SUBSISTENCE FARMING IN LOWER SHABELLE RIVERINE ZONE

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ADC	Agricultural Development Corporation
AEZs	Agro-Ecological Zones
CDR	Crude Death Rates
CEFA	European Committee for Education and Agriculture
CIDRI	International Cooperation for an integrated rural development
CNDVI	Crop Normalized Difference Vegetation Index
EC-JRC	European Commission Joint Research Center
ENC	National Commercial Agency
EU	European Union
FAO	Food and Agricultural Organisation of the United Nations
FEWS-NET	Famine Early Warning Systems Network
FSNAU	Food Security and Nutrition Analysis Unit
GAM	Global Acute Malnutrition
GDP	Gross Domestic Product
GIS	Geographic Information System
Ha	Hectare
IDP	Internally Displaced Persons'
IPC	Phase Classification
IMF	International Monetary Fund
ITCZ	Intertropical Convergence Zone
LULC	Land use/land Cover
MCH	Maternal and Child Health
MT	Metric Tons
MUAC	Measuring Mid-Upper Arm Circumference
NGOs	Non-Government Organisations
PWA	Post War Average
RFE	Rainfall Estimates
SAM	Severe Acute Malnutrition
SLIMS	Somalia Livelihoods Indicator Monitoring Systems
SoSh	Somali Shiling
SWALIM	Somalia Water and Land Information Management
TFG	Transitional Federal Government
USD	United States Dollar
VHR	Very High Resolution

EXECUTIVE SUMMARY

Between late 2010 and early 2012, southern and central Somalia experienced severe food insecurity and malnutrition precipitated by a prolonged period of drought resulting in the poorest harvests since the 1992-1993 famine. The effects of the drought were compounded by various factors including decreased humanitarian assistance and increasing food prices. Furthermore, this emergency occurred against a backdrop of heightened insecurity and persistent high levels of acute malnutrition, and affected populations whose resilience mechanisms had already been weakened over the past few years by a protracted crisis featuring a combination of armed conflict, natural disasters and adverse economic conditions. By July 2011, based on criteria established by the multi-partner Integrated Food Security Phase Classification (IPC, an analysis template used globally for determining relative severity of food insecurity), the United Nations declared famine in central Somalia in agro-pastoral areas of Middle Shebelle and among IDPs in Mogadishu the Afgoye corridor. Based on further data and analysis, Bay, Bakol agropastoral and Lower Shebelle regions were designated as famine-affected over the subsequent two months.

In October 2011, the Food Security Analysis Unit for Somalia (FSNAU) carried out a study in the Lower Shabelle Riverine Livelihood across all five districts of the region, including Afgooye, Marka, Qoryoley, Kurtunwaarey and Sablaale. The purpose of the study was to examine characteristics of smallholder farming and various factors that influence agricultural production of the riverine population in the region and to determine the factors that contributed to the famine in 2011. The study attempts to fill the gaps in knowledge about the changes in levels of production and related assets of households, which have occurred since the collapse of the previous government in 1991. This knowledge is important because despite Lower Shabelle being one of the major agricultural areas in Somalia, the region was among few regions affected by the 2011 famine.

During the time of study, Lower Shabelle was inaccessible for most United Nations agencies and other international organizations due to the insecurity posed by insurgents who were controlling the area. To obtain the required information, FSNAU trained local enumerators to carry out primary household-level data collection covering a total of 33 villages, each of them within 5-10km on either side of River Shabelle. In addition, to cross-check and validate the field level data, aerial photographs and Very High Resolution (VHR) satellite imagery were used to detect land use and land cover changes. However, due to the very limited archive availability of VHR imagery for the area during the major crop seasons, only two study areas (a total of 5,000ha including north of Janale and Sagarole villages of Marka district) could be analysed.

Summary of major findings:

• Seasonality and agricultural production: There are two main cropping cycles in Lower Shabelle Riverine Zone, which correspond to the onset of the *Gu-Hagaa* and the *Deyr* rainy seasons. Land preparation normally begins in mid-March and ends mid-April before the onset of the *Gu* rains, while in the second cropping cycle land tillage spans between the first dekad of September and mid-October (before the onset of the *Deyr* rains). Maize and sesame are the principal food crops grown by subsistence farmers in Lower Shabelle riverine. Traditionally, most households from poor and lower middle wealth groups in Lower Shabelle plant maize exclusively during the main *Gu* season[1]. During the *Deyr* season along with maize they also plant sesame, using approximately 60 and 40 percent of the cultivated land, respectively.

• Cereal consumption and use of harvest: The poor households consume or sell their maize from the ripening stage (green consumption) up to the harvest. On average the poor households harvest about 900kg-1 000kg of maize annually, of which 50-55 percent is sold, while the rest is retained for own consumption. Approximately 40-45 percent of the total harvest is sold immediately after harvest, while about 10 percent is sold gradually thereafter. Poor households have cereal stocks from own production to last for about 4-6 months a year. For the very poor households, the stocks are estimated to last for 3-4 months, due to their heavy reliance on maize consumption; a consequence of low incomes constraining access to other food through purchases.

1 The wealth groups were defined using Household Food Economy approach

• Main income sources: Agricultural labour is the most important source of income for the majority of poor households in riverine areas. These households engage in agricultural labour for more than 6 months of the year in order to obtain extra income to purchase food. The study revealed that more labour income is earned during *Deyr* rather than *Gu* season because of the intensive crop propagation and irrigation activities involved in order to maximise the benefits from the short rainy (*Deyr*) season. Other income sources include the selling of agricultural produce and self-employment. The income generated from the sale of crops is mostly used to cover the costs of agricultural inputs, tractors and seeds, which are important for land preparation in the *Gu* season, but also to repay debts.

• Factors affecting agricultural production:

- **Land tenure, ownership and access:** After the collapse of central government, both customs and the remnants of state rule have overlapped creating a rather confusing and non-obvious land tenure system in Lower Shabelle leading to persistent conflicts, land-grabbing and even displacement. Land tenure in Lower Shabelle today is the product of institutional and socio-political developments that have shifted over the generations; at least three distinct periods can be distinguished. In recent years (based on fieldwork and analysis of satellite imagery) about two-thirds of the land in Lower Shabelle riverine areas has been cultivated while the rest of the areas were left fallow. Most of the cultivated land (90%) is watered through gravity irrigation (85%) and to a lesser extent pump irrigation (15%), predominantly in Afgooye district. In Kurtunwaarey district, less than half (46%) of the available land was cultivated, while the rest of the land remained fallow due to the high cost of inputs and effects of the drought. Sixty to eighty percent of the very poor population in riverine areas own 1-2 darabs of farmland (0.33-0.66ha), while the poor own 2-3 darabs (0.66-1ha). About 10-20 percent of the poor and very poor households are landless and depend on rented land. The middle and better-off households in the riverine areas tend to own land plots with an average of 2-4ha and 5-10ha, respectively. The middle and better-off households obtain seeds from their own harvest, while the vast majority of the poor (about 80%) depend on seed purchases.

- **Irrigation infrastructure:** Since the breakout of civil war in 1991, most river embankments have been eroded, while barrages, intakes and canal systems are filled with sediment. This has encouraged vegetation growth and reduced the canals' hydraulic sections. Lack of terminal outlets and the topography of the irrigation area have increased silting of the drainage system. At present in some parts, less than 50 percent of the irrigatable area and irrigation facilities are operational, and these are at diminishing levels of efficiency (Mbara et al., 2007). Breaching of riverbanks by farmers to obtain irrigation water has caused uncontrolled flooding and water wastage. Even though agencies like FAO-Somalia through local NGOs have tried to rehabilitate irrigation canals, agricultural production in Lower Shabelle riverine is still low, leading to reliance on imports and food aid (Mbara et al., 2007).

• Causes and Consequences of the 2011 Famine in Lower Shabelle: Factors that led to the food security crisis and subsequent famine in Lower Shabelle in 2011, included very poor crop harvest (production shock), limited on-farm employment opportunities (labour constraints), import bottlenecks (trade constraints), and lack of or limited humanitarian access (transfer failures). The outcomes were escalated prices of staple commodities (maize) and the weakened purchasing power of the local population. This triggered both mass movements towards Internally Displaced Persons' (IDP) settlements to access food aid and other forms of humanitarian assistance and migrations towards the main urban areas of Marka, Qoryoley and Mogadishu to access labour opportunities (e.g. portering, construction employment, etc.). Severe food insecurity led poor households to engage in coping strategies such as the distress sale of productive assets including selling own land, farm mortgaging (rahan), unsustainable sales of livestock, seeking social support from relatives and kinship, reducing the number of meals or meal portions consumed in a day and even begging. A nutrition survey conducted in July 2011 by FSNAU in Lower Shabelle Riverine Zone showed Global Acute Malnutrition (GAM) rates of 28.7 percent, Severe Acute Malnutrition (SAM) rates of 14.2 percent, and Crude Death Rates (CDR) of 6.12. These indicators were reaching famine threshold as defined in the Intergrated Phase Classification approach, and were the basis for the declaration of famine in the Lower Shabelle region. A joint FSNAU/FEWSNET study on the 2011 famine death toll highlighted that 'particularly high death tolls were noted for Lower Shabelle region and IDPs. While this is not captured explicitly by our estimation, a large number of displaced people left the worst-affected regions on foot, seeking labour and assistance in Mogadishu. Some of these stopped while on the way in Lower Shabelle, so as to seek farm labour. These IDPs might have been particularly vulnerable'[2].

[2] Mortality among populations of southern and central Somalia affected by severe food insecurity and famine during 2010-

Recommendations of the study:

The findings of the study show that despite the recognition of Lower Shabelle riverine area as the cereal basket of Somalia, mismanagement and disputes over irrigation infrastructure, persistent droughts, declining river levels and increased river siltation continue to hamper agricultural production. Moreover, generational shifts in institutional and socio-political arrangements on land tenure continue to constrain agricultural production in Lower Shabelle riverine area.

The study provides some recommendations for improved agricultural production in Lower Shabelle riverine:

- Increase coverage of infrastructure rehabilitation activities within the riverine area in order to improve water availability for irrigation farming.
- Optimize the efficiency of irrigatiRehabilitation of irrigation infrastructure to cover more areas within the riverine area in order to reduce river and canal siltation and improve water availability for irrigation farming
- There is need to strengthen the capacity to monitor and detect early warnings in weather patterns and disseminate information to prepare farmers for appropriate response.
- Considering that agriculture in Lower Shabelle riverine area is highly dependent on rainfall conditions in the Shabelle river basin (particularly in the Ethiopian highlands), when river levels decline even functioning irrigation canals cannot *Gu*arantee good crop production. It was established from the study that dam construction projects implemented by the Ethiopian government in the upstream areas of river Shabelle could partly be contributing to the drop in river levels downstream. As a result, the government in Somalia could work with development agencies to initiate research activities that on one side optimize the efficiency of irrigation canals and on the other side explore opportunities for harnessing groundwater resources for use in agricultural production, especially during times of prolonged dry spells and drought. In the same token, there is need to promote investment programmes designed to improve river water management through the construction of micro-dams for harvesting and storing water from river Shabelle, which can be used for on-farm irrigation when there is drought.
- Agriculture-based intervention programmes should be designed by government in partnership with development agencies and implemented through local NGOs and farmers to enhance farm mechanization (ploughing) in order to increase agriculture production. Increased focus on more targeted productive investments and social protection programmes should aim at cushioning short-term livelihood shocks while at the same time offering long-term opportunities for poverty reduction. These programmes could also be linked with agribusiness projects that subsidize inputs costs to smallholder farmers who cannot afford to own modern agricultural machinery. Through such efforts, agriculture can be key towards raising agricultural productivity, improving rural incomes, enhancing food security and reducing unemployment and poverty.
- In Lower Shabelle riverine, knowledge on agricultural production exists but the institutional and human capacity to support knowledge transfer that can accelerate the adoption of new technologies for increased agricultural production is inadequate. In view of this, the government and humanitarian agencies should design programmes that promote and adopt technological innovations needed to boost productivity and adapt to emerging challenges (climate change) facing food production. This push for location-specific technological innovations should be amplified across the entire agricultural supply chain, from use of inputs and planting crop varieties that are tolerant to drought, diseases/pests and floods to reducing postharvest losses. This will contribute towards enhancing self-sufficiency (in terms of food security), building livelihood resilience and enhancing sustainability.
- There is a need to emphasize sustainable farming methods that increase productivity, reduce soil erosion and enhance environmental conservation. These could be implemented through agricultural extension services (agricultural information centers or farmers field schools), as this will contribute towards enhancing sustainable livelihoods.
- In order to increase agricultural diversification and expansion of agricultural labour opportunities, there is need to popularize the re-introduction of horticulture farming and extensification of plantation farming.
- The promotion of handicrafts and off farm income generating activities and petty trade are essential in order to improve income and food security of poor households.

2012, FAO/FSNAU and FEWS NET, May 2013 (page 53).

- Roads, most of which are rendered impassable during times of heavy rain, need to be rehabilitated. This will improve transportation of farm produce to the markets, ease trade flow of goods and services, open up the rural farming areas for development and accessibility in case of humanitarian crisis. Improving transport infrastructure by constructing culverts and bridges will ensure the smooth flow of goods and services.
- Considering that access to health services is a serious problem, responsible government agencies in collaboration with health intervention organizations should combine efforts to improve access to and provision of healthcare, particularly in the rural areas.
- Expanding and improving access to education by providing and improving educational infrastructural facilities, raising the quality of teaching and learning for effective outcomes, and focusing investment on vocational and technical education.
- Popularize the re-introduction of horticulture farming and extend plantation farming in order to increase agricultural diversification and expand agricultural labour opportunities.
- Rehabilitate roads, most of which are rendered impassable during times of heavy rain. This will improve transportation of farm produce to the markets, ease the trade flow of goods and services, open up rural farming areas for development and improve accessibility in case of humanitarian crisis. Improving transport infrastructure by constructing culverts and bridges will ensure the smooth flow of goods and services.

CHAPTER ONE. INTRODUCTION, METHODOLOGY AND STUDY DESIGN

1.1 Introduction

Between late 2010 and early 2012, southern and central Somalia experienced severe food insecurity and malnutrition precipitated by a prolonged period of drought resulting in the poorest harvests since the 1992-1993 famine. The effects of the drought were compounded by various factors including decreased humanitarian assistance and increasing food prices. Furthermore, this emergency occurred against a backdrop of heightened insecurity and persistent high levels of acute malnutrition, and affected populations whose resilience mechanisms had already been weakened over the past few years by a protracted crisis featuring a combination of armed conflict, natural disasters and adverse economic conditions. By July 2011, based on criteria established by the multi-partner Integrated Food Security Phase Classification (IPC, an analysis template used globally for determining relative severity of food insecurity), the United Nations declared famine in central Somalia in agro-pastoral areas of Middle Shebelle and among IDPs in Mogadishu the Afgoye corridor. Based on further data and analysis, Bay, Bakol agropastoral and Lower Shebelle regions were designated as famine-affected over the subsequent two months.

Despite decades of neglect and lack of investment, agriculture remains an important economic activity and a major component of the rural livelihood[3] systems in Somalia, not only in terms of meeting the food needs of the population, but also in terms of generating income through crop sales and opportunities for agricultural labour. Although agriculture accounts for a significant part of the Gross Domestic Product, national food production is still far from covering the food needs of the country. In 2004, for example, agricultural production accounted for as much as 60 percent of Somalia's US$2.1 billion Gross Domestic Product (GDP),[4] but only 0.2 million tonnes of food were produced within the country. The average annual cereal production in the past three years (2010- 2012) in Somalia has been 293 250 metric tons (MT), which met only 29 percent of the estimated annual domestic cereal requirement of one million tonnes based on the 135kg of cereals needs per person per year.

One of the most important agricultural production areas of Somalia region is Lower Shabelle. Over the past decades, different agricultural production systems existed in this region. Over the past two decades, since the collapse of the Central Government in Somalia, irrigation farming has significantly declined in Lower Shabelle and at present primarily subsistence farming is practiced on small land parcels. A significant part of the arable land is not currently cultivated which is due to the combination of several factors. They include insecurity (which increases farming costs), erratic and highly variable rainfall, lack of farming inputs, lack of credit facilities and extension services, poor irrigation and transport infrastructure, and limited efforts to rehabilitate irrigation infrastructure because of inaccessibility. While these factors are relatively well known, very little is known about their impact on agricultural production in Lower Shabelle have been established and the extent to which they affect the development of the production system in the region.

The aim of this study was to fill in this gap by assessing the nature of the subsistence production system in the Lower Shabelle Riverine area. The objectives of the study were to:

- Examine the characteristics of smallholder farming and the different factors, which influence agricultural production;
- Determine the factors that contributed to the 2011 famine in Lower Shabelle.

This report is structured as follows. The remainder of this chapter describes the methodology used for this study. Chapter two discusses the characteristics of land tenure policies and the agricultural production system in southern Somalia with special focus on Lower Shabelle – adding a historical dimension to the analysis. The agro-ecological characteristics of the area are also discussed in the second chapter along with the re-zoning of the livelihood zone. The third chapter analyses the data collected during the fieldwork, focusing on the socio-economic characteristics of the population groups, describing access to basic services, land

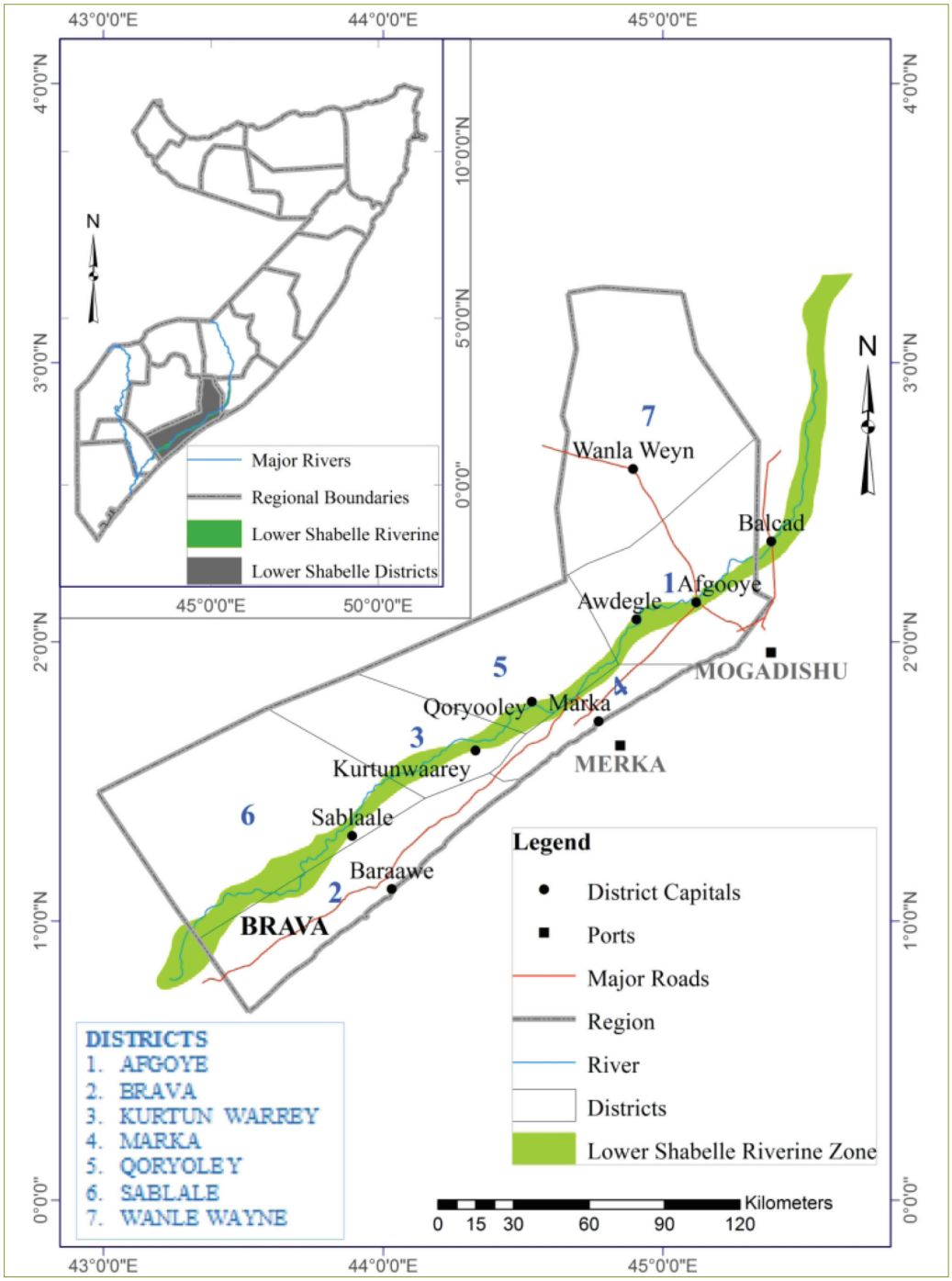
3 The two major agricultural livelihood systems include agro-pastoralist (practicing a mix of agriculture and livestock production) and agriculturalist (whose livelihood is entirely based on agricultural production).

4 The World Bank: Country information [Online]; Available from *http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/0,pagePK:180619theSitePK:13 6917,00.html*

ownership practices, issues of seasonality, determinants of agricultural production, uses of agricultural inputs, consumption of main food groups and sources of income. The fourth chapter takes a look at the causes and consequences of the famine in Lower Shabelle during 2011. In this chapter, the remote sensing data are used as an important source of information and images are provided for the areas which were surveyed. The chapter discusses agricultural changes between 2008-2011, the major hazards and impacts on livelihoods and food security, the root causes of the food crisis (in terms of availability and access to food) and coping strategies during the famine. Finally, the study concludes in Chapter Five with some recommendations for improving agricultural production and development in Lower Shabelle Riverine area.

1.2 Study area

Figure 1. Location of Lower Shabelle Riverine Area in Somalia

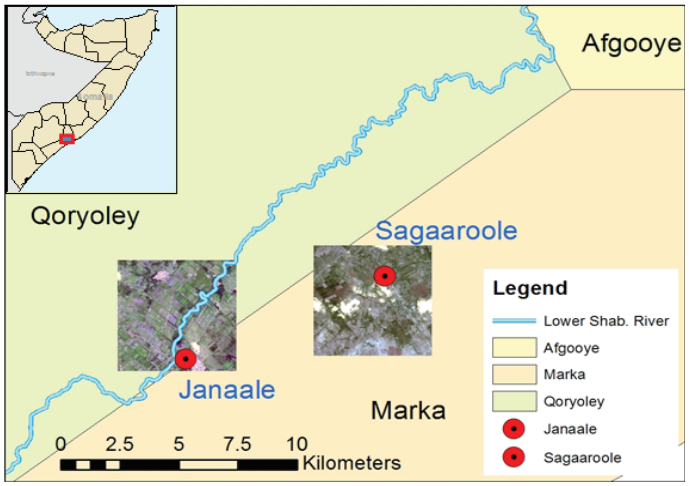


Lower Shabelle region is one of the most high agricaltural potential areas and is a maize basket in Somalia. The region consist of seven districts, of which only two districts(W/ weyn and Brava) depend on rainfed crop, while the rest are Riverine zone.

The Shabelle river basin originates from the Bale Mountains in the eastern Ethiopian highlands and drains over an area of about 297,000km^2, of which 108,300km^2 lies in Somalia (Markakis, 1998). Arid to semi arid conditions mainly characterize the climate in Lower Shabelle (Barry and Richard, 1992). The area receives between 500 and 800mm of rainfall annually (*Dyer* et al,1993). Mean annual temperatures ranges from (26^{0}C to 28^{0}C). Orographic and coastal influences increase rainfall variability (Griffiths, 1972), while the movement of the Intertropical Convergence Zone (ITCZ) results in four seasons, namely: Jiilaal (January to March); *Gu* (April to June, mainly rain-fed); *Hagaa* (July to September) and *Deyr* (October to December, mainly irrigated) (FAO-SWALIM, 2010 p.11-15).

Data on soils in Somalia is scarce. Vargas et al. (2007) report that the soils in Lower Shabelle riverine zone are mainly composed of vertisols and gleysols (floodplain), which are poorly drained (FAO-SWALIM, 2010 p. 22-23). In Somalia, River Shabelle covers about 1,236km over a vast alluvial plain on a very gentle slope of 0.25 to 0.35m/km across Afgooye, Qoryoley, Marka, Kurtunwaarey, Sablaale and Barawa districts (FAO-SWALIM, 2010 p. 2-3). The Shabelle river basin is linked to the formation of the Eastern Rift Valley System. The uplift of the Ethiopian highlands and deposition of thick volcanic ash and sedimentary rocks determined the geological setting of River Shabelle. Downstream, the river is characterized by extensive sedimentary rocks. An 'island' of metamorphic and igneous rocks (Buur Hills) define the watershed divide with Juba basin.

Figure 2. Location of the study area in Somalia and sample areas for LULC analysis



NB: Each satellite image frame has an area of 5*5 km (2500 ha)

Lower Shabelle river valley widens at very low relief leading to increased deposition of volcanic rock sediments scoured from erosive processes upstream. In the flood-prone zone, the river acquires its peculiar morphology where the riverbed appears higher than the surrounding floodplain (hanging or elevated river). This is typical of rivers carrying loads of sediment and whose reduced flow cannot keep it in suspension. The riverbed builds up and the riverbank elevates to a very variable extent from year to year. This enables the soils to retain enough moisture, which supports recession agriculture (FAO-SWALIM, 2010 p. 9-10).

The main vegetation types in the riverine zone include closed and open tree canopies on temporarily flooded areas, woodlands, open shrubs, herbaceous and savannah vegetation. Rain-fed farming occupies a large portion of the cultivated area and irrigated agriculture is confined to the flood plains adjacent to Lower Shabelle River (FAO-SWALIM, 2010 p. 16-21). Lower Shabelle riverine falls into four main Agro-Ecological Zones (AEZs)as reflected by the figure 3 below and further explained by table 1.

1.3 Methodology

When designing the data collection methods for this study, the research team faced serious challenges due to very limited access to the population in the riverine zone. Considering the security constraints in the area, household questionnaires could not be administered to collect primary level data. However the 'usual' key informant interviews and focus group discussions had to be conducted through enumerators while FSNAU staff were not able to access the field directly. To overcome these limitations and to validate the field level data in these circumstances, satellite imagery was used as an innovative method to cross-check the field data.

The fieldwork for the study was conducted between 3 to10 October 2011 and covered all five districts of Lower Shabelle (Afgooye, Marka, Qoryoley, Kurtunwaarey and Sablaale districts). A total of 33 villages were surveyed for this study, each of them within 5-10km on either side of River Shabelle, and all settlements were purposively selected due to the limited access to the areas. To determine the list of villages to be surveyed, the FSNAU field analysts held consultations with representatives from the Ministry of Agriculture in the Somali TFG, Mogadishu University, local NGOs working in the area and with different enumerators who were recruited to undertake the fieldwork.

The interviews targeted subsistence farmers who mainly grow maize and sesame in the *Gu-Hagaa* and *Deyr* seasons. From each village four wealth groups (very poor, poor, middle and better-off) were identified based on land and asset holding. The subsistence farmers from each wealth category participated in the focus group discussions through which most of the data in this study was collected. A questionnaire, translated into Somali language, was administered by a team of seven enumerators who were recruited and trained for three days in a workshop in Mogadishu. In addition, telephone interviews were conducted with selected farmers within the study area.

To supplement, verify and cross-check the field level data, aerial photographs and Very High Resolution (VHR) satellite imagery were also analysed to detect land use/land cover (LULC) changes in this study. Archival aerial photographs of the whole Shabelle irrigated area were obtained from a flight survey conducted by SWALIM in January 2008. The intention of the (LULC) analysis was to acquire (VHR) image data of several consecutive crop seasons, 2008 and 2011, in order to verify the results of the field survey and to detect changes, particularly in the drought seasons (*Deyr* 2010 and *Gu* 2011). However, due to the very limited archive availability of VHR imagery for the area during the major crop seasons, only two study areas of 2,500ha each could be analysed. The first area is located North of Janaale village and the other is centered in Sagaarole village of Marka district. For the Janaale study area three dates were available (January 2008, May 2011 and December 2011), while for the Sagaarole site only two dates could be retrieved (January 2008 and December 2011). For both sites the total area of 2,500ha was fully analysed by photo-interpretation, screen digitization and classified into six land use classes (banana, sesame and maize, tree plantations, fallow, natural vegetation and settlements). The original idea was to analyse the relative change of the area cultivated under sesame and maize, but due to the resolution and seasonality of the images, it turned out that those two classes can only be photo-interpreted as one class.

The analysis resulted in around 3,000 field level polygons for each study area, which were assigned to a land cover class for the different dates. Splits or aggregations of polygons were also taken into account. The results of this analysis carried out by a consultant in collaboration with GIS and remote sensing specialists from FSNAU, Somalia Water and Land Information Management (SWALIM) and (EC-JRC) are presented together with the results of the village survey in the following sections.

It is important to mention some of the limitations of the study with regard to the representativeness collected field data. As mentioned earlier, the survey teams did not have sufficient access to interview households directly, therefore this study reports figures collected from key informants and knowledgeable people. The remote-sensing data supplements this information and as much as possible these figures are triangulated with the micro-level socio-economic figures.

Table 1: Agro-Ecological Zones of Shabelle River catchments

AEZ	Length of growing period in days		Soils		Land suitability				Climate
	Gu	*Deyr*	Description	Classification	Rainfed Agriculture	Irrigated Agriculture	Extensive Grazing	Forestry Plantations	
14G	<120	<45	1 poor drainage 2 high salt content	Gleysols, Stagnosols Solonchaks	S2, S3	S2, S3	S2	S2	Moist semi-arid
14S	<120	<45	High salt content	Solonetz, Solonchaks	S2, S3	N	S2	S2	
14V	<120	<45	Deep and clayey	Vertisols	S2	S2, S3	S2	S1	
D	Dunes		Sandy	Arenosols	N	N	S3/N	S3	Various

Length of Growing Period is the number of days that precipitations exceeds half potential evapotranspiration
Land Suitability: S1=Highly suitable; S2=Moderately suitable; S3=Marginally suitable; N=Not suitable

CHAPTER TWO. LAND TENURE, POLICIES AND AGRICULTURAL PRODUCTION

2.1 Background

Land tenure in Lower Shabelle today is the product of generational shifts in institutional and socio-political developments in which at least three distinct periods can be distinguished. First, until around the 1970's land was largely managed under the customary land tenure system. This was intended to be replaced by the nationalization of land in 1975, which, despite its intentions, did not completely invalidate the customary land tenure system. Thirdly, after the collapse of the Central Government, both customs and the remnants of state rule have overlapped creating a rather confusing and non-obvious land tenure system in Lower Shabelle. Persistent conflicts, land-grabbing and displacement over the past two decades have made it very difficult to assess land tenure and identify lines along which land is distributed and owned in the area.

2.2 Customary land tenure system

In the customary land tenure system, the clan council adjudicated over all land it occupied (Lewis, 1998).[5] Under deegan,[6] ownership of land shifted between clans, quite often depending on the balance of power between them (Farzin, 1988; Norton, 2008, p.84). Land-holding therefore, determined the superiority of one clan, with less powerful clans gaining access to land through becoming clients of a more powerful clan. At the village level, each household normally farmed – four or five different plots or about 3.5ha (Besteman, 1994, p.492). According to Besteman (1995) this was a strategy to mitigate risks such as floods, pests and land disputes. This system was flexible, relatively efficient, met the needs of farmers, allowed farmers to maintain fallow land and even borrow land for farming (Besteman, 1994, p.494).

The sociological composition of farmers in Lower Shabelle riverine area is of importance in understanding how the customary system worked. Traditionally, the Bantu who practiced a sedentary lifestyle, lived in the villages along River Shabelle (Norton, 2008, p.87; Besteman and Casanelli, 1996). Since independence and throughout the 1960's there was a growing interest in land from the Somali state elites. Purchasing or acquiring land was seen as a fruitful investment in light of the high market volatility. In the 1960's the Somali government elites and the former Italian concessionaires took over the majority of shares in the banana and sugarcane estates in Lower Shabelle area. This was followed by a policy compelling smallholder farmers to sell their land to the state and to the army officials (Mukhtar, 1996, p.88). This pushed the Bantus to the periphery of the large farms and affected production under the customary land tenure system in Lower Shabelle.

2.3 Implementation of the agricultural laws in the mid-1970s

The 1970s marked a crucial change in the land tenure system in Lower Shabelle. In 1973 the Co-operative Development Law spearheaded the shift to large-scale farming and collectivized all means of production (Norton, 2008, p.88; World Bank, 1981, p.16). The Agricultural Crash Programmes established in 1974 allocated fertile land to government employees and students from agricultural training institutions (Hoben, 1988; Unruh, 1996). However, these state corporations, due to their inexperience in agriculture, could not function without labour and engaged small-scale farmers in land-sharing contracts in the form of wage labour (Besteman, 1994, p.502).

In 1975 the government formulated a law on land nationalization and compelled farmers to register all land under the customary system (Roth, 1988, p.10). The overall aim of the policy was to improve agricultural production. Under this system land could no longer be sold, split or left idle; the state determined who could access land and what it was used for. Households were allowed to register a maximum of 30ha of irrigated land and 60ha of non-irrigated land. This law was linked to the establishment of the Agricultural Development Corporation (ADC), which monopolized the marketing and pricing of food grain and seeds as well as the National Commercial Agency, which controlled importation and distribution of food (Conze and Labahn, 1986; Mukhtar, 1996; von Boguslawski, 1986; World Bank, 1987). By 1986, about 5.3 percent of the total land in Lower Shabelle was registered (Roth, 1988, p.14-16). This law negatively affected smallholder farmers who did not have the resources to meet the costly, time-consuming and rigorous land registration process. Thus, most of the Bantus in the riverine area occupied and cultivated land, which they accessed illegally (Roth, 1988).

5 i.e. the possibility for the clan council to be recognized as the ruling authority.
6 a term used to refer to the exclusive control of land and its resources by a clan or sub-clan

Due to the ADC keeping crop prices artificially low at the expense of the farmers, by the late 1970s smallholders had reverted to subsistence farming and shifted to cash crops, fruits and vegetable production which were not controlled by the ADC (Labahn, 1986; Thompson, 1991; Roth, 1993). This increased the rural labour force and the cropped areas, but still food crop production stagnated (World Bank, 1987; von Boguslawski, 1986). The government debt incurred in financing subsidies increased inflation and affected the balance of payments (Asser et al., 1984). By 1987 production levels in the registered plots had halved compared to those in small-scale farms (Besteman, 1994). Overall land laws failed to increase agricultural production and never really eradicated the customary land tenure. Instead, they increased social and economic marginalization of small-scale farmers, hampered agricultural production, partly fuelled the underlying conflict that burst out in 1991 and continue to exacerbate food insecurity in Somalia (Norton, 2008).

2.4 Land tenure after 1991

The land tenure in Lower Shabelle riverine in the past 20 years has probably become even more complex and there are very few up-to-date studies on this subject. However, it seems very likely that the customary system is still widely used, although this has been disrupted by years of clan rivalries and fighting between different factions. Contending militias and their offshoots consistently confiscate and sell productive assets to obtain hard currency (Norton, 2008). In the late 1990s the dynamics between newcomers (galti) and indigenous people (guri) changed. Previously, residents allowed newcomers to acquire and cultivate parcels of land but this was no longer considered a valid option in the middle of the conflict. Different non-local clan-backed militias started grabbing land at their convenience. In response, the residents used their own armed factions to tighten their grip on land (Cassanelli, 1996). In the eyes of the Lower Shabelle residents, in the past, land was seized by the pen, today, land is seized at Gunpoint (Webersik, 2002). Since the collapse of the government in 1991 many of the banana plantations had been abandoned or captured by militia from different factions, and the area under irrigation had reduced to about 20-30 percent of pre-war levels. To date, irrigation infrastructure has been neglected because land ownership was often disputed (Norton, 2008:104). This has disrupted agricultural production, particularly in Lower Shabelle and exacerbated chronic food insecurity in Somalia.

2.5 Establishment of irrigation schemes and pre-war agricultural production

Irrigation agriculture was established by the Italians in the 1920s and 1930s (Mbara et al., 2007). The network of canals allowed an abundant and consistent supply of irrigation water from River Shabelle to supplement erratic rainfall. Irrigation systems were originally based on a limited number of gravity-fed river intakes, which were linked to the secondary and tertiary canals (Mbara et al., 2007). Large plantations were located along River Shabelle and near primary canals, where access to water was relatively secure, while smallholder farms remained in the periphery of the large farms (Unruh, 1991). Long-standing and intimate ties between farmers and pastoralists influenced some small-scale riverine farmers to keep livestock as a secure investment following a good harvest and often hired pastoralists to herd their animals in the adjacent rangelands (Besteman and Cassanelli, 2003; Unruh, 1996). Since small-scale farmers availed more land to produce fodder for herders, these ties increased livestock density in smallholder areas, intensified competition for resources and lead to land degradation. Along River Shabelle in Marka and Qoryoley districts, gravity irrigation was used and the main canals were Siigaale (3.6km), Giddu (6km), Asayle (15.5km), Liiban (6km), Dhamme Yaasin (15km), Primo Secondario (32km), Wadajir (15km) and Bahore (19km). In Kurtunwaarey district the main agricultural areas were Arbowoheerow zone (1,900ha was rain-fed and there was some supplemental irrigation supplied by flood spillage), Kurtunwaarey settlement scheme (3,000ha cultivated of which 1,650ha was under controlled irrigation using the barrage in Garowle), Idow Goodow zone south of the swampy area (1,400ha was rain-fed conditions) and Habaabshe plain zone (5,000ha was rain-fed). In Barawa district about 10,000ha was cultivated in isolated spots concentrated around towns and villages. Other zones cultivated included *Gu*marta, Barawa Yare, Aysuuce, Qunyo Barrow, Saarey (1,000ha) and Haaway where 1,100ha was cultivated (SDR, 1987).

Since the breakout of the civil war in 1991, most river embankments have been eroded while barrages, intakes and canal systems are filled with sediment. This has encouraged vegetation growth and reduced the canals' hydraulic sections. Lack of terminal outlets and the topography of the irrigation area have increased silting of the drainage system. At present, less than 50 percent of the irrigatable area and irrigation facilities in certain parts are operational, and these are at diminishing levels of efficiency (Mbara et al., 2007). Breaching of riverbanks by farmers to obtain irrigation water has caused uncontrolled flooding and water wastage. Even though agencies like FAO-Somalia through local NGOs have tried to rehabilitate irrigation canals, agricultural production in Lower Shabelle riverine is still low, leading to reliance on imports and food aid (Mbara et al., 2007).

CHAPTER THREE. FARMING AND LIVELIHOODS IN LOWER SHABELLE RIVERINE

This chapter describes the characteristics of the villages and the households, which were surveyed for this study.

3.1 Socio-economic characteristics of the areas surveyed

The study surveyed 33 villages within the riverine zone in five districts (Afgooye, Marka, Kurtunwaarey, Qoryoleey and Sablaale) of Lower Shabelle region. The distribution of villages surveyed was based on population size. Ten villages were surveyed in Afgooye and Marka districts, five villages in Kuntinwarey and Qoryoley districts and 3 villages were assessed in Sablaale district. As depicted in Table 2 below, approximately 22, 000 households live in the 33 villages surveyed including a total population of 132,000 people. The average number of households per village is 644 (with a median of 500), with a high level of variation between the villages in terms of populations. The largest villages can be found in Kurtunwaarey and in Marka regions where the average number of households was 1,270 and 880, respectively, while the average size of a household in all the districts surveyed ranged between 5-7 members. Although the demographic profile of the households was not assessed it is postulated that most of these household members include mainly children.

Table 2: Number of Households by village

District	No of villages	No. of Households	HH size	% of long-term resident households in the area	% of households who moved in to the area over the past 12 months
Afgooye	10	3,430	5-7	92	8
Marka	10	8,770		96	4
Qoryoley	5	2,830		77	23
Kurtunwaarey	5	6,360		94	6
Sablaale	3	770		88	12
Total	33	22,160			

In most of the villages surveyed, on average 90 percent of the households are long-term residents. The rest of the households are new arrivals who moved into the villages within the last 12 months before the study was conducted, from the neighboring regions including Bay, Bakool, Middle Shabelle and Banadir.

3.2 Access to Basic Services

Access to formal education in the surveyed villages is limited. Marka district recorded the highest number of primary schools with about 2,800 pupils. In the villages surveyed in Sablaale district, there were no primary schools. Afgooye (8 schools), Qoryoole (4 schools) and Kurtunwaarey (4 schools) districts recorded a total of 4,135 pupils (Table 3).

Table 3: Primary schools in the surveyed villages

District	No of surveyed villages	Primary Schools	No. of students
Afgooye	10	8	150
Marka	10	16	2,900
Qoryoley	5	4	700
Kurtunwaarey	5	4	385
Sablaale	3	-	-
Total	33	32	4135

Another important indication of basic services is the number of health services per village. There are a total of 61 health facilities in the 33 villages surveyed (Table 4). When compared to the number of primary schools per village, it can be seen that those villages that are served with health facilities are very likely to have primary schools as well, although the number of primary schools is on average 25 percent less than the number of health facilities.

Table 4: Health facilities per population in the surveyed villages

City/Town	Population in villages	Health Facilities		No of Private Clinics	No of Traditional Healers
		No of Health Facilities	Population per Health Facility		
Afgooye	21,000	18	1,140	14	13
Kurtunwaarey	38,000	9	4,240	2	8
Marka	53,000	18	2,920	3	10
Qoryoley	12,000	10	1,160	10	9
Sablaale	5,000	6	770	6	3
Total	129,000	61	10,230	35	43

In addition to the health facilities, the villages also have private clinics and traditional healers. Most of the health services in the livelihood zone are run by NGOs, Maternal and Child Health (MCH) programs and health posts are less common. Most of the NGO-managed health facilities are located at the respective district headquarters of the districts such as Qoryoley and Sablaale while in other districts like Marka people access MCH services, private clinics and traditional healers.

Households in the riverine zone have access to markets in the main towns as well as village markets. The main markets accessed are Buulo-mareer, Afgooye, Qoryoley, Kurtunwaarey, Janaale, Mogadishu, Barawa and Sablaale. These markets are important in the sale of farm produce, purchase of imported food and non-food commodities, and purchase of farm inputs and households items.

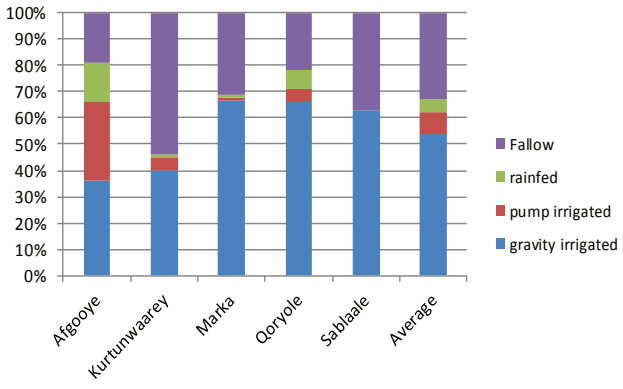
In terms of road infrastructure, most roads that link the villages, towns and village markets in Lower Shabelle riverine livelihood zone are seasonal and in poor condition. They are impassable during the rainy seasons. This has hampered effective trade flow both within and outside the livelihood zone. Marka, Qoryoley, Kurtunwaarey and Afgooye districts have access to the only tarmac road in the area, which links the livelihoods to the major markets of Mogadishu. On average 25 percent of the households have access to mobile phones. In Sablaale district about 40 percent of the households have access to mobile phones, while in Kurtunwaarey district about 19 percent of the households have access to mobile phones.

The availability of safe and clean water in Lower Shabelle riverine area is poor. The main water source in 32 out of the 33 villages surveyed is River Shabelle. This is due to the proximity of riverine farmlands and villages to the river. Households that reside further away from the river access water through the irrigation canals. Other sources of water include protected hand-dug shallow wells and water catchments (Waro).

3.3 Land Ownership and Access

The survey collected information on land the villages have 'access to', how much of the accessible land is currently cultivated and in what way it is irrigated. From the overall sample of the 33 surveyed villages, about two-thirds of the land in the riverine areas is currently cultivated while the rest of the areas is left fallow. The land which is currently under cultivation is irrigated in over 90 percent of the cases in the riverine areas; the rest of the cultivated land (approximately 7%) is rain-fed. The major form of irrigation is gravity-fed (85%) and only 15 percent of the land is pump irrigated particularly in Afgoye.

Figure 3: Land ownership and access



Significant variations can be observed by district. For example, while in Afgooye over 80 percent of the land is under cultivation, a significantly higher proportion of this land appears to be rain-fed (nearly 20%) when compared to the overall average in the riverine areas (7%). In Kurtunwaarey, about 46 percent of the available land was cultivated, while the rest of the land remained fallow due to the high cost of inputs and drought. Almost all of the cultivated land was irrigated (gravity-fed), while a small part of land was cultivated through recessional cultivation as shown in Figure 3.

Given the limitations of the methodology used in the data collection, it was important to cross-check these figures with satellite images of two of the surveyed villages. Analysis of the satellite images shows that in Janaale area the average observed field size in December 2011 was 0.9ha. The largest areas mapped show banana plantations and fallow areas (1.1ha) while the smallest areas depict tree plantations and cereals plus sesame fields (0.7ha). In the Sagaarole area the average field size is of 1.35ha, the banana plantations are the largest plots (1.65ha) while cereals plus sesame fields are of smaller average size (1.1ha)[7].

The images show a similar proportion of irrigated and cultivated land. By interpreting the results of satellite image sub-scenes acquired in December 2011, it can be observed that 59 percent and 57 percent of the areas in Sagaarole (Marka district) and Janaale (Marka district) areas were cultivated, respectively. About 28 percent of the areas in Sagaarole and 25 percent of the areas in Janaale were fallow land, the rest of the areas were classified as abandoned agricultural land and built up areas. These data roughly confirm the findings of the survey and the differences can be attributed to the fact that the areas covered by satellite images only represent small fractions of the Marka district as well as the difficulty in explaining what exactly is fallow land.[8]

Former agricultural plots with shrubs and small trees have been classified as natural vegetation, which might have been recorded as fallow in the village survey. The image interpretation does also confirm that in both areas nearly all cultivated fields benefit from irrigation. The most common type of irrigation is by gravity. . The functionality of canals and their width can be established only for primary and secondary canals, while the very articulated network of tertiary canals is often too small to be successfully analysed on very high resolution images.

As discussed in the Second Chapter, the land tenure system in Lower Shabelle is rather complicated and has shifted several times since the colonial period from clan control to land registration by the government and back again to the clan control system after the collapse of the Central Government. Despite the potential limitations of these definitions, the survey made an attempt to collect information on ownership of land (owned and rented).[9]

Table 5: Land use and access by wealth groups

	Very Poor		Poor		Middle	Better-off
Owned	60-80%	1-2 darab (0.33-0.66ha)	60-80%	2-3 darab (0.66-1ha)	2-4ha	5-10ha
Rented (from)	10-20%	1-1.5 darab (0.33-0.5ha)	15-20%	1-2 darab (0.33-0.66ha)	-	-
Crop Share	10%	1.5-3darab (0.5-1ha)	10-15%	3-4 darab (1-1.33ha)	Crop sharing	Crop sharing
Gift/Donation	5%	1-2darab (0.33-0.66ha)	-	-	-	Gifts

As Table 6 indicates, about 60-80 percent of the very poor populations in the riverine areas own 1-2 darab of farmland (0.33-0.66ha), while the poor own 2-3 darabs (0.66-1ha). About 10-20 percent of the very poor and 15-20 percent of the poor are landless and depend on rented land from others. The middle and better-off households in the riverine areas tend to own their land with an average of 2-4ha and 5-10ha, respectively. The very poor and the poor wealth groups do not rent land to anyone, while the middle and better-off rent approximately 40 percent of the land they own. This may imply that the better-off households do not themselves work on their farms, but rather utilize agricultural wage labour from those 'renting' the land. The size of land holding among the riverine wealth groups varies, as it relatively increase in Kurtunwarey and Sablale districts. Crop sharing system is also high in the mentioned districts while yield per unt areas is also high in those areas. These are the downstream parts of the Shabelle riverine where more flooded wet land and alluvial deposit are available.

7 The areas reported do not imply ownership of land. The satellite imagery only depicts the size of land demarcated by natural boundaries. Each piece of land may be owned by one household or several pieces of land may be owned by one household.

8 The definition of fallow land adopted for this study is any area that is currently not cultivated or has not been cultivated for up to 4 seasons.

9 An attempt was made to collect information on 'farmland under share cropping' and 'farmland as a gift', however there were too many missing cases in the questionnaires to be able to report anything reliable on this. It is reassuring, however, that both owned and rented land was clearly indicated in all questionnaires suggesting a rather clear definition of these terms in the local context.

Discussions with key informants confirmed that in about 10-15 percent of the cases where households rent land from others, crop sharing agreements are made between the person renting the land and the owner of the land. The landlords (mainly the middle and better-off) normally cover input costs (ploughing and seeds), while the poor households provide labour throughout the growing period. The harvest is then shared based on a ratio agreed upon by both parties.

At the time of the survey, the average cost of renting one hectare of irrigated land was 670 thousand Somali Shillings (USD 21) ranging between Somali Shilling (SoSh) 366,666 in Sablaale district and SoSh 907,500 in Afgooye district. The average cost of one hectare of non-irrigated land was 394,000 SoSh (USD 12) ranging between SoSh 335,000 in Afgooye district to SoSh 562,000 in Sablaale district. The high costs in Afgooye and Kurtunwaarey districts are due to the high demand and quality of land (Table 6).

Table 6: Cost of renting 1 Ha of land by district

District	Irrigated land per season		Non-irrigated land per season	
	SoSh	USD	SoSh	USD
Afgooye	907,500	28	335,000	10
Kurtunwaarey	900,000	28	400,000	13
Marka	590,000	18	350,000	11
Qoryoley	660,000	14	375,000	18
Sablaale	366,666	11	N/A	N/A
Average	684,833	20	365,000	13

Note: The exchange rate used in these calculations is 32,000 SoSh for one USD, which was prevalent during the survey in December 2011.

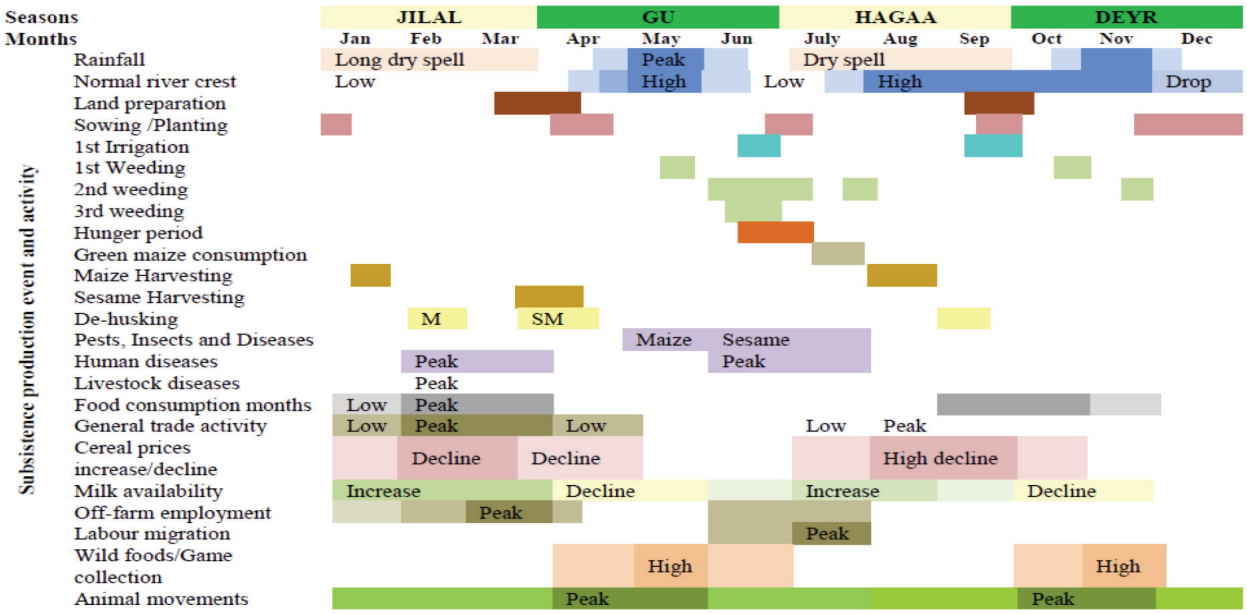
3.4 Seasonality and agricultural production

There are two main cropping cycles in Lower Shabelle Riverine Zone, which correspond to the onset of the *Gu*-Hagaa and the *Deyr* seasons. Land preparation normally begins in mid-March and ends mid-April before the onset of the *Gu* rains. This marks the first cropping cycle, which lasts up to August. In the second cropping cycle land tillage spans between the first dekad of September and mid-October (before the onset of the *Deyr* rains). The *Gu* rains, which are linked to the main growing season normally start in the last dekad of April, peak in May and end in the last dekad of June. This season is usually preceded by a long dry period (Jilaal) which starts towards the end of December and lasts till March. The *Hagaa* dry spell finishes in September. In the dry seasons (Jilaal and *Hagaa*) river levels drop and reduce water availability for irrigation. The onset of the *Gu* and *Deyr* rains increases the river levels, which peak in May and August to mid- December respectively (Figure 4).

River levels in Lower Shabelle depend mainly on rainfall in the Ethiopian part of the Shabelle River basin and gravity irrigation can only take place when river levels are high. Crops in the riverine areas are usually planted before the start of the rainfall using irrigation, but rainfall is important for continuous crop development and has a direct impact on yields. In the *Gu* season the first weeding of maize and beans takes place between mid and end May. The second weeding starts in June-July and may last up to August. In the *Deyr* season the first weeding starts in the last dekad of October to the first dekad of November. The second weeding starts in the last dekad of November. Weeding of sesame starts in the last dekad of July and ends in the first dekad of August. The hunger period coincides with the vegetative stage of the crop, normally from mid-June to mid-July. As such, green maize consumption begins at the ripening stage of the crop in mid July (for the first crop cycle) and the second dekad of December (for the second crop cycle).

July-August is the onset of the harvest period for maize planted in the *Gu* season. The second maize crop (planted in *Deyr*) is harvested in mid-February. Sesame is harvested from the third dekad of March up to the last dekad of April. Mature maize is cut and stacked in the fields until the time of shelling. The stover is mainly used as animal feed. Harvested crops are stored in underground pits. These are traditional storage facilities about a metre deep, lined and covered with maize stover and topped with soil. Threshing of maize is done in February and August. Sesame is de-husked in March-April and from mid-September.

Figure 4: Seasonal calendar of critical activities and events in Lower Shabelle Riverine Zone



Maize and sesame are the principal food crops grown in the irrigated (riverine) areas. Traditionally, most poor and lower middle households in Lower Shabelle plant 100 percent of the land with maize during the main *Gu* season, followed by a second crop of maize (40%) plus sesame (60%) in the *Deyr* season. Hand sowing of maize and beans in the *Gu* season starts from mid to end of April, and from mid-September to mid-October in the *Deyr* season. Planting of sesame in *Hagaa* season starts in the last dekad of June and ends in mid-July. Some middle and better-off farmers mainly allocate land intended for *Hagaa* sesame cultivation; others plant sesame after harvesting maize, while others plant sesame on farms with maize that is nearing harvest. The low preference to plant sesame in *Deyr* as opposed to *Hagaa* is due to unfavorable weather conditions and the prevalence of sesame web worms.

In the *Deyr* season, planting starts in the last dekad of November. Sesame is the main cash crop predominantly cultivated in the region, which is mostly planted during the *Deyr* season and yields better because it is less vulnerable to insect attacks and diseases. The importance of this crop has increased in the last 10 years, due to high export demand. Apart from small amounts of oil pressing for household consumption and seeds, the rest of the harvested sesame is sold. Other cash crops whose export demand has increased recently include lemons, which are mainly cultivated by some upper middle and better-off wealth groups.

Mono-cropping is common among the poor, due to their small farm size, and insufficient stocks at the household level. Maize is the main crop, which is cultivated during the two seasons by households living in the poor riverine areas. It is usually irrigated once in *Gu* and at least twice in the *Deyr* season. Production depends on the amount of rainfall in the season, on the length of the dry spells and the timing of the sowing dates (late sowing normally requires more irrigation). Irrigation, in addition to rainfall, can influence crop development and yield/unit area. The average yields vary quite significantly by districts (Table 7). Higher yields are realized in Kurtunwatery and Sablaale districts, most probably because of relatively recent resumption of agricultural activities in the two districts and because of the high fertility in the flood plains (caused by the alluvial silt deposited during periodic episodes of flooding).

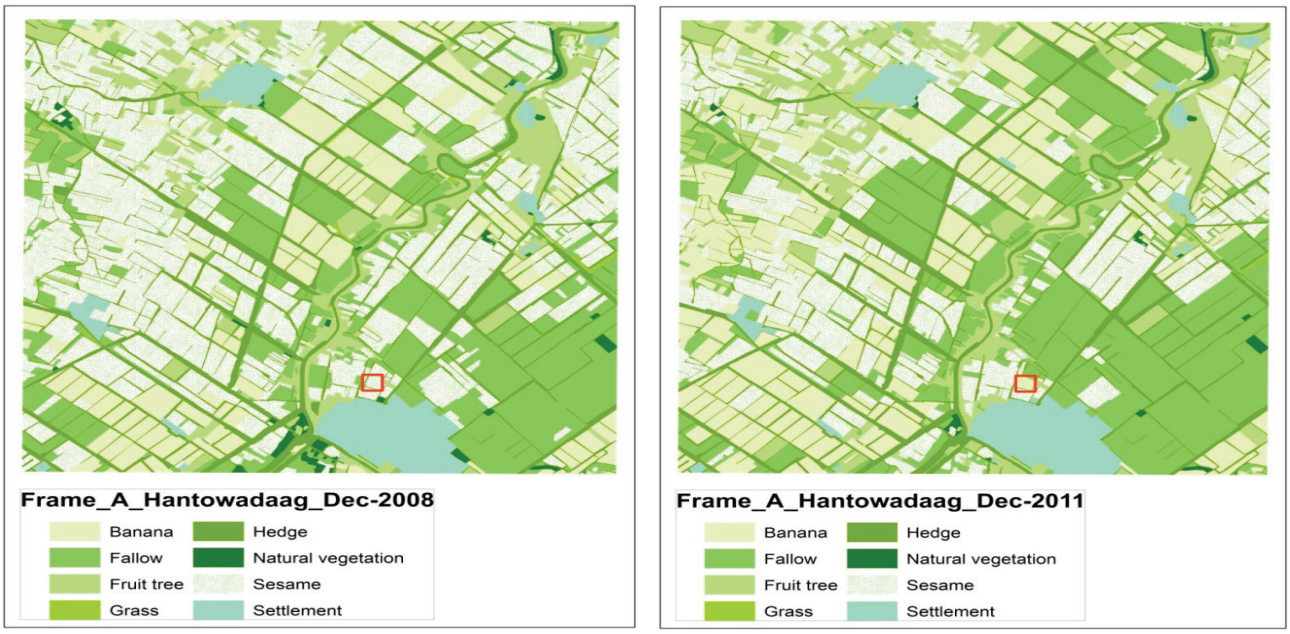
Table 7: Average yield of maize and sesame in Lower Shabelle Riverine (MT/Ha)

	Maize		Sesame	
	Gu/Hagaa	Deyr	Gu/Hagaa	Deyr
Afgooye	1.23	0.97	0.38	0.42
Kurtunwaarey	1.48	1.12	0.46	0.92
Marka	1.30	0.99	0.41	0.63
Qoryoley	1.20	0.96	0.23	0.40
Sablaale	1.80	1.0	0.47	0.83
Average	1.34	1.0	0.39	0.60

3.5 Recent land use trends

TRemote sensing information for the Janaale area in Marka district was available for three dates: January 2008 (SWALIM aerial photographs), May 2011 and December 2011. For the Sagaarole area in the same district, on the other hand, only two dates were available: January 2008 and December 2011. In addition to the observation of typical field sizes and percentages of cultivated and irrigated land, this also allowed for some analysis of changes in production patterns. Aggregated statistics for the different land use classes are shown below. During the analysis it became increasingly evident that in the early stages of crop development (the images are taken early in the season) the distinction between maize and sorghum is very difficult, compared to bananas, tree plantations and fallow land, which is easily distinguished. For this reason, maize and sesame are classified in one land use class in figures 5-10.

Figure 5. LULC analysis for a selected area (Hantowadaag) in Lower Shabelle riverine zone



The land use change analysis in figures 5 and 10 suggest that fallow land remained nearly constant over the last three years in both areas, as did the settlement area (as would be expected). The Janaale area is the most intensive banana and tree plantation area in Lower Shabelle and at least four major banana plantations can be clearly distinguished in the 2500ha frame close to Janaale. In this frame it is interesting to observe that both banana and tree plantations have increased over the last three years by 42 and 20 percent, respectively, which can be linked mainly to extensive canal rehabilitation work implemented by FAO and financed by the EU over the last years. This is consistent with similar results of a canal rehabilitation study recently carried out by SWALIM, where banana plantations increased by 35 percent in two years in a vast area south/west of Janaale. In Janaale this increase in plantation area saw a parallel decrease of sesame and cereals. Case examples of particular areas where significant changes in land use have happened are shown in Figures 8-10.

Figure 6: Land uses in Janaale area

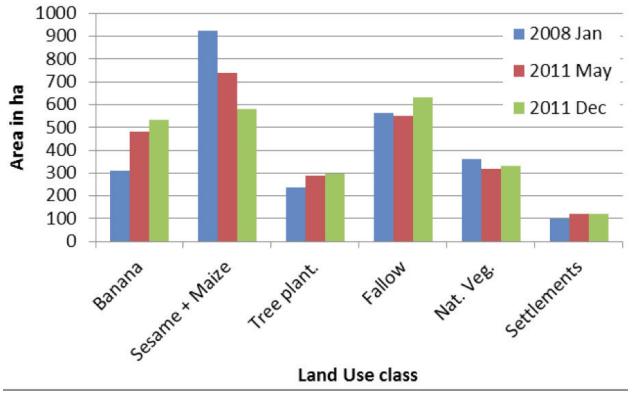


Figure7: Land uses in Sagaroole area

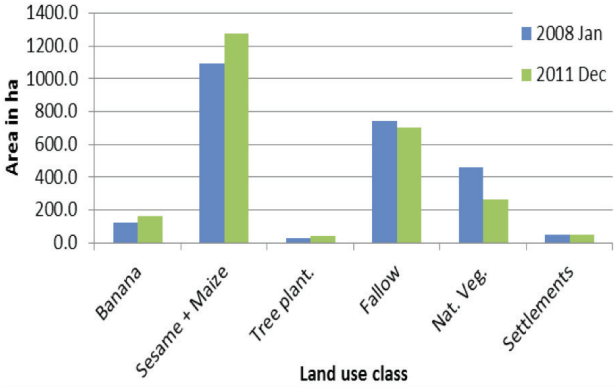
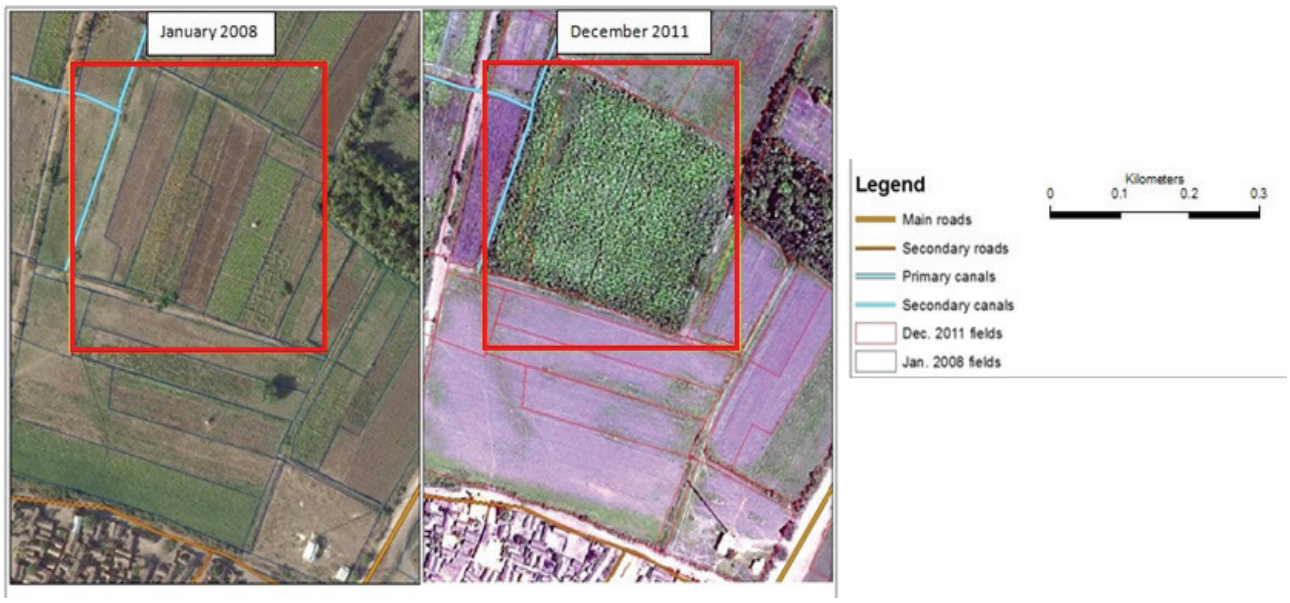
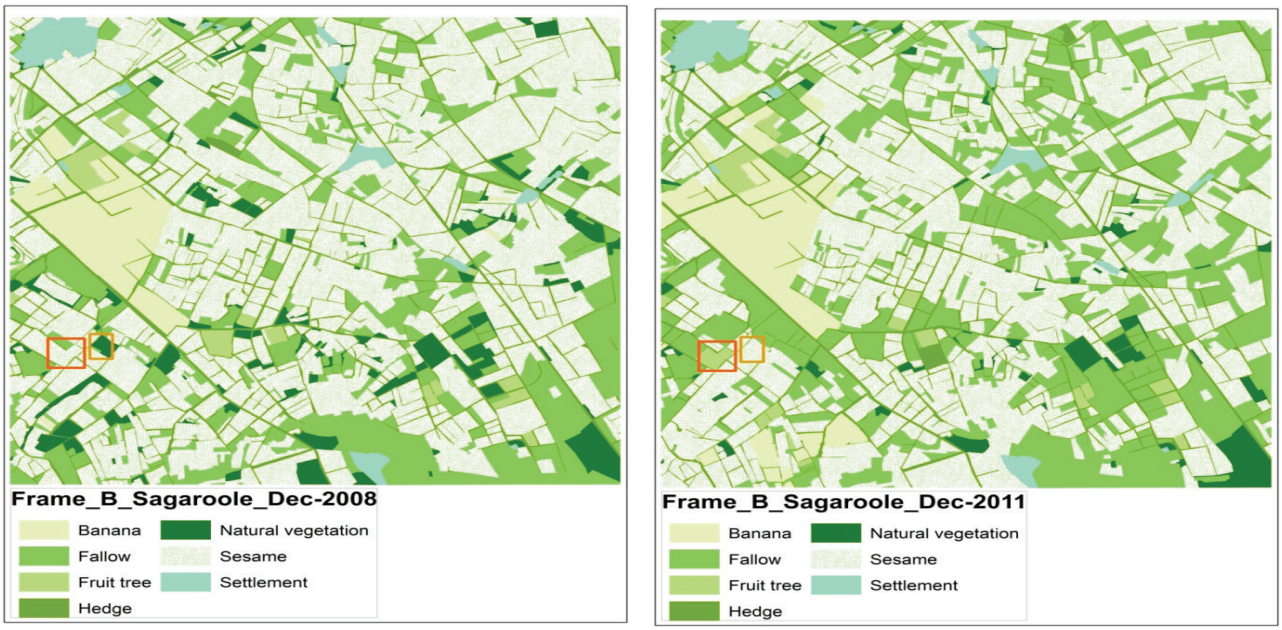


Figure 8. A subset of the maps in Figure 5 in January 2008 and in December 2011 (Geo Eye image SWALIM aerial photos).



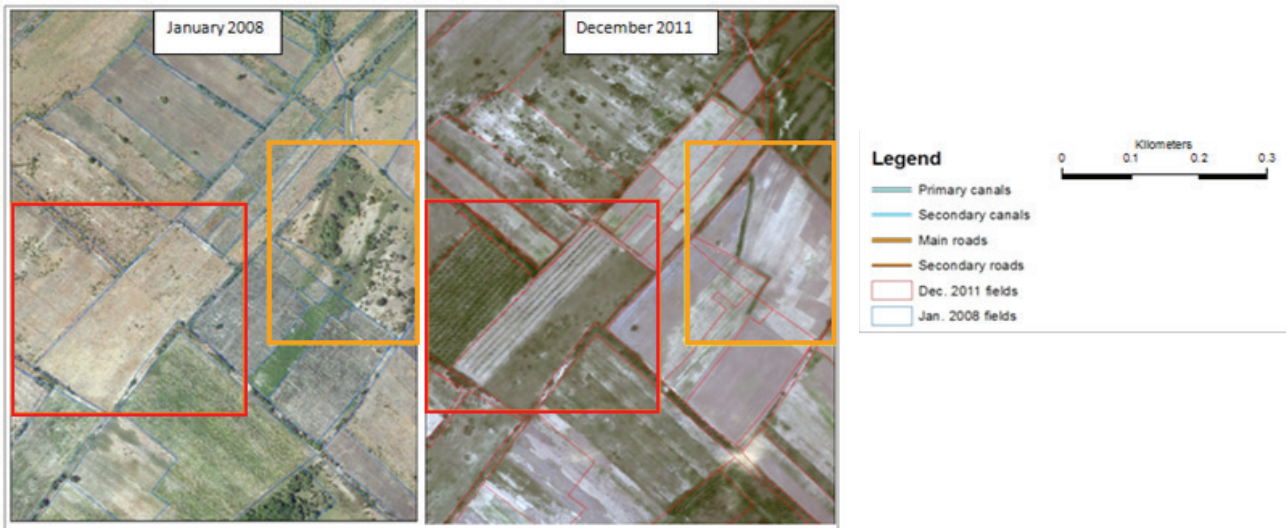
The central area evidenced by the red square shows how a number of small sesame fields (2008) have been merged into one large banana plantation (2011). Also visible, the secondary canal bringing water from Shabelle river to the plantation.

Figure 9. LULC analysis for selected areas (Sagaarole) in Lower Shabelle riverine zone



The field on the right evidenced by the yellow rectangle shows how a fallow area in 2008 has been cleared and prepared for cultivation (2011). The red rectangle shows two fields, which were cultivated with sesame in 2008 and have been planted with fruit trees in 2011. In the Sagaarole area, which is further away from the river than the Janaale area and which has only one banana plantation, banana and tree crop areas have remained constant, while the three-year period shows a 15 percent increase of sesame plus cereals mainly at the expense of natural vegetation. This can be attributed to both canal rehabilitation and to the increasing demand for sesame. Natural vegetation in this case refers to mainly agricultural areas, which had been cleared or cultivated longer than two years back in time and successively abandoned.

Figure 10. A subset of the maps in Figure 9 south west of Sagaarole village in January 2008 (SWALIM aerial photos) and in December 2011 (GeoEye image)



3.6 Use of agricultural inputs and farming practices

It is important to look at how households in different wealth groups access agricultural inputs, especially seeds, fertilizer and tractors. Table 9 below shows that most middle and better-off households obtain seeds from their own harvest. These households also purchase fertilizer from the market and use it mainly for non-cereal crop production (banana, lemon, onion, etc). The vast majority of the poor (about 80%) depends on seed purchases.

The survey findings indicate that 36 percent of the poor households benefited from 'gift' fertilizer, most of which was distributed through relief interventions (by FAO) in 2009 and 2010, targeting the poor and middle wealth groups. Such households often do not use this fertilizer on their farms, but sell it to the better-off households. This is supported by the argument that subsistence farmers in Lower Shabelle did not use fertilizers even before the civil war in 1991 and thus have limited knowledge of fertilizer application.

Table 8. Sources of agricultural inputs used for cultivation by wealth group

Agricultural input	Source	Proportion of households (%)		
		Poor	Middle	Better-off
Seed	Own resources	18	91	100
	Purchases	82	9	0
Fertilizer	Gift	36	24	24
	Purchases	0	30	73

Most farmers hire tractors to cultivate their land in both seasons, except for the poor households who normally only use tractors in the *Gu* season, as the high fuel prices make tractor hire unaffordable. Tractors are needed for ploughing in the riverine areas because the soil in the irrigated areas is composed of fine silt deposits, which when dry are highly compacted making it difficult to dig by hand or by oxen.

3.7 Trading and commercial activities

Trade in cereals peak in February-March after harvesting the maize planted in *Deyr*. It increases again in August-October after the harvest from the *Gu* season. The harvest periods increase the supply of cereal commodities in the markets, which pushes the prices downwards. Off-farm employment opportunities include collection and sale of bush products (firewood, charcoal, grasses), portage, hut thatching and mudding (usually by women), hand crafting, and petty trade. Most of these activities are available in January-March and in June-July when land preparation activities are low, in anticipation of the *Gu* and *Deyr* seasons. Labour migration to different areas, both within and outside the area increases in June-July. Animal movements in the riverine areas increase from December-March and in June-September when pasture and water availability decreases. Livestock movement reverts to the rangelands (terrestrial land) in April-May and October-November, coinciding with peaks of the *Gu* and *Deyr* seasons.

3.8 Cereal consumption and use of harvest

The poor households consume or sell their maize from the ripening stage (green consumption) up to the harvest. On average the poor households harvest about 900kg-1000kg of maize annually, of which 50-55 percent is sold, while the rest is retained for own consumption. Approximately 40-45 percent of the total harvest is sold immediately after harvest, while about 10 percent is sold gradually thereafter. Poor households have cereal stocks from own production to last for about 4-6 months a year. For the very poor households, the stocks are estimated to last for 3-4 months, due to their heavy reliance on maize consumption; a consequence of low incomes constraining access to other food through purchases.

Table 9: Use of harvest by the very poor and poor households (per every 900-1000Kg)

Use	Quantity kg
Household consumption	500- 600 kg [Or 3-4 months for Very Poor households and 5-6 months for Poor households]
Amount sold	400-500 kg

The fact that poor households are unable to produce sufficient food to cover their consumption needs contributes to their vulnerability to livelihood and food insecurity. This is even more serious in light of the fact that agriculture is the main livelihood activity for this social group. The major constraints faced by poor households include insufficient access to cultivable land, extensive green crop consumption (Yibil-Baroore) during the hunger period and low sales from the harvest (due to debt repayment). Factors which contribute to low production include frequent failures of rainfall (during planting and during different times of the agricultural production cycle - as was the case in *Gu* 2011) and fierce competition for irrigation facilities in the region which are in poor condition. Poor seasonal performance, in turn, leads to lack of agricultural wage labour opportunities, which decrease cash income to purchase food and increase the risks of hunger and malnutrition.

3.9 Main Income Sources

There are no differences between Very Poor and Poor households in terms of their main income sources. Agricultural labour is the most important source of income for most of the very poor and poor households in the riverine areas. Other income sources ranked in order of importance include selling of agricultural produce and self-employment, respectively (Table 10). The main agricultural activities which generate income especially for the poor and the very poor households include land preparation, seed sowing or planting, weeding, irrigation, *Gu*arding of crops, as well as harvesting, de- husking and threshing of dry harvest.

Comparatively more income per capita from agricultural labour is generated in the *Deyr* season than in the *Gu* cropping period. The total income earned from land preparation and irrigation in the *Deyr* season is estimated to be nearly twice as much as the income earned during the *Gu* season. This is because the *Deyr* season receives shorter rains, which require more frequent irrigation. Moreover, during the *Deyr* season maize and sesame are predominantly grown due to favourable conditions, but in the *Gu* season maize is the main crop planted. Other crops (water melon, lemon, sweet potatoes, onions, tomatoes, pumpkins, groundnuts) are also planted in the *Deyr* season. This leads to the intensification of cropped areas in the *Deyr* season, leading to increased agricultural wage labour opportunities.

Table 10: Main household sources of income, ranked in order of importance

Very Poor	Poor	Middle	Better-off
Agricultural labour Crop sales Self-employment Trade/Small business Gifts Loans	Agricultural labour Crop sales Self-employment Trade/Small business Gifts Loans	Crop sales Trade/Small business Self-employment Loans Agricultural labour	Crop sales Trade/Small business Self-employment Loans Remittances in cash.

Table 11 below indicates the number of days in both seasons and the average daily wages earned from agricultural wage labour. This is the main income source for the poor in the riverine areas, followed by own crop sales, and the collection and sale of bush products.

Table 11: Available and actual number of labour-days accessible to poor households in a year

Activities	Gu-Hagaa Season				Deyr Season			
	Labour-days		Daily rate (SoSh)	Total actual labour income	Labour-days		Daily rate (SoSh)	Total actual labour income
	Available	Actual			Available	Actual		
Land preparation	14	8	65,000	520,000	25	15	93,000	1,395,000
Sowing	15	10	63,000	630,000	20	12	75,000	900,000
1st Weeding	22	15	90,000	1,350,000	30	20	93,000	1,860,000
2nd Weeding	15	11	63,000	693,000	21	12	55,000	660,000
3rd Weeding	8	6	33,000	198,000	11	7	35,000	245,000
Irrigation	8	6	67,000	402,000	23	13	75,000	975,000
Guarding	20	9	30,000	270,000	15	15	30,000	450,000
Harvesting	23	16	77,000	1,232,000	27	16	85,000	1,360,000
Husking/threshing	23	16	67,000	1,072,000	26	15	60,000	900,000
Total	148	97		6,367,000	198	125		8,745,000

Note: The number of actual labour days indicated in the table is about 60% of the total number of days available agricultural labour activities in the Lower Shabelle riverine area.

CHAPTER FOUR. FAMINE IN LOWER SHABELLE RIVERINE

In mid-2011 the food security situation in Somalia deteriorated to such levels that the UN declared a Famine on 20th July 2011. Despite its high potential for agricultural production, Lower Shabelle was among the first regions in Somalia where famine was declared.[10] A joint FSNAU/FEWSNET study on the 2011 famine death toll highlighted that 'particularly high death tolls were noted for Lower Shabelle region and IDPs. While this is not captured explicitly by our estimation, a large number of displaced people left the worst-affected regions on foot, seeking labour and assistance in Mogadishu. Some of these stopped while on the way in Lower Shabelle, so as to seek farm labour. These IDPs might have been particularly vulnerable'[11]. This chapter discusses the causes and consequences of the famine, including the normal coping and distress coping strategies employed.

4.1. Causes of the Famine

According to Sen's 'Entitlement Approach' to famine analysis, famines follow from failures in four types of entitlements to food including: production-based; trade-based; labour-based and transfer-based entitlements. This is a useful framework for analysing the famine in the riverine areas of Lower Shabelle, which followed from a reduced harvest (production shock), import bottlenecks (trade constraints), poverty, limited off-farm employment opportunities (labour constraints), lack of or limited humanitarian access (transfer failures).

4.1.1. Agricultural production (2010-2011)

Agricultural production can be analyzed both by investigating production trends (historical perspective) and looking at factors which affected production just before the crisis happened (trigger factors). There were some changes in the cropping pattern in Lower Shabelle (based on the examples of analysed satellite imagery of Janale and Sagaarole) over the last three years as shown in Chapter 3.5. Specifically, area occupied by banana and tree plantation increased in Janaale Village, while sesame and cereal planted area has decreased. Conversely, in Sagaarole, area planted under sesame and cereals increased (15%), while banana and tree plantations remained constant.Additionally,in the period preceding 2011 famine, the region received poor crop production for two consecutive seasons (*Deyr* 2010 and *Gu* 2011) as a result of overall poor rainfall performance. FSNAU and partners crop assessments and analysis for *Deyr* 2010 and *Gu* 2011 have boths revealed poor crops production. for example In *Deyr* 2010/11 the cereals productions in Lower shabelle was 23 percent of PWA (Averages of all *Deyr* season crops 1995-2009 which was estimated at 7700 MT of maize and 38 percent of 5 years average), While in *Gu* 2011 cereals production was estimated at 23,130 MT (18,330 Maize and 4800 Sorghum)and constituted

[10] The Global Acute Malnutrition (GAM) was 28.7 in the riverine and 38.7 in the agro-pastoral areas and the Crude Death Rate (CDR) was 6.12 in the riverine and 4.29 in the agro-pastoral areas (FSNAU and FEWSNET, 2011. "Famine in Southern Somalia: Evidence for a Declaration". Nairobi, 20th July 2011). According to the Integrated Phase Classification (IPC) for Famine to be declared there must be evidence of three triangulating conditions in a given area: (1) at least 20% of households face extreme food shortages with limited ability to cope; (2) Global Acute Malnutrition prevalence must exceed 30%; and (3) Crude death rates must exceed 2/10,000/day. These figures together with the high proportion of households not having access to food and/or other basic needs provided sufficient evidence of famine conditions in this part of Somalia.

[11] Mortality among populations of southern and central Somalia affected by severe food insecurity and famine during 2010-2012, FAO/FSNAU and FEWS NET, May 2013 (page 53).

Figure 11: Trends in *Deyr* Cereal Production (1995-2012)

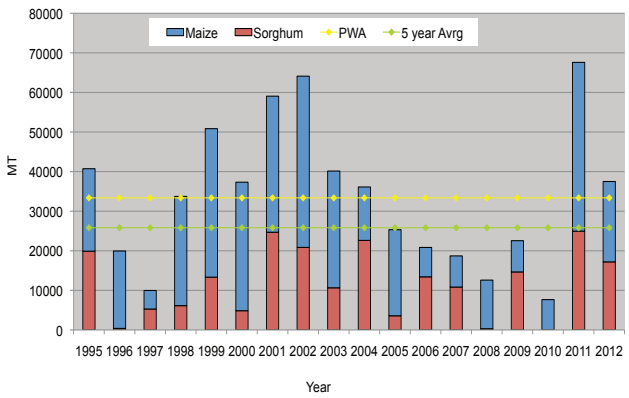
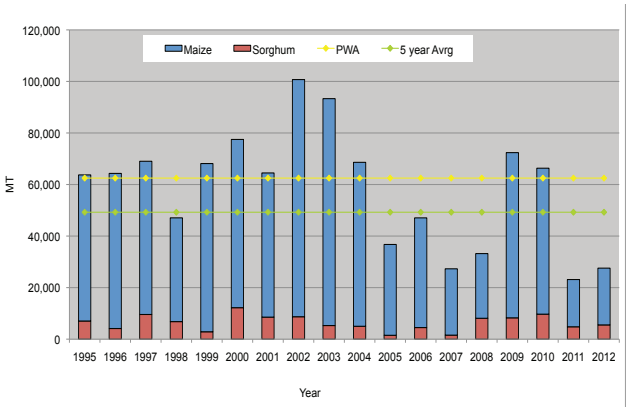


Figure 12: Trends in *Gu* Cereal Production (1995-2012)



The two successive seasonal cereal production (Deyr 2010 and Gu'2011) were the lowest production records ever noted since 1995-2009 and 1995-2010 of the Deyr and Gu'post war averages respectively. Source : FSNAU and partners seasonal assessments

to 37 percent of PWA (Averages of all the *Gu* seasons crop since 1995-2010) and 35 percent of 5 years averages. The poor seasonal crop production in the two reference periods was mainly due to poor rainfall performance that resulted In long dry spells, Increased incidences of crop pest (aphids and stem borers) based on field observations and lack of water for irrigation due to delayed river crest, which drastically hampered gravity irrigation as can be deduced from the below related evidences; To highlight further the level of poor crops production in lower shabelle,the study have taken time to analyse deeply climatically or rainfall related aspects that contributed heavily to low level of production in Lower shabelle riverine.

Seasonal rainfall performance (Deyr 2010 and Gu 2011) and river levels

Rainfall estimates (RFE) and vegetation (CNDVI) indices[12] standardized from long term means (1999-2011) clearly show the two failed seasons (*Deyr* 2010 and *Gu* 2011). The delay of the *Gu* 2011 planting is evident also on the May 2011 very high resolution image for the Janaale area (Figure 13). By 26th of May many fields had still not been planted or were in a very early vegetative stage, while according to the crop calendar at the end of May, maize plants should be in an advance vegetative stage. Importantly the delay of the *Gu* 2011 rains by about one and half months led to a drop in the river levels. River level measurements obtained from SWALIM (Figure 15) show that the river levels at Jowhar gauging station in *Gu* 2011 dropped continuously to below long term mean levels from the first dekad of March 2011 to May 2011 (land preparation and planting stage). This inhibited any attempts for supplemental irrigation and deteriorated pasture for livestock production. Low river levels particularly affected irrigation farming since it coincided with the time when supplemental irrigation was needed at the crop vegetative stage (May). Consequently, for crops that had already been sown in *Gu* 2011 prolonged dry spells resulted in the loss of soil moisture and subsequently crop failure

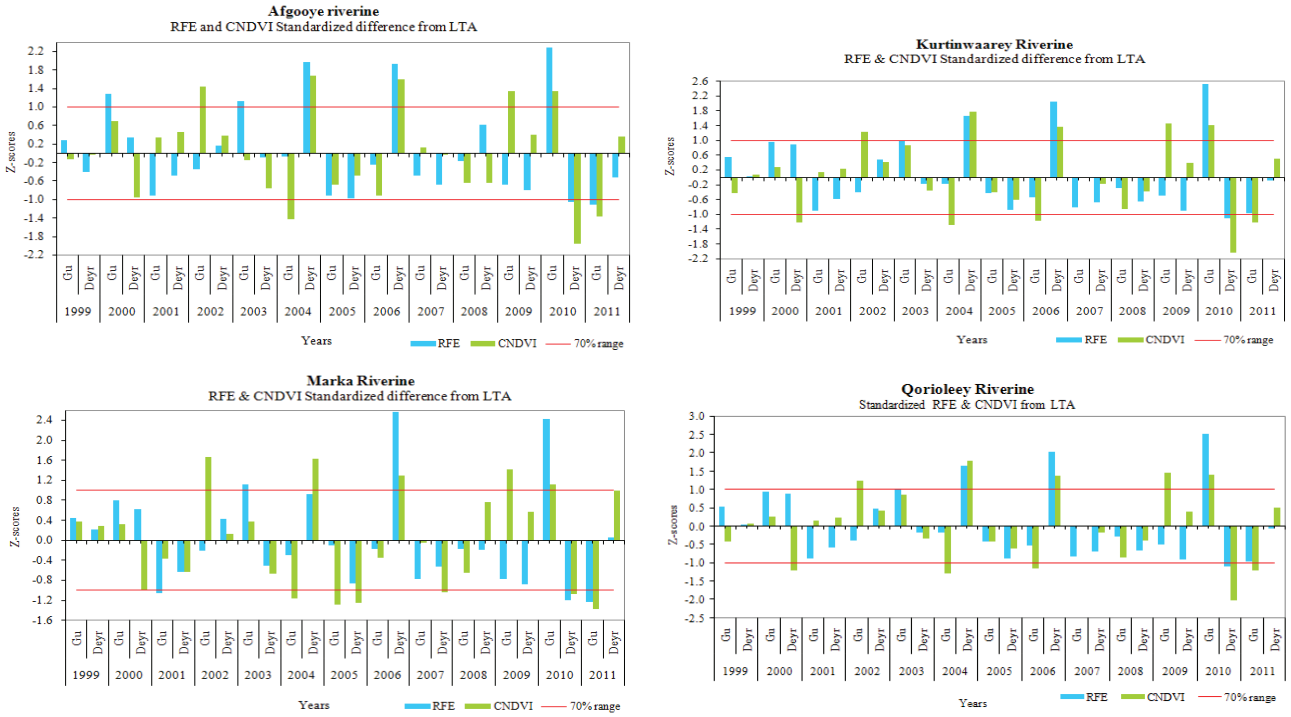
Figure 13. Janale Imagery May 2011

Reduction in per capita cropped area

The prolonged dry spells in the critical stages of the crop cycle made it impossible for farmers to plant crops in the arable lands and as a consequence, the cropped area was significantly reduced. Other compounding factors such as lack of seeds and ineffective irrigation infrastructure only exacerbated an already precarious situation. In addition, the poor performance of the *Deyr* 2010 and *Gu* 2011 rains, which reduced water availability for irrigation, rendered the irrigation farming ineffective. As such, most downstream farms located far away from the primary canals were not planted.

[12]Rainfall Estimates and NDVI data are derived from NOAA/CPC and DEVCOCAST (www.devcocast.eu) respectively, while the rain gauge data is collected by FAO-SWALIM and FEWSNET. Z-score graphs produced with the support of JRC-MARS.

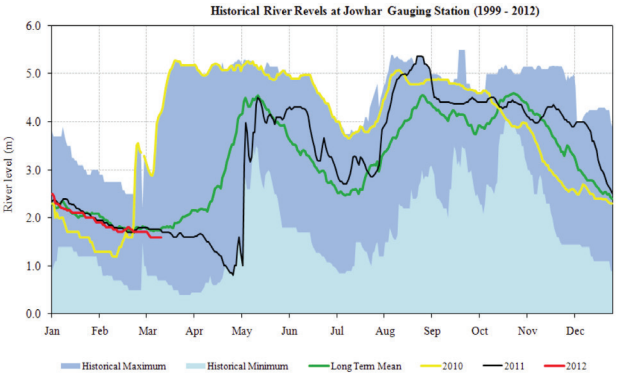
Figure 14: FRE and CNDVI standardized difference from LTA in four riverine districts



Ineffective irrigation infrastructure

Most of the irrigation canals have not been de-silted, are choked with vegetation and only function effectively when river levels are near or slightly above flood risk levels. Despite the efforts by FAO and other NGOs rehabilitated the canals, the facilities have been ineffective since river crests were low during *Gu* 2011 and thus rehabilitation could not aid irrigation agriculture. Breaching of riverbanks by farmers to access water for irrigation is a major consequence of the non-functioning canal system. This results in uncontrolled flooding and wastage. Shortages of water in most cases increase competition and trigger water resource conflicts. This is seen especially where farmers in the upstream areas closed the barrages and blocked water flow to the downstream areas. This deprives farmers further downstream of water for irrigation and renders irrigation facilities inaccessible.

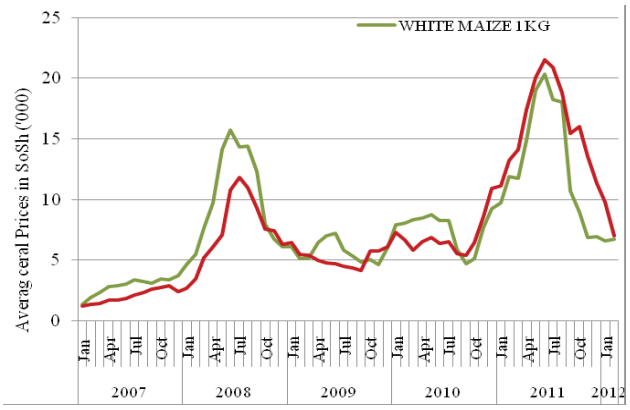
Figure 15. River levels at Jowhar gauging station (derived from SWALIM)



4.1.2. Trade constraints

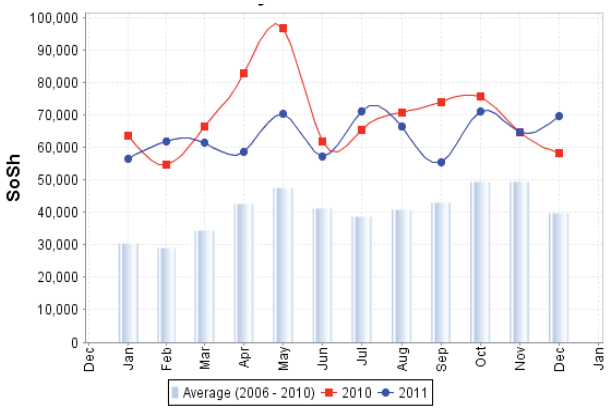
The FSNAU Market Data Update for April 2011 indicated that maize prices were 73 percent higher than in April 2010. Instability in wage rates and rising cereal prices n April 2011 reduced the terms of trade by about half of its levels in the previous year. This negatively impacted on food access during this period thereby aggravating the food access and nutrition situation. The quarterly brief of the outcome of Jilaal dry season (Jan–Mar 2011) showed an upward trend in food prices. As cereal stocks and locally produced cereal supplies continued declining, local cereal prices increased by 40-45 percent in the first quarter of 2011.

Figure 16: Trend in cereal prices (SLIMS)



High food prices negatively effect purchasing power in urban and rural markets throughout southern and central Somalia due to: reduced stock availability following the *Deyr* 2010 and *Gu* 2011 crop failure; increased demand for local cereals from urban areas; neighboring regions and refugee camps resulting in the steep price of imported cereals (wheat flour, pasta), and lack of food assistance due to limited access by humanitarian agencies. The shortage of supply is reflected in the significantly elevated local cereal prices throughout South, Central and Northeast. Terms of trade (ToT) between labour and cereal declined in the riverine areas. In March 2011, 5kg of maize could be acquired per daily labour wage in Lower Shabelle (6kg in Dec. '10). In May-June 2011, opportunities for agricultural labour wage rates remained 20 percent lower than the same time in 2010.

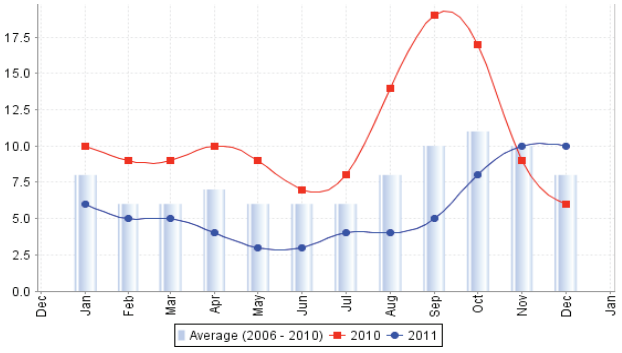
Figure 17: Daily labour wage rates in Lower Shabelle



4.1.3. Labour constraints

Agricultural labour in Lower Shabelle riverine is an important source of food and income. In the period preceding the crisis, poor rainfall performance reduced agricultural production activities and increased competition for the limited agricultural labour opportunities, thus agricultural wage labour opportunities declined significantly. In areas where crops were planted early, the effect of the very late onset of rainfall, delayed river crest and increased outbreaks of crop pests/diseases and led to crop failure or losses. Households with standing crops opted to sell the crop as fodder. This was due to at least two factors: the high demand for livestock feed (which Guaranteed good returns) and the fear of completely losing all crops. Even though some households obtained cash income, this could only purchase a very limited amount of food because of the unprecedented increase in food prices. Households that experienced complete crop losses moved to areas where humanitarian intervention was accessible. As a result, since April 2011 households engaged in distress migration to Mogadishu and to other parts of Lower Shabelle (such as Fiid Dheer, etc) to access relief.

Figure 18: Terms of trade (Labour/white maize) in Lower Shabelle



In addition, in-migrating pastoralists from other parts of Lower and Middle Shabelle increased demand for both existing stocks and standing fodder crops. This exacerbated the food deficit. For agro-pastoral households the lack of rainfall, limited forage resources, outbreak of livestock diseases (Trypanosomiasis) and lack of veterinary services increased livestock deaths. This was in addition to losing crops due to drought, which diminished the critical role livestock plays in cushioning households in times of extreme shock. This predisposed pure agricultural and agro-pastoral households to livelihood and food insecurity.

4.1.4. Transfer failures: limited access and insecurity

hronic insecurity that has persisted in Lower Shabelle for a long time, restricted and continues to restrict humanitarian access. Provision of relief food was banned by the authorities in Lower Shabelle, with non-food relief activities also minimized significantly. Sporadic confrontations and political tensions among religious groups in Mogadishu have direct and indirect impacts on interventions related to food security and nutrition. Banned food aid rations distributed in Mogadishu and other regions as well as blockage of important transport routes that traverse conflict zones affected the flow of essential food and non-food items from the main towns to the rural villages. In addition, high taxation by the authorities in the rural areas led many households to migrate to less controlled areas that were presumed to be "safe". The suspension of key activities by insurgents further restricted humanitarian activities, which negatively affected access to food and basic services.

4.2. Consequences of the famine

4.2.1. Nutrition situation

The integrated nutrition situation analysis in August 2011 classified the nutrition situation in the Lower Shabelle riverine as Very Critical. A comprehensive nutrition assessment conducted among the Riverine population in July 2011 indicated a GAM rate of 28.7 percent and a very high SAM rate of 14.2 percent. This was a deterioration compared to a likely Critical nutrition situation in the *Deyr* 2010/11 when a Rapid MUAC assessment conducted in December 2010 identified >10 percent of the assessed children as acutely malnourished with MUAC<12.5 cm. Similarly, data from health facilities in the riverine zone of Lower Shabele for the period between January-July 2011 indicated a high (>20 percent) and increasing trend of acutely malnourished indicating a Very Critical nutrition situation. Mortality survey among the Lower Shabele riverine population reported high Crude death rate of 5.93 and Under five death rate of 18.64 both of which are above the emergency threshold of 2/10,000/day according to UNICEF classification. Since the tools used didn't differentiated between the IDPs from other regions (Bay/Bakool and Middle Shabelle) and host communities of Lower Shabelle, there is a strong a assumption that, a large proportion of the people who died in Lower Shebelle are people who migrated into the area in the lead up to the famine declaration. They came here in search of employment opportunities, to access humanitarian assistance etc. Therefore, while Lower Shebelle was also impacted by the severe drought in 2010/11, it is doubtful whether the situation will have deteriorated to famine level without the large influx of already weakened and vulnerable from other regions. Other factors that contributed to the deterioration in nutrition situation which included outbreak of diseases such as diarrhea and measles, poor dietary diversity due to reduced access cereals and milk. Further aggravating factors included chronic problem of poor child feeding and health care practices and limited access to health facilities.

4.2.2. Population influx and cereal stock depletion

As discussed earlier, from *Deyr* 2010 lack of *Gu*-Hagaa rains in most parts of southern Somalia coupled with successive poor rainfall performances in the previous seasons triggered huge migration of pastoralists from Middle Shabelle, Bay, Bakool and Hiran regions into Lower Shabelle riverine area. Overgrazing depleted the limited riverine pasture and water resources, while the demand for food stocks increased. Considering that the previous *Deyr* 2010 season was associated with poor cereal production, demand for available cereal stocks for both human and livestock consumption quickly depleted the available stocks. As a consequence, cereal prices increased in tandem with increased demand for cereals from other regions that were experiencing a drought. This increased cereal outflow from Lower Shabelle riverine, causing a huge cereal deficit.

In addition, poor *Gu* rains reduced availability of agricultural wage labour opportunities (Figure 18), which reduced incomes and the purchasing power of the local population. In April 2011, daily wage declined by 31 percent (from 82,916 SoSh - 57,500 SoSh) compared to same month of the preceding year (Figure 17). Thus labour/maize ToT also decreased by 60 percent (from 10Kg/wage rate - 4Kg/wage rate) and 43 percent (from 7Kg/wagre rate - 4Kg/wage rate) when compared to same time and the 5-year average (2006-2010) respectively. To cope with this, most households either migrated to IDP camps (table 13) or reduced the number and portion of meals consumed in a day. Although estimates for the riverine zone are not available, the United Nations High Commission for Refugees (UNHCR) estimates of Lower Shabelle's monthly population movements increased dramatically. In July 2011, the number of people entering the region from neighboring areas (Bay, Bakool etc) was 83 percent higher (from 5,370 to 9,880 people) than the same month of the preceding year (2010), while the number of displaced people from Lower Shabelle to Mogadishu also drastically increased from 320 in July 2010 to 22,780 people (when the famine was declared). Most areas that were usually cropped were rented to herders for fodder and wilting crops along the riverine areas were sold as fodder. This resulted in acute food crisis in Lower Shabelle riverine zone.

Table 12: Out-migration from Lower Shabelle districts

District	May	June	July	August	September	October
Afgooye	1800	1000	3700	3400	2500	33000
Kurtunwaarey	130	570	5900	550	370	20
Marka	850	620	3100	670	2700	5800
Sablaale	NA	90	580	640	90	NA
Qoryoley	NA	520	6800	2000	240	10

4.3. Coping Strategies

4.3.1. Normal coping strategies

In a normal hunger situation where own crop production fails due to a combination of either drought, crop diseases or pests, most households in the villages surveyed employ the following coping strategies in order of importance:

- Seeking agricultural labour opportunities by engaging in activities such as digging/rehabilitating irrigation canals, land preparation, planting, weeding, irrigating and Guarding standing crops, harvesting and de-husking.
- Engaging in off-farm employment activities such as collection and selling of bush products (construction poles/sticks, firewood) and burning and sale of charcoal.
- Labour migration to the main towns as house help or other areas along the coast where fishing is available.
- Engaging in self-employment activities such as portering, petty trade and handicraft (such as making baskets and mats).
- Seeking social support such as gifts and loans or seeking kinship support through local remittance.
- Increased consumption of wild foods.
- Consumption of cereal stocks.
- Seeking loans.
- Increased livestock and crop sales, without damaging sustainable level.
- Reducing the portions and number of meals taken in a day.

4.3.2. Distress coping strategies

Since the onset of the crisis, households in Lower Shabelle adopted distress-coping mechanisms which included:

- Distress sale of productive assets. This involved selling their own land, farm mortgaging (rahan) or unsustainable sale of livestock. This resulted in displacement of families who migrated to IDP camps or main urban areas in Marka, Qoryoley and Mogadishu. The male heads of the household stayed behind to take care of standing crop till harvest
- Intense collection and sale of bush products
- Portering in the main towns (migration) and seeking construction employment
- Distress seeking social support from relatives and kinship
- Increased seeking of loans and credit
- Reduction in the number and meal portions consumed in a day. In situations of distress, young children are normally prioritized for any meals available. The adult or older members of the family then rely on one meal in a day or having some days without meals
- Intensification of charcoal burning and sale in the main towns
- High preference for cheap food items
- Increased seeking of food aid, other forms of humanitarian assistance and even begging

CASE STUDY INTERVIEW WITH FAAMAY SHOOBAY IN AN IDP CAMP IN MOGADISHU

Faamay Shoobay, Aliyow Maamow Isaka (her husband) and their 6 children migrated to the IDP camp from Gayorow village, Qoryoleyy district in Lower Shabelle region. Prior to the crisis the family cultivated about 2 darabs (0.66ha) of farmland inherited from their father. On the land they planted maize in two cropping cycles (*Gu* and *Deyr* seasons). The maize was intercropped with cowpeas, sweet potatoes, pumpkin and tomatoes. Most years the harvested food would not last till the next harvest due to their small farm-holding and increased green maize consumption after the periodic lean period (Yibil baroor). During the year the family seek agricultural labour to earn income which they use to buy food items from the market. As the head of the canal (Yarsin) Faamay's husband was responsible for managing and distributing irrigation water to farmers. As a result of the failed *Gu* rains, which was preceded by poor production in the *Deyr* season, and the delay in the river crest, most farmers in the riverine and agro-pastoral areas of Lower Shabelle experienced wide spread crop failure. Faama's family was not spared despite irrigating their crops in the later stage of the season.

To compound the problem Faamay states that there was an influx of displaced persons from Bay and Bakool regions as well as agro-pastoralists from drought-stricken parts of Lower Shabelle. This was in addition to the herders who had migrated from Middle Shabelle region in the *Deyr* season. The high human populations reduced availability of agricultural wage labour opportunities, daily wage rates and incomes due to increased competition for limited opportunities. Since available stocks from the previous *Gu* 2010 season had been depleted, maize prices increased to highest levels in the local markets. This was due to high stock demand for human and livestock use and high prices in neighboring deficit regions causing cereal out-flow.

While cattle herders from Middle Shabelle spent more money to purchase crops as fodder for livestock, Aliyow Maamow sold 1 darab of the maize crop at vegetative stage. With the worsening situation and no cash, Aliyow's family was displaced to Badbaado Camp in Mogadishu on 20th July 2011. Her husband remained to guard the remaining crop (tussling stage). Faamay's arrival in Badbaado camp coincided with the start of the short Hagaa rains. In the IDP camps basic services were not available and two of her youngest children contacted measles and diarrhea.

Since there were only mobile clinics which reached the camp three days after the incidence, her youngest daughter died due to lack of medical assistance. One month relief arrived amidst the frequent militia attacks. Aliyow requested that their elder son go to assist in harvesting the crop and preparing the land for the *Deyr* rains. Inspite of the cash for work activities launched by FAO in Lower Shabelle Riverine, Faamay said that she was not going back till the *Deyr* crop was fully established. This was because the sales from the previous harvest were used to meet tractor ploughing costs. The main chronic hazards that affected subsistence production in Lower Shabelle riverine zone include erratic and unreliable rainfall, drop in river levels, political instability, civil insecurity, lack of agricultural inputs (fertilizers and quality seeds for food crops), land disputes, high food prices, ineffective irrigation infrastructure, high population movements and disease outbreaks. Other shocks that affect crop production and have been persistent in Lower Shabelle riverine (mainly maize and sesame) include food crop pests, insect infestations and crop disease attacks.

CHAPTER FIVE. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary and Conclusion

The findings of the study show that despite the recognition of Lower Shabelle riverine area as the cereal basket of Somalia, mismanagement and disputes over irrigation infrastructure, persistent droughts, declining river levels and increased river siltation continue to hamper agricultural production. Moreover, generational shifts in institutional and socio-political arrangements on land tenure continue to constrain agricultural production in Lower Shabelle riverine area. Lower Shabelle riverine area is characterized by two overlapping livelihood systems: pure riverine (crop dependent) areas and the riverine (livestock dependent). Two cropping cycles (*Gu-Hagaa* and *Deyr* seasons) drive agricultural production of maize and sesame. As such agricultural labour (60% of the available labour days) provides the main source of income for poor households followed by own crop sales, collection and sale of bush products. The maize harvest in two seasons sustains poor households for about 5-6 months.

Access to formal education and health facilities is limited. Most of the health services are run by NGOs, with MCH programs and health posts being less common hence major factors that contributed to the very critical level of malnutrition. About two-thirds of the land in the riverine areas is cultivated, with 90 percent of this under irrigation. About 85 percent of the irrigated land is under gravity-fed systems and the remaining 15 percent is pump irrigated (particularly in Afgooye district). In addition, supporting findings from the satellite imagery analyzed in this report have shown a decrease of cultivated area with maize and sesame. Hence, River level and rainfall performance are the key factors that determine lower shabelle riverine production system. Main evidence is a complete crop failure and severe effects of income from the agriculture works, which would play a vital role in accessing food and non food essentials - leading to high proportion of riverine households not having access to food and other non food essentials ; increased mal-nutrition and mortality rates of displaced and host community.

Mid-2011, the food security situation in Lower Shabelle deteriorated and famine was declared. The main causes included poor rainfall and low river levels, reduction in per capita cropped area, reduced harvest (production shock), ineffective irrigation infrastructure, import bottlenecks (trade constraints), poverty, limited off-farm employment opportunities (labour constraints), transfer failures (limited humanitarian access and insecurity), trade constraints and an influx of a substantial/significant number of an already weakened and vulnerable population from neighboring regions in search of food, employment opportunities and to access humanitarian assistance. In response, most households resorted to distress coping strategies such as sale of productive assets, intense collection and sale of bush products, portering in the main towns (migration) and seeking construction employment, distressed seeking of social support from relatives , increased seeking of loans and credit, reduction in the number and meal portions consumed in a day, intensification of charcoal burning and sale, high preference for cheap food items and increased seeking of food aid, other forms of humanitarian assistance and even begging.

5.2 Recommendations

From the consultations with key informants and resources persons, the opportunities suggested for improving agricultural production and development in Lower Shabelle riverine area are summerised below:

- Rehabilitation of irrigation infrastructure to cover more areas within the riverine area in order to reduce river and canal siltation and improve water availability for irrigation farming. This is a developmental priority for the government in partnership with humanitarian/development agencies as well as local non-governmental organizations.

- There is need to strengthen the capacity to monitor and detect early warnings in weather patterns and disseminate information to prepare farmers for appropriate response. Establishment of weather observation networks will enable the collection of real time climatic data, to be used alongside the RFEs, in providing early warning information in terms of weather patterns in a timely manner. This effort requires investment and thus the government of Somalia should work in partnership with development/humanitarian organizations and donors in mobilizing resources that will facilitate the capacity training and installation of station observation networks and climate communication equipment.

•Considering that agriculture in Lower Shabelle riverine area is highly dependent on rainfall conditions in the Shabelle river basin (particularly in the Ethiopian highlands), when river levels decline even functioning irrigation canals cannot *Gu*arantee good crop production. It was established from the study that dam construction projects implemented by the Ethiopian government in the upstream areas of river Shabelle could partly be contributing to the drop in river levels downstream. As a result, the government in Somalia could work with development agencies to initiate research activities that on one side optimize the efficiency of irrigation canals and on the other side explore opportunities for harnessing groundwater resources for use in agricultural production, especially during times of prolonged dry spells and drought. In the same token, there is need to promote investment programmes designed to improve river water management through the construction of micro-dams for harvesting and storing water from river Shabelle, which can be used for on-farm irrigation when there is drought.

•Agriculture-based intervention programmes should be designed by government in partnership with development agencies and implemented through local NGOs and farmers to enhance farm mechanization (ploughing) in order to increase agriculture production. Increased focus on more targeted productive investments and social protection programmes should aim at cushioning short-term livelihood shocks while at the same time offering long-term opportunities for poverty reduction. These programmes could also be linked with agribusiness projects that subsidize inputs costs to smallholder farmers who cannot afford to own modern agricultural machinery. Through such efforts, agriculture can be key towards raising agricultural productivity, improving rural incomes, enhancing food security and reducing unemployment and poverty.

•In Lower Shabelle riverine, knowledge on agricultural production exists but the institutional and human capacity to support knowledge transfer that can accelerate the adoption of new technologies for increased agricultural production is inadequate. In view of this, the government and humanitarian agencies should design programmes that promote and adopt technological innovations needed to boost productivity and adapt to emerging challenges (climate change) facing food production. This push for location-specific technological innovations should be amplified across the entire agricultural supply chain, from use of inputs and planting crop varieties that are tolerant to drought, diseases/pests and floods to reducing postharvest losses. This will contribute towards enhancing self-sufficiency (in terms of food security), building livelihood resilience and enhancing sustainability.

•There is a need to emphasize sustainable farming methods that increase productivity, reduce soil erosion and enhance environmental conservation. These could be implemented through agricultural extension services (agricultural information centers or farmers field schools), as this will contribute towards enhancing sustainable livelihoods.

•In order to increase agricultural diversification and expansion of agricultural labour opportunities, there is need to popularize the re-introduction of horticulture farming and extensification of plantation farming.

•The promotion of handicrafts and off farm income generating activities and petty trade are essential in order to improve income and food security of poor households.

•Roads, most of which are rendered impassable during times of heavy rain, need to be rehabilitated. This will improve transportation of farm produce to the markets, ease trade flow of goods and services, open up the rural farming areas for development and accessibility in case of humanitarian crisis. Improving transport infrastructure by constructing culverts and bridges will ensure the smooth flow of goods and services.

•Considering that access to health services is a serious problem, responsible government agencies in collaboration with health intervention organizations should combine efforts to improve access to and provision of healthcare, particularly in the rural areas.

•Expanding and improving access to education by providing and improving educational infrastructural facilities, raising the quality of teaching and learning for effective outcomes, and focusing investment on vocational and technical education.

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(Footnotes)

1 The stalk borer (Chilo partellus) damages crops, especially in the Deyr season, leading to crop losses and reduced production. Aphids and sesame web worms attack crops in June-July.

A. GENERAL HOUSEHOLD CHARACTERISTICS

Region:		District:		Village:	
Name of the Interviewer:					

1. What is the estimated population of the village? _____
2. What is proportion of HHs in the village are involved in these livelihood systems?

Livelihood system	Proportion of HHs
a. Riverine	
b. Agro-pastoral	

3. What is the average household size in the village: _____

4. Do all households usually reside in this village or have been displaced from other areas?
   a. All reside in this village: _____
   b. Some were displaced from other regions (***specify regions***) _____
   _____**(GO TO 23)**

5. Are there any schools in the village?

	No	No. of pupils/students	
Madrassa			
Primary			
Secondary			
Tertiary			

6. What types of telecommunication services do households in the village access?

7. What types of health services do households access in the village (list types)?

8. What is the nature of road infrastructure in the village?

9. How would you describe market access in the village?

B. ACCESS TO LAND

10. What is the estimated proportion of land owned/cultivated by the following wealth groups

	Very Poor	**Poor**	**Middle**	**Better-off**
Land owned				
Land rented to others				
Land rented from others				
Farmland under share cropping				
Farmland as a gift				

11. (a) Have you observed any changes in the cultivated area in your village? Yes/No
    (b) If YES, what are the cause of this change?

10. What proportion of land in the village is:
    a. Under irrigation _____
    b. Under rain-fed _____
    c. Changed from irrigation to rain-fed production systems_____
    d. If YES, what caused the changes?

C. AGRICULTURAL PRODUCTION

11. What are the main types of crops grown in the following seasons?

Cereal Crops	*GU*	*DEYR*
a.		
b.		
c.		
d.		
Cash crops		
a.		
b.		
c.		
d.		
Other Crops		
a. Vegetables		
b. Fruits		
c.		
d.		

12. Have there been any change in the crop types cultivated? (explain)

13. Which type of irrigation system do you use in your villages?

Gravity irrigation	
Pump irrigation	

14. Do farmers in your village use the following inputs, and if so, what is the source and unit cost?

Inputs	**Yes**	**No**	**Source** (*Self, Gift, Purchase, Relief*)	**Quantity**	**Cost (*Sosh*)**
Seeds					
Fertilizers (inorganic)					
Farm Manure					
Compost					
Mulch					

15. What is the average yield per hectare of different crops cultivated in a normal year

Cereal Crops	*GU*	*DEYR*	*Total (kg)*
i.			
ii.			
iii.			
Cash crops			
i.			
ii.			
iii.			
Other Crops			
i. Vegetables			
ii. Fruits			
iii.			

16. Assuming the very poor and poor households produce 10 quintals, how do the they use their harvest?

Use	Quantity		How months do they consume?	
	Very poor	Poor	Very poor	Poor
Household consumption				
Sold for any purpose				
Seeds				
Gifts				
Other uses				

17. In a normal year, what are the main factors affecting agricultural production in the village?

18. What type of livestock species are commonly reared in the village?

	Very poor	Poor	Middle	Better-off
Sheep				
Goats				
Cattle				

19. In your opinion, what is the impacts of humanitarian intervention(agricultural inputs) on agricultural production and development in the village?

20. What are the main sources of income for households?

	Very poor	**Poor**	**Middle**	**Better-off**
Sale of agriculture produce (crops and livestock)				
Agricultural labor/Casual labour				
Livestock production				
Trade/Small business				
Self-employment				
Gifts				
Loans				
Remittances in cash				
Salary employment				

D. CURRENT SITUATION

21. In GU 2011, what were the main hazards/shocks that affected crop/livestock production in Lower Shabelle?

Hazards	*GU*	
	Crops	*Livestock*
Use the following criteria to rank the level of severity of the hazard/shock: 1-Most destructive; 2-Second most destructive; 3-Third most destructive; 4-Fourth most destructive		

22. (a) In the last 12 months, are there any household in this village who were displaced to other regions? YES/NO
(b) If YES, indicate accordingly in the table below:

Some	Most	All	None

23. What were the impacts of in-migrants on the host community and existing resources?

Host community	**Resources (cereal stocks, pasture, water, etc)**

24. What are the main cereal inflow and out- flow routes in normal and bad year (GU 2011). *Indicate the routes on the map provided.*

25. Did you observe any changes in the cereal flow patterns in *GU* 2011? YES/NO

26. If YES, list the changes and explain why they occurred.

Changes	Explanation

27. What opportunities do you think exist for boosting agricultural production and development in Lower Shabelle?

LOWER SHABELLE REGION

Basic study on riverine production system (research)

Teleconferencing Questionnaire:

1. What is proportion of HHs in the village are involved in these livelihood systems?

Livelihood system	Proportion of HHs/ or % of the population
a. Riverine	
b. Agro-pastoral	

2. What is the average household size in the village: _____

3. **B. ACCESS TO FARM LAND**

What is the estimated proportion of land holding by each wealth groups*

	Very Poor	**Poor**	**Middle**	**Better-off**
Land owned				
Land rented to others				
Land rented from others				
Farmland under share cropping				
Farmland as a gift				

*Question must be based on what the majority of each wealth groups practices

4.What is the average yield per hectare of different crops cultivated in a normal year

Cereal Crops	*GU*	*DEYR*	*Total (kg)*
i.			
ii.			
iii.			
Cash crops			
i.			
ii.			
iii.			
Other Crops			
i. Vegetables			
ii. Fruits			
iii.			

4.Assuming that poor households produce 10 quintals/year, how do they normally use their harvest?

Use	Quantity		How months do they consume?	
	Very poor	Poor	Very poor	Poor
Household consumption				
Sold for any purpose				
Seeds				
Gifts				
Other uses				

5. How poor riverine do access to Agricultural labour opportunities?

Activity	Gu-Haggai season		Deyr season	
	Duration	Average daily rate	Duration	Average daily rate
Land preparation/Canal Rehab.				
Planting/Sowing				
Weeding1				
Weeding2				
Weeding3				
irrigation				
Guarding				
Harvesting				
husking/threshing				
Total				

Activity	Gu-Haggai season		Deyr season	
	Duration	Average daily rate	Duration	Average daily rate
Grass sales				
Bush product sales				
Total				

HANNAANKA WAX SOO SAARKA BEERAHA SHABELLAHA HOOSE WAKIILADA BULSHADA/WAX GARADKA WEYDIIMAHA

Gobolk:		**Degmada:**		**Tuulada:**	
Magaca wareystaha:					

I. MACLUUMAAD GUUD EE QOYSKA

1.Immisaa Qoys ayaa ku nool Tuulada? Waa immisaa celceliska tirada qoysaskoodu?

Tirada qoysaska tuulada	Ceceliska tirade qoysaska.	Of which resident	
		Inta deggan tuulada	
		inta ku soo barakacdey 12 bilood ee la soodhaafey.	

2.Heya'do ma ka shaqeeyaan tuulada?

	Nooca	**Tirada**		
		Iskuullada	**Ardeyda**	**Ma shaqeeyaa iskuulku? siduu u shaqeeyaa?**
Iskuullo?	Hoose			
	kuwa kale _____			
Xarumo caafimaad	Xarunta Hooyada iyo dhallaanka			
	Xarumo caafimaad ee NGO -yada			
	Goob caafimmad oo shakhsi			
	Daaweyn dhaqameed			
Jidadka	*Quality, condition and problems:Tayada,Xaaladaha iyo dhibaatooyinka:*			
Suuqyada	*Suuqa/Suuqyada ugu dhow ee ay wax ka soo iibsadaan:*			
halkay biyo ka helaan	*Sheeg meelaha ay ka helaan biyaha adigoo siday u kala muhiimsanyihiin u kala hormarinaya:*			

3.Sheeg qiyaasta qoysaska Isticmaala adeegyadan:

Moobaayl	_____%	**Taarka**	_____%	**Kuwa kale:** _____	_____%	**Zaad**	_____%

4.Waa immisaa qiyaasta qoysaska ku nool tuulada adigoo u fiiranaya habnololeedkooda? Ama habkooda dhaqan dhaqaale?

Habnololeedka	**Saamiga ama boqolkiiba intee Qoys bay ka yihiin?**
Beerkunool(Riverine/Farming)	
Beerioy xoolo ku nool(Agro-pastoral)	
Waxyaallo kale:	
Other:	

Other:	

II. LAHAANSHAHA DHUL BEEREEDKA:

5. Immisaa lagu qayaasi karaa dhulbeereedka tuulada? Immisaa laga tacbaa hadda? Immisaa waraab ah?

Wadarta Dhul beereedka: _____Ha	**inta la tacbo:**	____ Ha	**Inta waraabka ah:**	_____ Ha	**inta daadoy ku cabta:**	_____Ha
					Inta matoor ku waraabta	_____Ha
					kuwa kale	_____Ha
			inta beer roobeedka ah:	_____ Ha		
	inta baryoodka ah:	____ Ha				

6.Qiyaas hababka lahaanshaanshaha tacabka dhulbeeredyada(qiyaas qeyb walba ugu yaraan iyo ugu badnaan-range).

		Liita	Danyarta	Dhaxdhaxaad	Ladanayaasha
Inta milkigiisa					
Ijaarka /kireysi	**Ijaarte**				
	Ijaare				
Shirkada dalag wadaag ah					
Dhul doon fuul ah.					

Waa immisaa celceliska qiimaha ijaarka hektarkiiba?

Dhulka waraabka	Dhulka aan waraabka aheyn

III.WAXSOOSAARKA BEERAHA

7.Fadllan sheeg dalagga muhiimka ee cuntada ahaan looga beerto tuulada(sida galeyda iwm) iyo kaash ahaan (sida sisinta iwm) laga beero tuulada, xilliga Guga iyo Deyrtaba?Islamarkaana sheeg mid walba qayaasta hektarkiiba uu dhalo sida caadiga?

	Type of crop grown in the village									
	dalagga	inta uu dhalo/ Ha	Dallaga	inta uu dhalo	Dalaga	Inta uu dhalo	Dallaga	inta uu dhalo	Dallaga	inta uu dhalo
Gu – Hagaa										
Deyr										

8. Beeraleyda tuuladaada ma isticmaalaan tasiilaadka hoos ku qoran, haddii ay isticmaalaan xaggey ka helaan, waana immisaa qiimuhu?

	Abuur		Bacrin		Makiinada
	Isagu leeyahay	Soo gato	Sadaqo-siismo	gatey	
Danyare					
Dhaxdhaxaad					
Ladane					

9. Sidee bay u isticmaalaan qoysaska danyarta ahi haddii ay masalan u soo go'do 10 kiish oo boqol kilo ah sanadkii?

Isticmaal	Tirada		Keydku immisaa bilood ayuu ku filanyahay?	
	Liita	Danyare	Liita	Danyare
Immisuu cunto u dhigtaa				
immisuu iska iibiyaa				

immisuu abuur u dhigtaa		
Immisuu Sadaqeystaa		
Isticmaal kale		

10.Haddii waxa qoyska u soo goáa aysan ku filneyn sanadka oo dhan, waa maxay xeeladaha muhiimka ee uu ku maareyn karo noloshiisa? U tax siday u kal muhiimsanyihiin:

_____
_____
_____
_____
_____
_____
_____

11. Qoysaska beeraleyda ee xoolo dhaqashadu u soo raacdo beerfalashada, waa maxay qiyaasta tirade ay lahaan karaan?

	Liita	**Danyare**	**Dhaxdhaxaad**	**Ladane**
Ido				
Riyo				
Lo'				
Kuwa kale _____				
Kuwa kale_____				

12.Waa maxay dakhliyada muhiimka u ah qoysaska(1=ugu muhiimsan;2=muhimadda labaad;3=muhimadda saddexaad; muhiimadda afaraad iwm)

	Liita	**Danyare**	**Dhaxdhaxaad**	**Ladane**
Iska iibinta wax soosaarka (Dallaggaiyo xoolaha)				
Shaqada beeraha(Tacabla beeraha)				
Anfaca xoolaha(Caano, subagga iwm)				
Geddiska/Ganacsiga yar-yar				
Iskii u shaqeysta(Qoryo,Dhista,Dhuxusha iwm)				
Sadaqada				
Ammaah				
Xawaalad				
Lacag Mushaar				
Waxyaabo kale(sheeg:_____)				

IV. XAALADDU SIDAY TAHAY - 2011

13. Faddlan tax Aafooyinkii ugu waaweynaa ee waxyeeleeyey wax soosaarka Tuulada tan iyo Gu'2011.

/Aafooyinka sida:	***GU'2011***	
	Dallagga	**Xoolaha**
Dagaal		
Abaarta		

14.Waqtiga yibil barooraha(baahida) dadka danyarta ah side bay u maareeyaan noloshooda? Sidee bayse u maareeyaan marka ay Aafadu dhacdey tan iyo April 2011(Gu_2011), Fadllan u tax siday u kala muhimsanyihiin.

Maareynta Nolosha marka ay xaaladdu Caadi tahay	Sida loo maareeyey Markay Aafadu Dhacdey

15.Tan iyo April2011(Gu_2011) ma jiraan qoysas ka bara kacey tuulada,mase jiraan barakacayaal soo gaarey Tuulada?

	Tirada qoysaska	Gobolkeey u barakaceen/Gobolkeyse ka soo barakaceen	Sheeg sababta dhalisey barakaca/iyo saameynta ay ku yeelatey dadka Tuulada.
Ka barakacey Tuulada			
Ku soo barakacey Tuulada			

16.Tan iyo bisha April 2011 wax ma iska beddeleen tacabka beeraha tuulada? Haddii ay haa tahay maxay tahay sababtu?

	Sababtu Maxay tahay?
Kordhey	
Yaraadey	
Ma isbedelin/Caadi	

17.Tan iyo Gu-2011 maxaa iska bedeley habka waraabka ? Maxaa sababey isbedelka?

	Sababtu maxay tahay?
Wuu hagaagey	
Ma isbedelin	
Waa sii xumaatey	

(Tusaale:kanallada oo duugmey,webiga oo hoos u dhacey, tartan waraab,iwm)

18.Waa maxay Fursadaha Jira si loo kordhiyo wax soo saarka Tuulada ama lagu hormarin karo? U tax siday u kala muhiim sanyihiin_____

_____
_____
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