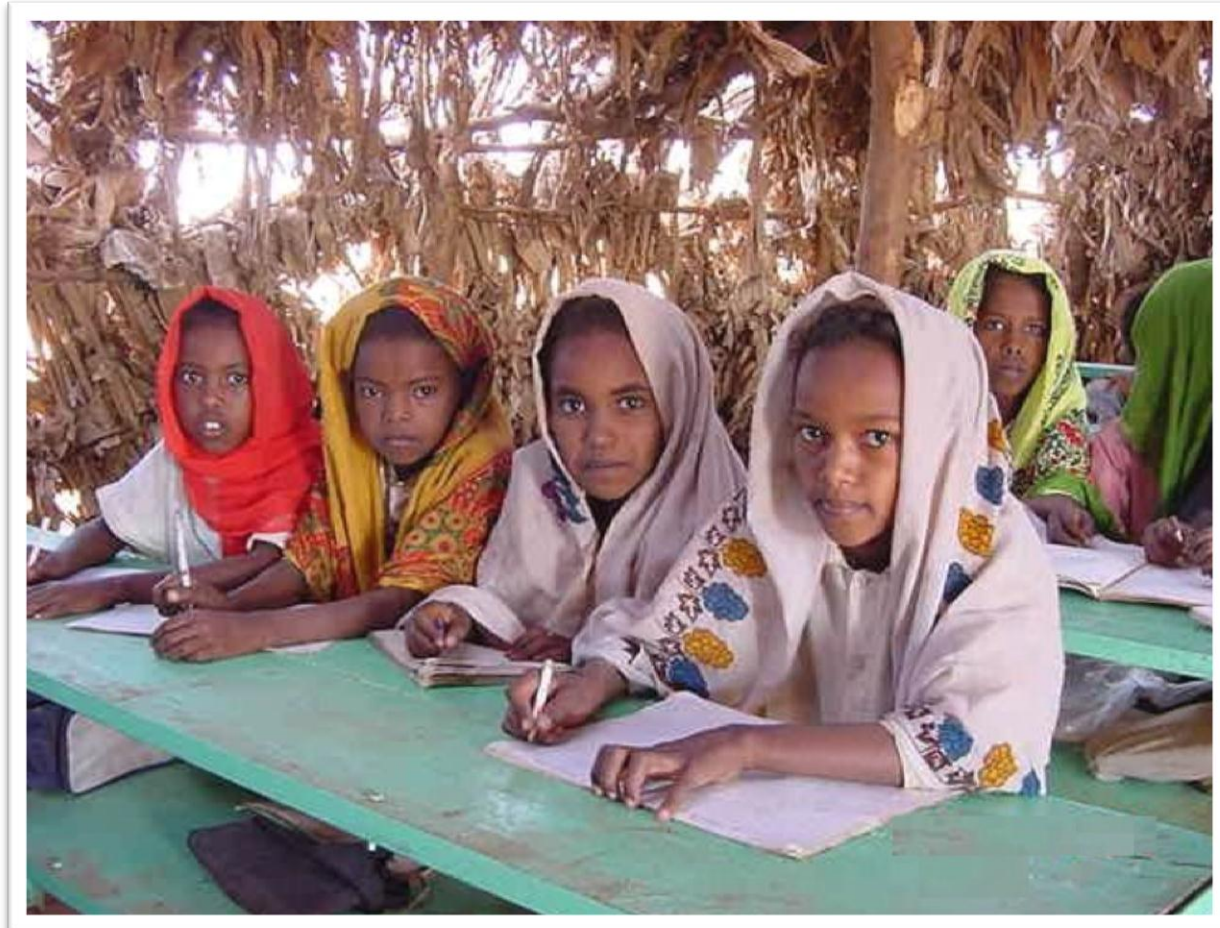


# A Comprehensive Food Security Assessment in Kassala State, Sudan



**UN WORLD FOOD PROGRAMME  
KASSALA STATE MINISTRY OF AGRICULTURE**



**January 2012**

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## I. EXECUTIVE SUMMARY

The comprehensive food security assessment was conducted in December 2011 and January 2012 by the State Ministry of Agriculture and Strategic Reserve Corporation with support from WFP Sudan. The main objectives of the assessment were:

- to provide a reliable and detailed assessment of the current food security and vulnerability situation of the Kassala population;
- to assess some of the causes and risk factors for food insecurity and vulnerability and
- to identify pockets of vulnerability where assistance and targeting may be required in the future.

Information was collected from a total of 1,554 households. In total, 55 cities/villages were randomly visited from 11 localities across six different livelihood zones. Child health and feeding information was collected along with the mid-upper arm circumference (MUAC) measure for approximately 1,400 children between 6 and 59 months of age.

The majority of the households are residents (94 percent), with a small percentage of IDPs, returnees and nomads. The average household size is 6.4 people. Only 4 percent of households are headed by women. Analysis shows that a high percentage of household heads in Kassala does not have any education (77 percent).

The survey found that the most common housing structure in Kassala is thatched house (39 percent) followed by mud/mud brick houses (17 percent). In Kassala, the main source of drinking water is public tap (25 percent), followed by surface water (river, stream) (17 percent). Out of the surveyed households in Kassala, 68 percent use bush/stream as toilet facility.

According to the International Fund for Agricultural Development (IFAD), there is a long-term and short-term aspect to food security. When a household is regularly unable to meet the food requirements of its members over a long period of time, characterised by short periods of good and bad moments, this is known as *chronic food insecurity*. The short-term problem can affect any household regardless of the current situation. Shocks like crop failure, seasonal shortages or reduced income due to illness or underemployment of productive members may temporarily reduce household access to adequate amounts of nutritious food, leading to *transitory or acute food insecurity*.

For this study, both acute and chronic food insecurity will be measured at the household level, with a focus on the food access issues and using slightly different indicators and analytical approaches in order to best understand the situation of the people in Kassala.

### 1.1. Who are the food insecure?

#### **Acute food insecurity:**

The main factors affecting the acute food insecurity in Kassala are:

- Livelihood:
  - Households relying on sale of firewood, grass and charcoal
  - Households relying on sale of other crops, construction and porters
  - Households relying on brick making, rickshaw and begging
- Purchasing power - Poor households are more likely to suffer from acute food insecurity compared to households with better purchasing power.

#### **Chronic food insecurity:**

The main factors affecting the chronic food insecurity in Kassala are:

- Wealth: Poor households with few assets are more likely to be food insecure compared to those with more assets.

- Education: A higher percentage of households headed by a person with no education are food insecure compared to households where the household head is educated.
- Livelihoods:
  - Households relying on sale of firewood, grass and charcoal
  - Households relying on brick making, rickshaw and begging
  - Households relying on gifts

## 1.2. How many are they?

### Acute food insecurity

Findings from the comprehensive food security assessment show that 2 percent of the households in Kassala were suffering from acute food insecurity at the time of the survey, and 4.5 percent were vulnerable to acute food insecurity. When using the projected population numbers for 2011, an estimated population of 38,000 people in Kassala are acutely food insecure. Furthermore, an estimated 85,500 people are vulnerable to acute food insecurity.

When analysing acute food security by locality, all the localities are food secure. *North Delta* has the highest percentages of acute food insecure households followed by *Hamashkoreeb*. In addition, *Hamashkoreeb* has the highest percentage of households vulnerable to acute food insecurity.

### Chronic food insecurity

When analysing chronic food insecurity, analysis shows that 22 percent of the households in Kassala are suffering from chronic food insecurity, while 26 percent are chronically moderately food insecure. When using the population numbers, an estimated population of 418,000 people are chronically food insecure with an additional 494,000 people suffering from moderate chronic food insecurity. The most chronic food insecure localities are *Hamashkoreeb*, *North Delta* and *Telkok*.

### Nutrition

Mid Upper Arm Circumference (MUAC) was measured on a total of 1408 children in the age between 6-59 months in Kassala. Using a cut-point of < 12.5 cm, a total of 12.3 percent of the children were malnourished. Children 6-23 months of age were more likely to be malnourished than those two years of age and over. The prevalence of MUAC less than 11.5 cm is 6.3 percent for the entire sample in Kassala state.

When analysing the prevalence of malnutrition by water sources, findings show that children, who drink water from unsafe water sources, are more likely to be malnourished compared to children drinking from safe water sources.

When analysing SAM and GAM by age and locality, findings show that some of the localities are much worse off compared to the state average. In *Atbara River*, 28 percent of children between 6 and 23 months are measured with SAM, and 56 percent with GAM. In *North Delta* and *Reefi Kassala*, GAM is 30 percent while SAM is 14 percent and 11 percent respectively.

## 1.3. What are the interventions recommended?

WFP Sudan defines **resilience building** as 'increasing the ability of individuals, households, communities and systems to be better prepared, mitigate, adapt to and recover from shocks and crises so as to be able to meet basic food and nutrition requirements'. This is done through the following general steps:

1. Strengthen capacities of national and local structures, networks and institutions for planning and implementation of food security and resilience programmes
2. Build the resilience of individuals and communities to withstand shocks and recover from them by:
3. Improve anticipation, early warning and early action

With the above in mind, WFP and partners would like to implement activities at household and community level in order to achieve the following objectives:

1. Enhance the productive sector and increase skills for diversification of income sources and increased agricultural and livestock production;
2. Enhance the adaptation to climate change and increase skills and means to alleviate further deforestation and environmental degradation;
3. Enhance market functioning and improve opportunities to access markets and market information, credit and insurance schemes;
4. Enhance nutrition to build human resilience and enhance human capital.

WFP will implement a set of complementary activities together with its partners targeting communities, households and individuals in the same localities and communities to provide the comprehensive approach needed for building resilience.

- Safe Access to Firewood and Alternative Energy (SAFE),
- Integrated Blanket Supplementary Feeding Programmes (IBSFP),
- Farmers to Markets (F2M) livestock and
- Asset Creation (FFA)

WFP's vision with **SAFE** is to provide food assistance to vulnerable populations in Kassala by ensuring basic food needs are met while giving them the right tools and knowledge to address the challenges of safe access to cooking fuel, income diversification, human skills and capacities and safety of women.

The **IBSFP** aims to address malnutrition and break the intergenerational cycle of hunger and is essential to unlocking the potential of vulnerable communities and promoting human resilience and economic growth. The IBSFP provides nutritious foods to children aged between 6-36 months and promotes optimal feeding practices, food hygiene and food safety. It also builds the ability of communities and households to meet the nutrition requirements for the children and pregnant/lactating women in a sustainable manner.

The **F2M** experience in 2011 and 2012 showed that dry areas such as North Darfur, Kassala and Red Sea States have a high potential for livestock investment and livestock projects. The objectives of the project are to connect agro-pastoralists to four markets: (1) micro-finance, (2) micro-insurance (3) extension services and (4) market for sale - either through local traders, wholesalers or large private sector companies.

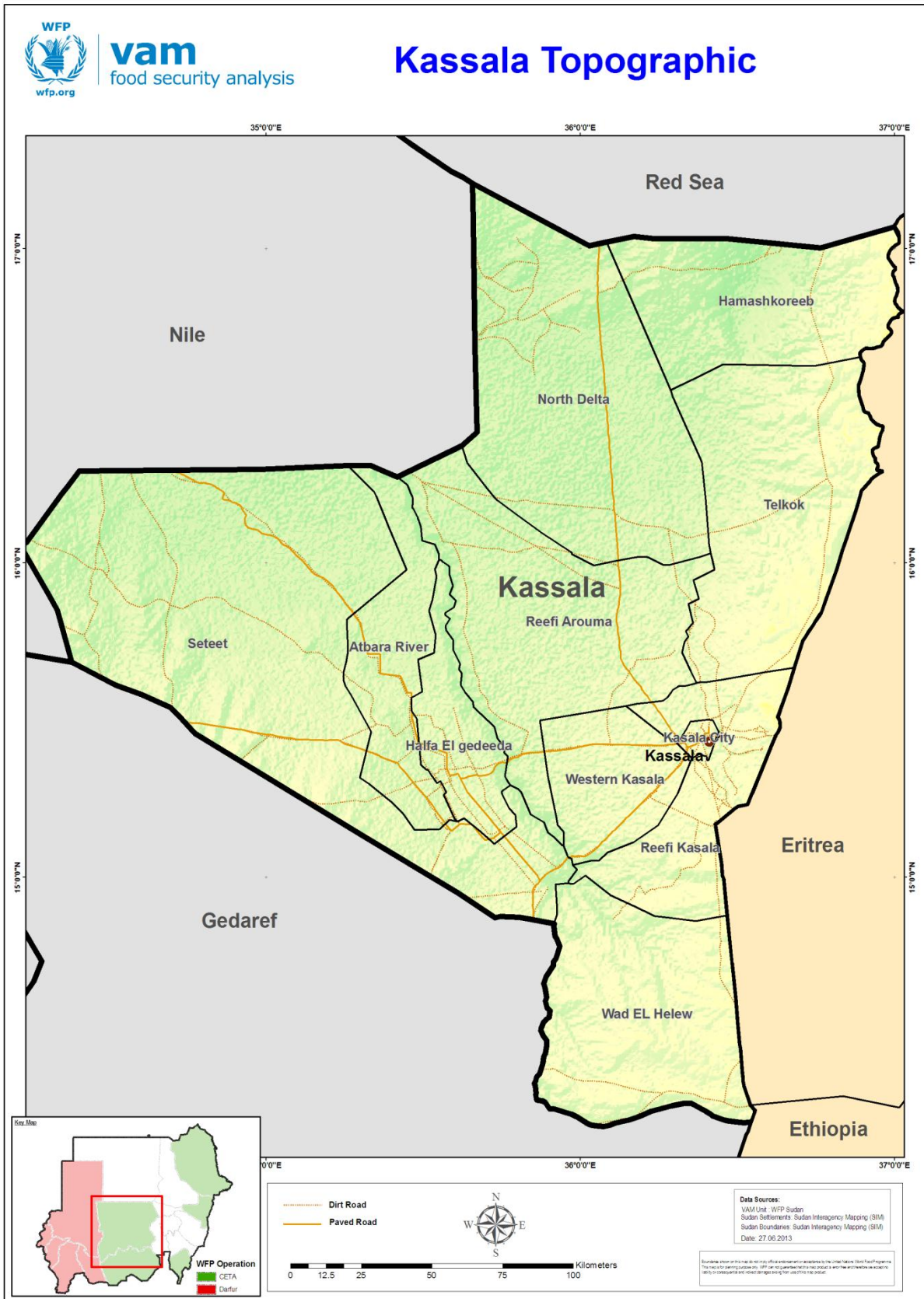
The **asset creation** programme aims to build community infrastructures and capacities for:

- water harvesting (water reservoirs/haffirs and terracing) to increase water provision for humans and livestock,
- to improve drainage systems and de-siltation to build resilience to drought.

The interventions will be carried out through a community-based approach where committees are formed and trained on project management and transfer of technical skills, essential for sustainability of any project.



# Map I. Kassala Topography



## 2. INTRODUCTION

### 2.1. Background

Sudan is one of the most geographically and ethnically diverse countries in Africa. Two rounds of a North-South civil war have cost the lives of 1.5 million Sudanese and the on-going conflict in the Western region of Darfur has driven 2 million people from their homes. After years of insecurity and displacements, exacerbated by drought, failed harvests and high food prices since 2009/2010, a complex humanitarian crisis continues in most of Sudan.

In the East, while the political and security situation remained calm, minimal advancement was made in the implementation of the 2006 Eastern Sudan Peace Agreement (ESPA) including the reintegration of ex-combatants under the Disarmament, Demobilization and Reintegration (DDR) programme; provisions of funds to the Eastern Sudan Recovery and Development Fund; and the representation of eastern Sudanese in the national civil service. The eastern Region (Kassala, and Red Sea) has long suffered chronic poverty, lack of adequate access to basic services such as healthcare and education, high levels of malnutrition and widespread unemployment. A long-standing low-intensity rebel insurgency ended with the ESPA, providing a degree of security. However, the peace dividends have not materialised as expected. Since eastern Sudan's population is predominantly rural, competition over scarce natural resources, such as water and farming or grazing land, is one of the causes of inter- and intra-tribal tension and conflicts.

Instability in Eritrea and the border regions of Kassala and Red Sea has resulted in large numbers of displaced people settling in and around urban centres in those states. In addition there are around 60,000 Eritrean refugees who are residing in rural refugee camps in Kassala. Because repatriation or resettlement options have diminished, refugees will likely require assistance that may support local integration. The influx of refugees from Eritrea continues, averaging 2,000 per month with possible implications for risky onward migrations.

### 2.2. Food and livelihood assistance in Kassala

In eastern Sudan, food and nutrition assistance is targeted toward refugees and communities who are severely food insecure. Furthermore, some demographic groups have been targeted for specific support, including children under five, school-aged children and pregnant and lactating women.

In Kassala in 2012, approximately 30,000 people were supported with traditional food assistance. In addition, around 36,000 people were supported through vouchers. According to focus group discussions, vouchers are the preferred option for the majority of the beneficiaries. Newly arrived refugees in established camps in Kassala are given the choice between in-kind food and vouchers, with more than 95 percent selecting vouchers. The main intervention in Kassala is the refugee camps, in addition to food-for-education (FFE) for some 48,000 children in primary schools across the state.

In addition, round 4,000 children less than five years of age were targeted and supported with supplementary feeding programmes (SFP) with another 2,000 children supported through the integrated blanket supplementary feeding programme (IBSFP) in four centres in the state. The multi-sectoral IBSFP includes the provision of specialised foods to meet the nutrient gap of pregnant and lactating women, and children 6-36 months throughout the year. This is complemented by behaviour change communication for improved feeding practices and greater diet diversity, improved water and sanitation practices and increased use of health care.

Finally, 19,000 farmers in Kassala were supported through the Farmers to Market project (F2M) which is implemented jointly by the Central Bank of Sudan, the Ministry of Agriculture and WFP and provides micro-finance opportunities and extension services training under food-for-training programmes to small holder farmers associations.

### 2.3.Livelihood Zones

There are six livelihood zones<sup>1</sup> in Kassala State which include:

- 1) **Southern Riverine Small/Medium-Scale Cultivation:** The basis of the economy of this zone is irrigated production with also some flood-retreat cultivation. Towards the southern parts of the zone rainfall is substantial leading to a good production in the rainy season. Surrounded by the vast zones of rainfed semi-mechanized and irrigation scheme cereal production, this zone, with its fertile alluvial soils but limited land area, concentrates on garden produce and orchard fruits. These cash crops – notably onions and tomatoes – are the most profitable use of the land in a situation where market value has greatly increased by good roads leading to big centres such as *Ed Damazin, Sennar, Wad Medani, Kosti* and Khartoum.
- 2) **Eastern Pastoral:** This zone has a very varied topography, from mountain to hill to inland and coastal plains, but a common ecology is that the rainfall is too low for rainfed cultivation (a mean of not more than 150mm per annum). The best use people can make of the land is for grazing, and goats and sheep are the main livelihood activity in this very harsh and rugged environment, together with some camels and donkeys for carriage. Cattle are few because of the harsh environment.
- 3) **Eastern Agropastoral Sorghum:** On this plains terrain the natural cover is grass. Mean annual rainfall of 230-240 mm is low for crop cultivation, but the light clay soils have some moisture retention quality and are relatively fertile. Usually, in two out of three years there is satisfactory rainfall in from June to September. The soils favor sorghum, and this is the sole crop grown, purely rainfed, successfully enough in most years to provide a large part of subsistence for the population, although only a little for sale by wealthier farmers. Livestock are kept for milk but also offer the greater part of the earnings of the wealthier households through sales.
- 4) **Flood Retreat:** This zone is composed of separate areas of flood retreat cultivation including the *Aroma/Wager* area in east Kassala (El Gash). Sorghum is the food crop of choice on these fertile alluvial soils, and wealthier farmers are not only entirely self-sufficient in the staple, but can also market a surplus. Poorer households by contrast only manage to produce a harvest to last them some three months of the year, and they are dependent on the market to buy the balance of their requirement. The retreat of the river flood-waters begins in August, allowing the progressive sowing of sorghum for a harvest between December and January. Sorghum has recently replaced cotton as the major cash crop. In addition, there is some production of vegetables, notably tomatoes, and of watermelons, for home consumption and garden marketing.
- 5) **Central Irrigated Schemes:** The zone comprises the *New Halfa* scheme which dates from 1964 when the *Khashm el Girba* Dam was created on the Atbara River for a scheme on which to resettle some 50,000 Nubians from *Wadi Halfa* displaced by the disappearance of their pasturelands under Lake Nasser behind the Aswan Dam. Production on the moderately fertile clay-based soils is mainly sorghum and cotton, with wheat as an important second food and cash crop for the wealthier farmers. There is also secondary production of groundnuts, horticultural produce and orchard fruits.
- 6) **Southeast Semi-Mechanized Rainfed Agriculture:** There are two kinds of production, in this zone: mechanized plots and smallholdings. In the smallholdings, where the owners cultivate for themselves with traditional ox-ploughing or hand-tilling. Members of these households may also work on the mechanized farms. The clay soils are fertile, and mean annual rainfall ranges from 400mm at the northern limit to up to 900mm towards the south, where the rains continue into October. The main food crops grown are sorghum and to a lesser extent millet; sesame is the main cash crop, followed by cotton and sunflower seed that are grown by wealthier farmers.

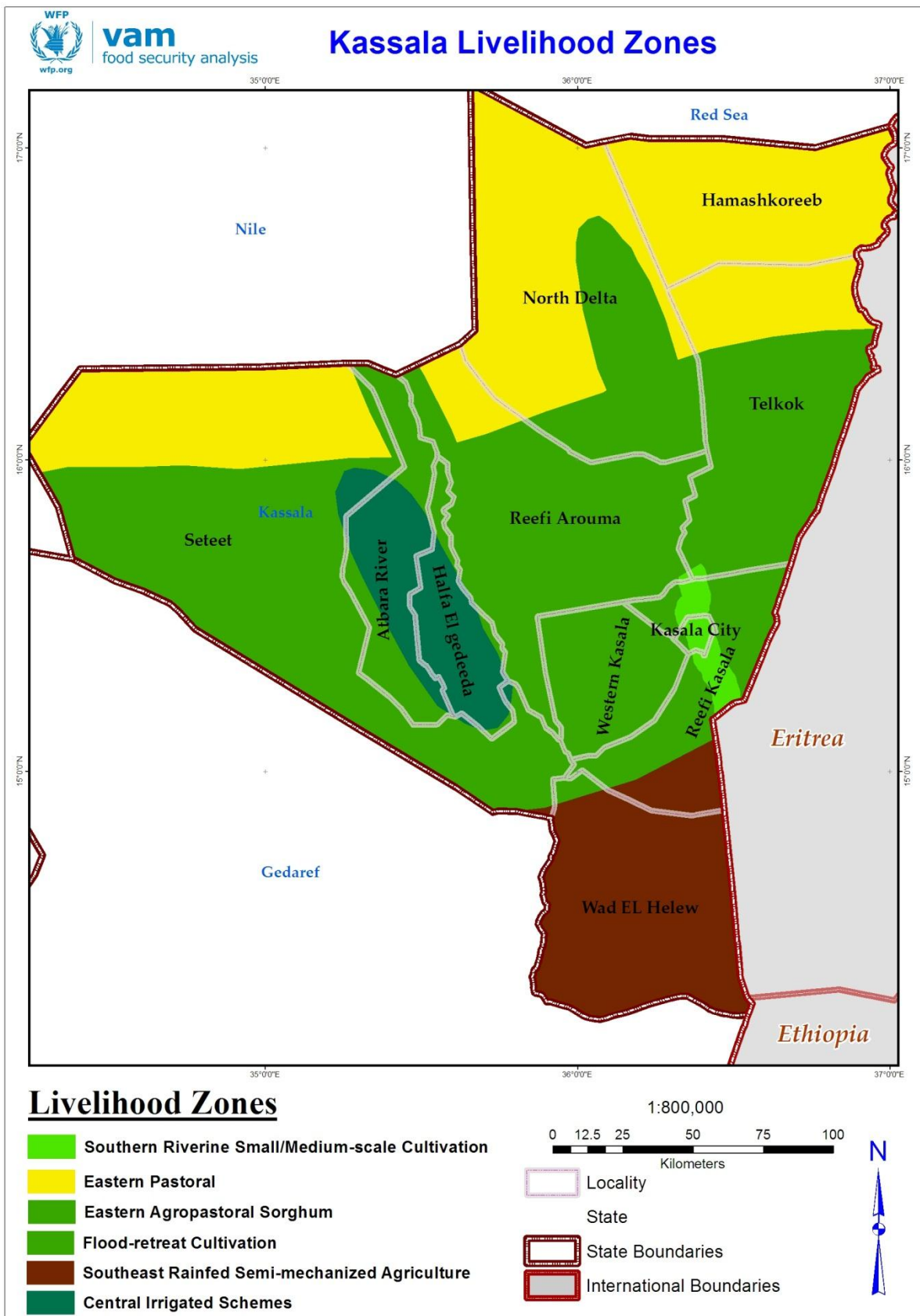
This map has been created by FEWSNET and partners. It is difficult to ascertain the livelihood zones with 100 percent accuracy, and especially the borders of the zones might not accurately reflect the situation on the ground<sup>2</sup>.

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<sup>1</sup> Livelihoods Zoning “Plus” Activity in Sudan. A special report by the Famine Early Warning Systems Network (FEWSNET) August 2011

<sup>2</sup> Livelihoods Zoning “Plus” Activity in Sudan. A special report by the Famine Early Warning Systems Network, 2011

Map 2. Kassala livelihood zones



## 3. STUDY OBJECTIVES AND METHODOLOGY

### 3.1. The need for a comprehensive assessment

A comprehensive food security assessment has never been carried out in Kassala, and WFP wanted to do this assessment to get a more complete picture of the food security situation in the state. The Comprehensive Food Security Assessment was implemented in partnership with the State Ministry of Agriculture.

### 3.2. Objectives

The primary objectives of the comprehensive food security assessment in Kassala are:

- to provide a reliable and detailed assessment of the current food security and vulnerability situation of the population in Kassala;
- to assess some of the causes and risk factors for food insecurity and vulnerability and;
- to identify pockets of vulnerability where assistance and targeting may be required in the future.

The results of the survey are intended to assist WFP and the Government of Sudan in determining the best interventions, improve geographic and social targeting and to help policymakers in exploring options for establishing a food security-based safety net programme.

### 3.3. Sampling

A classic cluster sampling approach was adopted with locality used as primary clusters. In Kassala, the sample frame and the primary sampling units were updated according to the census of 2008 and based on information provided by the WFP Area Offices. The 2011 population numbers were created based on the population census numbers from 2008 multiplied with the annual population growth rate. This again, was used as the sample frame for the survey. The survey covered all the 11 localities in Kassala state. The six livelihood zones within each locality were also used.

The proportions of locality population to the total population within each state were used to determine the sample size. The design was set at 11x141 (11 localities and 141 households within each locality) to yield 1,554 households. When conducting the survey, information was collected from 1,536 households. The total number of sampled cities/villages within each locality was based on the proportion of different livelihood zones within each locality.

In all, 55 cities/villages were randomly visited from 11 localities and a minimum of 14 households were randomly selected and interviewed from each city/village. When selecting the households, the teams use the city/village centre as a starting point, and head off in different directions to cover the whole city/village. To find the interval between households, the estimated number of households was divided by the number of interviews to be conducted from the location.

If, for some reason, the teams could not reach the sampled location, the teams would select the nearest alternative locations within the same locality and livelihood zone.

### 3.4. Data collection

For the last year, WFP has built a strong partnership with the State Ministries of Agriculture in Kassala and Strategic Reserve Corporation, and are planning to continue this partnership by conducting workshops to build their capacity in terms of food security assessments, data collection and analysis.

The household questionnaire was designed to collection information on livelihoods, risk, and vulnerability in order to best understand food insecurity in the region. The questionnaire was divided into the following 10 modules:

- Household Demographics/Circumstances

- Income and Market
- Expenditures
- Food Sources and Consumption
- Coping Strategies
- Food Aid
- Agriculture
- Household Assets
- Child Feeding and Health
- Child Mid Upper Arm Circumference (MUAC)

The design of the questionnaire was intended to allow better understanding of the current problems facing the people in Kassala and understanding of the types of livelihood activities adopted by food-secure and food-insecure households. This kind of information will help to determine the type of risks affecting food-insecure households and how best to assist them.

The questionnaire was made available in two languages, Arabic and English. The month used as a reference period when reporting all income and expenditures was December 2011. A series of extensive training workshops were conducted by WFP on all household survey modules, for WFP national staff and staff from the State Ministry of Agriculture and Strategic Reserve Corporation.

The data were collected using structured interviews with household members that reflect WFP's Vulnerability Analysis Mapping (VAM) standard framework of key questions which characterize food insecurity and vulnerability. The following questions guided the process of designing and carrying out this study:

- What is the current food security and vulnerability situation of the Kassala population?
- Who are the food insecure?
- Why are they food insecure (causes and risk factors for food insecurity and vulnerability)?
- How many are they?
- Where do they live (identify pockets of vulnerability where assistance and targeting may be required in the future)?
- What can be done to assist (interventions, improve targeting)?

## 4. FOOD SECURITY AND VULNERABILITY ANALYSIS

### 4.1. Human capital

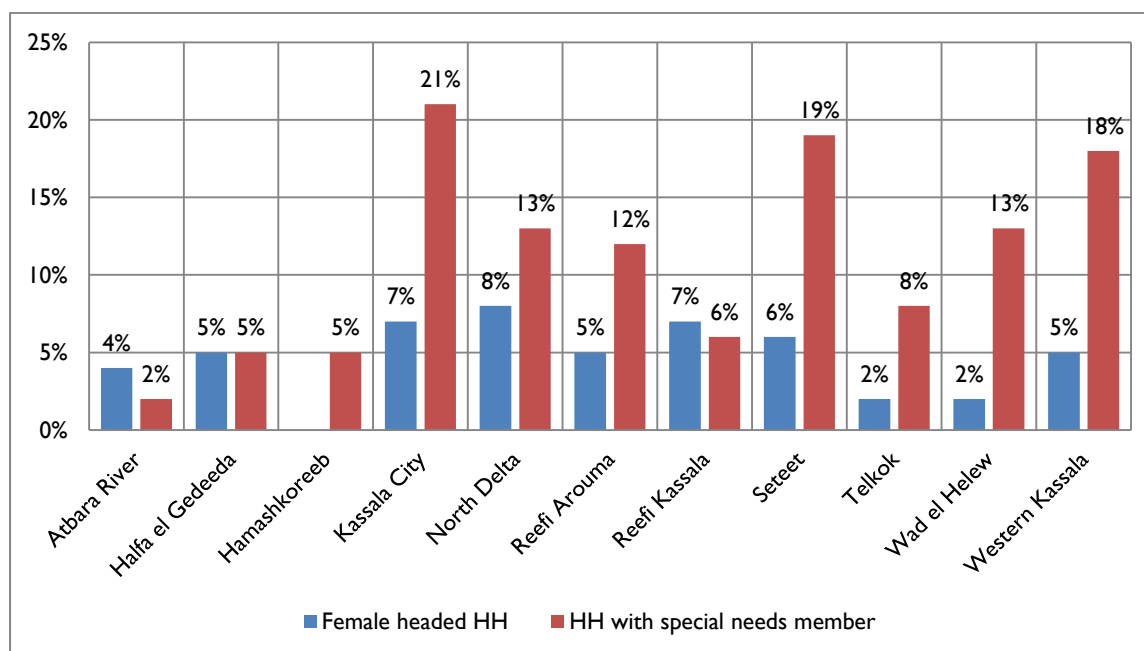
#### 4.1.1. Demographics

Data from the survey indicate that the majority of the households are residents (94 percent), with a small percentage of IDPs, returnees and nomads. The mean household size is 6.4 people with a median of 6 members. By locality, households in *Reefi Kassala* are the smallest with a median size of 5 while those in *Wad el Helew* and *Western Kassala* have a median size of 8 while those in *Kassala City* rural locality and *Seteet* have a median size of 7 members.

In all, only 4 percent of households are headed by women, ranging from zero in *Hamashkoreeb* to 7 percent in *Reefi Kassala* and *Kassala City* rural locality and 8 percent in *North Delta*. Overall, the ratio of males to females in the households is 1:1; however, households in *Hamashkoreeb* and *Kassala City* have a slightly lower percentage of females than males.

In Kassala, 9 percent of the households have members with special needs. This ranges from a low of 2 percent in the *Atbara River* locality sample to a high of 18 percent in *Seteet* and *Western Kassala* and 21 percent in *Kassala City* rural locality.

**Chart 1. Household characteristics by Locality**



In this survey, the analysis of household composition shows that approximately 19 percent of the population are children less than five years of age, 37 percent are school aged (6-15 years), around forty percent are adults of working age (16-60 years) and around four percent are elderly.

**Table 1. Households composition**

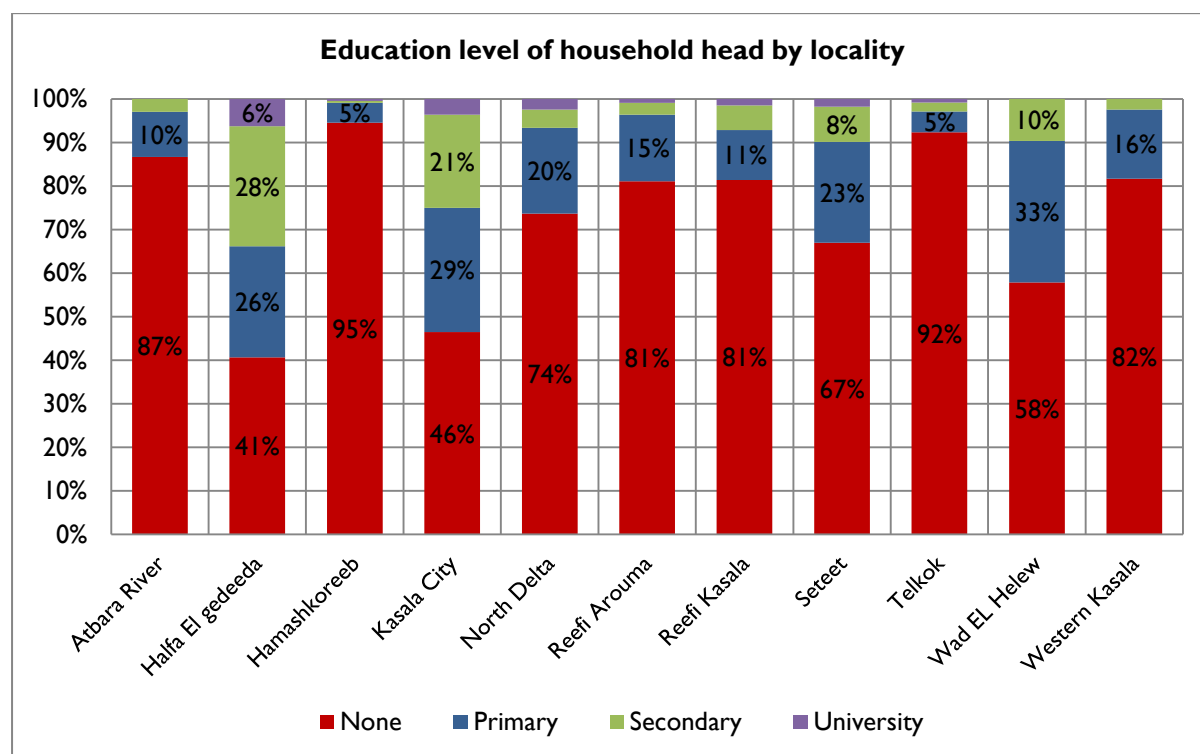
<b>Average household size</b>	<b>6.4</b>
under 5, Male	10%
under 5, Female	9%
6 -1 5 yrs, Male	19%
6 -1 5 yrs, Female	18%
16 -60 yrs, Male	20%
16 -60 yrs, Female	20%
over 60 yrs, Male	2%
over 60 yrs, Female	2%
<b>% of Disabled</b>	<b>12%</b>
Physical	9%
Mental	3%
Both	< 1%

#### 4.1.2. Education

Analysis shows that a high percentage of household heads in Kassala does not have any education (77%). Out of the educated heads of household, the majority of the household heads have primary education, with only a very small percentage holding a university degree.

When analysing education level by locality, the highest percentages of household heads with no education are found in *Hamashkoreeb* (95%), *Telkok* (92%) and *Atbara River* (87%). Households in *Kassala City* and *Halfa El Gedeeda*, have the highest percentages of educated heads at 59 and 54 percent respectively.

**Chart 2. Education level by locality**





## 4.2. Natural Capital

### 4.2.1. Agricultural production at household level

When asked if the household has cultivated this season, only 38 percent replied that they had. For the sample, the main reasons for not cultivating this season were:

- that they were not farmers (51 percent),
- poor/irregular rains (27 percent) and
- no access to land (12 percent).

All the people who cultivate rent the land, and the main mode of payment is in cash (94 percent).

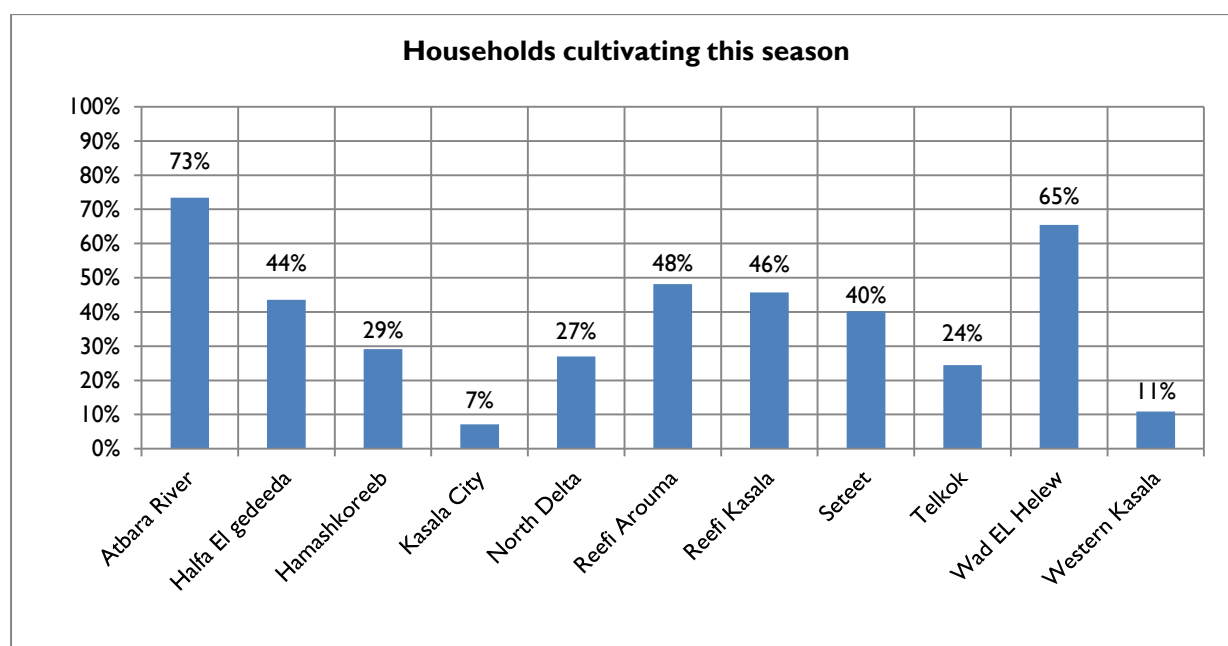
When analysing cultivation by locality, findings show that households in *Atbara River* were the mostly likely to have cultivated (73 percent), followed by *Wad El Helew* (65 percent). *Atbara River* belongs to the **Central Irrigated Schemes** livelihood Zone, while *Wad El Helew* is situated in the **Southeast Semi-Mechanized Rainfed Agriculture** zone. In *Kassala City* locality, only 7 percent had cultivated in the current season.

The most important source of seeds is purchase from the market, followed by own production and donation.

On average, the area cultivated this year in the three states is similar to area cultivated last year, for all crops. Overall, households in Kassala has cultivated 11.3 *mukhamas*<sup>3</sup> sesame, 7.7 *mukhamas* millet, approximately 5 *mukhamas* groundnuts and millet and 4 *mukhamas* watermelon seeds.

The largest expected average household production in Kassala this season is 63 bags (45 kg) of groundnut and approximately 30 bags (90 kg) of sorghum and watermelon seeds.

**Chart 3. Percentage of households cultivating this season**



In Kassala, 95 percent felt that that the rainfall in term of quantity was worse than normal and 96 percent believed the rainfall distribution was uneven. The 2011/2012 harvest season was expected to be poor compared to the exceptionally good harvest in 2010, which is mainly due to the low and unevenly distributed rainfall this season.

<sup>3</sup> mukhamas Sagyer = 1.25 feddan; 1 feddan = 4200 square metres (m<sup>2</sup>) = 1.038 acres

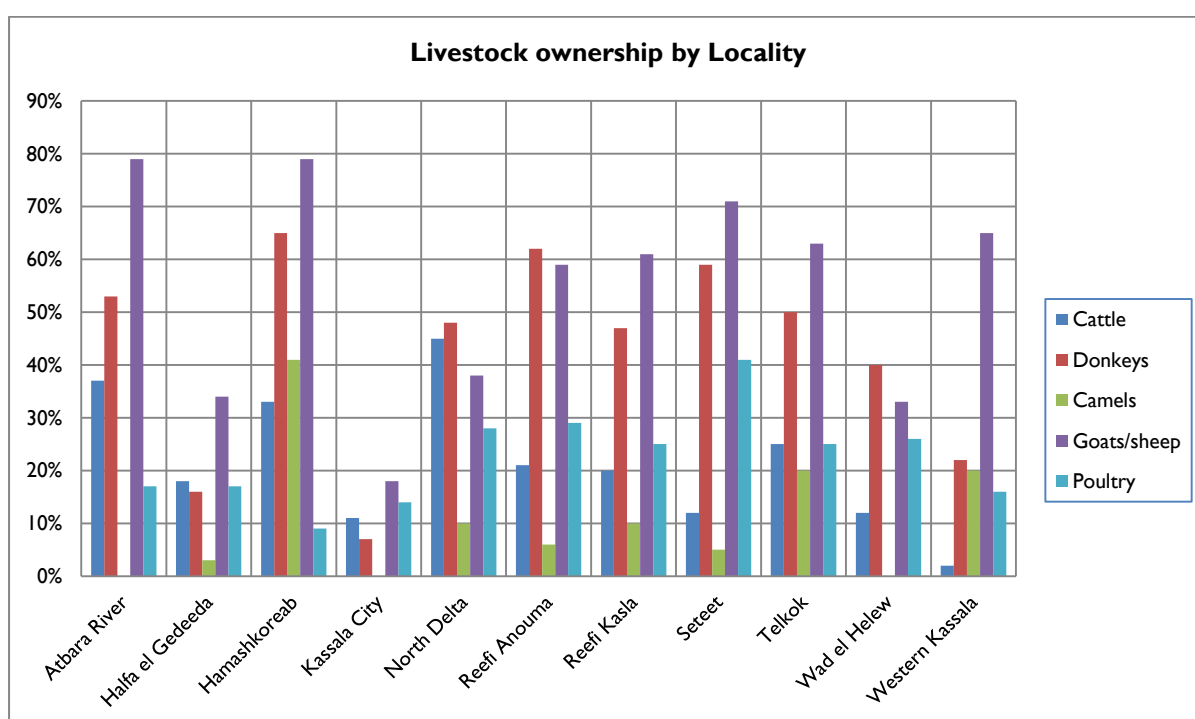
### 4.2.2. Livestock ownership

Three-quarters of the households in the survey owned animals. The most common animals to own are sheep and goats (shoat) (58 percent), followed by donkey (46 percent), cattle (22 percent) and camels (13 percent).

More than 90 percent of the households in the *Atbara River* sample owned livestock, followed by 87 percent in *Hamashkoreeb*, 84 percent in *Seteet* and 81 percent in *Telkok*. As expected only 36 percent of the households in the *Kassala City* sample owned animals.

The chart below shows livestock ownership by locality. Households in *Atbara River* and *Hamashkoreeb* are the most likely to own goats/sheep, while those in *North Delta* are the most likely to own cattle. Households in *Hamashkoreeb* and *Reefi Anouma* are the most likely to own donkeys while those in *Seteet* are the most likely to own poultry. Camels are found most often amongst households in *Hamashkoreeb*.

Chart 4. Percentage of households cultivating this season



## 4.3. Physical and financial capital

### 4.3.1. Housing, water and sanitation

The survey found that the most common housing structure in Kassala is thatched house (39 percent) followed by mud/mud brick houses (17 percent). In addition, 31 percent of the households have replied 'other' which could imply nomadic stick houses.

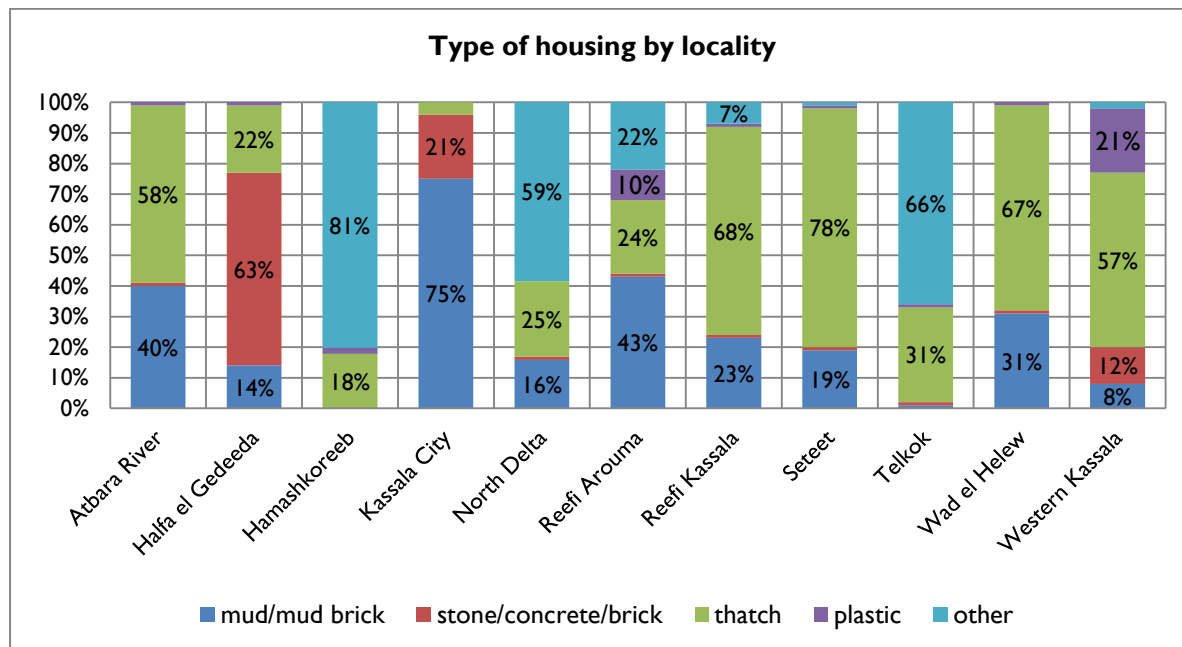
In Kassala, the main source of drinking water is public tap (25 percent), followed by surface water (river, stream etc.) (17 percent) and tanker truck (15 percent).

Out of the surveyed households in Kassala, 68 percent use bush/stream as toilet facility. For the rest of the households, they use a traditional pit latrine/open pit as toilet facility (18 percent) or an improved latrine with cement slab (14 percent) which is considered 'improved' by UNICEF standards.

Across localities, there are great variations when it comes to type of housing. In *Kassala City*, 75 percent of the households live in mud/mud brick houses. *Atbara River* and *Reefi Arouma* also have high

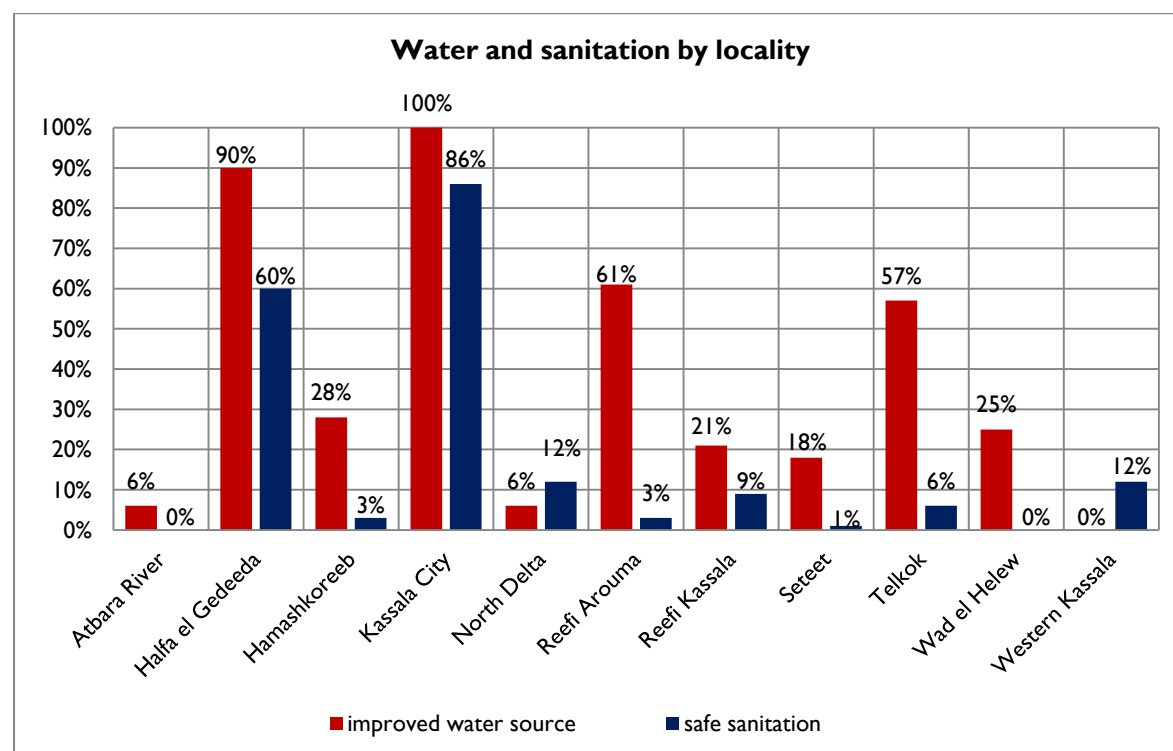
percentages of households in this housing category. In *Hamashkoreeb* and *Telkok*, 81 and 66 percent respectively report that their housing is 'Other'. Considering that these areas are pastoralist areas, most likely these houses are portable nomadic stick houses. In *Seteet*, *Refi Kassala*, *Wad el Helew*, *Western Kassala* and *Atbara River*, more than half of the households live in thatched houses.

**Chart 5. Type of housing by locality**



Analysis illustrates that there are great variations across localities in terms of access to water from improved sources and safe sanitation. In *Kassala City* locality, all of the households have access to water from improved sources, and 86 percent have access to safe sanitation. On the other hand there is *Atbara River* where only 6 percent of the households have access to water from improved sources and none have access to safe sanitation.

**Chart 6. Water and sanitation by locality**



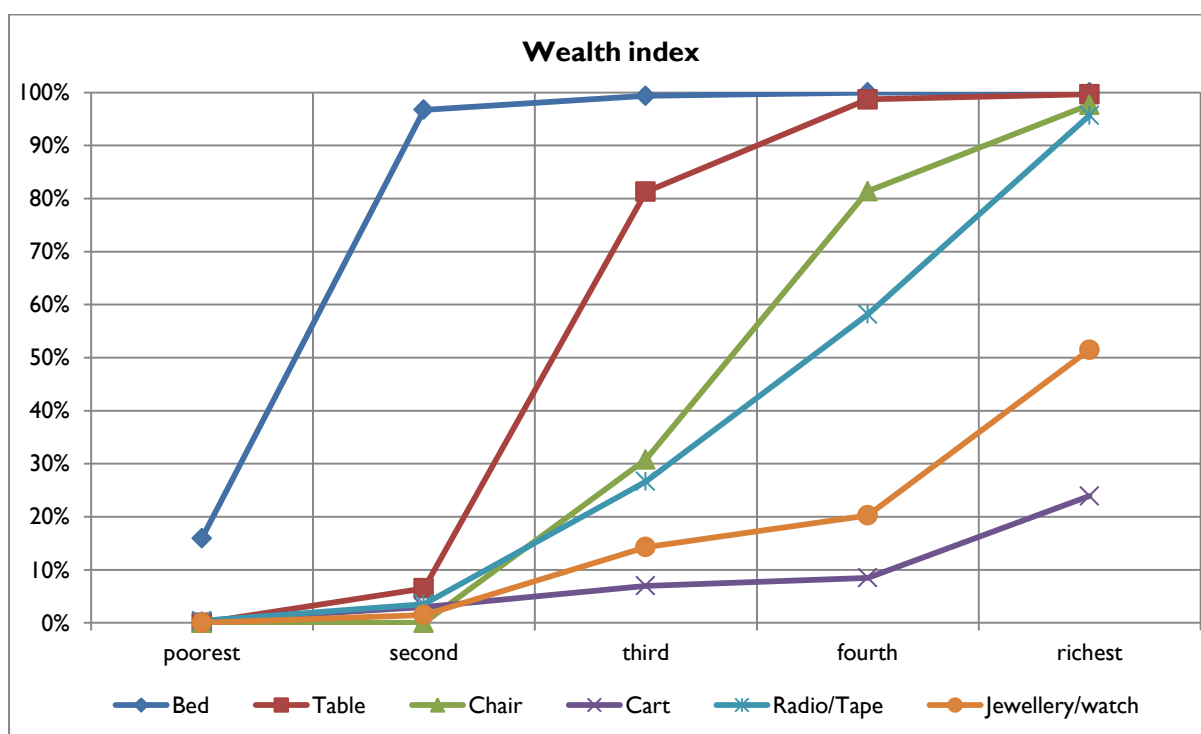
### 4.3.2. Wealth Index

Wealth is the value of all natural, physical and financial assets owned by a household. While measuring wealth is possible, it is difficult and requires making assumptions about the value of assets. Therefore, as a proxy measure, a wealth index was constructed using a series of different socio-economic measures.

The type of household assets assessed in the survey include: bed, table, chair, lantern, cooking utensils, bicycle, cart, hoe, axe, *muhurat*, radio/tape player, and jewellery or watch. In addition, households were asked about livestock ownership. The most commonly owned assets were cooking utensils (90%), bed (84%), axe (79%) and lantern (75%).

The first step in the construction of the wealth index in Kassala was to identify a series of assets or socioeconomic proxies that would be a comparable measure of wealth across localities. A number of variables were determined to meet this criterion. Using these variables, a principal component analysis (PCA) was conducted. The first component was selected and wealth quintiles (poorest, poorer, moderate, richer and richest) were developed.

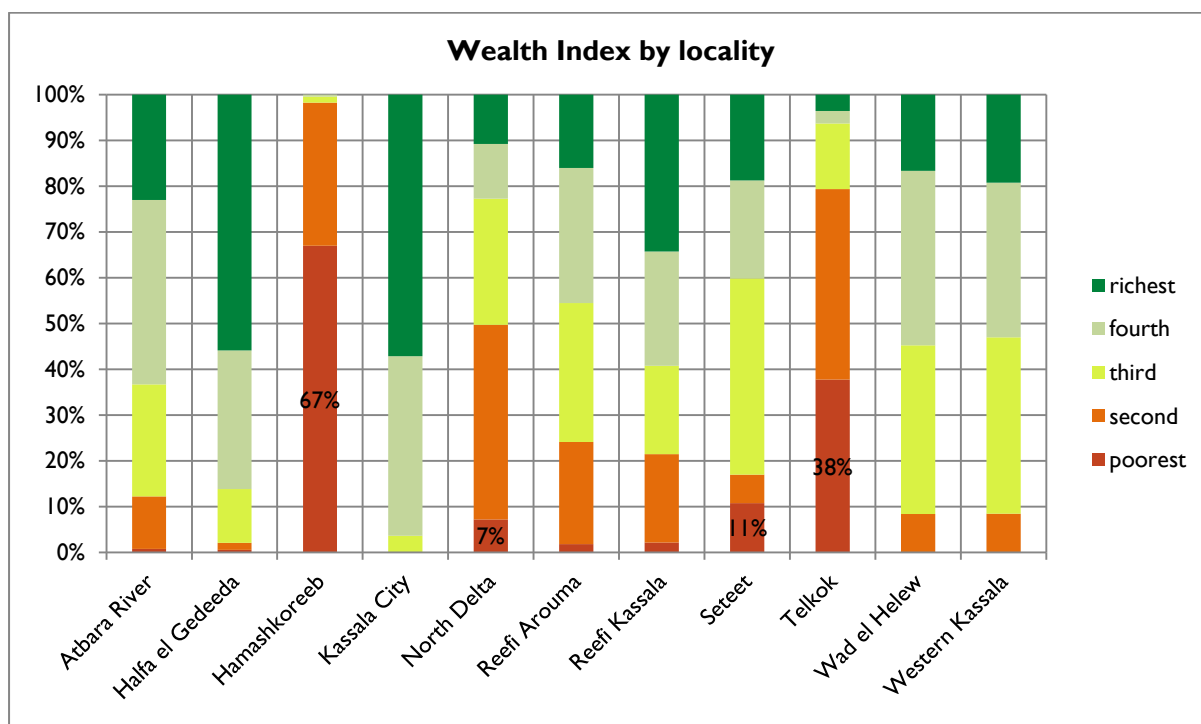
**Chart 7. Asset ownership by wealth quintile**



For all assets in these graphs, as wealth increases ownership of the various assets also increases. A typical example is bed and tables, where a low percentage of households in the poorest wealth quintile own these assets while all the households in the richest quintile own beds and tables.

Analysis of wealth by locality shows great variations across the localities. In *Hamashkoreeb*, 67 percent of the households are in the poorest quintile and 31 percent in the second quintile. *Telkok* is another locality with a high percentage of asset poor households, with 38 percent of the households in the poorest quintile and 42 percent in the second quintile. The two peri-urban localities of *Kassala City* and *Halfa El Gedeeda* have the highest percentages of households in the richest quintile, 57 percent and 56 percent respectively.

Chart 8. Wealth quintiles by locality



#### 4.3.3. Livelihood zones

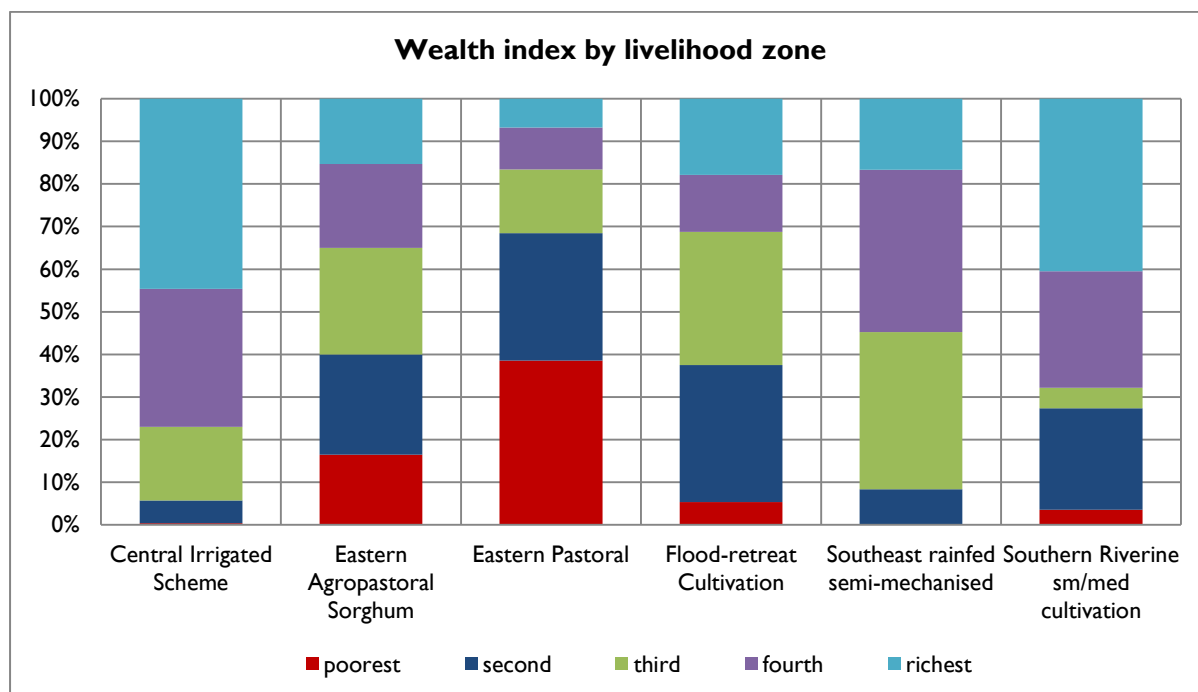
In this assessment, six livelihood zones in Kassala state states were visited. The assessment has considered the geographical coverage of each livelihood zones within the localities and the states. The number of households selected in each livelihood zones is proportionally representing the livelihood zones in the locality and the state. The most important livelihood zone is *Eastern Agropastoral Sorghum* where 33 percent of the interviewed households live, followed by *Eastern Pastoral* (31 percent) and *Central Irrigated Schemes* (18 percent).

Table 2. Livelihood zones sampled households

Central Irrigated Schemes	18%
Eastern Agropastoral Sorghum	33%
Eastern Pastoral	31%
Flood-retreat Cultivation	7%
Southeast Rainfed Semi-mechanized Agriculture	5.5%
Southern Riverine Small/Medium-scale Cultivation	5.5%

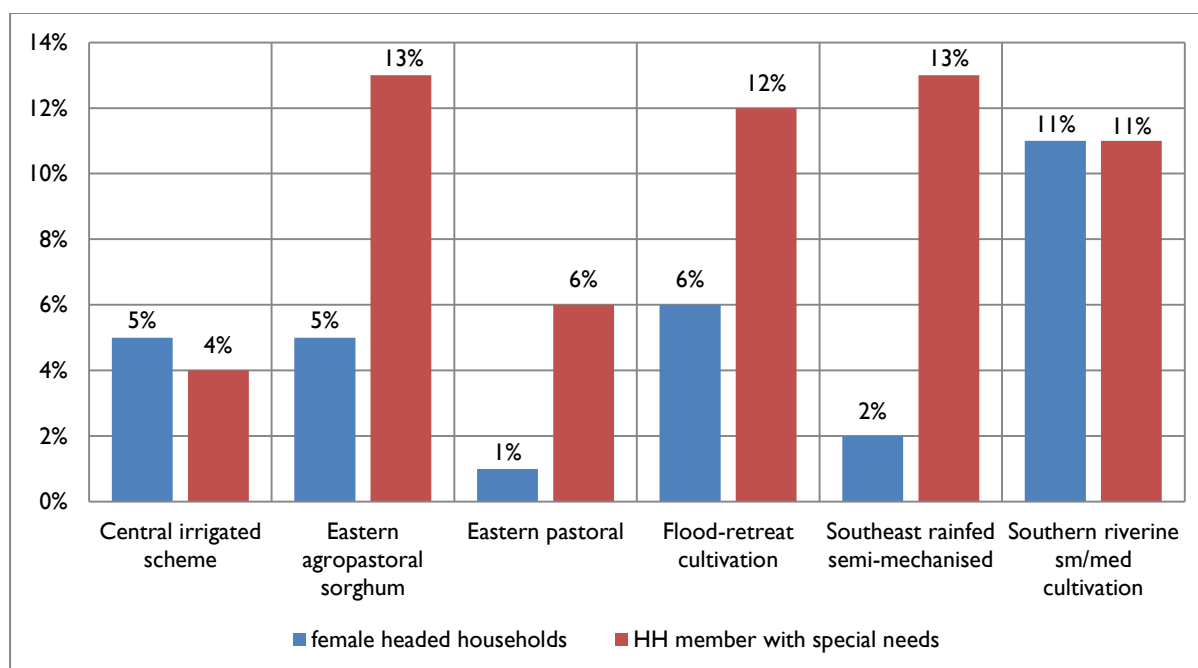
When analyzing wealth index by livelihood zone, *Eastern pastoral* has the highest percentage of households in the poorest group (29 percent), with another 30 percent of the households in the second poorest group. *Central irrigated scheme* has the highest percentage of households in the richest wealth quintile (45 percent), followed by *Southern riverine small/medium cultivation* (40 percent). There is a tendency that the pastoralist areas are poorer, and areas focussing on agriculture are much better off.

Chart 9. Wealth index by livelihood zone



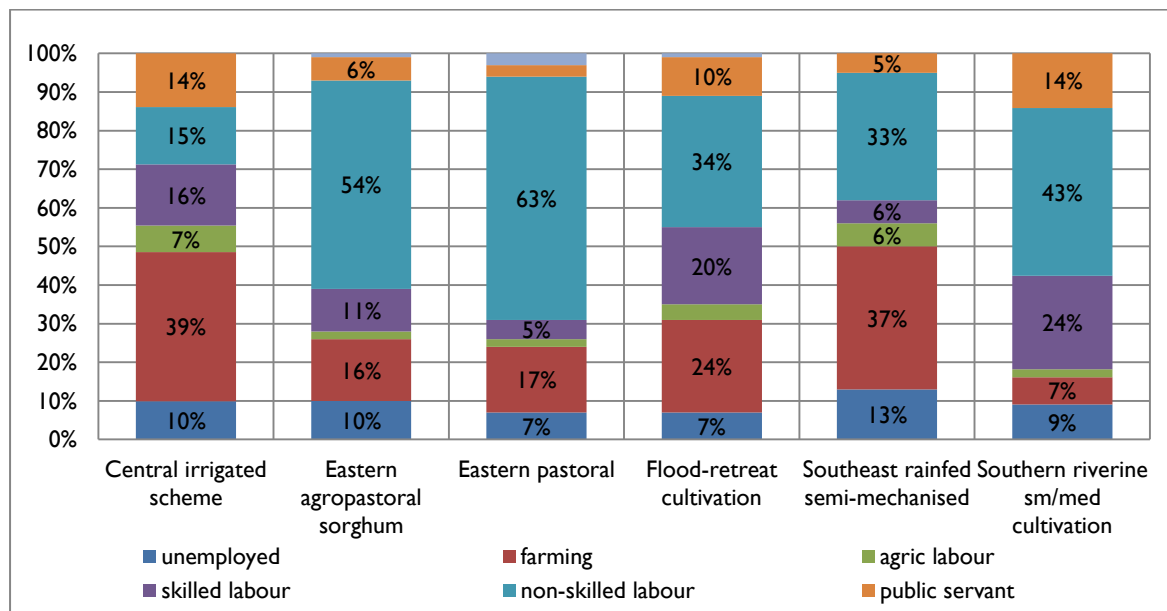
Analysis of household characteristics by livelihood zone shows variation across the zones in both the percentage of female headed households and household members with special needs. *Eastern pastoral* and *Southeast rainfed semi-mechanised* zone have the lowest percentages of female headed households, 1 and 2 percent respectively, while the *Southern riverine small/medium cultivation* has the highest percentage of female headed households (11 percent). The highest percentages of households with special needs members are in *Eastern agropastoral sorghum* and *Southeast rainfed semi-mechanised* zones with 13 percent. *Central irrigated scheme* has the lowest percentage of households with special needs members (4 percent).

Chart 10. Household characteristics by livelihood zone



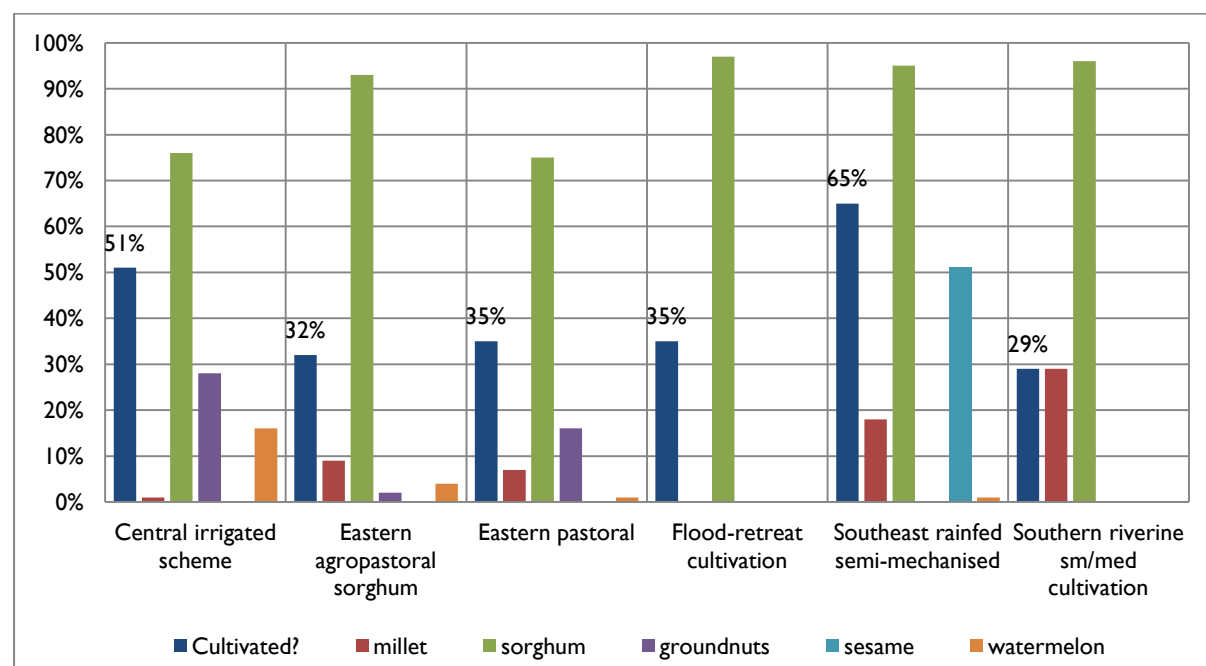
Analysis of the household head employment shows some variation across the livelihood zones. The largest percentages of households relying on farming are found in the *Central irrigated scheme* and the *Southeast rainfed semi-mechanised* livelihood zone, 39 and 37 percent respectively. It is also in these zones there are many households relying on agricultural labour – more than half of the households in *Eastern pastoral* and *Eastern agropastoral sorghum* are relying on non-skilled labour. The highest percentage of skilled labour is in the *Southern riverine small/medium cultivation* (24 percent) with an additional 14 percent working as public servants.

**Chart 11. Household head employment by livelihood zone**



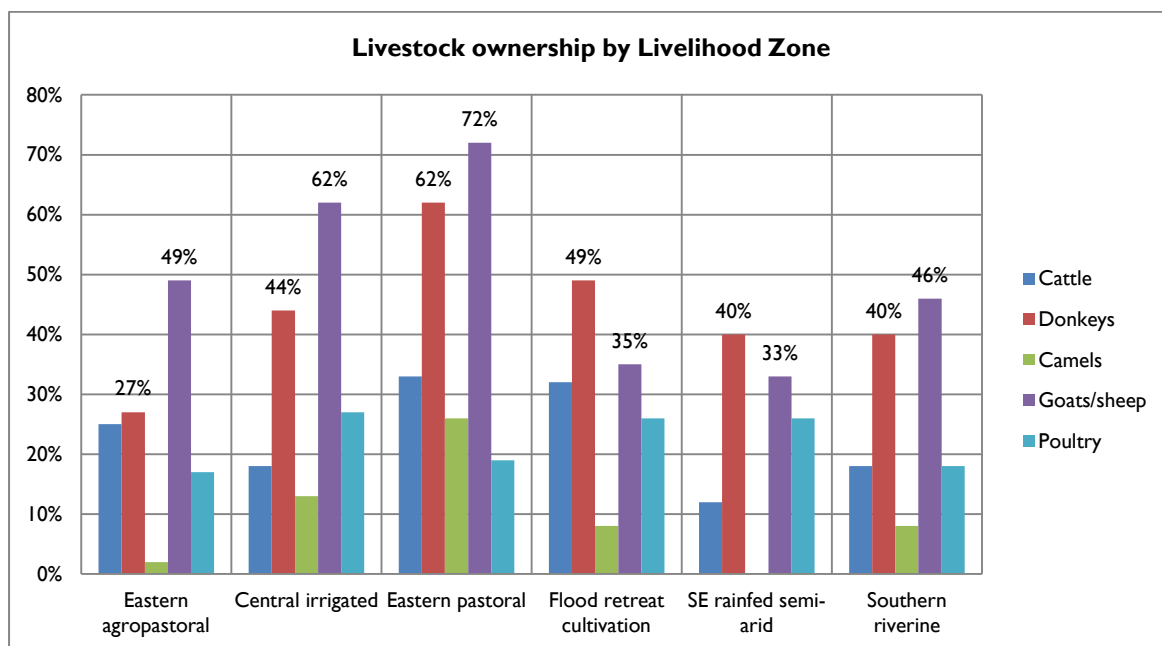
*Southeast rainfed semi-mechanised* livelihood zone have the highest percentage of households reporting to have cultivated this season (65 percent) followed by the *Central irrigated scheme* (51 percent). The main crop cultivated is sorghum in all livelihood zones. In the *Southeast rainfed semi-mechanised* zone, over 50 percent of the cultivating households are cultivating sesame, while groundnut cultivation is found in the *Central irrigated scheme* and *Eastern Pastoral* livelihood zone.

**Chart 12. Agriculture by livelihood zone**



A relatively large percentage of households in all livelihood zones own livestock. The highest percentages are found in *Eastern Pastoral* zone, where 72 percent of the households own goats or sheep, 62 percent own donkeys and around 25 percent own camels.

**Chart 13. Livestock ownership by Livelihood zone**



#### 4.3.4. Livelihoods and income sources

Approximately 93 percent of all households in the Kassala sample reported that heads of household are employed. For the unemployed population, illness/aging was the most important reason for not working followed by no chance of work.

Using the share contribution to total income by the 25 livelihood activities in the survey, 10 different groups were created. The number of different groups was a result of exploratory analysis where groups with more than one activity logically made sense. The livelihood groups are useful for understanding the nature of food insecurity and for social targeting of interventions.

The 10 distinct livelihood groups are:

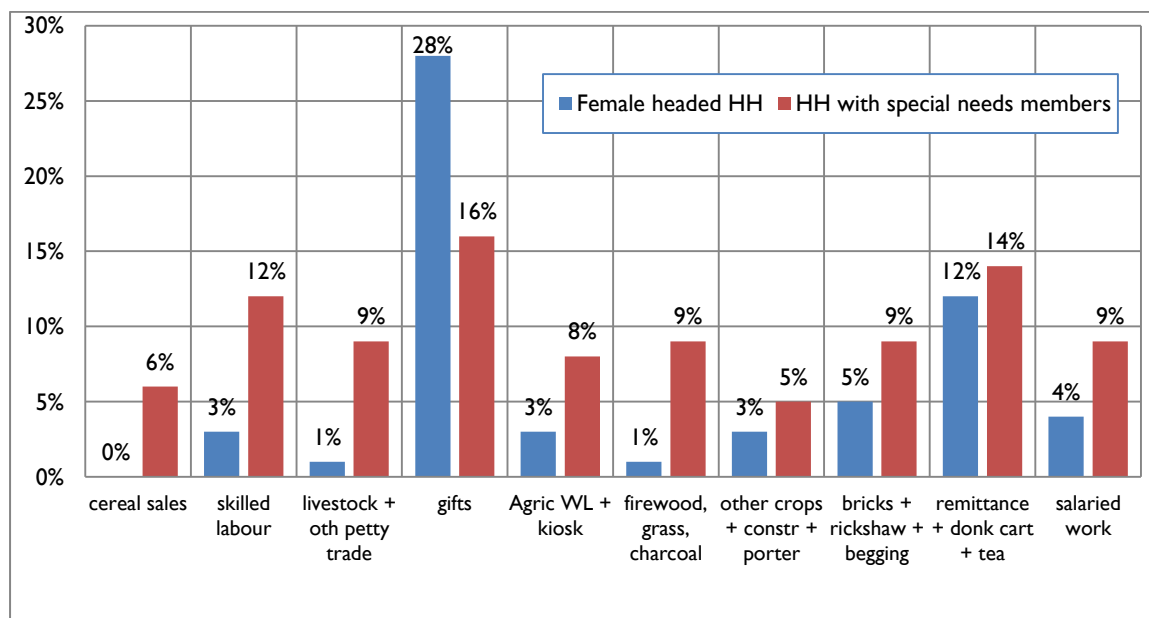
- Cereal crops = 18% of households
- Skilled labour = 8%
- Livestock and other petty trade = 13%
- Gifts = 7%
- Agricultural wage labour and kiosk = 8%
- Firewood/grass/charcoal collection = 22%
- Other crops, construction and porter = 7%
- Brick making, rickshaw and begging = 3%
- Remittances, donkey cart and tea selling = 3%
- Salaried work = 12%

Households relying on *Gifts* have the highest percentage of female headed households (28 percent), followed by households relying on *Remittances + donkey cart + tea selling* (12 percent). The lowest percentages of female headed households are in the livelihood group relying on *Cereal sales* (none) and within the two pastoralist related livelihood groups, namely *Sale of livestock + other petty trade* and *Firewood + grass + charcoal collection* (both one percent).



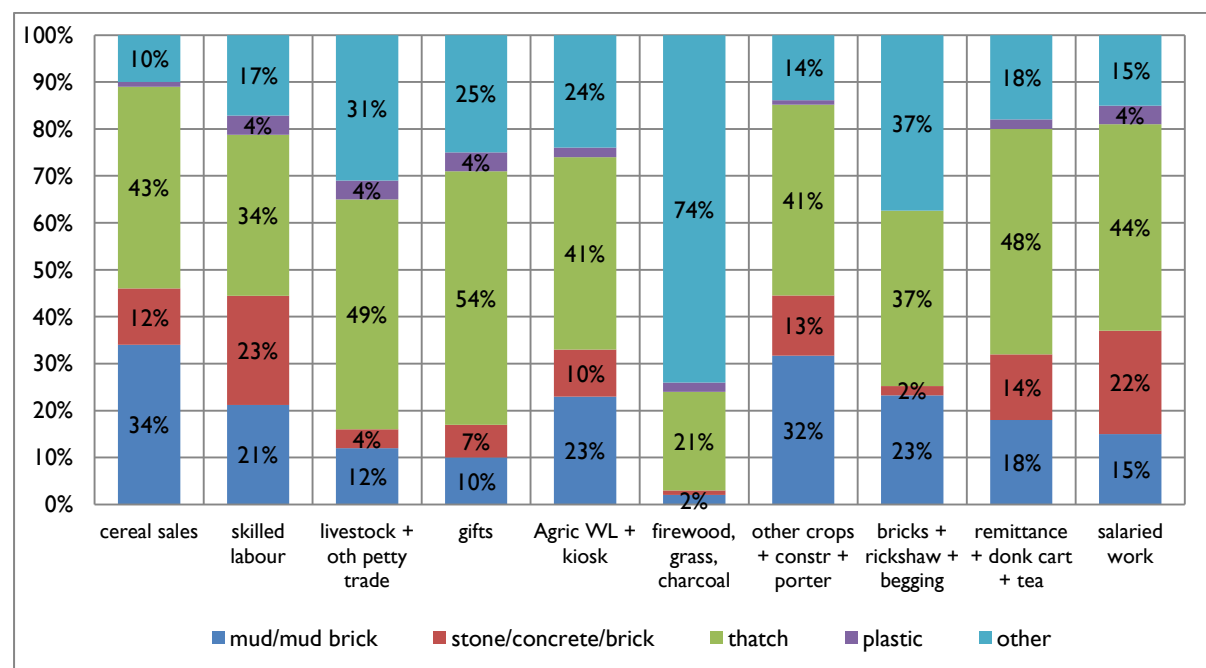
Households relying on *Gifts* have the highest percentage of households with special needs (16 percent), followed by the households relying on *Remittances + donkey cart + tea selling* (14 percent). The lowest percentages of households with special needs members are found in the group relying on *Sale of other crops + construction + porter* (5 percent) and the group relying on *Sale of cereals* (6 percent).

**Chart 14. Household characteristics by livelihood group**



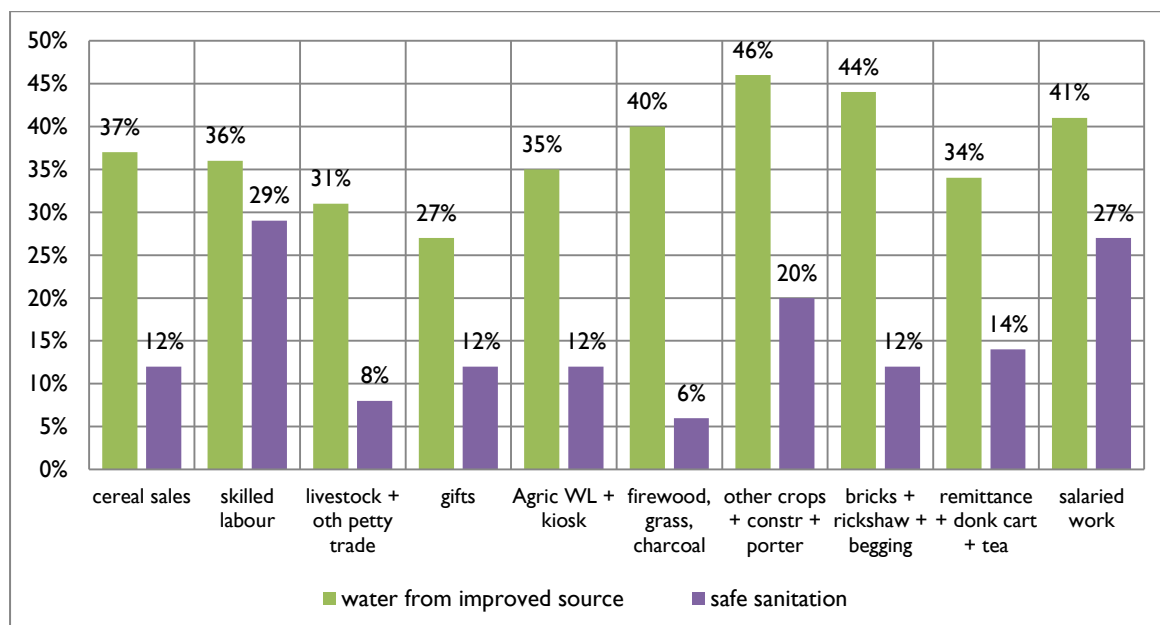
The majority of the interviewed households in Kassala live in thatched houses, the largest percentage found among the households relying on *Gifts*. In the livelihood group relying on *Sale of firewood, grass and charcoal*, 74 percent of the households have reported 'Other'. 'Other' is expected to be the nomadic stick houses, and this livelihood activity is typical for nomadic communities. Households relying on *Skilled labour* and *Salaried work*, have the highest percentages of households living in stone/concrete/brick houses, 23 and 22 percent respectively.

**Chart 15. Housing type by livelihood groups**



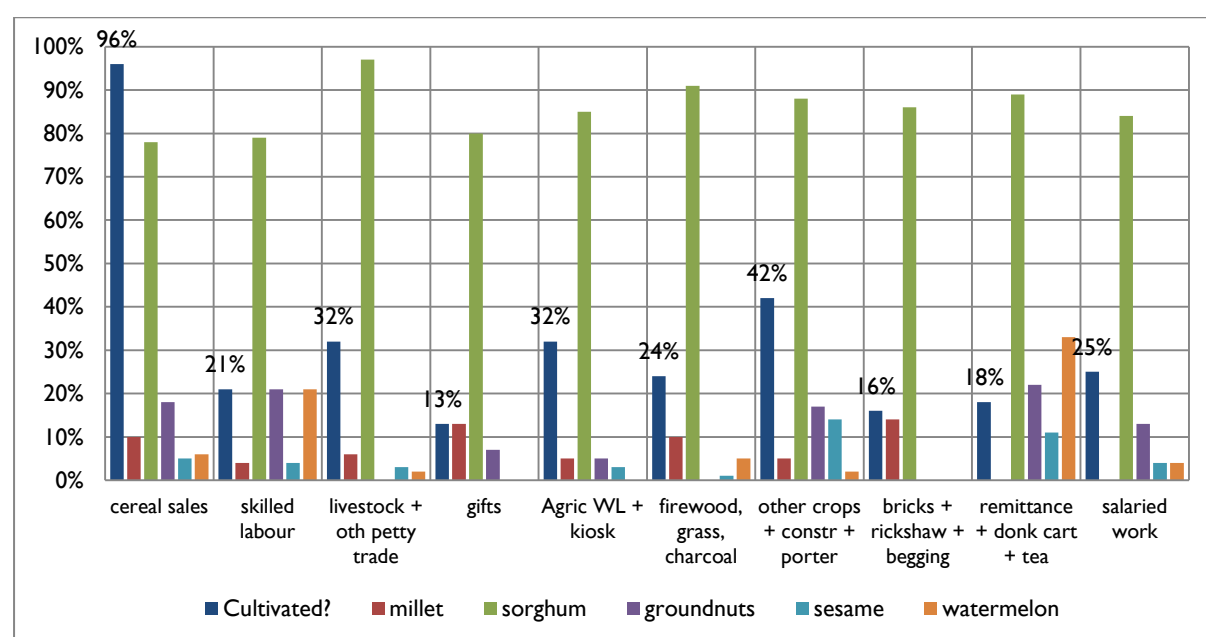
In Kassala, between 27 and 46 percent of the households in the different livelihood groups have access to water from improved sources. The lowest percentage found in the group relying on *Gifts*, while the highest percentage is found in the groups relying on *Sale of other crops + construction + porter*. The nomadic dominated groups relying on *Sale of firewood + grass + charcoal* and *Sale of livestock + other petty trade* have the lowest percentages of households with access to safe sanitation, 6 and 8 percent respectively. The best access to safe sanitation is found among the households relying on *Skilled labour* (29 percent) and *Salaried work* (27 percent).

**Chart 16. Water and Sanitation by livelihood group**



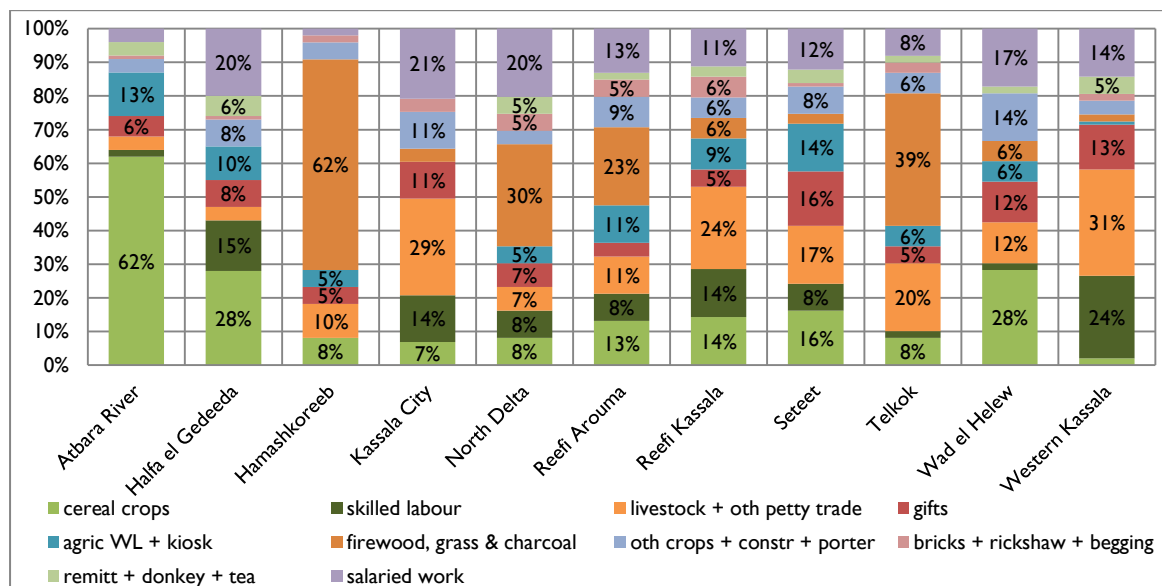
For the households in the *Sale of cereals* livelihood group, 96 percent report to have been cultivating this season. The second highest percentage of cultivating households is found in the group relying on *Sale of other crops + construction + porter* (42 percent). The lowest percentage of cultivating households is found in the livelihood group relying on *Gifts* (13 percent). The most commonly cultivated crop across all livelihood groups is sorghum.

**Chart 17. Agriculture by livelihood group**



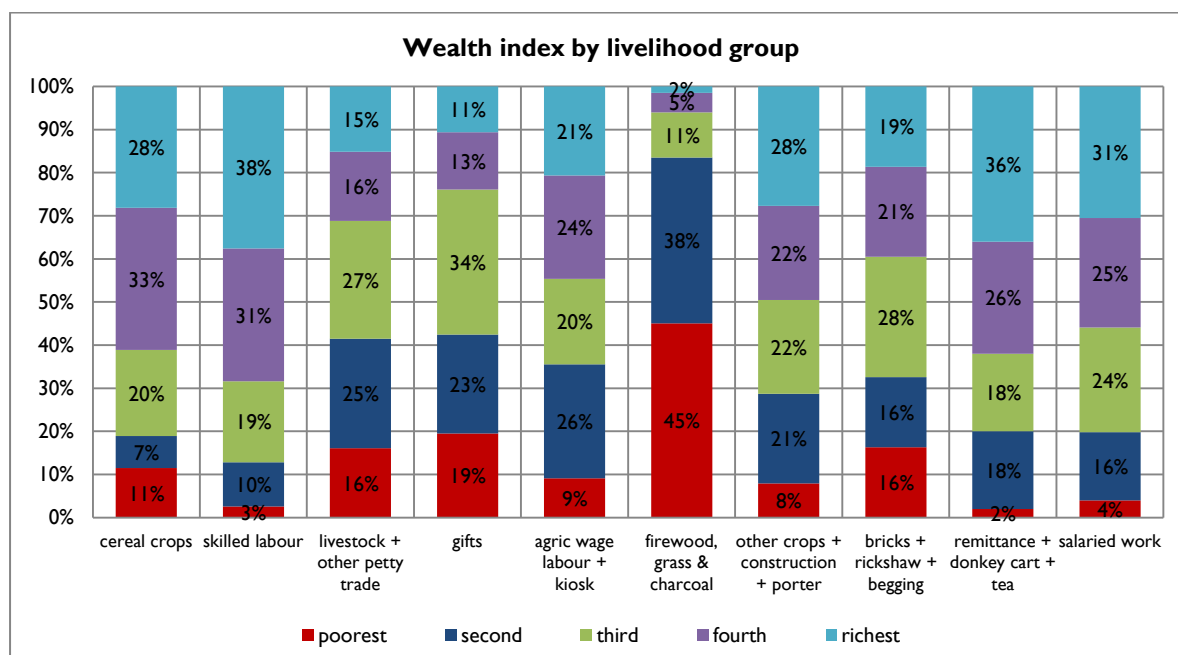
Analysis was done on main livelihood activities by locality. In the majority of the localities, the different livelihood activities are evenly distributed. However, a few of the localities have one dominant livelihood activity. In *Atbara River*, 62 percent of the households are in the *Cereal crops* livelihood group while in *Hamashkoreeb*, 62 percent of the households are in the *Firewood + grass + charcoal* group as are 39 percent of the households in *Telkok*. Furthermore, 31 percent of the households in *Western Kassala* are in the *Sale of livestock and other petty trade* livelihood group.

**Chart 18. Livelihood groups by locality**



Households in the *Firewood + grass + charcoal* livelihood group are the poorest households, with 45 percent of the households in the poorest wealth quintile and another 38 percent in the second poorest wealth quintile. The wealthiest households are those relying on *Skilled labour* with 38 percent of the households in the richest wealth group, followed by those in the *Remittances + donkey cart + tea selling* (36 percent) and *Salaried work* (31 percent) livelihood groups.

**Chart 19. Wealth index by livelihood group**



### 4.3.5. Expenditure

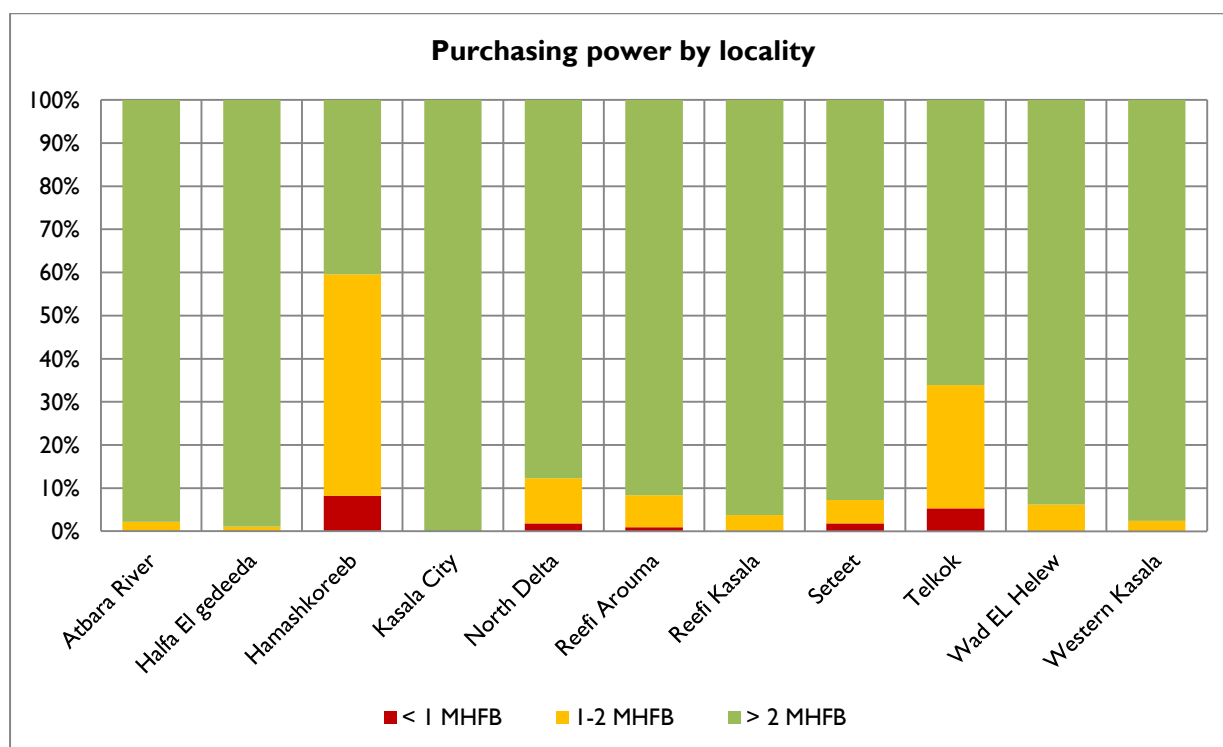
In this assessment, expenditure is used as a proxy for household income. When analyzing household expenditure, this approach uses the cost of the Minimum Healthy Food Basket (MHFB) and well as share of monthly expenditure on food.

The MHFB consists of eight food items; cereals (sorghum), milk, dry vegetables, cooking oil, goat meat, cow meat, onions and sugar. The amount of each food needed for the MHFB is calculated in order to meet the WHO minimum requirements of 2,100 kilocalories per person per day. The requirement in grams is then multiplied by the market prices of different food items.

After calculating the cost of the minimum healthy food basket, households are classified into three different categories based on their purchasing power. The first category is the **poor** category, where households cannot even afford the cost of one minimum healthy food basket. The second category is the **borderline** category, where households can afford between one and two baskets. Finally, the third category can afford more than two baskets and are therefore the **acceptable** category. The cost of one minimum healthy food basket in January 2012 in Kassala is 1.64 SDG per person/day.

In Kassala, the households' purchasing power is good, with more than 82 percent of the household that can afford more than two minimum healthy food baskets. Overall, 15 percent of the households can afford between one and two MHFBs while 2.5 percent of the households cannot afford the cost of one basket.

Chart 20. Purchasing power by locality

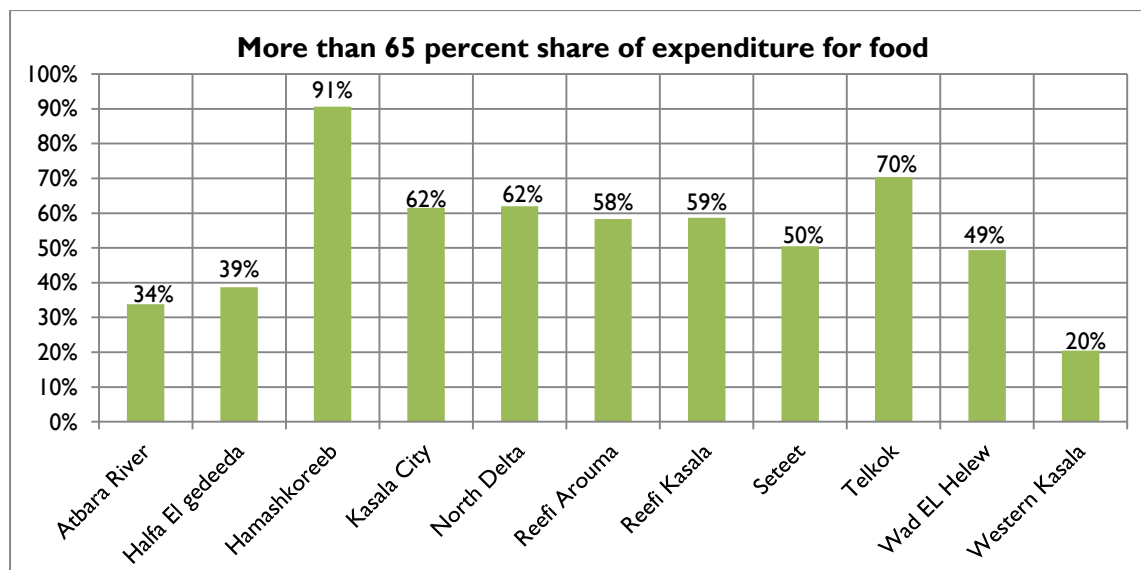


Analysis of the purchasing power by locality show that two localities stand out in terms of low purchasing power. In *Hamashkoreeb*, 8 percent of the households cannot afford the cost of the one minimum healthy food basket and 52 percent can afford between one and two. Furthermore, in *Telkok*, 5 percent of the households cannot afford one basket, while 29 percent can afford between one and two minimum healthy food baskets.

In Sudan, the World Bank threshold for estimating vulnerability to shocks in terms of food access is set at 65 percent of expenditures for food. Sixty five percent or less of total monthly expenditure for food is regarded as acceptable where more than 65 percent is poor as any changes in food prices

could have a detrimental outcome. In Kassala, 58 percent of the households allocate more than 65 percent of their monthly expenditure for food.

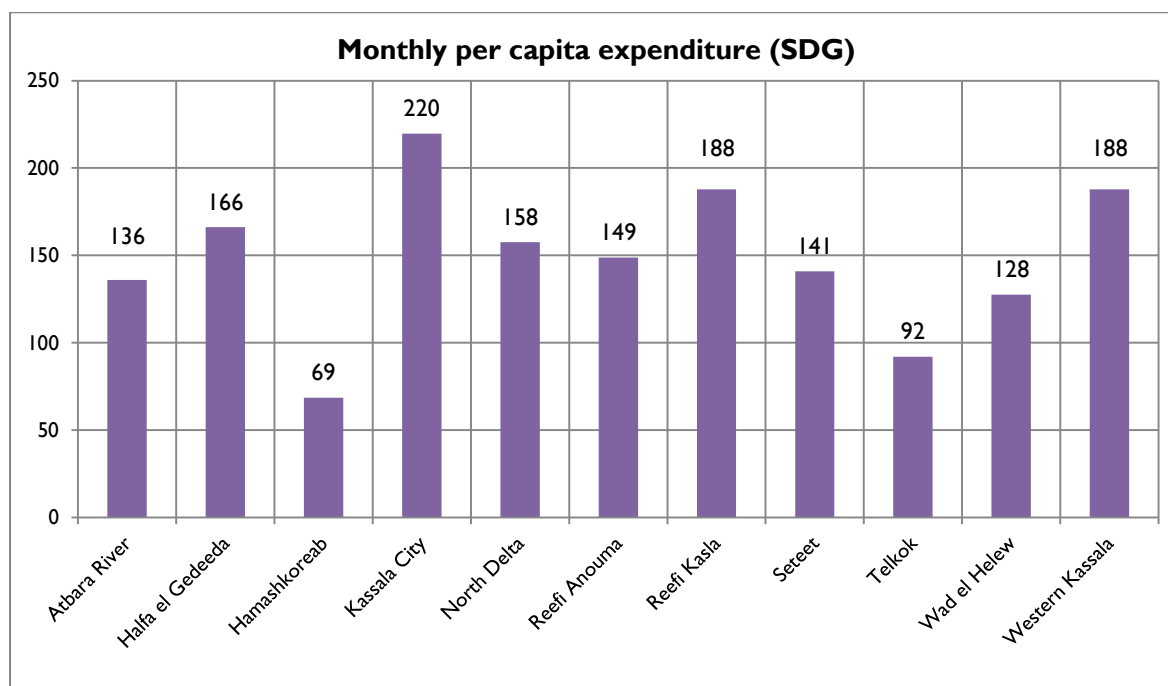
**Chart 21. Share expenditure on food**



By locality, *Hamarshkoreeb* has the highest percentage (91) of households allocating more than 65 percent of their total monthly expenditure on food followed by *Telkok* (70 percent). The lowest percentages of households spending more than 65 percent of their total monthly expenditure on food is found in the agricultural area of *Atbara River* (34 percent) and in *Western Kassala* (20 percent) where households to a large extent rely on sale of livestock.

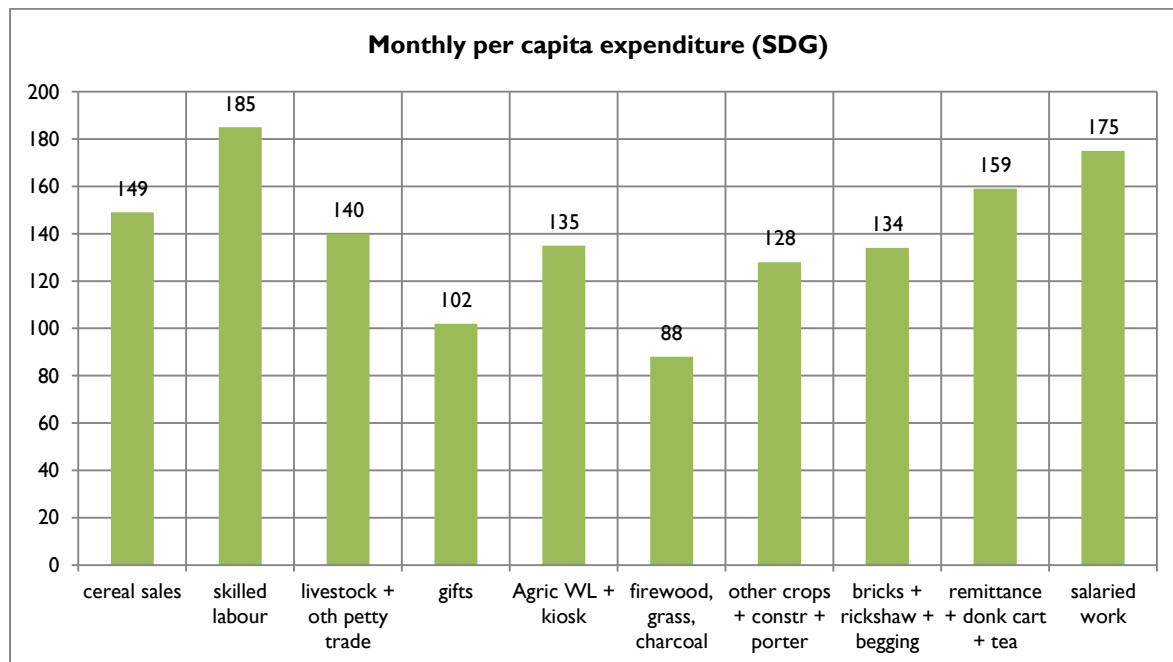
Monthly household per capita expenditure varies greatly by locality. The highest monthly per capita expenditures are found in *Kassala City* (220 SDG), followed by *Reefi Kassala* and *Western Kassala* (both 188 SDG). Those with the lowest per capita monthly expenditure are households in *Hamashkoreeb* and *Telkok* with a monthly per capita expenditure of 69 and 92 SDG respectively. These two localities also have the highest share of monthly expenditure on food, 91 and 70 percent.

**Chart 22. Monthly per capita expenditure by locality**



Analysis of monthly per capita expenditure by livelihood groups indicate that households in the *Skilled labour* and *Salaried work* groups have the highest monthly per capita expenditure of 185 and 175 SDG respectively. The worst off are households relying on *Sale of firewood, grass and charcoal* followed (88 SDG) by households relying on *Gifts* (102 SDG).

**Chart 23. Monthly per capita expenditure by livelihood group**



#### 4.3.6. Household food consumption

Research has shown that dietary diversity<sup>4</sup> and frequency are a good proxy measure of food consumption and food security at household level. Food consumption data was collected and analysed using the standard WFP methodology: the variety and frequency of different foods and food groups consumed over a 7-day recall period was recorded to calculate a weighted Food Consumption Score (FCS). Weights were based on the nutritional density of the foods. Standard cut-points or thresholds were established to enable analysis of trends and to provide a benchmark for success. Households were then classified as having either ‘poor’, ‘borderline’ or ‘acceptable’ consumption based on the analysis of the data. The table below outlines the weights and their justification for each food/food group used to calculate the food consumption score.

**Table 3. Weights and justification for food consumption score**

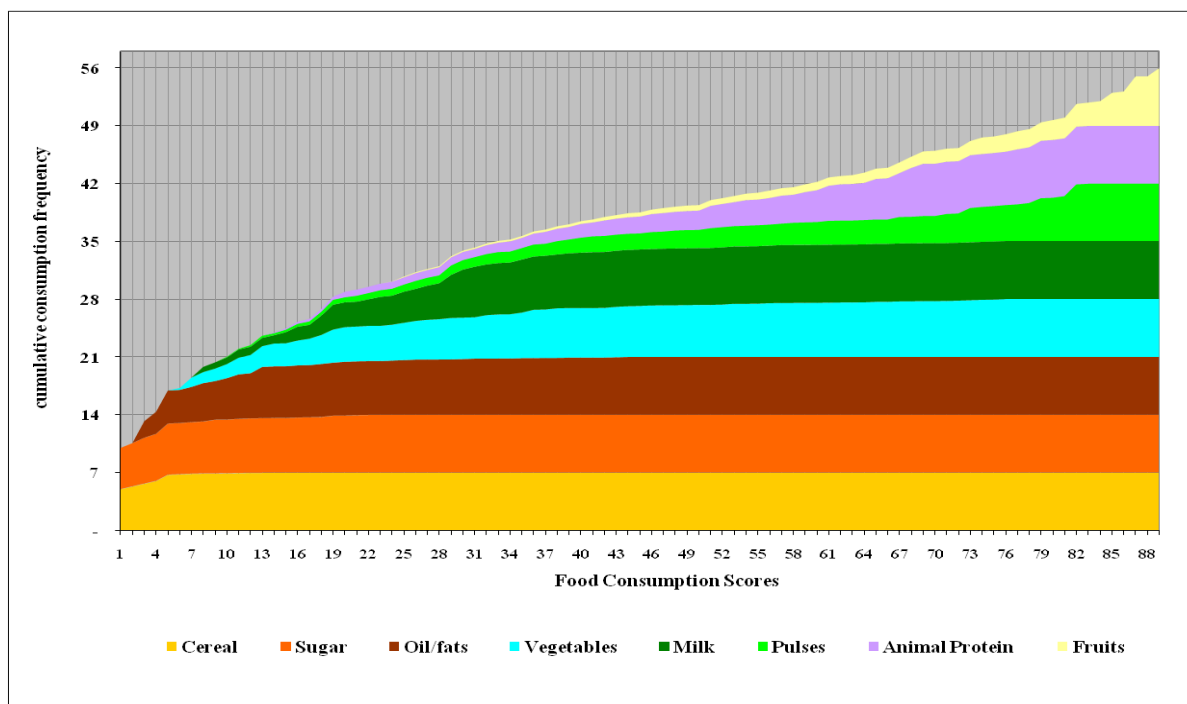
Food group	Weight	Justification
Main staples	2	Energy dense, protein content lower and poorer quality than legumes, micronutrients.
Pulses	3	Energy dense, high amounts of protein but of lower quality than meats, micronutrients, low fat.
Vegetables	1	Low energy, low protein, no fat, micronutrients.
Fruit	1	Low energy, low protein, no fat, micronutrients.
Meat and fish	4	Highest quality protein, easily absorbable micronutrients, energy dense, fat. Even when consumed in small quantities, improvements to the quality of diet are large.
Milk	4	Highest quality protein, micronutrients, vitamin A, energy.
Sugar	0.5	Empty calories. Usually consumed in small quantities.
Oil	0.5	Energy dense but usually no other micronutrients.

<sup>4</sup> Dietary diversity is defined as the number of individual foods or food groups consumed over a given period of time

In this survey, households with a score less than 28 are classified as having poor consumption; those with a score from 28 to 42 are classified as borderline while households with a score greater than 42 are considered to have acceptable consumption. In Sudan people tend to consume sugar on a daily basis.

Based on analysis of the entire sample, Chart 23 below shows the relative contribution (and importance) of food items as consumption improves. Nearly all households eat cereal and sugar on a daily basis. Oil/fats are also very important in the Kassala diet, followed by the consumption of vegetables. When moving up the food consumption score, items such as pulses, animal protein and fruits are being included in the diet.

**Chart 24. Food items contribution to the food consumption score**

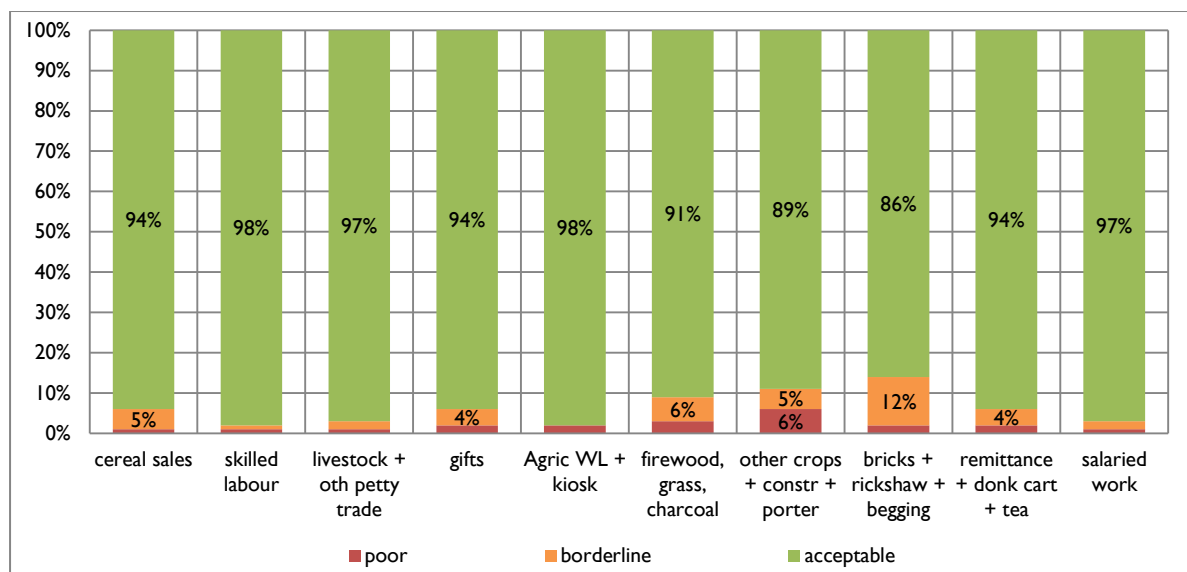


Overall, the dietary diversity and food frequency is good in Kassala with 94 percent of the households having acceptable food consumption, four percent borderline and two percent poor food consumption.

Analysis by locality show that the best consumption is found in the peri-urban locality of *Kassala City* with all households having acceptable consumption, while households in *Wad el Helew* have the highest percentages in the poor and borderline food consumption categories (13 percent).

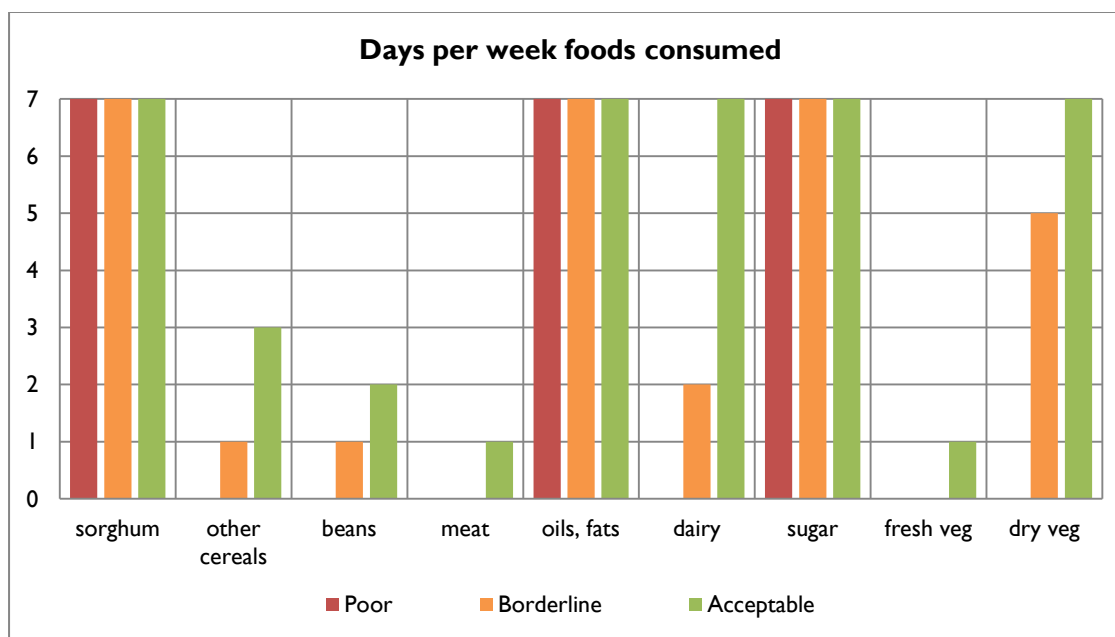
By livelihood group, household relying on *Brick making + rickshaw + begging* have the worst consumption, followed by those relying on *Sale of other crops + construction + porter* activities as indicated in the chart below.

**Chart 25. Household food consumption by livelihood group**



To understand qualitatively what the consumption categories mean, the chart below highlights the typical weekly consumption of households in each group. Households with poor consumption consume sorghum, oil and sugar on a daily basis. Households with borderline consumption also eat sorghum, oil and sugar on a daily basis, but supplement with dry vegetables 5 days a week, dairy for 2 days and other cereals and beans one day per week.

**Chart 26. Weekly food consumption by group**

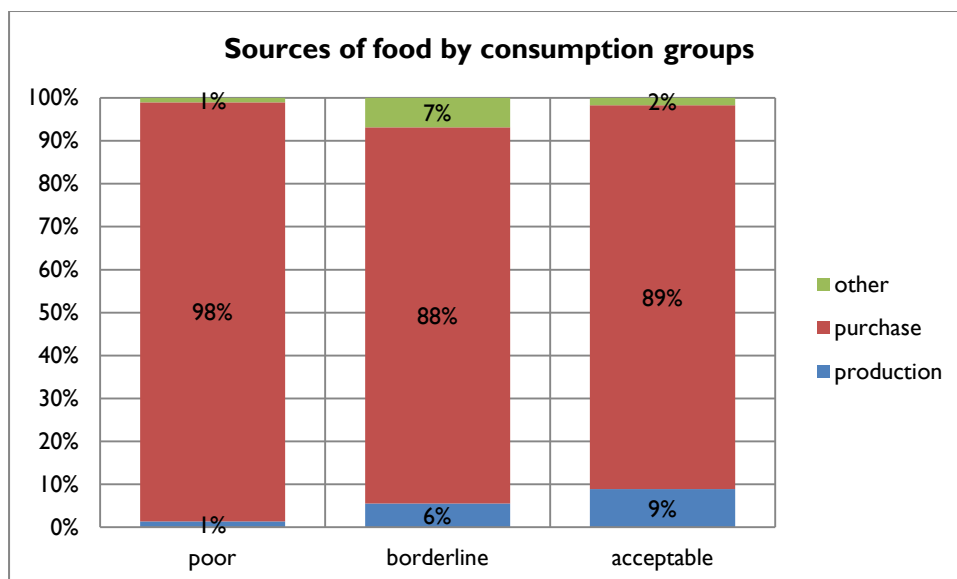


#### 4.3.7. Sources of food consumed

The sources of different foods consumed are analysed as an attempt to understand how reliance on particular sources of food can impact household food security. The main source of food in the Kassala context is the market. Households with borderline and acceptable food consumption also rely some on own production. Other sources such as gifts, borrowing, in-kind payments or hunting/gathering/fishing were considered in the survey but are not regular sources.

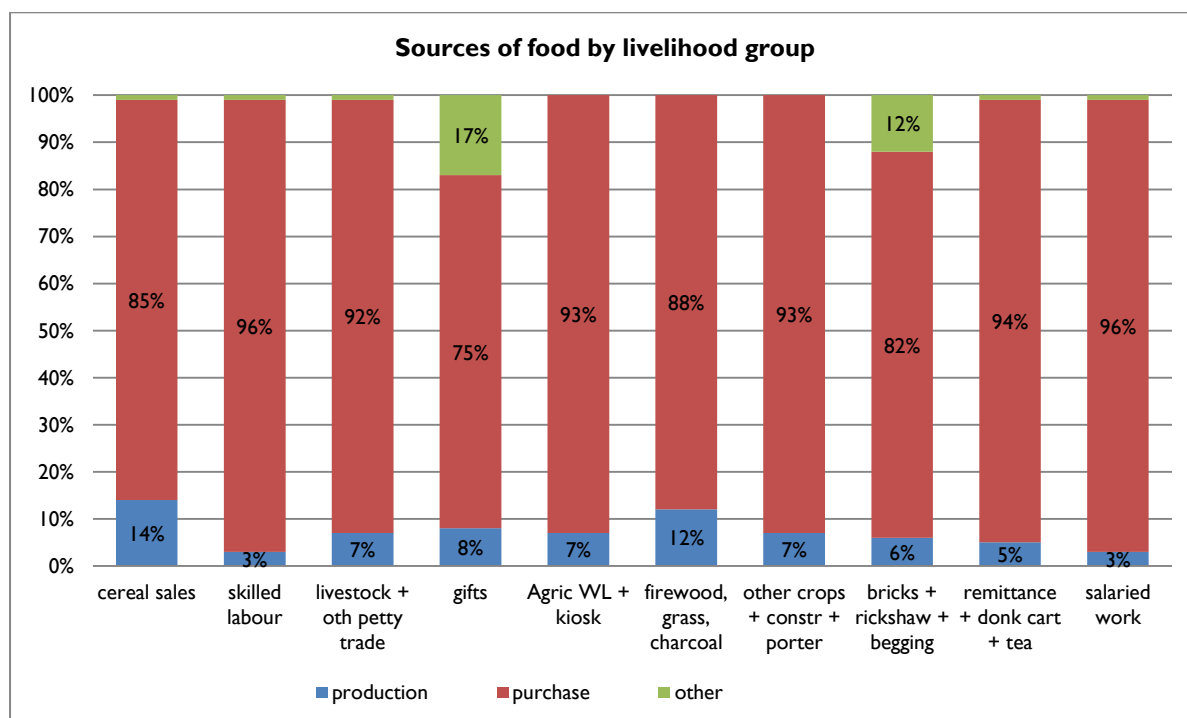


**Chart 27. Sources of food by consumption group**



When analysing food sources by livelihood group, two groups stand out. Households relying on *Gifts* and households relying on *Brickmaking + rickshaw + begging* have a much higher percentage of households reporting 'other' sources as their food source compared to the other livelihood groups. In this assessment, the main 'other' source is gifts.

**Chart 28. Sources of food by livelihood group**



## 5. HOUSEHOLD FOOD SECURITY

### 5.1. Food Security

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 (World Food Summit, 1996). In general, food security is a measure of food availability, food access and food utilisation for purposes of this assessment, household food security will be determined through analysis of food access indicators.

According to the International Fund for Agricultural Development (IFAD), there is also a long-term and short-term aspect to food security. When a household is regularly unable to meet the food requirements of its members over a long period of time, characterised by short periods of good and bad moments, this is known as *chronic food insecurity*. The short-term problem can affect any household regardless of the current situation. Shocks like crop failure, seasonal shortages or reduced income due to illness or underemployment of productive members may temporarily reduce household access to adequate amounts of nutritious food, leading to *transitory or acute food insecurity*.

For this study, both acute and chronic food insecurity will be measured at the household level, with a focus on the food access issues and using slightly different indicators and analytical approaches in order to best understand the situation of the people in Kassala. First, acute food insecurity will be presented, followed by the analysis of chronic food insecurity in the study areas.

### 5.2. Acute Food Insecurity

In this assessment, the multi-dimensional aspects of acute food security will be measured using three different variables:

1. Ability to afford the Minimum Healthy Food Basket<sup>5</sup> (MHFB), which is a measure of household poverty;
2. Share of total monthly expenditure on food where a household is better off if it has less than 65% of total expenditure for food which reflects household purchasing power.
3. Household dietary diversity and food frequency which is a measure of current household food security.

The households were classified as being acutely food insecure, vulnerable or food secure based on the above-mentioned indicators. These findings were then used to draw conclusions about acute food insecurity at locality level.

Based on the composite analysis presented above, 2 percent of the households in Kassala are acutely food insecure, while 4.5 percent are vulnerable to acute food insecurity at the time of the survey.

When using the projected population numbers for 2011<sup>6</sup>, an estimated 38,000 people are food insecure with a further estimated 85,500 people vulnerable to food insecurity.

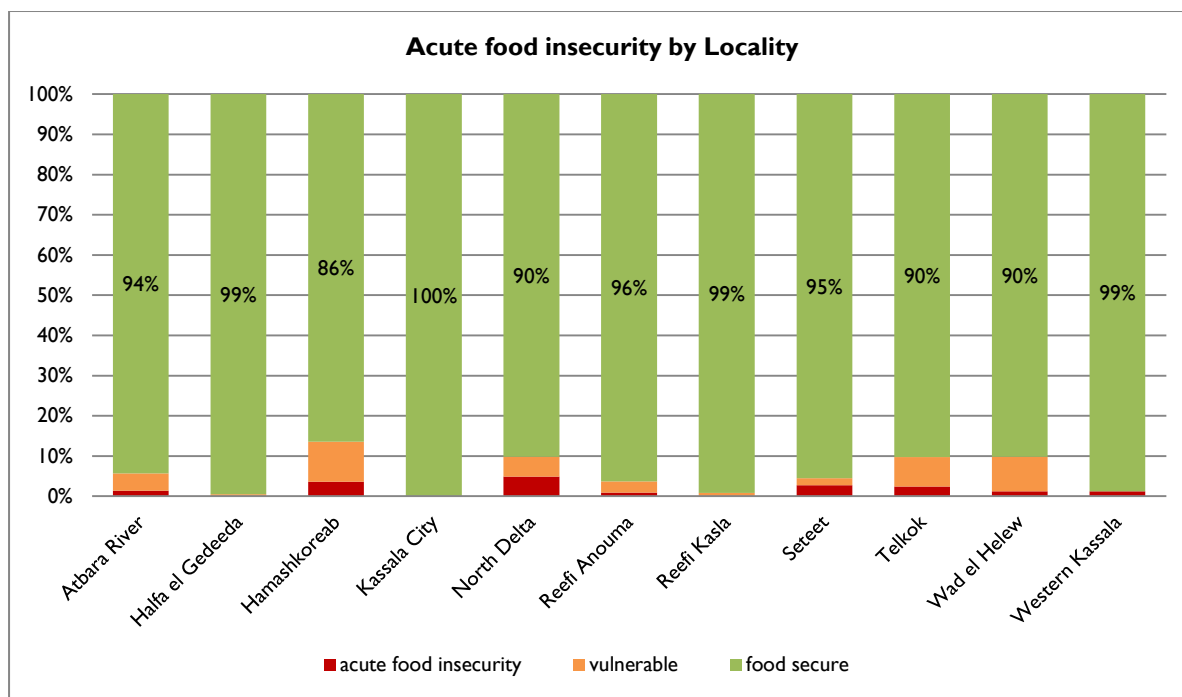
In Kassala state, the most food insecure localities are *Hamashkoreeb*, *Telkok*, *Wad El Helew* and *North Delta*, while *Kassala City* is best off.

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<sup>5</sup> The MHFB consists of eight food items; cereals (sorghum), milk, dry vegetables, cooking oil, goat or cow meat, onion and sugar.

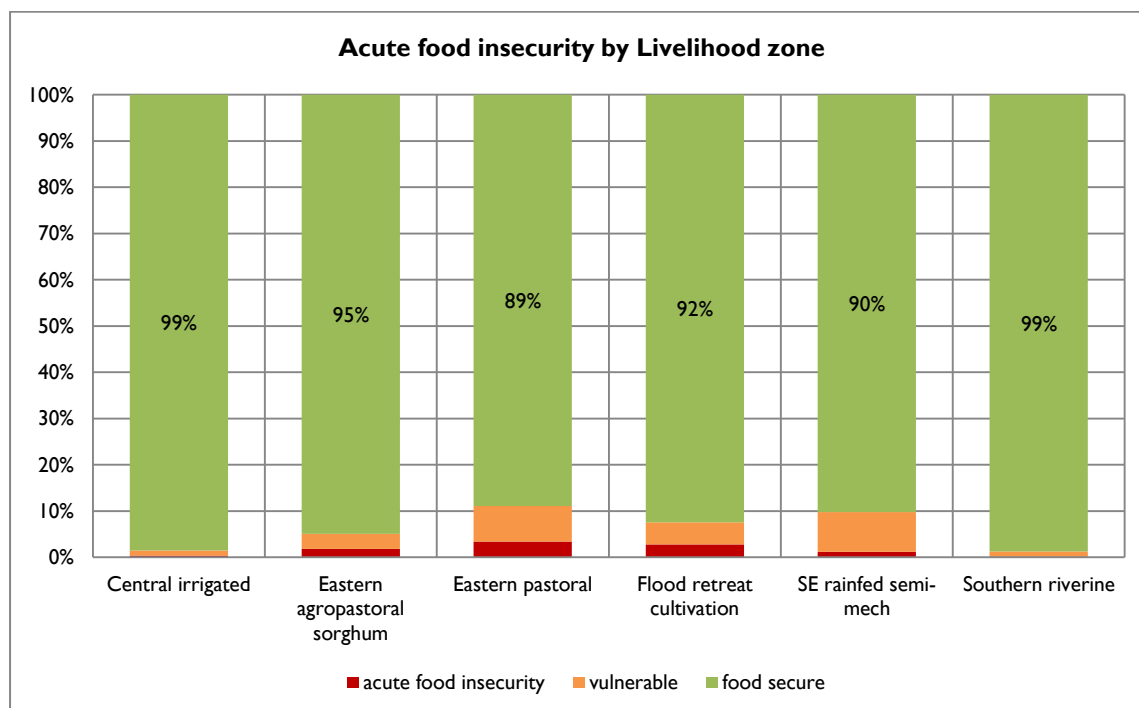
<sup>6</sup> Based on the 2008 Census

**Chart 29. Acute food insecurity by locality**



When reporting food security by livelihood zone, finding shows that households in *Eastern Pastoral* and *Flood Retreat Cultivation* zone are the least likely to be food secure (89 percent) followed by households in the *Southeast Rainfed Semi-mechanised* zone. Households in the *Central Irrigated Schemes* and *Southern Riverine Small/Medium cultivation* zones are the most likely to be food secure.

**Chart 30. Acute food insecurity by Livelihood zone**



### 5.3. Household profiling of acute food insecurity

This section explores the underlying causes of acute food insecurity. The purpose of this section is to characterize typical food insecure households and to identify particular groups that are more

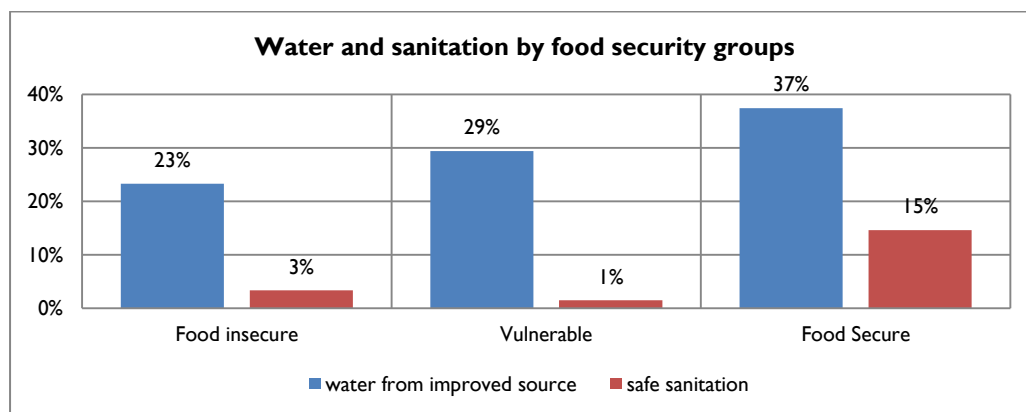
likely to be food insecure in order to help guide the design and targeting of food security interventions more effectively.

### 5.3.1. Household and housing characteristics

Acutely food insecure households are no more or less likely to be headed by women compared to the other groups. However, in Kassala, households with acute food insecurity are much more likely to have a disabled member (17 percent) than the other groups (9 percent each). Family size is similar across the three groups but with vulnerable households having 5 members on average compared to 6 members for the other groups. The main demographic difference between households is the percentage of dependents where acutely food insecure households consist of 68 percent dependents (< 18 or 60+ years) compared to 56 percent in the other groups, which is a statistically significant difference ( $p < 0.05$ ).

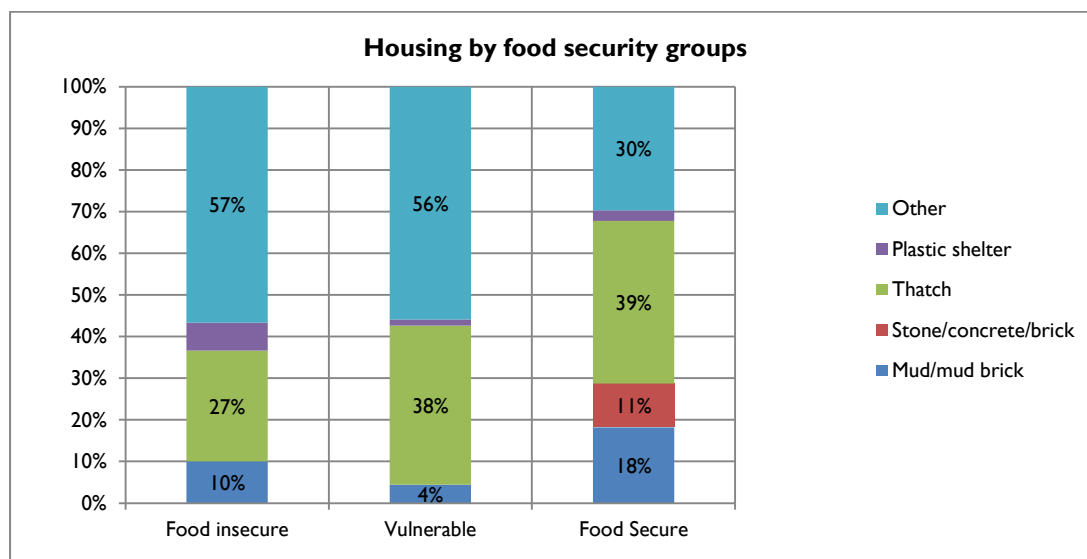
When analysing access to water and sanitation by food security groups, findings show that access to water from improved sources and safe sanitation is higher among food secure households than food insecure households.

**Chart 31. Water and sanitation by food security groups**



Acutely food insecure and vulnerable households have similar housing facilities, with a large percentage reporting 'other' (nomadic stick houses) and also a high percentage of these households live in thatched houses. Also 7 percent of acutely food insecure households are living under a plastic shelter. Food secure households are more likely to be living in mud/mud brick houses and are the only group where people report to be living in stone/concrete/brick houses.

**Chart 32. Housing by food security groups**



### 5.3.2. Education of household head

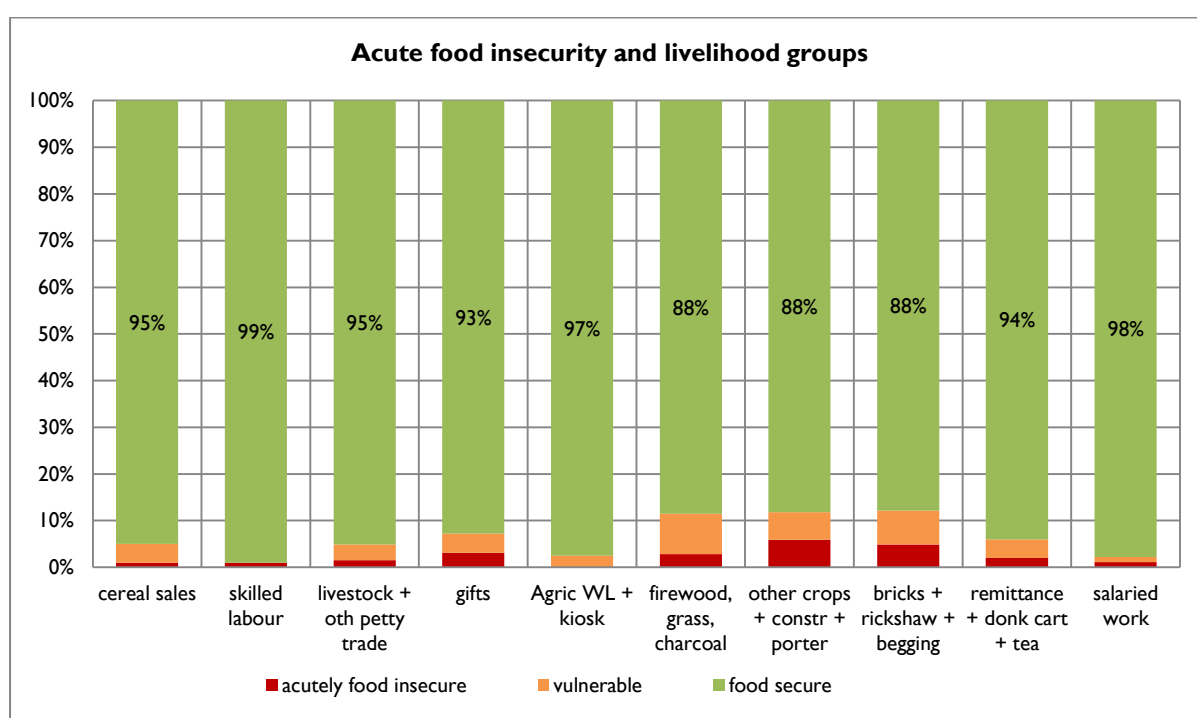
Education of household head has an effect on the food security status of a household. A higher percentage of households headed by a person with no education are food insecure compared to households where the household head is educated. Analysis shows that level of education for the household head has a clear influence on a household's purchasing power.

### 5.3.3. Employment and livelihood strategies

Employment of the household head is related to household food security status. From the Kassala data, for acutely food insecure households, only 83 percent of the heads are employed, compared to 91 percent in the vulnerable and 93 percent in the food secure households.

As illustrated in the chart below, households relying on *Skilled labour, Salaried work or Agricultural wage labour + kiosk* are least likely to be acutely food insecure. However, households relying on *Sale of other crops + construction + porter, bricks + rickshaw + begging* or *Sale of firewood + grass + charcoal* are the most likely to be acutely food insecure groups (88 percent food secure).

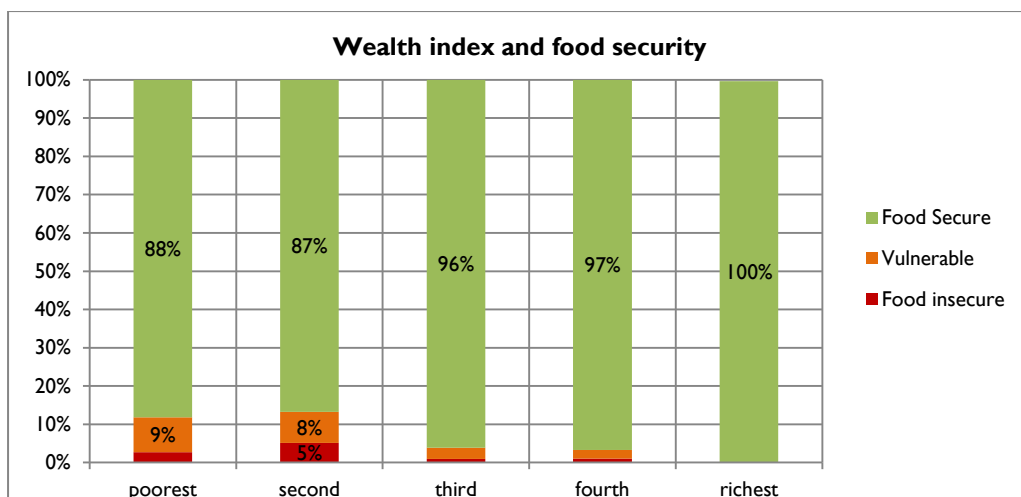
**Chart 33. Food security by livelihood group**



### 5.3.4. Household wealth

Household wealth is somewhat related to food security status as acutely food insecure households are also asset-poor households. As illustrated in the chart below, households in the poorest wealth quintile, 3 percent are acutely food insecure and 9 percent are vulnerable to acute food insecurity. These findings are similar to those found in the second poorest wealth quintile. The percentage of acutely food insecure households is minimal in the next two quintiles, while all households in the wealthiest quintile are food secure.

**Chart 34. Wealth quintiles and acute food security**



### 5.4. Chronic Food Insecurity

A second food security analysis was done in order to test a different approach for the Kassala study in order to better understand the relationship between chronic food insecurity and poverty.

Three continuous variables were analysed together using cluster analysis:

- *Food consumption score* – a measure of current household food security
- *Total number of different assets (0-15) owned* – a measure of wealth/future food security
- *Share of total expenditure for food* – a measure of food access

A total of 4 different groups were identified and are shown in the table below:

**Table 4. Chronic food insecurity groups**

	FCS	# different assets	% expenditure for food	N
Food secure – rely on production	63	9.4	47%	369 (24%)
Food secure – rely on purchase	90	8.3	62%	424 (28%)
Moderate food secure	61	6.4	74%	394 (26%)
Food insecure	48	4.6	93%	326 (22%)

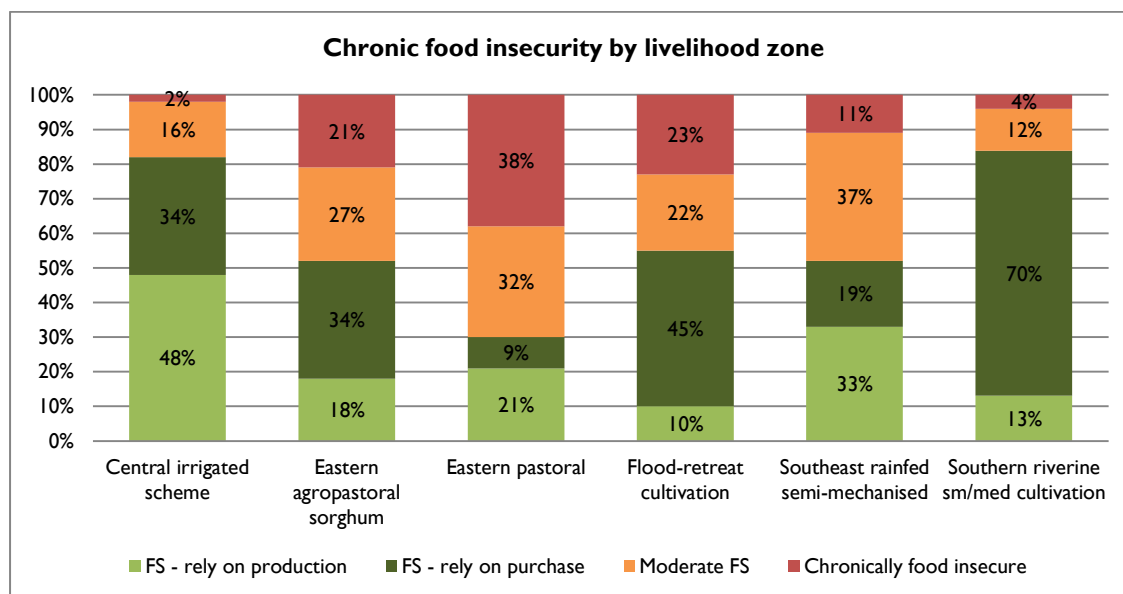
Households who are *food secure and rely on production* are characterised with good dietary diversity and food frequency, a strong asset base and relatively low share of monthly expenditure for food. Households who are *food secure and rely on purchase* are characterised with extremely good dietary diversity and food frequency, a fairly strong asset base but a higher share of expenditure for food compared to the other food secure group.

The *moderately food secure* households also have good dietary diversity and food frequency but a more moderate asset base and a share of expenditure for food that is higher than the Sudan threshold of 65 percent. Thus a particular shock could send them into a state of acute food insecurity. The *chronically food insecure* households have the lowest food consumption score and thus lower dietary diversity and food frequency. They also have a low asset base indicating them to be more vulnerable to shocks and also a very high share of expenditure for food which also indicates that they are extremely vulnerable to price increases.

The chart below shows the distribution of chronic food insecurity by livelihood zone. Households in the *Eastern Pastoral Zone* are the most likely to be chronically or moderately food insecure.

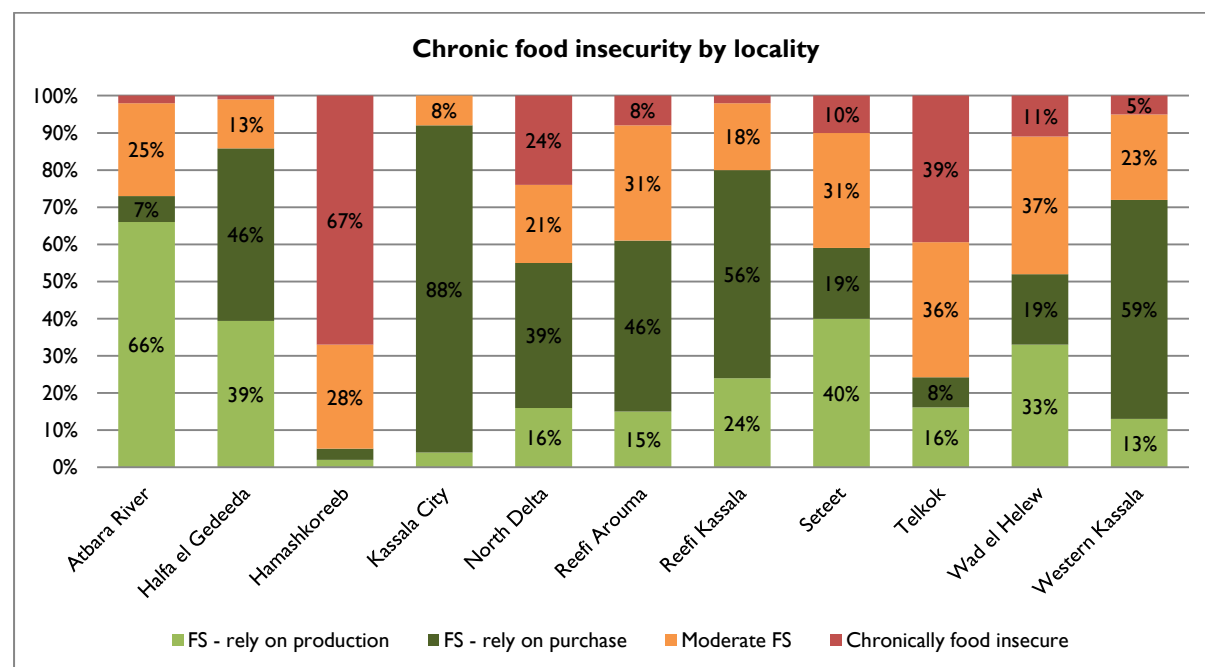
Households in the *Eastern Agro-pastoral Sorghum* and *Flood-retreat Cultivation* zones also have a higher chance of being chronically food insecure. Households in the *Central Irrigated Scheme* and *Southern Riverine* zones are the best off in terms of chronic food insecurity.

**Chart 35. Chronic food insecurity by livelihood zone**



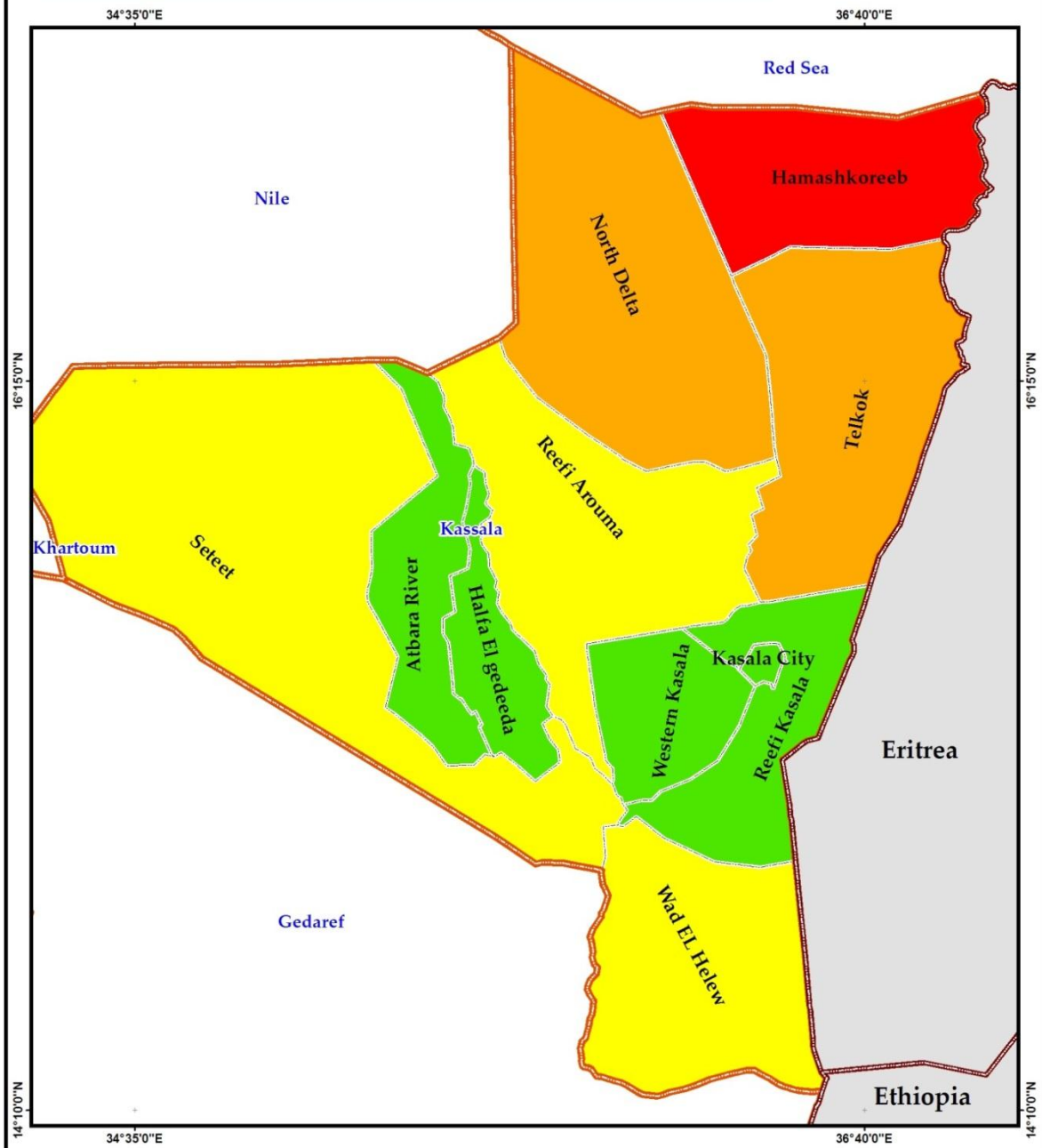
The chart below shows the chronic food insecurity by locality. It is clear that households in *Hamashkoreeb* are the most vulnerable to chronic food insecurity, followed by those in *Telkok* and *North Delta*. Households in *Kassala City* locality and *Halfa el Gedeeda* are the best off, as expected.

**Chart 36. Chronic food insecurity by locality**



**Map 3. Chronic food insecurity in Kassala**

# Kassala Chronic Food Insecurity



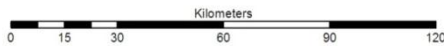
## Kassala Food Security

- Very Low
- Low
- Moderate
- High

- International Boundaries
- State Boundaries
- Locality



1:810,000



Data Sources:  
Sudan Interagency Mapping (SIM)  
Information Management Working Group (IMWG)

Boundaries shown on this map do not imply official endorsement or acceptance by the United Nations World Food Programme. This map is for planning purposes only. WFP does not guarantee the accuracy of the map product, nor does it accept any liability or consequential and indirect damages arising from use of this map product.



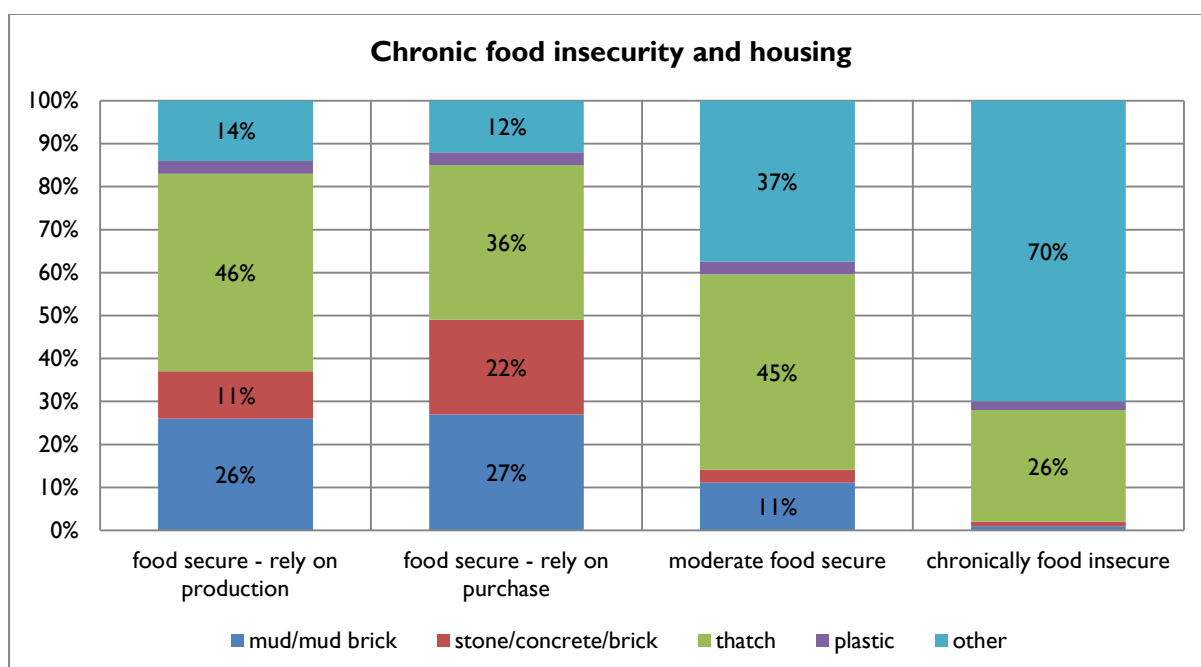
### 5.4.1. Household characteristics

In terms of household headship, moderately food insecure households are more likely to have a female head (6 percent) compared to the other groups as seen in the chart below. There is no difference in household size between the groups (6 members on average) and also there is no real difference regarding households with a special needs member.

However, chronically food insecure households have a significantly higher ( $p < 0.001$ ) percentage of dependents (< 18 or 60+ years) than the other groups – nearly two-thirds of each households' members are dependents, or non-earners. For the other groups, about half are earners and half are dependents.

A better distinction between the four groups is found when comparing type of housing. Households in the two food secure groups are more likely to live in mud/mud brick houses and stone/concrete/brick houses than the other groups. Households that are moderately food secure are most likely to be living in thatch houses or those made with 'other' materials like the nomadic stick houses. For the chronically food insecure, the majority live in the nomadic stick houses with some having thatch houses.

**Chart 37. Chronic food insecurity and housing**



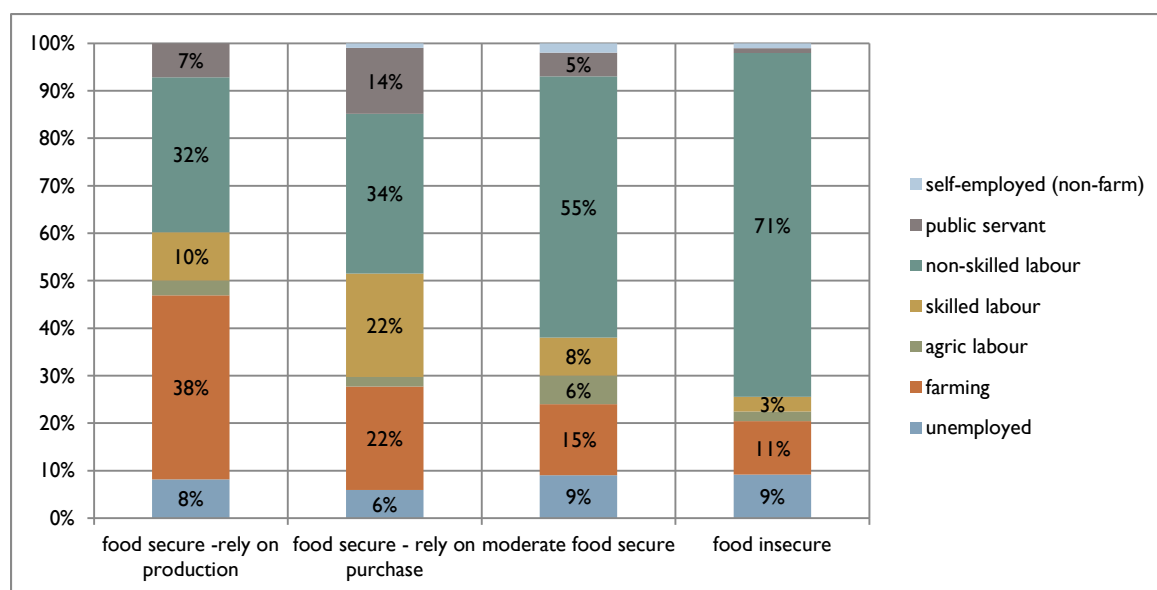
For all the groups, the access to water from improved sources is similar, with the food secure group relying on purchase having the best access (42 percent), likely because many are found in peri-urban areas. Regarding safe sanitation, households in this same group also have the best access (30 percent). Only 3 percent of households in the chronically food insecure group have access to safe sanitation.

Education of the head of household has a relationship with chronic food insecurity. For households that are chronically food insecure, 94 percent of the heads have no education at all. In addition, 84 percent of the heads of households that are moderately food insecure are uneducated with only 5 percent having secondary or higher education. For the food secure households, 59 percent of the heads of households relying on purchase are uneducated and 18 percent have a secondary education or higher. For those relying on production, more are uneducated (74 percent) and fewer have secondary or higher education (8 percent).

### 5.4.2. Employment and livelihoods

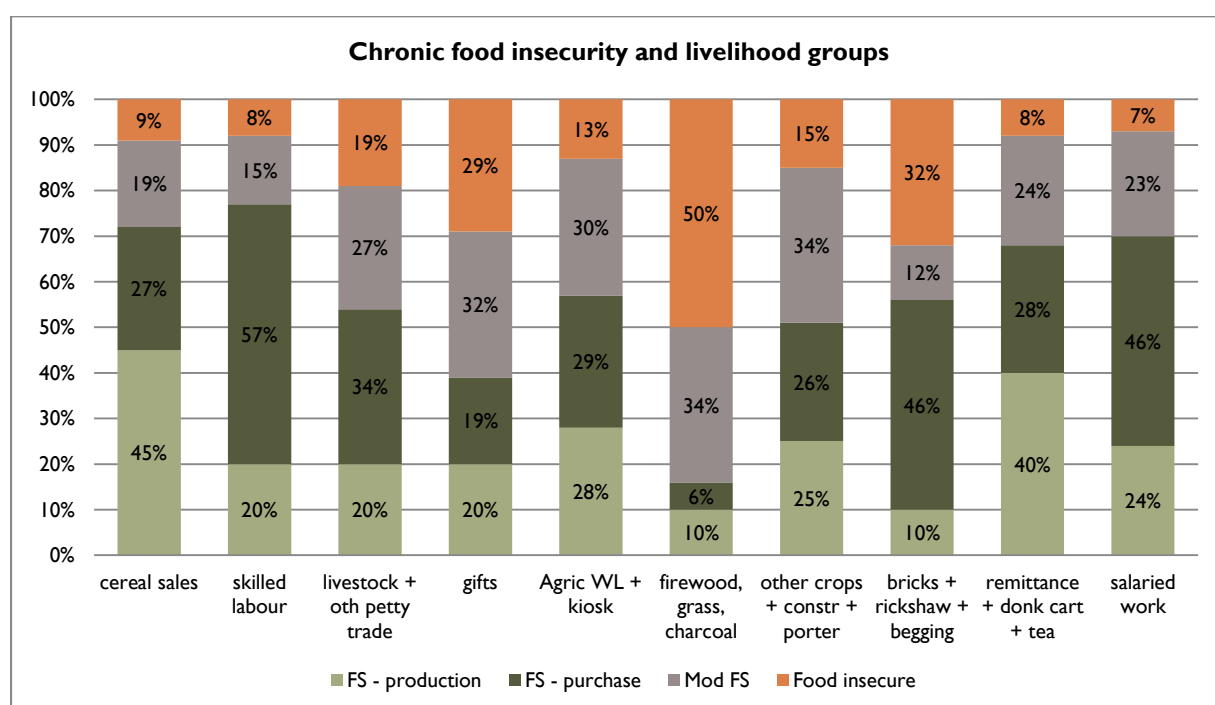
When analysing chronic food insecurity by employment of household head, the food secure households relying on own production is the most likely (and logically) to rely on farming (38 percent) compared to the other groups. Food secure households relying on purchase are the most likely to earn income through skilled labour as well as through public service. The chronically food insecure heads of household are the most likely to rely on non-skilled labour followed by those in moderately food secure households making them more vulnerable to fluctuation in job opportunities.

**Chart 38. Chronic food insecurity and employment**



Analysis by more detailed livelihood groups show that half the households relying on *Sale of firewood, charcoal and grass* are chronically food insecure and only 16 percent are food secure. Those relying on *Brickmaking + rickshaw + begging* or *Gifts* are also more likely to be chronically food insecure.

**Chart 39. Chronic food insecurity by Livelihood groups**



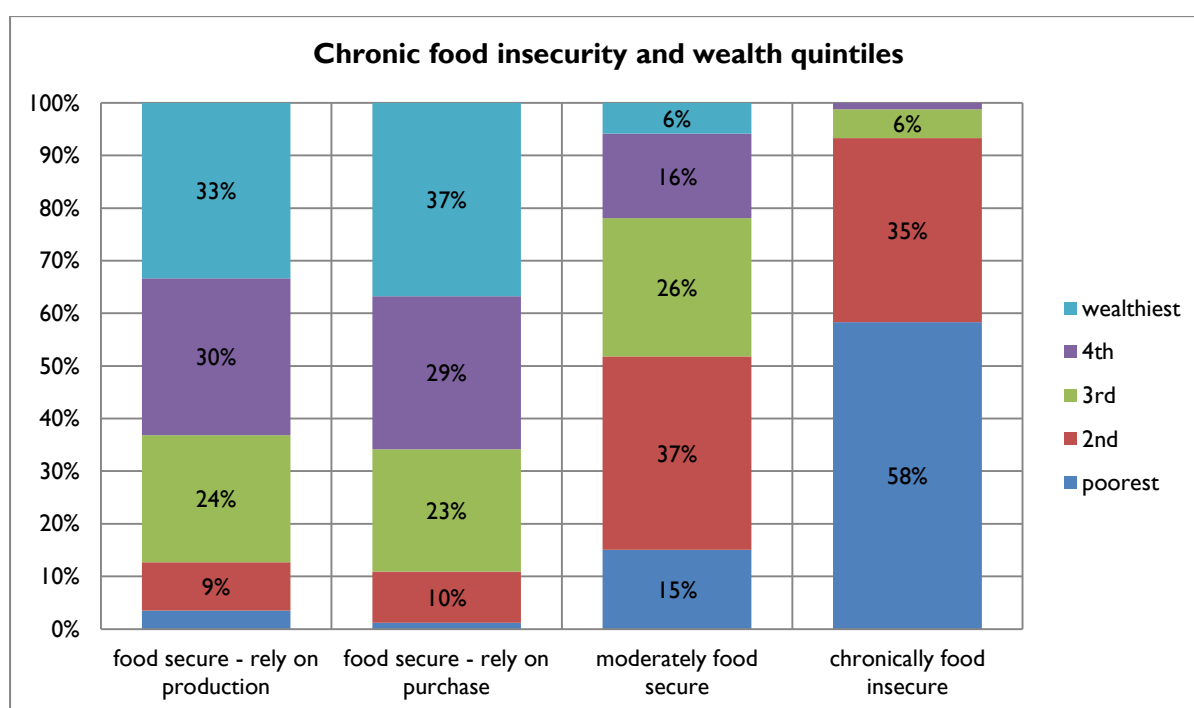
As the chart above indicates, households relying on *Skilled labour* are the most likely to be food secure followed by those relying on cereal sales or salaried work. Those relying on *Remittances + donkey cart + tea stalls* are also surprisingly food secure.

### 5.4.3. Household wealth

As mentioned earlier, there is a strong relationship between household wealth and chronic food insecurity in Kassala. Overall, the chronically food insecure households own fewer different assets than the others. The most commonly owned assets for chronically food insecure households are cooking utensils (89 percent), an axe (77 percent), a lantern (56 percent) and a bed (43 percent).

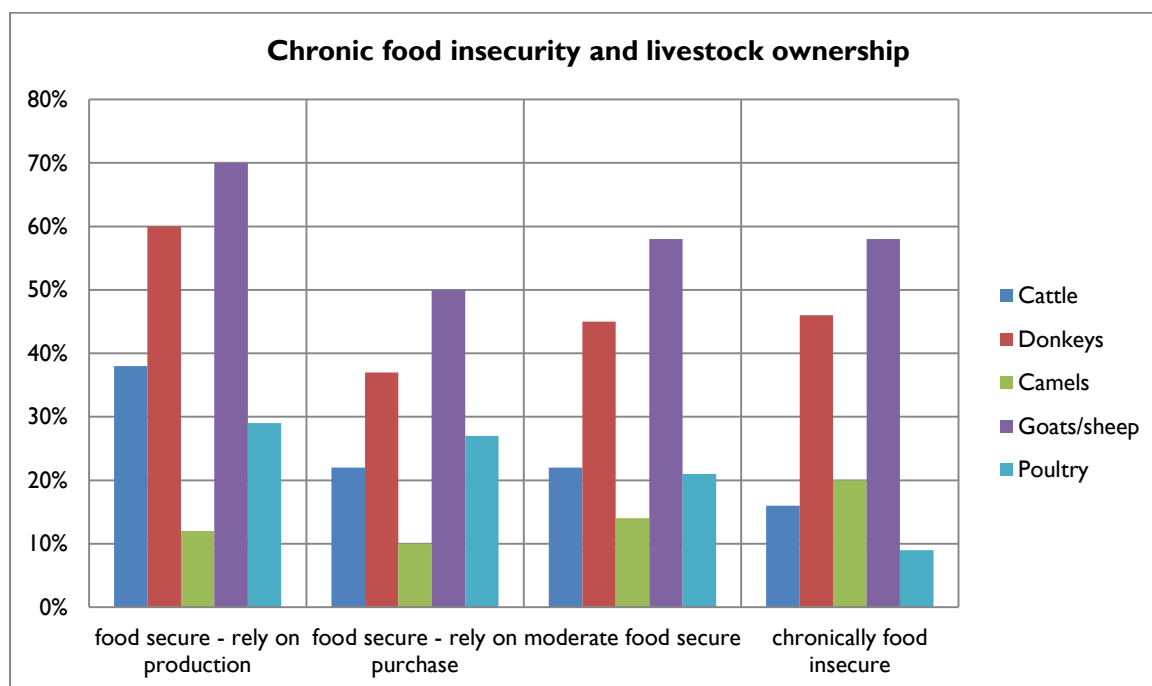
The chart below shows the distribution of each food security group by the wealth quintiles. Nearly 60 percent of the chronically food insecure households are in the poorest wealth quintile, compared to only 15 percent from moderately food secure and hardly any from the food secure groups. For both of the food secure groups, the distribution within wealth groups is similar – more than 60 percent of all households are in the wealthiest two quintiles.

**Chart 40. Chronic food insecurity and wealth quintiles**



The ownership of livestock is similar across the groups with even the chronically food insecure households owning livestock at similar levels to those of the food secure households as illustrated in the chart below. In terms of herd size, livestock owning food secure households tend to own slightly more animals than the moderately food secure or chronically food insecure households. Households tend to own more goats and sheep than any other type of animal – median of 5 for the food secure households and 4 for the other groups.

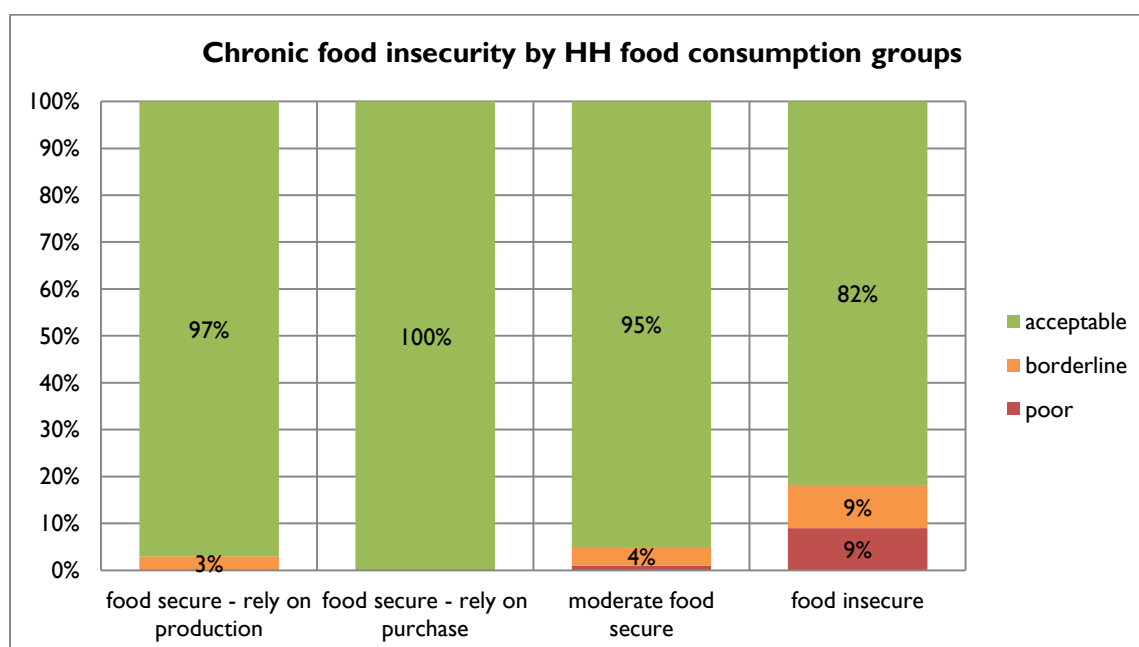
**Chart 41. Chronic food insecurity and livestock ownership**



**5.4.4. Household food consumption**

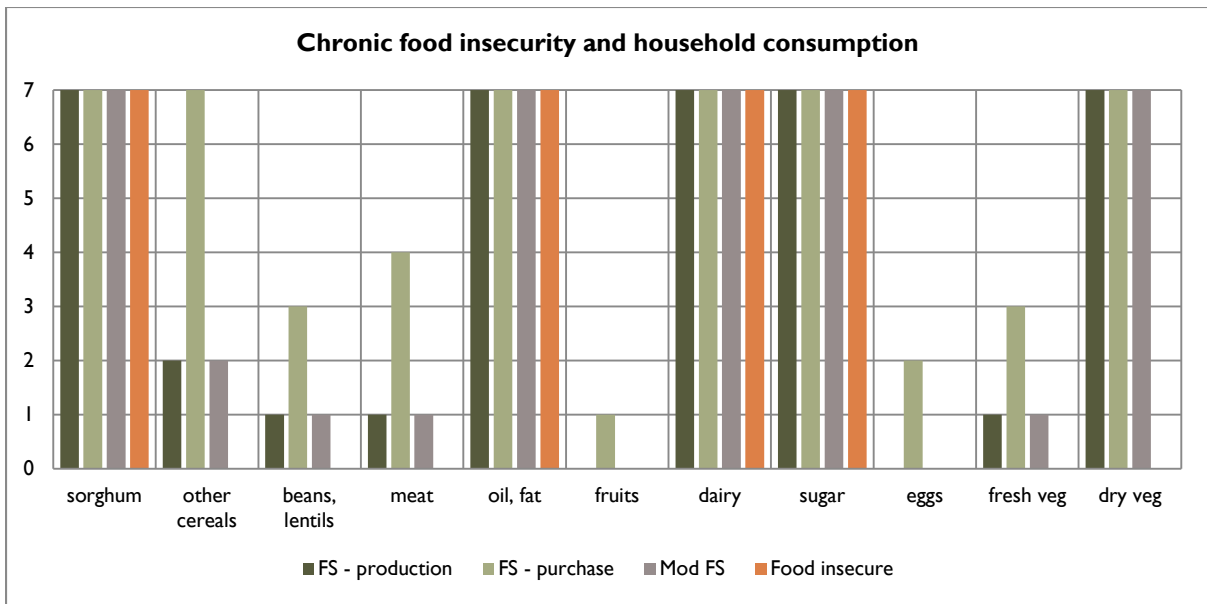
Only 82 percent of the chronically food insecure households had acceptable consumption compared to nearly all in the other three groups thus indicating that household food access is one of the constraints of the chronically food insecure.

**Chart 42. Chronic food insecurity by household food consumption groups**



When looking at the specific diversity of the weekly consumption the chronically food insecure households have, on average, daily consumption of sorghum, oil, dairy and sugar only (see chart below). The food secure households relying on purchase have the best diversity of consumption and are the only households eating fruits or eggs on a regular basis. Because these households rely on purchase, they appear to have greater purchasing power and can better afford a more varied diet.

Chart 43. Chronic food insecurity and dietary diversity



## 6. HOUSEHOLD STRESS AND COPING

In the survey a series of questions were used to assess households' do when they do not have enough food or do not have enough money to buy food. In other words, the behavioural responses or 'coping strategies' when faced with food insecurity, such as reducing the frequency of meals, reducing the portions of food consumed during meals or shifting reliance to cheaper foodstuffs, shifting reliance to less preferred or cheaper food types and other food consumption-related coping strategies. Overall, 28 percent of the households in the Kassala sample had engaged in food-based coping strategies the 7 days prior to the survey.

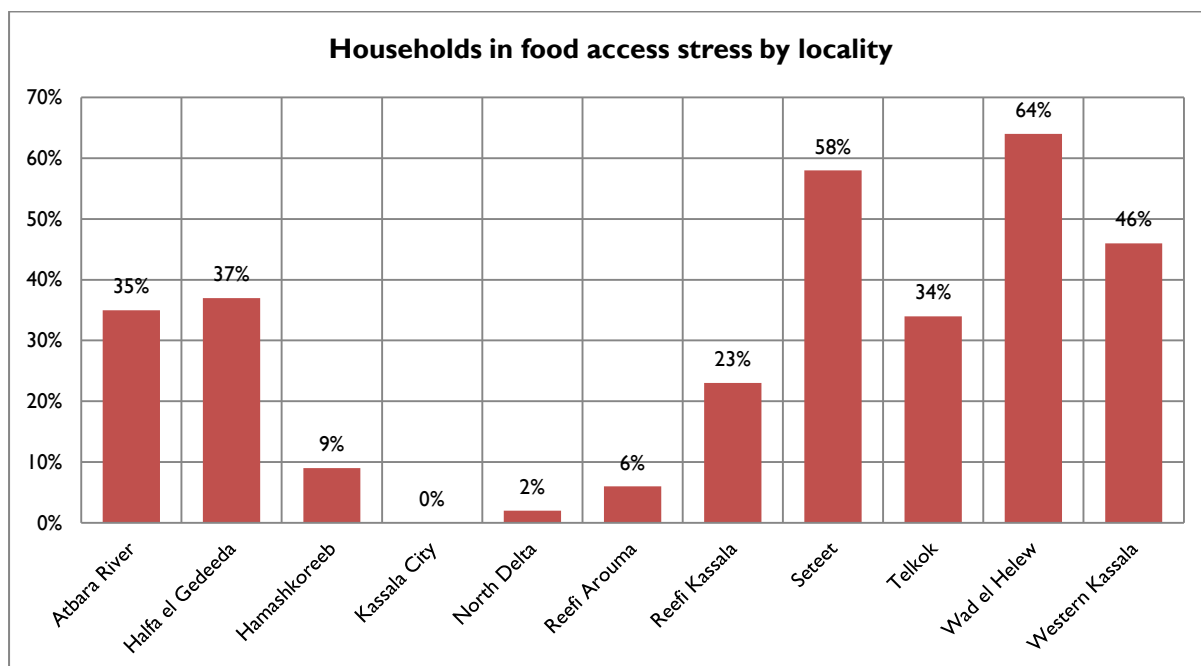
When looking at the coping strategies adopted by households the most common (from a fixed list) is to borrow food or money to purchase food (24 percent) followed by relying on less preferred/less expensive foods (18 percent). The table below outlines the use of these different strategies for households who had experienced difficulty in accessing enough food in the week prior to the survey.

**Table 5. Use of key coping strategies**

	<b>Kassala</b>
Eat less preferred/less expensive foods	18%
Borrow food or money to buy food	24%
Rely on help from friends or relatives ( <i>musaada</i> )	11%
Limit portion size at mealtimes	11%
Reduce consumption by adults so children can eat	8%
Reduce the number of meals per day	15%

Regional analysis of food access stress reveals great differences between the localities. In *Kassala City*, no households had experienced any food access stress in the previous week compared to 64 percent in *Wad El Helew* and 58 percent in *Seteet* or 46 percent in *Western Kassala*.

**Chart 44. Households in food access stress in past week**



## 7. FOOD UTILIZATION AND NUTRITIONAL STATUS

### 7.1. Children's nutritional status

During the survey, if one of the randomly selected households had any children between 6 and 59 months of age, they were asked to be included in the section on child nutrition and feeding for the survey. Mid Upper Arm Circumference (MUAC) was measured on a total of 1,408 children aged 6-59 months in Kassala. After cleaning the data, 1,342 records were used for analysis.

Using a MUAC cut-point of < 12.5 cm for global acute malnutrition (GAM), a total of 6.6 percent of the children were classified with moderate acute malnutrition. Children 6-23 months of age were more likely to be malnourished (15.7 percent) than those two years of age and over (3.1 percent). Only 1.7 percent of the children were classified as having severe acute malnutrition (SAM) with a MUAC less than 11.5 cm.

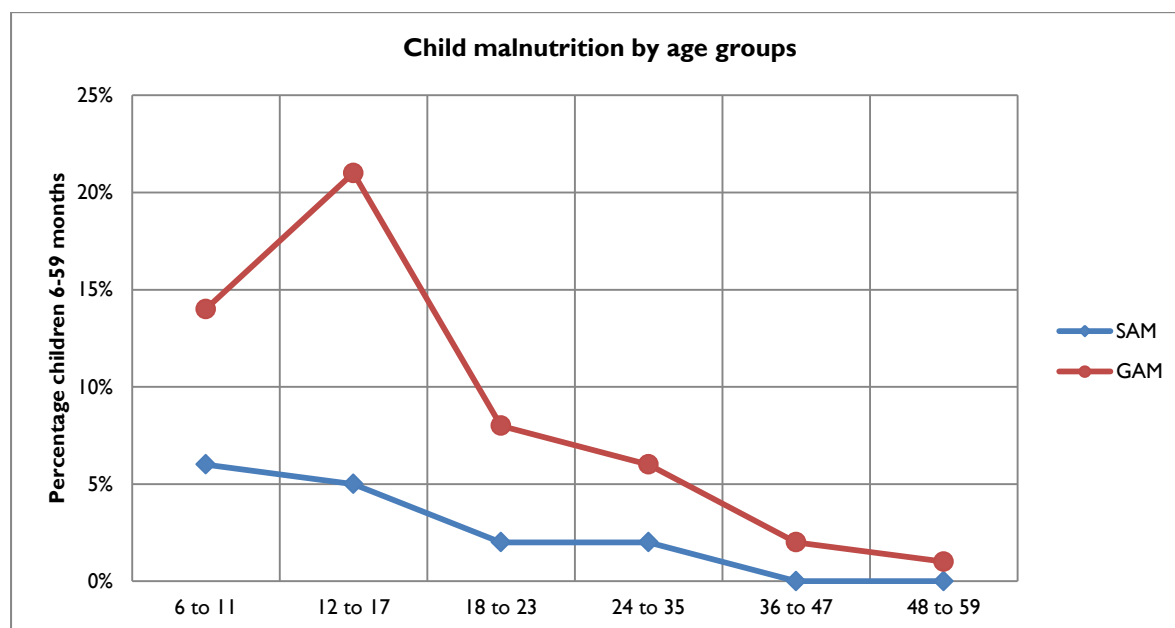
**Table 6. Child acute malnutrition by age (MUAC)**

	GAM		SAM	
	%	95% CI	%	95% CI
6-23 months	15.7	12.0-19.4	4.6	2.5-6.7
24-59 months	3.1	0.2-4.2	0.6	0.1-1.1
<b>Total</b>	<b>6.6</b>	<b>5.2-7.9</b>	<b>1.7</b>	<b>1.0-2.4</b>

The chart below shows the prevalence of GAM and SAM is highest in the younger children and decreases rapidly during the weaning period in all states. For children in Kassala, the peak is in the children 12-17 months of age with a GAM of 27.7 percent and SAM 12.7 percent.

The chart below shows the trend for GAM and SAM by age group and indicates that the most critical ages for young children are the younger age groups when complementary foods are introduced and the child is weaned from breastfeeding. The peak for GAM is at the 12 to 17 months age group and then it drops quickly and steadily for older children. SAM is highest in the youngest children and then drops slowly in 12 to 17 months group and then completely disappears by 36 months of age.

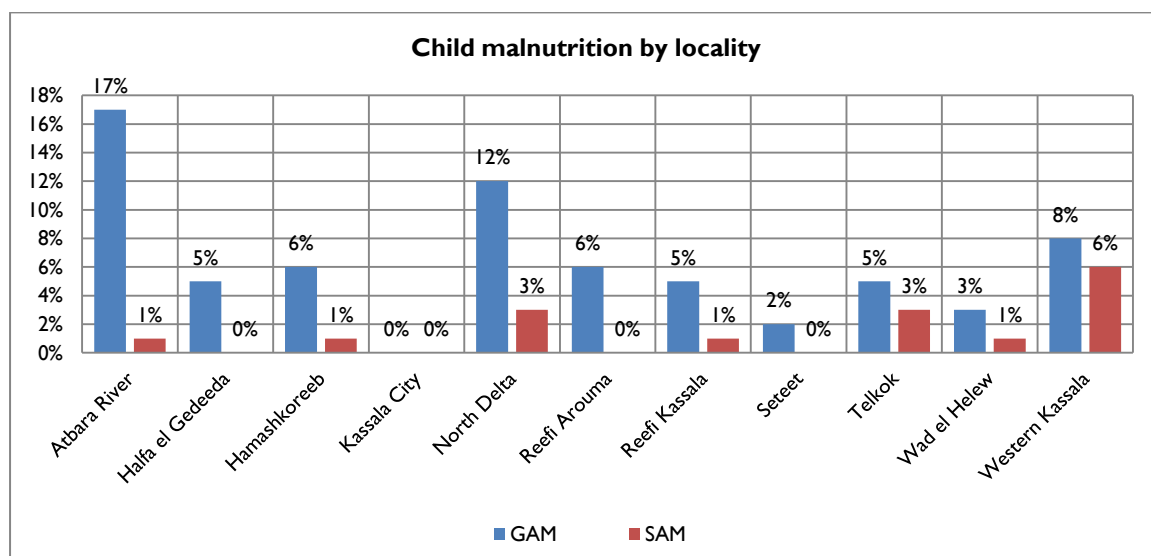
**Chart 45. Prevalence of GAM and SAM by child age group**



### 7.1.1. Child malnutrition by locality and livelihood groups

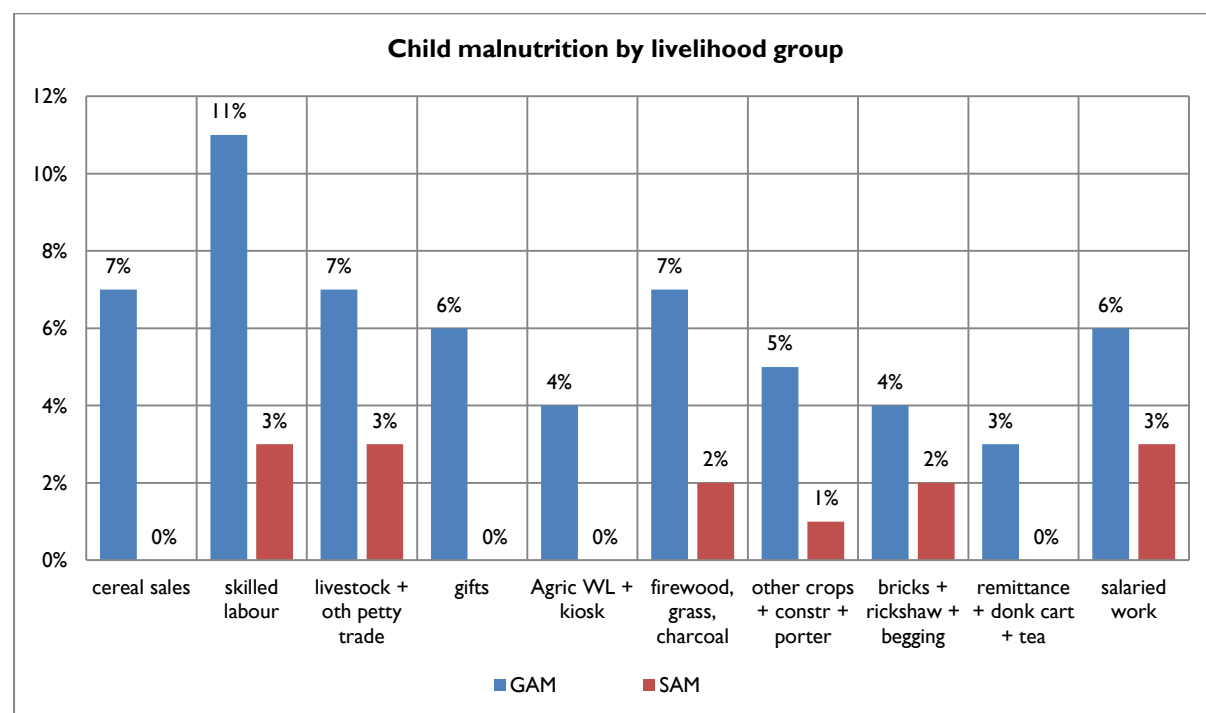
The chart below shows the estimates of GAM and SAM by locality. It is interesting to note that the highest rates are found in Atbara River locality which is one of the most food secure areas in the state. This signals that food is not necessarily the main cause of acute malnutrition amongst these children. The most chronically food insecure locality, *Hamashkoreeb*, shows an average level of GAM. Severe acute malnutrition is highest in children from *Western Kassala* which is a peri-urban area. This is difficult to explain.

**Chart 46. Child malnutrition by locality**



Children from households relying on *Skilled labour* are the most likely to be malnourished which is also counter-intuitive since that the one of the most food secure livelihood groups. Again, worse off livelihood groups have average rates of GAM, with the exception of the *Firewood + grass + charcoal* households.

**Chart 47. Child malnutrition by livelihood groups**

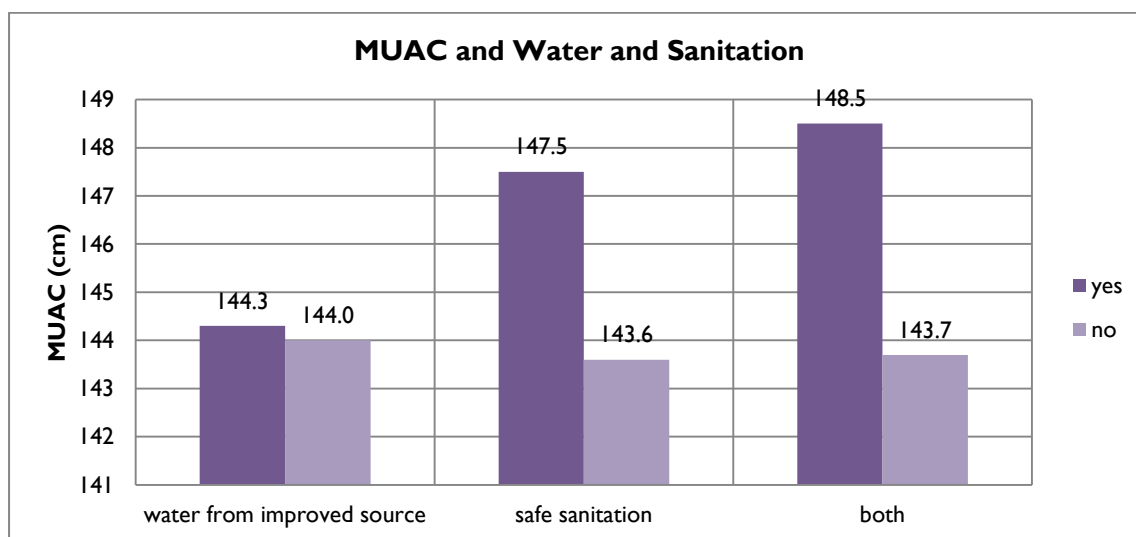




### 7.1.2. Child malnutrition and other factors

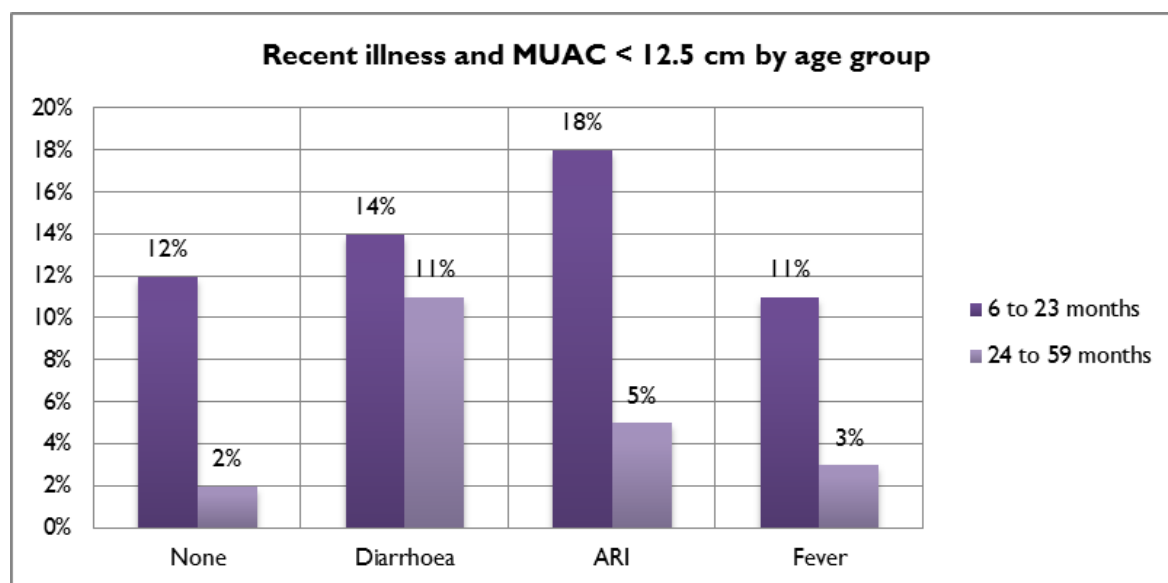
When analysing the relationship between drinking water from improved sources and safe sanitation individually on child malnutrition, there is no real difference in prevalence of GAM or SAM. However, when households have both safe drinking water and safe sanitation, they are less likely to be malnourished (4 percent vs. 7 percent) when compared to children who don't. The chart below presents the comparison of MUAC by the same parameters and shows that safe sanitation has a greater impact on child nutritional status than water from improved sources but having both, has the best impact.

**Chart 48. Child MUAC and water and sanitation**



Overall, 38 percent of the children had experienced diarrhoea, acute respiratory infection or fever, and this was significantly higher ( $p < 0.001$ ) in children 6-23 months (47 percent) compared to the older children (34 percent). Additional analysis by age shows that the prevalence of illness increases with age and that the children of weaning age (18-23 months) are the most likely to have diarrhoea and/or recent fever. The chart below shows that children 6 to 23 months with either recent diarrhoea or ARI are more likely to have low MUAC than those with no illness. For the older children, any illness can have an impact on nutritional status but that 11 percent with recent diarrhoea have low MUAC compared to only 2 percent with no illness.

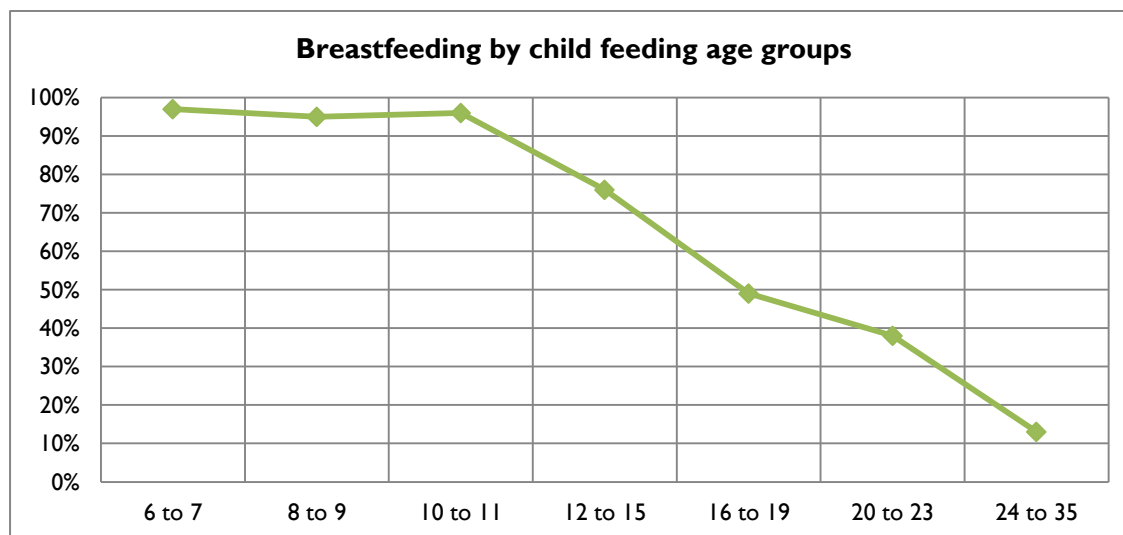
**Chart 49. Child illness and low MUAC**



## 7.2. Child feeding

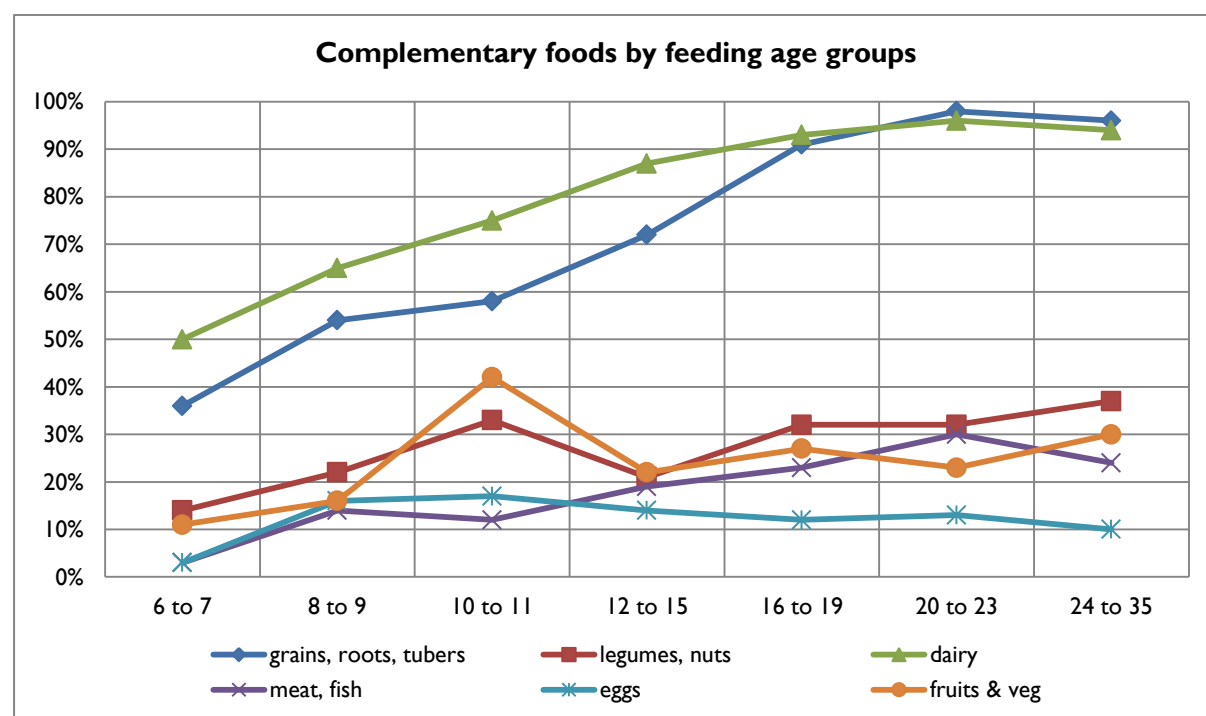
An important contributing factor to a child's health is the mothers feeding practices. In this assessment, the mother is asked what her child ate in the previous day. As illustrated in the chart below, current breastfeeding status (not exclusive) is quite high amongst the younger children in the sample and then starts to decrease around 12 months of age where weaning begins. The drop continues through to around 2 years of age and by 3 years, hardly any children are still breastfeeding.

**Chart 50. Breastfeeding by child feeding age groups**



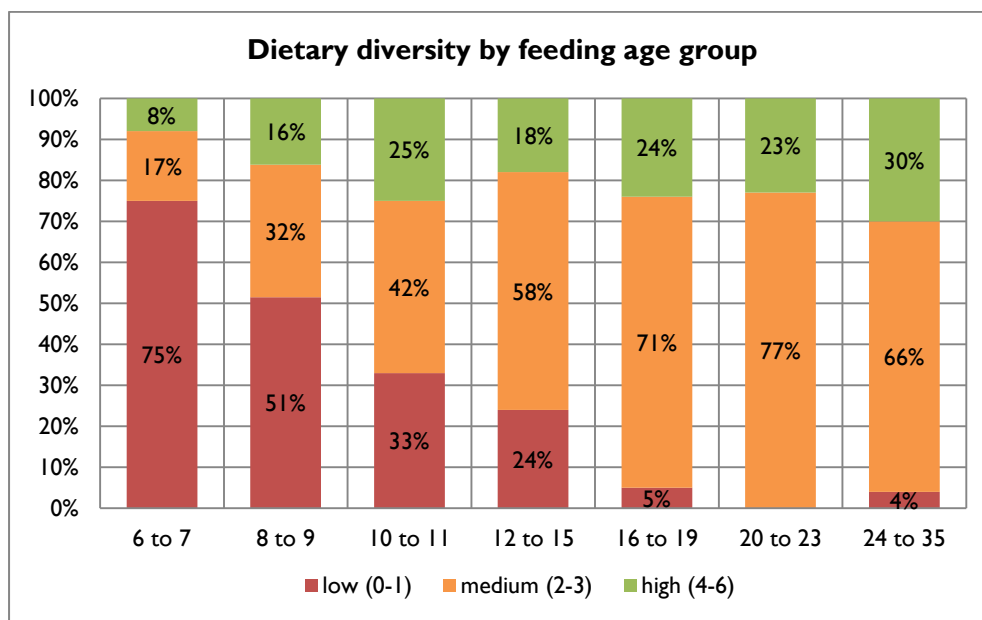
While exclusive breastfeeding was not measured, the ages at which different complementary foods are consumed are highlighted in the chart below. The most common food consumed is milk, followed by sorghum. The percentage of children consuming these foods increases steadily with age. Less commonly consumed are beans and nuts, or fruits and vegetables. Meat is introduced at age 8-9 months but only for no more than 30 percent of the children.

**Chart 51. Complementary feeding by child feeding age groups**



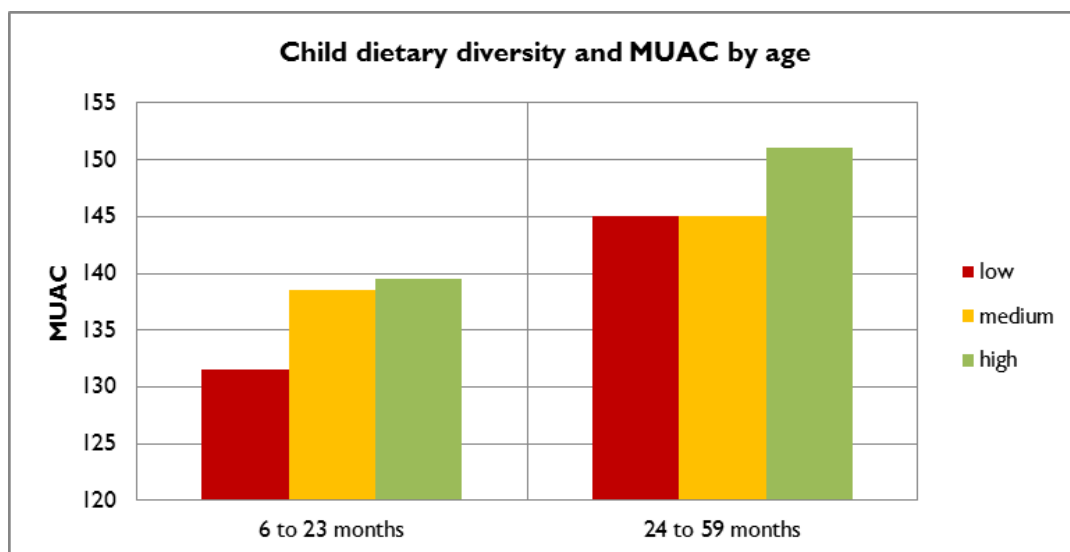
Dietary diversity was measured by counting the number of different foods/food groups (0-6) that are fed to the children. In the chart below it is clear that low diversity (0-1) decreases rapidly after 9 months of age and that high diversity (4-6) increases but never really goes beyond 25-30 percent of children in the older age groups. In general, most children are given foods from 2-3 different food groups between 6 to 36 months of age.

**Chart 52. Dietary diversity by child feeding age groups**



In Kassala, the percentage of children consume food from less than four food groups is very high (69 percent). This means that an extremely large percentage of children Darfur do not receive enough nutrients required for growth. Additional analysis shows that child dietary diversity is linked to household dietary diversity in that for children with low dietary diversity, 9 percent live in households with poor food consumption as measured by the food consumption score, compared to 2 percent of the children who consume from four or more food groups. Further analysis shows that dietary diversity is related to MUAC as shown in the chart below where children eating from 4 or more food groups have higher MUAC than those with less diversity. For younger children, those with low dietary diversity have a much lower average MUAC than the others.

**Chart 53. Child dietary diversity by MUAC**



Further analysis with wealth quintiles shows a strong relationship between wealth and dietary diversity in children where 59 percent of children from the wealthiest quintile were eating four or more food groups compared to only 6 percent from the poorest.

Lastly, good child feeding practises as measured by child dietary diversity are also a factor of the education of the household head. The chart below shows that the percentage of children with good dietary diversity (4 or more food groups) increases with increased education of the household head. Of course it is noted that the education of the household head is also related to household wealth.

## 8. Conclusions and Recommendations

In general the findings show that rural households in Kassala state are not greatly affected by acute food insecurity as measured by household food consumption score, purchasing power and share of expenditure for food each month. However, the problems in Kassala are much more related to chronic food insecurity where 22 percent were characterised as having poor dietary diversity and food frequency, fewer number of different household assets and a very high share of monthly expenditure allocated to food. In this context, chronic food insecurity is greatly linked to poverty in Kassala state.

The assessment results show that there is a distinct geographical distribution of food insecure households as well as specific livelihood groups associated with these households.

The highest percentages of food insecure households are found *Hamashkoreeb* (67 percent) and *Telkok* (29 percent) localities. These localities are located in the drought affected livelihood zones in the eastern parts of the state (Eastern pastoral and Eastern Agropastoral Sorghum) and are characterised by limited arable land, low rainfall and difficult physical access. The essential food commodity prices are the highest in the state due to poor production.

The main source of food for a typical household is market purchase which on an average constitutes more than ninety percent of households' monthly share for food items. Other reasons negatively impacting the households' food security status is the high percentage of illiteracy and adherence to traditions and customs which don't allow females to work outside their homes and thus they have many young children and a higher dependency ratio.

In the Flood Retreat Zone, there are a high percentage of chronically food insecure households although they are living in agricultural area, especially in *North Delta* locality (24 percent food insecure). The reason for this is that the land holding size in these areas is small meaning that the households cannot produce enough for their annual consumption of staple cereal. In addition, the main cultivated crops are vegetables. Therefore, the percentage of food insecure households in this zone is high because of the high percentage of households' monthly expenditure spent on food. These households are also likely to be more food insecure in case of price increases.

Overall characteristics of the food insecure households include:

- Daily consumption of only sorghum, oil/fat, dairy, and sugar
- Higher percentage of dependents in the households
- Living in thatch (26 percent) or 'Other'/nomadic stick houses (70 percent)
- No access to safe sanitation (3 percent only)
- Mostly rely on unskilled labour (71 percent) or farming (11 percent) for work; 9 percent are unemployed
- Livelihood activities focus on collection of grass, firewood or charcoal and/or brickmaking, begging or gifts.
- Household livestock ownership is higher for camels, average for donkeys and sheep/goats and lower for cattle and poultry than the other food security groups.

### **Malnutrition**

The percentage of children with MUAC < 12.5 cm is highest in *Atabara River*, *Reefi Kassla* and *North Delta* localities, particularly among less than two years compared to other localities in the state. Among the reasons behind the high child malnutrition rates are lack of supplementary food items during the breastfeeding period, poor hygiene and cultural practises.

The levels of low MUAC are not any higher or lower amongst children in food insecure households; however for children 6-23 months of age, 8 percent have MUAC < 11.5 cm which is the highest of all food security groups.

### **Causes of food insecurity and vulnerability**

Main factors related to food insecurity include: poverty, lack of education, unsustainable livelihood activities (unskilled labour, collection of wood/grass) and to a certain extent, isolation and cultural practices.

### **Recommendations**

Since 2009, WFP Sudan has embarked on a new strategy consisting of right-sizing and rationalizing its assistance in Sudan. WFP has been implementing a three-pillar strategy consisting of:

- effective and efficient response to emergency needs and short-term hunger and under-nutrition;
- reducing needs for emergency food assistance by early recovery and **building resilience** of local communities and populations and;
- increasing the capacity of civilian actors such as Government, communities, social networks, commercial sector, universities, farmers associations and food management committees.

WFP Sudan defines **resilience building** as *'increasing the ability of individuals, households, communities and systems to be better prepared, mitigate, adapt to and recover from shocks and crises so as to be able to meet basic food and nutrition requirements'*. This is done through the following general steps:

4. Strengthen capacities of national and local structures, networks and institutions for planning and implementation of food security and resilience programmes
5. Build the resilience of individuals and communities to withstand shocks and recover from them by:
6. Improve anticipation, early warning and early action

In order to address the multiple dimensions of food insecurity and vulnerability found amongst the people of Kassala state the following issues should be considered under a **Resilience** platform:

- Partnerships – Government ministries, UN agencies and NGOs/CBOs should work together to address the food insecurity issues in the state
- Planning – Multi-sector programmes that have well defined entry and exit strategies.
- Integration – Programmes that integrate livelihoods, training, nutrition will be more suitable to address the multi-dimensional aspects of chronic food insecurity and will build resilience
- Monitoring – Using the findings of the Comprehensive Food Security Assessment for Kassala, a food security monitoring system can be developed to both monitor the situation but also the impact of programmes.

With the above in mind, WFP and partners would like to implement activities at household and community level in order to achieve the following objectives:

5. Enhance the productive sector and increase skills for diversification of income sources and increased agricultural and livestock production;
6. Enhance the adaptation to climate change and increase skills and means to alleviate further deforestation and environmental degradation;
7. Enhance market functioning and improve opportunities to access markets and market information, credit and insurance schemes;
8. Enhance nutrition to build human resilience and enhance human capital.

WFP will implement a set of complementary activities together with its partners targeting communities, households and individuals in the same localities and communities to provide the comprehensive approach needed for building resilience.

- Safe Access to Firewood and Alternative Energy (SAFE),
- Integrated Blanket Supplementary Feeding Programmes (IBSFP),
- Farmers to Markets (F2M) livestock and
- Asset Creation (FFA)

WFP's vision with **SAFE** is to provide food assistance to vulnerable populations in Kassala by ensuring basic food needs are met while giving them the right tools and knowledge to address the challenges of safe access to cooking fuel, income diversification, human skills and capacities and safety of women.

1. Establish training centres for women and communities and provide material for construction of fuel-efficient stoves and production of fire fuel briquettes
2. Livelihoods and environmental activities through community nursery and forestry
3. Livelihoods support and income generating activities
4. Other training and sensitisation activities
5. Fuel for Education - Provide institutional fuel-efficient stoves and biogas to schools benefitting from WFP's school meals programme
6. Implementation and monitoring support

The **IBSFP** aims to address malnutrition and break the intergenerational cycle of hunger and is essential to unlocking the potential of vulnerable communities and promoting human resilience and economic growth.

Malnutrition costs lives and livelihoods and leaves a lasting legacy of lost productivity and limited opportunity. Children who do not receive proper nutrition in their first 1,000 days can suffer irreversible damage to body and mind. Those who survive to adulthood are likely to be less productive and less able to feed their own families.

The IBSFP provides nutritious foods to children aged between 6-36 months and promotes optimal feeding practices, food hygiene and food safety. It also builds the ability of communities and households to meet the nutrition requirements for the children and pregnant/lactating women in a sustainable manner.

The **F2M** experience in 2011 and 2012 showed that dry areas such as North Darfur, Kassala and Red Sea States have a high potential for livestock investment and livestock projects. The objectives of the project are to connect agro-pastoralists to four "markets" in areas where SAFE and IBSFP are being implemented:

1. Market for micro-finance so that they can invest in labour for livestock activities (fattening and breeding);
2. Market for micro-insurance and for credit-risk guarantee for the banks (so that they can lend to farmers/agro-pastoralists with no collateral);
3. Market for extension services - provided free by Ministry of Agriculture/Livestock;
4. Market for sale - either through local traders, wholesalers or large private sector companies.

The **asset creation** programme aims to build community infrastructures and capacities for:

- water harvesting (water reservoirs/haffirs and terracing) to increase water provision for humans and livestock,
- to improve drainage systems and de-siltation to build resilience to drought.

The interventions will be carried out through a community-based approach where committees are formed and trained on project management and transfer of technical skills, essential for sustainability of any project. WFP also will work closely with local communities to implement trainings on literacy and numeracy, life skills, health and nutrition awareness, accelerated learning programmes and vocational training as well as agricultural extension training.

#### **Exit/handover strategy**

- **SAFE** – The activity focuses on community empowerment and building livelihoods with a focus on women. Experience shows that within three years, women can make and sell fuel efficient

stoves and fire fuel briquettes and that the income generating trees are producing food or products for sale. The communities can then manage on their own with support from the key government partner, Ministry of Welfare and Social Security.

- **IBSFP** – This component is designed to train caretakers and government counterparts and within a 3 year period, if implemented broadly, the government counterpart, Ministry of Health, can take over programme implementation while a large cohort of caretakers/women will have the knowledge and be able to pass this on to their friends and family.
- **Farmers to Markets** – Since this component is implemented primarily by the Ministry of Agriculture and the Central Bank of Sudan, with WFP as a partner, the idea is that the Government will take full ownership of the activity.
- **Asset Creation** – Haffir and terracing activities are carried out with support of the Ministry of Agriculture's engineers and local communities are also trained to build and maintain these assets.



## 9. Annex 1.

Locality	Kassala											
	Atbara River	Halfa El gededa	Hama shkore eb	Kasala City	North Delta	Reefi Arouma	Reefi Kasala	Seteet	Telkok	Wad El Helew	Western Kasala	Kassala State
Average household members	6.7	5.9	6.2	7.1	6.0	6.4	5.7	6.9	6.2	8.1	8.4	6.4
% under 5, Male	9.3%	7.6%	11.7%	6.0%	9.4%	10.9%	9.0%	7.0%	13.8%	9.0%	10.4%	10.1%
% under 5, Female	9.1%	7.8%	8.2%	6.5%	7.9%	10.8%	8.3%	9.0%	8.9%	7.2%	9.1%	8.6%
% 6 -1 5 yrs, Male	20.9%	17.9%	23.1%	13.6%	19.6%	16.2%	18.7%	21.8%	18.5%	15.8%	17.8%	19.2%
% 6 -1 5 yrs, Female	16.6%	15.3%	19.6%	12.1%	16.6%	19.2%	18.3%	21.5%	20.5%	18.5%	19.1%	18.4%
% 16 -60 yrs, Male	21.1%	23.8%	17.3%	32.7%	20.2%	20.4%	22.4%	17.3%	17.5%	20.2%	17.4%	19.9%
% 16 -60 yrs, Female	19.0%	22.9%	16.5%	26.6%	22.8%	18.2%	21.3%	19.5%	17.6%	24.1%	22.3%	20.2%
% over 60 yrs, Male	1.8%	2.3%	2.0%	1.5%	1.4%	1.1%	0.6%	2.1%	1.2%	3.5%	2.1%	1.8%
% over 60 yrs, Female	2.2%	2.4%	1.7%	1.0%	2.1%	2.2%	1.4%	1.8%	1.2%	1.6%	1.7%	1.8%
Residence status												
Residents	99.3%	99.5%	72.6%	100.0%	85.0%	100.0%	98.6%	100.0%	97.2%	98.8%	98.8%	93.5%
IDPs	0.7%	0.5%	2.7%	.0%	11.4%	.0%	1.4%	.0%	.0%	1.2%	1.2%	2.1%
IDP in camp	0.7%	0.5%	2.7%	.0%	11.4%	.0%	1.4%	.0%	.0%	1.2%	.0%	2.0%
IDP outside camps	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	1.2%	0.1%
Returnees	.0%	.0%	24.7%	.0%	.0%	.0%	.0%	.0%	2.8%	.0%	.0%	4.1%
Nomads	.0%	.0%	.0%	.0%	3.6%	.0%	.0%	.0%	.0%	.0%	.0%	0.4%
For IDP or refugee - Years spent in camp												
1-2 years	.0%	100.0%	100.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	13.6%
3-4 years	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%
5-6 years	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%
>6 years	.0%	.0%	.0%	.0%	100.0%	.0%	.0%	.0%	.0%	.0%	.0%	86.4%
Gender of household head												
Male	96.4%	95.3%	100.0%	92.9%	91.6%	94.6%	92.9%	93.8%	98.4%	97.6%	95.2%	95.9%
Female	3.6%	4.7%	.0%	7.1%	8.4%	5.4%	7.1%	6.3%	1.6%	2.4%	4.8%	4.1%

Education level of the household head													
	None	86.7%	40.6%	94.5%	46.4%	73.7%	81.1%	81.4%	67.0%	92.3%	57.8%	81.7%	76.5%
	Primary	10.4%	25.5%	4.5%	28.6%	19.8%	15.3%	11.4%	23.2%	4.8%	32.5%	15.9%	14.8%
	Secondary	3.0%	27.6%	.5%	21.4%	4.2%	2.7%	5.7%	8.0%	2.0%	9.6%	2.4%	7.0%
	University	.0%	6.3%	.5%	3.6%	2.4%	.9%	1.4%	1.8%	.8%	.0%	.0%	1.6%
Type of housing													
	Mud/mud brick	39.6%	14.0%	.0%	75.0%	15.6%	43.2%	22.9%	18.9%	.8%	30.5%	8.4%	17.4%
	Stone/concrete/brick	1.4%	62.7%	.0%	21.4%	1.2%	.9%	1.4%	.9%	1.2%	1.2%	12.0%	9.8%
	Thatch	58.3%	21.8%	17.6%	3.6%	24.6%	24.3%	67.9%	78.4%	31.4%	67.1%	56.6%	38.9%
	Plastic shelter	.7%	1.0%	1.4%	.0%	.0%	9.9%	.7%	.9%	.8%	1.2%	20.5%	2.6%
	Other	.0%	.5%	81.0%	.0%	58.7%	21.6%	7.1%	.9%	65.7%	.0%	2.4%	31.3%
Main source of drinking water													
	Public tap/standpipe or piped water	5.8%	79.4%	.4%	100.0%	.0%	45.0%	12.9%	17.0%	32.5%	25.3%	.0%	24.8%
	Borehole with hand pump/engine	.0%	9.8%	26.3%	.0%	.0%	16.2%	8.6%	.0%	14.5%	.0%	.0%	9.4%
	Protected dug well/ spring	.0%	.5%	1.3%	.0%	6.0%	.0%	.0%	.9%	10.0%	.0%	.0%	2.6%
	Unprotected well/spring	.0%	.0%	44.6%	.0%	31.7%	.9%	.0%	.0%	17.3%	.0%	1.2%	12.9%
	Water Bladder	.0%	.0%	26.8%	.0%	.0%	.0%	.7%	16.1%	18.1%	20.5%	.0%	9.2%
	Surface water (River, stream, dam, lake, pond, canal, irrigation channel)	93.5%	1.5%	.0%	.0%	.6%	27.9%	12.1%	66.1%	.0%	3.6%	.0%	16.9%
	Tanker truck	.7%	2.1%	.0%	.0%	41.9%	.0%	42.1%	.0%	.8%	12.0%	97.6%	14.8%
	Vendor	.0%	1.0%	.4%	.0%	14.4%	2.7%	5.7%	.0%	4.8%	1.2%	.0%	3.3%
	Cart with small tank or drum	.0%	5.7%	.0%	.0%	5.4%	7.2%	17.9%	.0%	2.0%	37.3%	1.2%	5.9%
Type of toilet facility													
	Traditional pit latrine/ without slab/ open pit	50.7%	12.9%	.0%	14.3%	24.6%	45.0%	12.9%	13.4%	6.0%	32.9%	7.2%	17.8%
	Improved latrine with cement slab	.0%	60.3%	3.2%	85.7%	12.0%	2.7%	9.3%	.9%	6.4%	.0%	12.0%	13.8%
	Bush, stream	49.3%	26.8%	96.8%	.0%	63.5%	52.3%	77.9%	85.7%	87.6%	67.1%	80.7%	68.4%

Household members with special needs													
	No	97.1%	92.8%	93.2%	78.6%	82.6%	88.2%	93.1%	79.8%	90.1%	84.3%	75.4%	88.6%
	Yes	2.9%	7.2%	6.8%	21.4%	17.4%	11.8%	6.9%	20.2%	9.9%	15.7%	24.6%	11.4%
	Physical	2.9%	5.8%	3.8%	14.3%	13.2%	6.9%	6.1%	12.5%	8.9%	11.4%	21.3%	8.6%
	Mental	.0%	1.4%	3.0%	7.1%	4.1%	4.9%	.8%	6.7%	1.0%	4.3%	3.3%	2.8%
	Both	.0%	.0%	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.0%	.0%	.1%
Working status													
	Employed	95.0%	90.8%	94.6%	92.9%	92.8%	95.5%	90.0%	79.5%	95.2%	86.9%	89.2%	91.8%
	Unemployed	5.0%	9.2%	5.4%	7.1%	7.2%	4.5%	10.0%	20.5%	4.8%	13.1%	10.8%	8.2%
Reasons for unemployment													
	No chance of work	.0%	11.1%	9.1%	.0%	9.1%	.0%	7.1%	38.1%	16.7%	27.3%	20.0%	16.3%
	Do not know how to find a job	14.3%	16.7%	.0%	.0%	18.2%	33.3%	28.6%	.0%	.0%	.0%	.0%	9.8%
	Did not find a suitable job	14.3%	16.7%	.0%	.0%	.0%	.0%	.0%	9.5%	.0%	.0%	.0%	4.9%
	Illness, aging	71.4%	55.6%	90.9%	100.0%	72.7%	66.7%	64.3%	52.4%	83.3%	72.7%	80.0%	69.1%
	Security situation	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%
Main income sources (General)													
	Farming (self employed)	69.0%	33.7%	13.7%	7.7%	12.3%	28.8%	15.9%	25.8%	8.9%	42.5%	11.0%	23.7%
	Agricultural labour	12.4%	2.9%	1.4%	.0%	1.9%	4.8%	5.6%	2.2%	2.6%	6.8%	.0%	3.7%
	Skilled labour	5.4%	23.4%	.9%	19.2%	17.5%	19.2%	23.8%	9.0%	4.7%	6.8%	23.3%	12.4%
	Non-skilled labour	10.9%	18.9%	82.9%	53.8%	48.7%	41.3%	46.8%	57.3%	76.6%	38.4%	57.5%	51.2%
	Public servant	2.3%	21.1%	.5%	19.2%	16.9%	4.8%	7.9%	5.6%	2.6%	5.5%	5.5%	7.6%
	Self-employed (non-farm)	.0%	.0%	.5%	.0%	2.6%	1.0%	.0%	.0%	4.7%	.0%	2.7%	1.4%
Income sources (Detail)													
	Sale of cereals (sorghum, millet)	65.9%	29.7%	7.7%	7.1%	8.0%	13.9%	13.6%	15.3%	8.6%	26.6%	2.5%	18.1%
	Sale of other crops	.0%	2.9%	1.9%	.0%	1.2%	.0%	3.8%	2.7%	2.6%	2.5%	.0%	1.9%
	Sale of livestock and animal products	1.6%	3.4%	6.8%	7.1%	2.5%	3.7%	15.2%	8.1%	10.3%	6.3%	16.3%	7.1%
	Remittances	3.1%	3.4%	.0%	.0%	1.2%	.9%	3.0%	2.7%	.4%	.0%	2.5%	1.6%
	Renting out donkey cart	1.6%	.6%	.5%	.0%	.6%	.0%	.0%	1.8%	1.3%	.0%	1.3%	.8%
	Gifts from family/relatives	6.2%	9.1%	5.3%	10.7%	7.4%	5.6%	6.1%	16.2%	5.6%	12.7%	13.8%	8.0%

	Sale of food aid	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%
	Agricultural wage labor	14.0%	4.6%	3.9%	.0%	.6%	7.4%	6.1%	11.7%	3.4%	6.3%	1.3%	5.4%
	Salaried work	3.9%	22.3%	2.4%	21.4%	20.2%	13.0%	12.9%	12.6%	8.6%	17.7%	15.0%	12.4%
	Skilled labor	2.3%	14.9%	.5%	14.3%	8.0%	7.4%	14.4%	8.1%	2.6%	2.5%	25.0%	7.7%
	Wheal barrow/trolley	.0%	.0%	.0%	.0%	.6%	.0%	.8%	.0%	.0%	.0%	.0%	.1%
	Domestic labor	.8%	.0%	.0%	3.6%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.1%
	Brick-making	.0%	.6%	.5%	.0%	.6%	.9%	.8%	.0%	.9%	.0%	2.5%	.6%
	Construction	.0%	.6%	.0%	7.1%	.0%	1.9%	2.3%	2.7%	.9%	6.3%	1.3%	1.3%
	Portering	.8%	1.1%	.5%	.0%	1.8%	6.5%	.8%	2.7%	2.6%	3.8%	.0%	1.9%
	Sale of water	.0%	.0%	.0%	.0%	.6%	.0%	.8%	.0%	.4%	.0%	.0%	.2%
	Tea seller/catering	.0%	.6%	.0%	.0%	2.5%	.9%	.0%	.0%	.9%	1.3%	.0%	.6%
	Kiosk	.0%	5.7%	1.9%	.0%	4.3%	3.7%	2.3%	2.7%	3.9%	.0%	.0%	2.8%
	Rickshaw driver	.0%	.0%	.5%	3.6%	1.2%	3.7%	2.3%	.9%	.4%	.0%	.0%	.9%
	Sales of handicraft	.0%	.0%	1.4%	.0%	1.2%	.0%	.0%	.0%	.0%	2.5%	.0%	.5%
	Sales of firewood/grass	.0%	.0%	31.9%	3.6%	14.7%	22.2%	3.0%	2.7%	18.5%	5.1%	2.5%	11.8%
	Sale of charcoal	.0%	.0%	30.0%	.0%	16.0%	1.9%	2.3%	.0%	16.8%	.0%	.0%	9.1%
	Other petty trade	.0%	.6%	3.4%	21.4%	5.5%	6.5%	9.8%	9.0%	10.3%	6.3%	16.3%	6.6%
	Begging	.0%	.0%	1.0%	.0%	1.2%	.0%	.0%	.0%	.9%	.0%	.0%	.4%
	Adopt coping strategies related to food consumption												
	No	64.7%	63.0%	91.4%	100.0%	97.6%	93.6%	77.2%	42.0%	66.3%	35.7%	54.2%	72.3%
	Yes	35.3%	37.0%	8.6%	.0%	2.4%	6.4%	22.8%	58.0%	33.7%	64.3%	45.8%	27.7%
	Coping mechanism												
	No coping	64.7%	63.0%	92.3%	100.0%	97.6%	93.6%	77.2%	42.0%	66.7%	35.7%	54.2%	72.5%
	Low coping	4.4%	4.7%	5.9%	.0%	1.8%	5.5%	8.8%	26.8%	16.5%	17.9%	30.1%	10.5%
	Medium coping	.0%	1.6%	1.8%	.0%	.6%	.9%	2.9%	12.5%	10.4%	23.8%	10.8%	5.4%
	High coping	30.9%	30.7%	.0%	.0%	.0%	.0%	11.0%	18.8%	6.4%	22.6%	4.8%	11.6%
	Child food groups												
	Less than four food items	85.3%	61.0%	95.6%	25.0%	38.5%	52.6%	48.8%	67.3%	83.6%	66.3%	48.8%	68.8%
	Four and more food items	14.7%	39.0%	4.4%	75.0%	61.5%	47.4%	51.2%	32.7%	16.4%	33.7%	51.2%	31.2%

Child health - Illness													
	None	44.7%	49.6%	5.1%	.0%	10.9%	13.5%	14.4%	8.8%	9.8%	6.1%	11.0%	16.0%
	Diarrhea	6.7%	1.4%	6.3%	.0%	2.6%	3.0%	2.4%	2.7%	.3%	3.1%	.0%	2.8%
	ARI	8.0%	7.8%	14.7%	16.7%	10.3%	12.0%	5.6%	29.2%	19.9%	22.4%	24.4%	15.4%
	Fever	38.0%	37.6%	73.5%	83.3%	73.7%	69.9%	77.6%	59.3%	69.7%	67.3%	55.1%	63.9%
	Measles	2.7%	3.5%	.4%	.0%	2.6%	1.5%	.0%	.0%	.3%	1.0%	9.4%	1.8%
MUAC Measurements for children younger than 2 years													
	<= 115 mm	27.8%	8.3%	5.7%	.0%	13.5%	5.0%	11.1%	4.0%	10.7%	5.0%	14.0%	10.8%
	> 115 -125 mm	27.8%	11.1%	13.2%	.0%	16.2%	15.0%	18.5%	4.0%	12.0%	5.0%	2.3%	12.4%
	> 125 mm	44.4%	80.6%	81.1%	100.0%	70.3%	80.0%	70.4%	92.0%	77.3%	90.0%	83.7%	76.8%
MUAC Measurements for children 2 - 5 years													
	<= 115 mm	28.0%	.0%	1.3%	.0%	2.4%	.0%	9.3%	.0%	1.9%	.0%	1.4%	4.6%
	> 115 -125 mm	7.5%	1.0%	4.0%	.0%	4.7%	4.5%	3.5%	3.9%	2.9%	4.3%	1.4%	3.7%
	> 125 mm	64.5%	99.0%	94.7%	100.0%	92.9%	95.5%	87.2%	96.1%	95.1%	95.7%	97.2%	91.7%
Areas cultivated this season in Mukhamas													
	Millet	.8	1.7	2.6	.	.	2.0	3.8	15.0	4.7	8.5	.	4.7
	Sorghum	4.6	4.6	5.0	2.5	4.2	5.6	5.0	15.0	3.1	25.0	14.5	7.7
	Groundnuts	4.9	6.0	.	.	.	.	.	3.6	.	.	.	5.4
	Sesame	.0	.0	.	.	.	.	.	.	.	13.2	.	11.3
	Tombak	.0	2.5	.	.	.	1.4	.	.	.	.	.	1.1
	Watermelon seeds	3.2	4.4	.	.	.	2.0	4.5	.	.	.	10.0	3.9
Area cultivated last year in Mukhamas													
	Millet	2.0	10.0	2.3	.	.	2.0	3.6	10.0	4.4	9.3	.	4.9
	Sorghum	4.8	4.6	4.0	2.5	4.7	6.8	5.1	15.2	3.5	25.5	18.1	7.9
	Groundnuts	4.3	5.6	.	.	.	.	.0	2.4	.	.	.	4.8
	Sesame	.0	.0	.	.	.	.	.0	.	.	15.4	.	12.7
	Tombak	.0	.0	.	.	.	1.4	.0	.	.	.	.	.6
	Watermelon seeds	1.3	2.0	.	.	.	2.3	3.0	.	.	.	20.0	2.6
Production this season by number of bags (90kg)													
	Millet	9.2	17.5	19.0	.	.	1.3	15.9	8.5	31.7	.5	.	13.3
	Sorghum	12.3	19.1	1.4	17.0	39.6	93.8	11.3	6.2	69.7	8.1	6.2	28.5

	Groundnuts	61.7	66.5	.	.	.	.	.0	50.5	.	.	.	62.7
	Sesame	.0	.0	.	.	.	.	.0	.	.	1.3	.	1.0
	Tombak	.0	.0	.	.	.	10.2	.0	.	.	.	.	4.6
	Watermelon seeds	4.4	14.1	.	.	.	135.0	.0	.	.	.	.0	28.4
% of households describing rainfalls quantity this year													
	Better	.0%	1.2%	1.7%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.4%
	Average	.0%	.0%	11.7%	.0%	32.6%	2.0%	3.2%	2.2%	1.7%	3.6%	.0%	5.0%
	Worse	100.0%	98.8%	86.7%	100.0%	67.4%	98.0%	96.8%	97.8%	98.3%	96.4%	100.0%	94.7%
% of households describing rainfall distribution													
	Good	.0%	2.5%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.4%
	Even	2.2%	7.4%	4.9%	.0%	11.6%	.0%	3.2%	.0%	.0%	.0%	.0%	3.2%
	Uneven	97.8%	90.1%	95.1%	100.0%	88.4%	100.0%	96.8%	100.0%	100.0%	100.0%	100.0%	96.4%
Source of seeds this season													
	Own production	18.5%	34.2%	3.9%	.0%	15.9%	6.4%	32.3%	.0%	7.5%	10.2%	.0%	16.1%
	Purchase	73.9%	58.2%	60.8%	100.0%	84.1%	93.6%	32.3%	88.1%	77.4%	87.8%	100.0%	71.3%
	Donation (FAO, NGOs, GOS)	7.6%	7.6%	35.3%	.0%	.0%	.0%	35.5%	11.9%	15.1%	2.0%	.0%	12.7%
% of animal holding													
	Cattle	37.4%	18.5%	32.6%	10.7%	44.9%	20.5%	20.0%	11.6%	24.6%	11.9%	2.4%	24.5%
	Sheep and Goats	79.1%	34.4%	78.6%	17.9%	37.7%	58.9%	61.4%	70.5%	63.5%	33.3%	65.1%	58.2%
	Poultry	16.5%	16.9%	8.9%	14.3%	28.1%	28.6%	25.0%	41.1%	25.4%	26.2%	15.7%	22.1%
	Donkey	52.5%	15.9%	64.7%	7.1%	47.9%	62.5%	47.1%	58.9%	50.4%	40.5%	21.7%	46.4%
	Camel	.0%	3.1%	40.6%	.0%	9.6%	6.3%	10.0%	5.4%	19.8%	.0%	20.5%	13.5%
Wealth index													
	Poorest quintile	.7%	.5%	67.0%	.0%	7.2%	1.8%	2.1%	10.7%	37.7%	.0%	.0%	18.0%
	Second	11.5%	1.5%	31.3%	.0%	42.5%	22.3%	19.3%	6.3%	41.7%	8.3%	8.4%	22.0%
	Third	24.5%	11.8%	1.3%	3.6%	27.5%	30.4%	19.3%	42.9%	14.3%	36.9%	38.6%	20.5%
	Fourth	40.3%	30.3%	.4%	39.3%	12.0%	29.5%	25.0%	21.4%	2.8%	38.1%	33.7%	19.9%
	Richest quintile	23.0%	55.9%	.0%	57.1%	10.8%	16.1%	34.3%	18.8%	3.6%	16.7%	19.3%	19.6%
Food Consumption Score													
	Poor	2.9%	.0%	3.6%	.0%	4.8%	.9%	.0%	1.8%	2.4%	2.4%	1.2%	2.1%
	Borderline	7.2%	1.5%	2.7%	.0%	4.8%	3.6%	2.1%	2.7%	4.0%	10.7%	2.4%	3.8%
	Acceptable	89.9%	98.5%	93.7%	100.0%	90.4%	95.5%	97.9%	95.5%	93.6%	86.9%	96.4%	94.1%

Relative Expenditure on Food													
	<65%	66.2%	61.3%	9.4%	38.5%	38.0%	41.7%	41.4%	49.5%	29.6%	50.6%	79.5%	42.4%
	>65%	33.8%	38.7%	90.6%	61.5%	62.0%	58.3%	58.6%	50.5%	70.4%	49.4%	20.5%	57.6%
Absolute Expenditure (Minimum Healthy Food Basket)													
	< 1 MHFB	.0%	.0%	8.2%	.0%	1.8%	.9%	.0%	1.8%	5.3%	.0%	.0%	2.5%
	1-2 MHFB	2.2%	1.0%	51.4%	.0%	10.4%	7.4%	3.8%	5.5%	28.6%	6.2%	2.4%	15.4%
	> 2 MHFB	97.8%	99.0%	40.5%	100.0%	87.7%	91.7%	96.2%	92.7%	66.1%	93.8%	97.6%	82.1%
Food Security													
	Food Insecure	1.4%	.0%	3.6%	.0%	4.9%	.9%	.0%	2.7%	2.4%	1.2%	1.2%	2.0%
	Vulnerable to food insecurity	4.3%	.5%	10.0%	.0%	4.9%	2.8%	.8%	1.8%	7.3%	8.6%	.0%	4.5%
	Food Secure	94.2%	99.5%	86.4%	100.0%	90.2%	96.3%	99.2%	95.5%	90.2%	90.1%	98.8%	93.5%