The State of Food Insecurity among Households in Juba River Basin, Southern Somalia

Ali Ahmed
Mount Kenya University,
Department of Social Sciences and Developmental Studies, Nairobi, Kenya

Abstract

In the absence of a working state for the last over 25 years, hunger and malnutrition have been serious challenges in Somalia and great causes for concern to the international humanitarian community. Given the state of insecurity in Somalia, it is important that continuous research be done to understand the causes of lack of food and the consequences to the society. Juba River Basin has always been a major producer of food for Somalia. Yet, the state of household food insecurity in the Juba River Basin is an under-researched topic, and even reports by NGOs do not speak much of this crucial region. Thus, the objective of this study was to examine current state of household food insecurity in Juba Valley Region of Southern Somalia. The study results on state of household food insecurity indicate that 75% households are severely food insecure. Similarly, measure on household food insecurity access-related domains revealed that 80% of the households fall in domain 1 of worry and anxiety about food due to lack of resources, 84% of the respondents fall in domain 2 of insufficient quality food and as a result eat less preferred foods. Further, 85% of the households experience hunger (domain 3) where they reduce their meals per day. Thirty eight percent of the respondents face severe hunger according to the household hunger scale. A majority of the respondents (18.7%) blamed it on recurrent droughts where 16.5% stated that pests and diseases were big problem for crop production. Lack of fertilizers, appropriate seeds and farm implements/tools (12%, 10.7% and 14% were among some of the concerns of the study respondents. Figure 7 illustrates limiting factors to food production.

INTRODUCTION

Global discussions on food insecurity have evolved over the last half-century, moving from a focus on the physical availability of food at the global level to the provision of food to individuals. According to Devereux and Maxwell, food security can be assessed by examining

the success of local livelihoods to guarantee access to sufficient food at the household level (Devereux and Maxwell, 2001). The World Food Summit (WFS) of 1996 also argued that it can be assessed by examining if "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996a). Reutlinger went further to argue that besides access at all times for a healthy life, "food security essential elements are the availability of food and the ability to acquire it" (Reutlinger, 1985).

At the macro level, it implies that adequate supplies of food are available through domestic production or through imports to meet the consumption needs of all people in a country. Whether it is the household or individual, food security depends on a number of factors which are related to various forms of entitlements to income and food producing assets as well as the links between domestic and external markets. From these definitions, food insecurity can be attributed to a range of factors. FAO grouped these factors into three core areas: *Availability*, *Accessibility* and *Utilization* of food (FAO, 2010a). *Food availability* is achieved when sufficient quantities of food are consistently available to all individuals within a country. Such food can be supplied through household production, other domestic output, commercial imports or food assistance, that is, the overall ability of the agricultural system to meet food demand ((FAO, 2010a). *Food accessibility* is ensured when households and all individuals within the household have adequate resources to obtain appropriate foods for a nutritious diet (FAO, 2010a). Access depends on income available to the household, the

distribution of income within the household and the price of food. *Food utilization* is the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, potable water and adequate sanitation (FAO, 2010a). Effective food utilization depends largely on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper child care, and illness management (Riely et al., 1999).

Overall, food insecurity is one of the greatest challenges facing Somalia. Allen and Thomas (2000) argue that the country had been self-sufficient in grain production and livestock for both exportation and domestic consumption in the 1960s and 1970s. However, during the past over thirty years, the country has been experiencing a rapidly rising food deficit that reflects a rapidly increasing per capita food consumption on one hand, and a declining per capita food production on the other hand, leading to the country's overreliance on food imports and food aid. Although the humanitarian community has described Somalia's food situation as a complex emergency from time to time, volumes of existing literature suggest that the country had received $1 billion bilateral economic aid from the government of Italy alone between 1980 and 1989 to fund 114 projects (Ali, 2011). However, there is little evidence of improvements in the universal supply and availability of food in the country.

According to FSAU (2011), state of household food insecurity in the Juba Valley Region (the study area) is severe and deteriorating with the highest malnutrition levels in Somalia, which are significantly above the usual range (24.5%) of Global Acute Malnutrition (GAM). About 43% of the population in the region lives in an extreme poverty, or on less than US$1 per day. This

number is 53% in rural households. Household food insecurity refers to the lack of capacity of a household to procure a stable basket of adequate food for its members. A typical household that is food insecure means members in the household do not know where they will find their next meal. The livelihoods of Somalia households come from five main areas: agriculture, livestock, fishing, wage labour and income generating activities/small scale business. All of these areas of livelihoods, which determine the status of household food security, are under-researched and consequently little is covered in the literature except in some reports by NGOs. Allen and Thomas further argue the collapse of the central government in 1991 resulted in the destruction of agricultural production systems that were central in promoting food sufficiency. Recent years have shown worsening situations that led to the declaration of major food crisis across Somalia. The years of conflict in Somalia have created a situation of protracted and complex emergencies that have eroded livelihoods and threatened people's access to food. Since the collapse of a stable government in 1991, most government institutions ceased to exist, leading to a collapse of the major economic sectors supported by these institutions. These observations are similar to the FAO Reports. The 2003 report placed Somalia second to last in terms of the proportion of undernourished members (71%) of the total population, while the 2005 report's findings indicated that armed conflict is the leading cause of hunger around the world because it destroys lives, opportunities and environments. Another FAO Report (2008) indicates that such protracted crises are often characterized by loss of human lives due to conflict leading to high and steadily growing levels of food insecurity and hunger.

According to the FSNAU Report of 2013, agriculture, which has been the main economic activity in Somalia not just for meeting the food needs of the people but also for income generation for rural livelihoods, is in a state of neglect and underdevelopment. This situation has widely been attributed to the prolonged civil strife in the country which seems to have exacerbated the food insecurity situation (Watts and Bohle, 1993). It is suggested that among the proximate causes are "seasonal fluctuations vis-à-vis access to key foods, limited dietary diversity, poor early child feeding practices and low level of contact with health services for young children and women of reproductive age" (FSAU, 2004a). The vulnerability of households has increased considerably as the household asset base has become depleted, as my study also demonstrates.

The situation was also exacerbated by the 2011 drought, which created widespread famine in most parts of the country and mass migration of the farming communities to IDP camps in major cities like Mogadishu (FAO, Somalia Ministry of National Resources, 2013). Crop production in both rain-fed and irrigated areas in South Somalia, where most of the country's crops were typically grown, has suffered the most. What is more, reliable data on the degree of the decline of food production in Somalia is not immediately available although it is estimated that grain production is about 50% lower than in pre-war years (FAO, 2013: page). The once-successful banana and sugar cane trades, as well as cereal, fruit, and vegetable production, have collapsed and show limited signs of returning to their former states. However, the deficit in production is primarily filled by food imports and food aid (FAO, 2010b).

Research Methodology

This study used both the quantitative and qualitative approaches as well as secondary and primary data collection methods. The study employed household interviews, key informant interviews, focus group discussions, literature review and direct field observation methods to collect data. The exploration of the state of household food insecurity was based on the Household Food Insecurity Access Scale (HFIAS) indicators i.e., Household Food Insecurity Access-related Condition, Household Food Insecurity Access-related Domains, Household Food Insecurity Access-related Prevalence, and Household Food Insecurity Access Score. The three domains reflected in the HFIAS are: a) Anxiety and uncertainty, b) Insufficient quality, and c) Insufficient food intake and its physical consequences. The assessment of the severity of hunger was based on the Household Hunger Scale (HHS). A total of 360 respondents took part of the study. The study was conducted in Juba valley region (JVR) in Southern Somalia between Jaunty and April 2015. The region consists of three provinces: Lower Juba, Middle Juba and Gedo with a population of about 1.3 million (UNDP Somalia, 1997). Its name 'Juba' is derived from the Juba River, which runs through all the three administrative provinces. The topography of the region is composed of plains, coastal areas and semi-desert. The population in the region is classified under five main categories: pastoralists, agro-pastoralists, agriculturalists, fishing community and urban sedentary.

Data Presentation and Discussion

1. Household food insecurity status in Juba Valley Region

This section provides findings of the analysis for Household Food Insecurity status. The HFIAS module yields information on food insecurity (access) at the household level while at the same time provides some essential four indicators computed to help understand the characteristics of and changes in household food insecurity (access) in the surveyed population. These four indicators will provide summary information on Household Food Insecurity Access (HFIA) – related Conditions, HFIA – related Domains, HFIAS Score, and HFIA Prevalence. Another additional indicator presented is also the household hunger scale (HHS). The results from the analysis of these indicators is presented and discussed below.

i. Household food insecurity access-related conditions

Based on the 9 indicators questions in the HFIAS questionnaire, the percent of households experiencing the condition at any given level of severity, relative to the frequency of occurrence, were calculated (Table 1). Accordingly, the results presented below were obtained about the HH in the Juba Valley Region. Respondents were asked to report their personal experience with uncertainty and anxiety about acquiring food during the previous month. It was found that about 80% respondents reported any occurrence of worrying about food in the past month. However, a majority HH (54%) indicated that they experienced this situation sometimes (2-10 times) in the month while some (33%) said they experienced it quite regularly (> 10 times). In terms of whether any household member was not able to eat according to their preference due to lack of resources in the past month, 80% respondents affirmatively responded on this question. It was found that 34% HH experienced this condition often times (> 10 times), that is, having limited

choices in the type of food they eat due to lack of resources. Meanwhile about 20% experienced this condition sometimes (2-10 times) only in the past month. The study also looked at the dietary choices related to variety – that is, whether the household had to eat an undesired repetitive diet in the past month. Results indicate that 80% of the HH depended entirely on monotonous diets, but not a preferred wide variety of types of foods. With respect to specific frequency, 34% HH experienced this situation often times (more than 10 times).

Table1: Household Food Insecurity Access Conditions

HH situation in past 4 weeks from data of interview	Freq.	Percent	95% Conf. Interval	
Worry about food				
Not at all	75	20.38	16.38	24.86
Rarely (1-2 times)	94	25.54	21.16	30.32
Sometimes (2-10 times)	79	21.47	17.38	26.02
Often (> 10 times)	120	32.61	27.84	37.66
Unable to eat preferred foods				
Not at all	72	19.57	15.64	23.99
Rarely (1-2 times)	96	26.09	21.67	30.89
Sometimes (2-10 times)	74	20.11	16.13	24.57
Often (> 10 times)	126	34.24	29.4	39.34
Eat just a few kinds of food				
Not at all	70	19.02	15.14	23.41
Rarely (1-2 times)	89	24.18	19.9	28.89
Sometimes (2-10 times)	85	23.1	18.89	27.75
Often (> 10 times)	124	33.7	28.88	38.78
Eat foods they really do not want to eat				
Not at all	71	19.29	15.39	23.7
Rarely (1-2 times)	75	20.38	16.38	24.86
Sometimes (2-10 times)	76	20.65	16.63	25.15
Often (> 10 times)	146	39.67	34.64	44.87
Eat a smaller meal				
Not at all	69	18.75	14.89	23.12

Rarely (1-2 times)	73	19.84	15.88	24.28
Sometimes (2-10 times)	78	21.2	17.13	25.73
Often (> 10 times)	148	40.22	35.17	45.43
Eat fewer meals in a day				
Not at all	78	21.2	17.13	25.73
Rarely (1-2 times)	81	22.01	17.88	26.6
Sometimes (2-10 times)	64	17.39	13.66	21.66
Often (> 10 times)	145	39.4	34.38	44.6
No food of any kind in the HH				
Not at all	123	33.42	28.62	38.5
Rarely (1-2 times)	69	18.75	14.89	23.12
Sometimes (2-10 times)	46	12.5	9.3	16.32
Often (> 10 times)	130	35.33	30.44	40.45
Go to sleep hungry				
Not at all	131	35.6	30.7	40.73
Rarely (1-2 times)	69	18.75	14.89	23.12
Sometimes (2-10 times)	31	8.42	5.8	11.74
Often (> 10 times)	137	37.23	32.27	42.39
Go a whole day and night without eating				
Not at all	128	34.78	29.92	39.89
Rarely (1-2 times)	71	19.29	15.39	23.7
Sometimes (2-10 times)	31	8.42	5.8	11.74
Often (> 10 times)	138	37.5	32.54	42.67

Almost tantamount to the dimension of limited choices in the preceding paragraph, the study investigated whether any household member had to eat food that they found socially or personally undesirable due to a lack of resources with its hardships. About 81% of the respondents affirmed that they experienced such a situation. More specifically, 40% HHs reported that they experienced it quite often during the past month. Respondents were asked whether they felt that the amount of food (of any kind) that any household member ate in any meal during the past four weeks was smaller than they felt they needed due to a lack of

resources, 81% said members experienced this condition. It was further identified that about half of this group of HH actually experienced this situation often times (>10 times) during the past month. The respondents were again asked whether any household member, due to lack of food, had to eat fewer meals than recommended. Most (79%) HH reportedly experienced this situation saying that at least their members ate fewer meals than expected. In terms of frequency of occurrence, it was found that again about half of this group of households experienced the condition often times (> 10 times) during the past month.

A situational search was made on whether the household at any one time had no food to eat of any kind in the home. In other words, this is a condition where food was not available to household members through the households' usual means, for example, through purchases, from the garden or field, from storage, among others. It was interesting to find that over 60% HH experienced this undesirable situation in the past month. It was rather sad to note that about 35% experienced this condition so often (more than 10 times) in the past month. The study also investigated whether the respondent felt hungry at bedtime because of lack of food or whether the respondent was aware of other household members who were hungry at bedtime because of lack of food in the past one month. Empirical data showed that at least over 60% HH passed through this humiliating circumstance during the past month. In terms of relative frequency of occurrence, it was reportedly found that 37% went through this humbling experience often times (> 10 times) in the past one month. The study further inquired whether any household member did not eat from the time they awoke in the morning to the time they awoke the next morning

due to lack of food. Surprisingly, 65% HH responded affirmatively to this question. Additionally, 38% of the sample HH reported experiencing this condition regularly (> 10 times) in the past one month.

The findings indicated that most of the households in the study area underwent certain socially undesirable conditions in their search for food. This was despite the natural resource endowments of the study area. Although the tabular illustration above may seem a descriptive representation of the food insecurity situation in the area, it represents the general condition both by experience and frequency of occurrence.

ii. Household food insecurity access-related domains

The study examined HH distribution according to Household Food Insecurity Access-related domains (Table 2). According to the FANTA (2007), the three domains reflected in the HFIAS are: a) Anxiety and uncertainty, b) Insufficient quality, and c) Insufficient food intake and its physical consequences.

The study found that 80% of the households fall in the first domain of anxiety and uncertainty, in other words, they are unsure of what food to eat in subsequent meals. About 84% households experienced the condition of insufficient quality, that is, households resorting to eating the foods they would not wish to eat because of lack of resources. Lastly, it was found that 85% HH experienced a situation of insufficient food intake and its physical consequences i.e. eating fewer meals than expected, reducing on the quantity of food to eat, going to bed hungry, and as well as

spending the whole day and night without eating anything. The majority (over 80%) of households in the study area were victims of this disturbing research fact. Table 2 below illustrates Household Food Insecurity Access-related Domain data.

Table2: Household Food Insecurity Access-related Domain

Household Food Insecurity Access-related domain	Freq.	Percent	95% Conf. Interval	
Anxiety and Uncertainty				
Inside	293	79.62	75.14	83.62
Outside	75	20.38	16.38	24.86
Insufficient Quality				
Inside	309	83.97	79.81	87.57
Outside	59	16.03	12.43	20.19
Insufficient food intake & its Physical Consequences				
Inside	311	84.51	80.4	88.05
Outside	57	15.49	11.95	19.6

The pairwise chi-square test of independence was conducted to assess any associations between the binary HFIA-related Domains. It was found that these domains were highly correlated with each other (p-value < 0.001). This justifies and aligns well with theoretical expectation that most of the households that exhibit a behavior trait of being anxious and being uncertain on food during the month; also became vulnerable to consuming food of insufficient quality. At the same time, the households also struggle with eating insufficient quantities of foods, thus, suffered from hunger for considerable amount of time in a month.

iii. Household food insecurity access scale score (HFIAS)

A continuous measure of the degree of food insecurity (access) in the household revealed an approximate average HFIAS score of 15 with a standard deviation of 9.6. It was also observed that 27% HH scored exactly 27/27, indicating that they suffered all hunger domains and the frequency was more than 10 times for each of the indicators in the past month from the date of the interview. A proportion of 15% HH did not experience food insecurity at all, that is, HH achieved a score of 0/27, while about 13% HH scored 9/27 on the HFIAS. The rest of the HH are distributed on minority proportions (below 6%) on the HFIAS scale (not presented in table 3). The HH in general are averagely food insecure according to the HFIAS.

Table 3: Household Food Insecurity Access Scale Scores

HFIAS Score	Freq	Percent	95% Conf. Interval	
0	55	14.95	11.46	19.01
9	47	12.77	9.54	16.62
27	96	26.09	21.67	30.89

iv. Household food insecurity access prevalence (HFIAP)

The Household Food Insecurity Access Prevalence (HFIAP), a categorical food insecurity status, was also measured among the HH in the study area. It was found that 15% HH in the study population fall in the food secure category of the HFIAP (Table 4). Only about 0.5% HH are in the mildly food insecure group. The study identified that 10% HH are in the moderately food insecure group. Interestingly, the majority of the HH (75%) fell in the severely food insecure

category of the HFIAP classification. The HFIAP indicator, among the HFIAS earlier indicators, has also proven that there is clear evidence of food insecurity among the HH in the study area.

Table 4: Household Food Insecurity Access Prevalence

HFIAP category	Freq.	Percent	95% Conf. Interval	
Food secure	55	14.95	11.46	19.01
Mildly food insecure	2	0.54	0.07	1.95
Moderately food insecure	36	9.78	6.95	13.29
Severely food insecure	275	74.73	69.96	79.09

Household Hunger Scale

The severity of hunger experienced by the households was measured using the Household Hunger Scale (HHS) indicator. The study found that 34% HHs experienced little or no hunger at all. About 28% of the HH experienced moderate hunger, while 38% HH experienced severe hunger in the one month before the date of the interview (Table 5 below). Based on the HFIAS four indicators, the HHS further validates the fact that there exists a high degree of hunger among the HH in the study area. With 66% HH falling in the moderate to severe hunger, it clearly demonstrates that the HH in the study area are heavily constrained, and lack coping mechanisms at their disposal given these findings.

Table 5: Household Hunger Scale

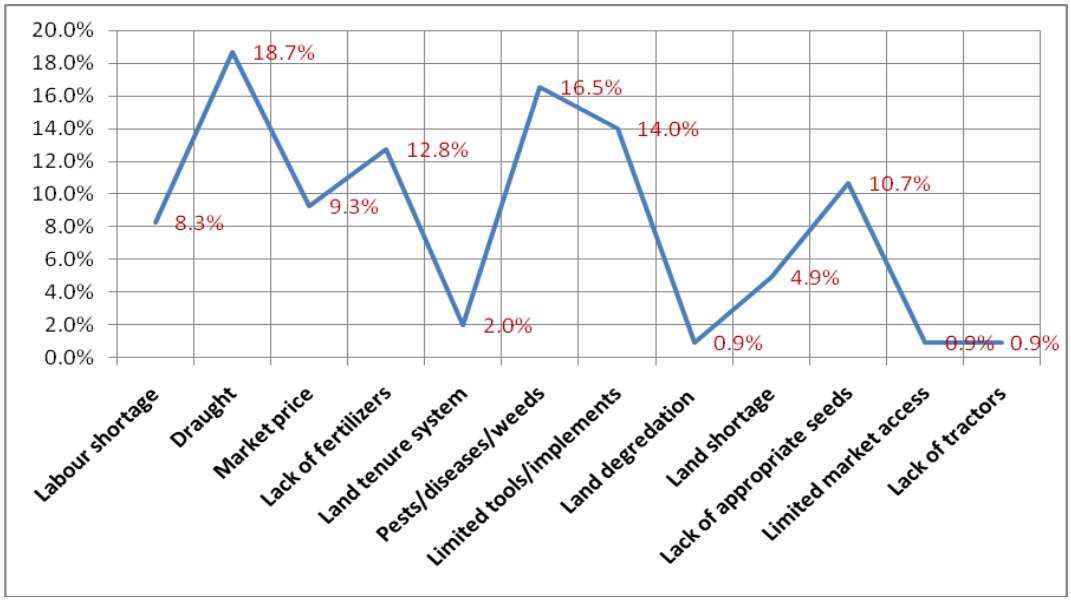
Hunger Scale	Obs	Percent	95% Conf.

			Interval	
Little or no hunger	126	34.24	29.37	39.11
Moderate hunger	103	27.99	23.38	32.60
Severe hunger	139	37.77	32.80	42.75

v. HH Perception on Limiting Factors to Food Production

The Juba River Basin is a farming region in Somalia where households predominantly practice subsistence agriculture**.** This study explored the perception of the household respondents cornering factors constraining food sufficiency as they see it. A majority of the respondents (18.7%) blamed it on recurrent droughts where 16.5% stated that pests and diseases were big problem for crop production. Lack of fertilizers, appropriate seeds and farm implements/tools (12%, 10.7% and 14%, were among some of the concerns of the study respondents. Figure 7 illustrates limiting factors to food production.

Figure 1: HH Perception on Limiting Factors to Food Production



The collapse of agricultural production system, lack of access to farm inputs, insecurity, climate shocks, weak copping mechanism and the absence of the government planning role factors undermined the livelihood potential of the farmers and threatened food access. Unfortunately, the agricultural production system collapsed with the central government in 199. Consequently, farming land, soils, and river water have been severely damaged.

Most survey respondents in the study area were agro-pastoralists who practice low input labor intensive subsistence farming, each cropping relatively small areas of land or working cooperatively on larger units. Because rural farmers were too poor to access agricultural inputs, the crop yields were below expected yield (20% of potential). The crop harvests they produce only last for short periods, leaving the households hungry for the most part of the year. Today, crop yields are low and have not improved for decades. Moreover, opportunities such as off-farm employment were non-existent and income generating activities were very minimal. Farmers were faced with seed shortages during planting season, and therefore, end up not realizing the full potential of their agricultural land. Besides, most farmers also utilized local seeds that were prone to diseases, drought, and were of low yield. The amount of food realized from a unit quantity of land could not, therefore, produced sufficient food to feed the family members over the months of the year.

In addition, farmers and agro-pastoralists in the area were also marginalized from product markets due to poor transport mechanism and road network. These conditions were exacerbated by insecurity that has limited households' access to markets and towns for trading opportunities, thus, significantly reduced the chances of improving their livelihoods. The protracted complex emergencies caused by armed militia have eroded the confidence of those engaging in productive agriculture.

Climatic shocks, especially drought, recurrently and severely affected food production in the area. Agricultural production in the study area was heavily reliant on rainfall with limited irrigation technology. Many flood-control systems and canals in the area that existed during the pre-war time are in ruins, as the infrastructure was looted, and/or became unusable. These factors add to the burden of recurrent food insecurity and hunger in JVR. Lastly, there were no proper coping and adaptation strategies among households against food insecurity in the study area. The households therefore remained vulnerable to any shocks that occur. Based on the above observations, the study presents the following suggestions for the improvement of food insecurity in the JRB

VI. Conclusion and Recommendations

Household hunger and malnutrition in Somalia have been challenges and remain significant causes for concern to the international humanitarian community in the absence of a stable state for the last over 25 years. However, the state of household food insecurity in Juba River Basin is

an under-researched topic and consequently little of it has been covered in the reports by NGOs. Thus, the objective of this study was to examine current state of household food insecurity in Juba Valley Region of Southern Somalia. The study results indicate that 75% of the researched households are severely food insecure today. Similarly, measures of household food insecurity access-related domains revealed that 80% of the households fall in domain 1 'of worry and anxiety about food' due to lack of resources. Eighty four percent of the respondents fall in domain 2 of 'insufficient quality food' and as a result eat less preferred foods. Further, 85% of the households experience hunger (domain 3) where they reduce their meals per day. Thirty eight percent of the respondents face severe hunger according to the household hunger scale. A majority of the respondents (18.7%) blamed it on recurrent droughts where 16.5% stated that pests and diseases were big problem for crop production. Lack of fertilizers, appropriate seeds and farm implements/tools (12%, 10.7% and 14%, were among some of the concerns of the study respondents.

Efforts to enhance household food security in Somalia have been threatened by a multiplicity of factors, both at the macro and micro household levels. Their collective effects have led to deep food insecurity, with the crisis escalating amongst the households. An understanding of these challenges, within their local context, and a critical examination of previous research, have been collectively used to suggest possible remedies to the food insecurity prevalent among households in the study area in particular, and Somalia in general. It is a central proposition of this study that building on traditional farming structures, using what people know and can do for

themselves are probably the best approaches to reconstruct food security in the Juba basin in Somalia.

1. **Increased productivity**: Increases in productivity will require improvements 'on farm' crop husbandry and management practices through extension and training services, access to steady and affordable sources of inputs, effective crop protection services, market incentives, crops diversification and improvement of the genetic yield potential of crops by identifying and testing improved varieties through adaptive research and on-farm testing. With reference to the seed system, training on the use and production of seeds is crucial as well as the expansion of the genetic portfolio of rain-fed and irrigated, long and short cycle varieties. In remote areas, seed production from local landraces should be encouraged and supported. The expected increased yield will lead to improved seed storing methodologies and facilities.

2. **Programs to Support and Motivate the Farmers:** The government needs to have special programs to support and motivate farmers in the Southern region to fully realize that they are very important in the national economy by providing them with incentives. Improving pricing policies, organizing farmers in groups to maximize on the economies of large-scale purchasing and marketing, the establishment of national silos for grain storage, and setting of annual targets to produce tons of food that the country needs to sufficiently feed the population among others, will see Somalia transform into a food

sovereign state. These efforts should be intensified to support poor households through the provision of farm inputs and credit facilities at low interest rates.

3. **Adult Literacy Programs**: The government and other agencies should provide education programs tailored towards introducing these farmers to modern agricultural and commercial practices. These programs should include aspects such as agricultural chain management practices and post-harvest techniques so that the communities can benefit from participating fully in the value addition chain. This would especially be beneficial to the female-headed households, who would in turn improve the overall livelihoods through food security.

4. **Infrastructural Rehabilitation:** Rehabilitation of key infrastructure is crucial for the revival of the agricultural sector. Roads need to be reopened, broken bridges repaired, market infrastructure refurbished and new ones constructed. All these activities will lead to improved access, by the households, to inputs and easy delivery of outputs from the farms to the markets. Infrastructural developments should stir interest in commercial agriculture in the food producing regions of Somalia.

References

Adeloye, A. A. (2010). "Global Warming Impact: Flood Events, Wet-Dry Conditions and Changing Scene in World Food Security." *Journal of Agricultural Research and*

Development (JARD), Vol. 9(1), pp. 1–15. Retrieved from http://ajol.info/index.php/jard/about.

Adger, W. (2006). "Vulnerability." *Global Environmental Change*, Vol. 16, pp. 268-281.Web.

Adger, W. N. (1999). "Social Vulnerability to Climate Change and Extremes in Coastal Vietnam." *World Development*, Vol. 27(2), pp. 249-269. Web.

Allen, Tim and A. Thomas (eds.) (200) *Poverty and Development in the 21st Century*. London: Oxford University Press.

AU. (2005). "Tatus of Food Security and Prospects for Agricultural Development in Africa, AU." *African Union Ministerial Conference of Ministers of Agriculture*, January 31-February 1,2006, Bamako, Mali (p.26). Retrieved from http://reliefweb.int/sites/reliefweb.int/files/resources/EA3EC4BDEDE74948C1257109004D10CD-au-afr-gen-1feb.pdf

Clay, E. (2002). "Food Security: Concepts and Measurement.Rome." Paper 1 1-8. Retrieved September16,2013,fromhttp://ieham.org/html/docs/food_security_concepts_and_measurement.pdf

Downing, T., & A. Patwardhan. (2005). "Assessing Vulnerability for Climate." *Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures*. Cambridge University Press. Ed, by B. Lim and E. Spanger-Siegfried, pp.67-89. Web.

FAO. (1996b). *The State of Food and Agriculture.*Rome. Retrieved September 16, 2013, from http://www.fao.org/docrep/003/w1358e/w1358e.pdf

FAO. (2002). *The State of Food Insecurity in the World*. Rome. Retrieved September 16, 2013, from http://www.fao.org/docrep/003/w1358e/w1358e.pdf

FAO. (2003). *The State of Food Insecurity in the World 2003: Monitoring Progress Towards the World Food Summit and Millennium Development Goals.* Rome. Retrieved from ftp://ftp.fao.org/docrep/fao/006/j0083e/j0083e00.pdf

FAO. (2005). "Committee on World food Security: Thirty-first session." In *International Alliance Against hunger: Food and Agriculture Organization of the United Nations Thirty-First Session,* Rome, *23-26 May 2005*. Retrieved from http://www.fao.org/monitoringprogress/docs/CSF_May05_en.pdf

FAO. (2008). *Integrated Food Security Phase Classification.* Rome. Retrieved August 3, 2013, from http://www.fao.org/docrep/010/i0275e/i0275e.pdf

FAO. (2010a). *The State of Food Insecurity in the World; Addressing Food Insecurity in Protracted Crises.* Retrieved September 16, 2013, from http://www.fao.org/docrep/013/i1683e/i1683e.pdf

FAO. (2010b, May 22). *A 5-Year Strategy and Plan of Action 2011-2015*. Retrieved from http://faosomalia.org/uploads/FAO Somalia 5-year strategy.pdf

FAO. (2011). *The State of the World's Land and Water Resources for Food and Agriculture (*SOLAW): *Managing Systems at Risk.* Rome. Retrieved September 16, 2013, from http://www.fao.org/nr/water/docs/SOLAW_EX_SUMM_WEB_EN.pdf

FAO. et al. (2013). *Strategic Options — Technical and Institutional — for Economic Sector Development (Agriculture , Livestock and Fisheries) in Somalia: Background Paper*.

FSAU. (2004b). Technical Series Report No. IV.1 November 11, 2004. In *Food Security Analysis Unit Strategic Development Retreat Technical Peer Review Workshop Proceedings* (p. 32).

FSNAU. (2013). *Food Security and Nutrition Analysis Post Deyr 2012/13*. Retrieved September 16, 2013, from http://www.fews.net/docs/Publications/Somalia_SR_FSNAU_Post-Deyr_2012-13_Technical_Series_03_2013_en.pdf

Funk, C. C., & M. E. Brown. (2009). "Declining Global Per Capita Agricultural Production and Warming Oceans Threaten Food Security." *Food Security*, Vol. 1(3), 271–289. http://doi.org/10.1007/s12571-009-0026-y

German Agro Action. (2004). *German Agro Action Annual Report 2004.* Deutsche: Welt Hungerhilfe. Retrieved April 25, 2015, from http://ghdx.healthdata.org/record/german-agro-action-annual-report-2004.

Graham, R. D. *et al.* (2007). "Nutritious Subsistence Food Systems." *Advances in Agronomy*, Vol. 92, pp. 1–74. Retrieved from http://www.sciencedirect.com/science/article/pii/S0065211304920019

Hays, J. (2008). The Great Famine: Cannibalism, Mass Starvation and Grain Exports after the Great Leap Forward, as Many as 45 Million Dead. Retrieved April 25, 2015, from http://factsanddetails.com/china/cat2/sub6/item2854.html

Keatinge, J. D. H. *et al.* (2011). "The Importance of Vegetables in Ensuring both Food and Nutritional Security in Attainment of the Millennium Development Goals." *Food Security*, Vol. 3(4), pp. 491–501. http://doi.org/10.1007/s12571-011-0150-3

Kelly, P., & W. Adger. (2000). "Theory and Practice in Assessing Vulnerability to Climate Change and Facilitating Adaptation." *Climatic Change Unit*.

Khush, G. S. *et al*. (2012). "Biofortification of Crops for Reducing Malnutrition." *Plant Biotechnology Reports*. Vol. *6*(3), pp. 195–202. http://doi.org/10.1007/s11816-012-0216-5

Little, P. D. *et al*. (2001). "When Deserts Flood: Risk Management and Climatic Processes among East African Pastoralists." *Climate Research*, Vol. *19*(2), pp. 149–159. http://doi.org/10.3354/cr019149

Maystadt, J. F. *et al*. (2013). "Extreme Weather and Civil War in Somalia: Does Drought Fuel Conflict through Livestock Price Shocks?" Washington: *International Food Policy Research Institute. IFPRI* - Discussion Paper 01243. Web.

McMichael, A. *et al*. (2007). "Food, Livestock Production, Energy, Climate Change and Health." *The Lancet*. 370 (9594). Web.

Munang, R. & J. N. Nkem (2011). "Using Small-Scale Adaptation Actions to Address the Food Crisis in the Horn of Africa: Going Beyond Food Aid and Cash Transfers." *Sustainability*, *3*(9), 1510–1516. http://doi.org/10.3390/su3091510

Munang, R. T. *et al*. (2011). "Ecosystem Management: Tomorrow's Approach to Enhancing Food Security under a Changing Climate." *Sustainability*, *3*(7), 937–954. Web.

Oxfam. (2012). *Food Crisis in the Horn of Africa: Progress Report July 2011-July 2012*. Retrieved September 17, 2013, from http://www.oxfam.org/sites/www.oxfam.org/files/er-horn-of-africa-2011-2012-progress-report-050712-en.pdf

Schipper, E. (2007). "Climate Change Adaptation and Development: Exploring the Linkages." *Tyndall Centre for Climate Change Research. 107 July 2007.*

Thompson, J., & I. Scoones. (2009). "Addressing the Dynamics of Agri-food Systems: an Emerging Agenda for Social Science Research." *Environmental Science & Policy*, Vol. 12, pp. 386- 397. Web.

Vogel, C., & S. Moser. (2007). "Linking vulnerability, Adaptation, and Resilience Science to Practice: Pathways, Players, and Partnerships." *Global Environmental Change*. Vol. 17 pp. 349 - 364. Web.

Watts, M. J., & H. G. Bohle. (1993). "The Space of Vulnerability: the Causal Structure of Hunger and Famine." *Progress in Human Geography*, Vol. 17, pp. 43–67. http://doi.org/10.1177/030913259301700103

Wesche, S. D., & H. M. Chan. (2010) "Adapting to the Impacts of Climate Change on Food Security among Inuit in the Western Canadian Arctic." *EcoHealth*, Vol. 7(3), pp. 361–373. Web.

World Food Programme. (2007). *Annual Report - World Food Programme, 2007: Be Part of the Solution.* Rome.

World Food Programme. (2009). *Annual Report - World Food Programme 2009.* Rome.