

## **EFFECT OF INTERVENTIONS ON THE FOOD SECURITY OF AGRO-PASTORALISTS IN SANKURI WARD, GARISSA COUNTY, KENYA**

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### **ABSTRACT**

The study sought to assess the effect of four interventions on the food security of agro-pastoralists in Sankuri Ward, Kenya. Fertilizers, farms tools and seeds resulted in increased crop production. Income from sale of the farm produce rose, thus food was available for consumption. New livestock assets resulted in more income generated from sale of livestock products which enabled households purchase food for consumption. Micro-economic initiatives led to business expansion and set up of new businesses thereby leading to increased income enabling households purchase food for consumption. Adequate water supply and latrines were essential for the acquisition of decent shelter. Interventions targeting farming activity was as a key priority in the region. Restocking was a key intervention measure that resulted in more food availability for consumption. Micro-economic initiatives resulted in income generating activities that enabled households purchase food for consumption. Provision of adequate water supply and latrines promoted decent shelter.

**Key terms;** Food security, Agro-pastoralists, Farming interventions, Livestock interventions, Micro-economic initiatives, living conditions, livelihoods

### **1.0 Introduction**

According to the World Food Summit (1996) food security exists “when all people, at all times have physical and economic access to adequate/sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”. The meaning of food security is much broader than just food availability but rather accessibility of food in terms of affordability, adequate quantities with essential nutrients (Kiome, 2009). Food security dimensions are availability, access, utilization and stability. Food availability refers to the supply side of food security which is the physical existence of food, from a household’s own production or from markets, including commercial food imports and food aid. In order for people to meet basic food needs, adequate availability is a prerequisite, but often the mere presence of food does not ensure access to “sufficient, safe, and nutritious food” (Anne, 2013).

### **2.0 Statement of the Problem**

According to Food and Agriculture Organization (FAO) of the United Nations overall progress notwithstanding, hunger remains an everyday problem for almost 795 million people worldwide including 780 million in the developing regions (FAO, IFAD,WFP, 2015). Food security is a situation where 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 (Ann,

2013). The World Food Conference in 1974 had proclaimed that "every man, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop their physical and mental faculties." In Kenya over 10 million people suffer from chronic food insecurity and poor nutrition, and between two and four million people require emergency food assistance at any given time. Nearly 30% of Kenya's children are classified as undernourished, and micronutrient deficiencies are widespread (GOK, 2011). According to Government of Kenya, 2014 Long Rains Seasons Assessment Report, 1.5 million people are facing acute food insecurity conditions and these populations largely occur in the northwestern and northeastern pastoral livelihoods regions in Kenya (GOK, 2014). The Government of Kenya developed Food and Nutrition Security Policy (FNSP) in 2011 that provides the framework for multiple dimensions of food security and nutrition improvement.

Despite the various interventions by various stakeholders, food insecurity remains a daunting challenge especially in the developing world and more specifically in Arid and Semi-Arid Lands (ASAL) in Kenya. Moreover, very little evidence is available on the effect of various interventions undertaken to tackle the problem of food insecurity (Bertelli & Macours, 2014). The key question is how can we determine what has worked in terms of reducing hunger and where should we direct our resources more in order to address food insecurity? Availability of such empirical data would be useful in terms of policy formulation and implementation by focusing on the interventions with positive effect on enhancing food security. It is important that food security interventions target poor and marginalized people such as smallholders, women and youth who have a crucial role to play in ending hunger and malnutrition (Fan, 2016). This study will focus on assessing the effect of interventions on the food security of agro-pastoralists in Sankuri Ward, Balambala Constituency, Garissa County in Kenya.

### **3.0 Research Objectives**

#### **4.0 General Objective**

The purpose of this study was to assess the effect of interventions on the food security of agro-pastoralists in Sankuri Ward, Balambala Constituency, Garissa County.

#### **5.0 Specific objectives**

The specific objectives of this study will be:

1. To establish the effect of farming interventions on the food security of agro-pastoralists in Sankuri Ward, Garissa County.
2. To find out the effect of livestock interventions on the food security of agro-pastoralists in Sankuri Ward, Garissa County.
3. To determine the effect of Micro-economic initiatives on the food security of agro-pastoralists in Sankuri Ward, Garissa County.
4. To assess the effect of interventions targeting living conditions on the food security of agro-pastoralists in Sankuri Ward, Garissa County.

#### **6.0 Research Questions**

The study will aim to answer the following research questions:

1. How does farming interventions affect the food security of agro-pastoralists in Sankuri Ward, Garissa County?
2. How does livestock interventions affect the food security of agro-pastoralists in Sankuri Ward, Garissa County?

3. How does Micro-economic initiatives affect the food security of agro-pastoralists in Sankuri Ward, Garissa County?
4. How does intervention targeting living conditions affect the food security of agro-pastoralists in Sankuri Ward, Garissa County?

## **7.0 THEORETICAL FRAMEWORK**

The following key theories were used in analysing the thematic area of study.

### **8.0 The Entitlement Approach**

In 1977, Amartya Sen proposed the idea that famine is not lack of food availability but rather lack of access to food. In his book "Poverty and Famines: An Essay on Entitlement and Deprivation" Amartya Sen defines the entitlement of a person as 'the set of alternative commodity bundles that can be acquired through the use of the various legal channels of acquirement open to that person' (Rubian, 2007). The entitlement approach is based on three conceptual categories, namely, the endowment set, the entitlement set and the entitlement mapping (E-mapping). The endowment set is the combination of all the resources legally owned by a person as per established norms and practices. The resources include both tangible assets such as land, equipment, animals as well as intangible ones such as knowledge and skills, labour power and community membership. The entitlement set is all possible combinations of goods and services that a person can legally acquire using the resources of the endowment set. This acquisition of goods and services may be done through production, exchange or transfer. The entitlement mapping is the relationship between the endowment set and the entitlement set. It is the rate at which the resources of the endowment set can be converted into goods and services.

According to Sen (1977), famine is not caused by shortage of food but rather due to failure of entitlement. This failure occurs when a person lacks enough food to avoid starvation and in the absence of non-entitlement transfers such as charity. Since entitlement set is derived by applying E-mapping on the endowment set, the entitlement failure and thus famine can occur due to adverse change in endowment or E-mapping or both (Nayak, 2005). The entitlement approach re-addressed the problem of hunger and famine by diminishing the role of aggregate food supply and giving more relevance to the socio-economic conditions of the people. According to Sen (1981), "Starvation is a matter of some people not having enough food to eat and not a matter of there being not enough food to eat". This notion has significantly affected the definition of food security by adding the access dimension. Food availability at national level is crucial but is not sufficient condition for food security. Therefore, food security assessment must consider other variables related to people's endowment such as productive and non-productive assets, with particular emphasis on employment, and non-tangible resources such as education or membership of an association (Francesco Burchi and Pasquale De Muro, 2012).

The entitlement approach allows prediction of future food deprivation. For instance, a lower amount of assets depicts that the person might have more problems in the future to access enough food. Hence, by examining a large entitlement set, we realize that issues such as drinkable water and health care are as important as food for food security. This means a radical shift from food first perspective and to emphasize the complex and multidimensional approach of food security (Francesco Burchi and Pasquale De Muro, 2012).

## 9.0 Sustainable Livelihoods Approach

The Sustainable livelihoods (SL) approach has a wider application on development and poverty than just food security. The basic elements of this approach was given by Chambers (1983) in his seminal book with focus on rural development and poverty. Subsequently, it has been elaborated further by Chambers in 1987, Chambers and Conway in 1992, Chambers in 1995, Ellis in 2000 and Scoones in 2005 (Francesco Burchi and Pasquale De Muro, 2012). Sustainable Livelihoods framework focuses on “gaining a living” (Chambers and Conway 1992:5) that means “the necessities of life”, as opposed to human development in broader sense (human flourishing). It also emphasises the “means” of acquiring a living that is the tangible and intangible assets owned by a household which is similar to the endowment concept of the entitlement approach. The assets are classified in terms rural capital, physical capital, human capital, financial capital and social capital (Francesco Burchi and Pasquale De Muro, 2012).

The SL approach brings into food security analysis three interrelated concepts that are peculiar to this framework. The first is the concept of vulnerability which explicitly considers risks and shocks, adverse trends and seasonality. According to Chambers (1995:175) this concept “means not lack or want but exposure and defencelessness. It has two sides: the external side of exposure to shocks, stress and risk; and the internal side of defencelessness, meaning a lack of means to cope without damaging loss”. The second concept is sustainability which according to DFID (1999) means “a livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future”. The third concept is coping strategies which are a number of activities that people undertake in order to achieve their livelihoods goal in response to exogenous shocks that lead to declining food availability (Francesco Burchi and Pasquale De Muro, 2012).

## 10.0 Capabilities Approach

The capabilities approach to food security was developed by Jean Drèze and Amartya Sen in 1989 in their book *Hunger and Public Action*. The authors developed a general analytical framework for studying hunger based on the capability approach of Sen (1985, 1999) and his entitlement approach. In their book, the authors explain why the entitlement approach is not adequate for a general framework to hunger issues and therefore the need to move beyond food entitlements to nutritional capabilities. They explain this concept as ‘The focus on entitlements, which is concerned with the command over commodities, has to be seen as only instrumentally important, and the concentration has to be, ultimately, on basic human capabilities’ (Drèze and Sen 1989:13).

A better approach is to make it possible to have the capabilities to avoid undernourishment and thereby escape deprivation associated with hunger. This switches the focus from “command over food” to “nutritional capabilities”, hence moving beyond the “access” dimension of food security (which is the main focus of entitlement and SL approaches) and includes the “utilisation” dimension. According to Drèze and Sen (1989), access to food is not sufficient but utilisation is crucial: ‘The object, in this view, is not so much to provide a particular amount of food for each. Indeed, the relationship between food intake and nutritional achievement can vary greatly depending not only on features such as age, sex, pregnancy, metabolic rates, climatic conditions, and activities, but also access to complementary inputs’ (Drèze and Sen (Action Against Hunger, 2016) 1989:13). They cite in their book a number of complimentary inputs such health care and medical facilities, clean drinking water, sanitation, eradication of infection epidemics and basic education (Francesco Burchi and Pasquale De Muro, 2015).

According to Sen (1999) the conversion of personal income, resources and commodities into well-being and freedom “depends on a number of contingent circumstances both personal and social” (Sen, 1999) such as personal heterogeneities, environmental diversities, variations in social climate, differences in relational diversities and distribution within the family. These circumstances make reliance on income, entitlements or livelihoods a lone a limited guide to food security. This becomes particularly more relevant when dealing with food security of disadvantaged people or those socioeconomic groups who are in unfavourable conditions (Francesco Burchi and Pasquale De Muro, 2015).

## **11.0 RESEARCH METHODOLOGY**

### **12.0 Research Design**

The study used a cross-sectional survey design which was be done at one point as opposed to a follow up study. This allowed the researcher to study different population groups at a single point and compare the various variables at the same time. Quantitative and qualitative data was collected using questionnaires and key informant interviews.

### **13.0 Target Population**

Target population refers to the entire group of people or things of interest that the researcher wishes to study (Kothari & Garg, 2014). The population of agro-pastoralist in Sankuri Ward is estimated at **20,598** while the total population of agro-pastoralist in Garissa County is estimated at **94,953**. The total population of Garissa County is estimated at **727,860**, thus making the proportion of agro-pastoralists 13% of the total population of Garissa County (National Drought Management Authority, 2014).

### **14.0 Target and accessible population of the of the study**

The study was conducted in Sankuri Ward of Balambala Constituency, Garissa County which is located in North Eastern region of Kenya. The main considerations for selecting Sankuri Ward was accessibility given that it is closest to Garissa Central in terms of distance. Thus, the target population for the study were agro-pastoralists in Sankuri Ward, Balambala Constituency, Garissa County, Kenya.

### **15.0 Sampling Procedures and techniques**

This study used a two stage cluster sampling technique to select substantial number of agro-pastoral population in Sankuri Ward, Balambala Constituency, Garissa County. In the first stage of the sampling the population was divided into distinct units defined by administrative boundaries that provided a list of villages with varied populations. Clusters were then randomly selected with the probability of selection being population proportional to size to ensure each person in the whole area had an equal chance of being selected. After clusters were selected, a given number of respondents were chosen at random from each cluster. Qualitative information was collected through key informant interviews with officials selected purposively from NGO’s working in the region.

### Sample Size

The following sample size calculation method was used to arrive at the desired sample:

$$n = Z^2 [p (1-p)/L^2]$$

Where:

n = the sample size;

Z = 1.96, the Standard Normal Deviate at the desired Confidence interval, 95%;

p = 0.13 (13%), the assumed proportion (prevalence) of the households whose livelihood is agro-pastoralism;

L = 0.05 (5%), the precision.

This computation yields a sample size of **173**.

### 16.0 Research Instruments

The study utilized a number of data collection instruments that included among others; questionnaires, key informant interviews and review of secondary data and information.

### 17.0 Data collection methods and procedures

Data was collected from different stakeholders in order to get meaningful information. The study employed both quantitative and qualitative techniques. These included among others questionnaires and key informant interviews. Prior to the actual fieldwork, the researcher conducted desk review in order to avoid repeating what others have already done on the same area of study.

Questionnaires were the main data collection instrument in this study. It contained structured and close-ended questions that enabled the researcher get specific and quantifiable information. The selection of the household was done randomly using a landmark and date of the interview to determine which household to start from during interview. The landmark included farms, market and water point. The researcher administered the questionnaires through face-to-face interviews with the respondents. This was preferred because many of the population are illiterate and cannot fill out the questionnaires for themselves. The key informant interviews included unstructured questions that will help the respondents express their opinions, knowledge and practice.

### 18.0 Data analysis techniques and presentation

Quantitative data collected through questionnaires administered through face-to-face interviews was entered into Microsoft Excel data entry template that is a specialized database. Checks was carried out on the data to identify outliers or unusual results in the process called data cleaning. Analysis was carried out using both descriptive and inferential statistics. The result of the analysis were presented in the form of charts, graphs and custom tables and used in the interpretation of the data. The observations were then subjected to Spearman's Correlation to establish the relationship between food security and the various interventions.

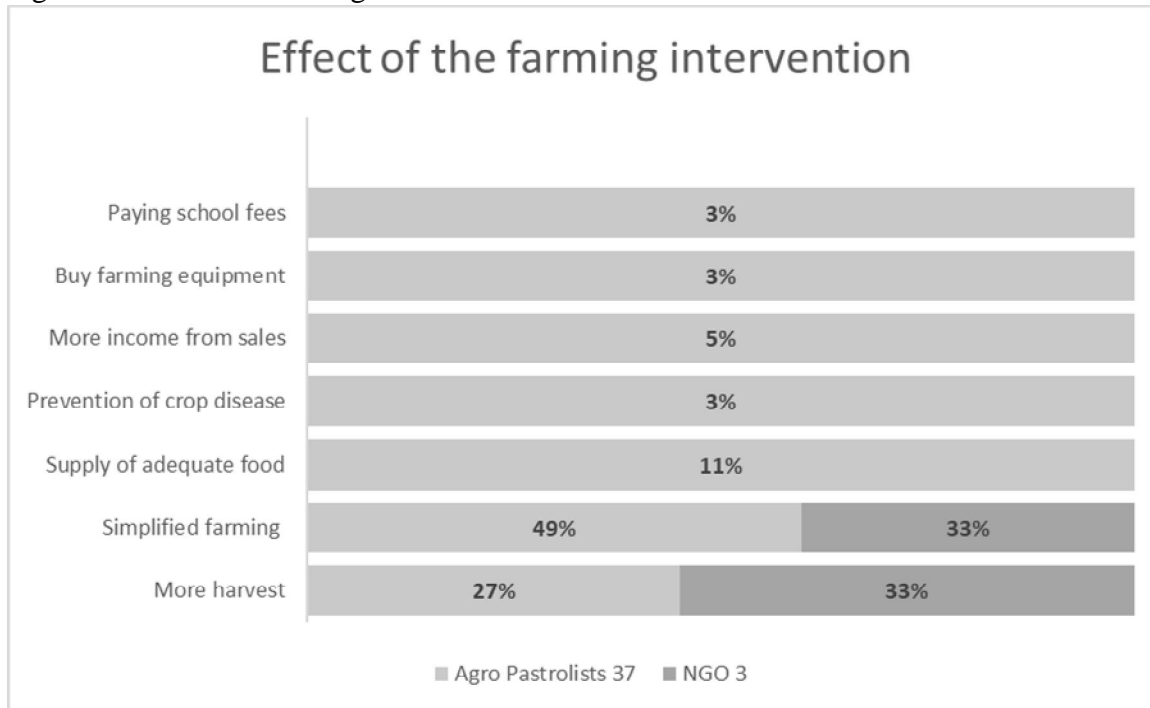
## 19.0 FINDINGS AND DISCUSSIONS

### 20.0 Effect of the farming intervention

In order to determine the effect of the farming intervention received, respondents were asked if the intervention was beneficial in anyway. Figure 4.1 and 4.2 illustrate the effect of the farming interventions.



Figure 4.1 Effect of farming intervention



The results show 49% of the agro-pastoralists who received farming intervention reported simplified farming, 27% more harvest and 11% experienced adequate food supply. On the other hand, 33% of the key informants (NGO) attributed more harvest to the farming intervention while another 33% felt it simplified farming as a result of provision of farm tools.

Figure 4.2 Effect of farming intervention

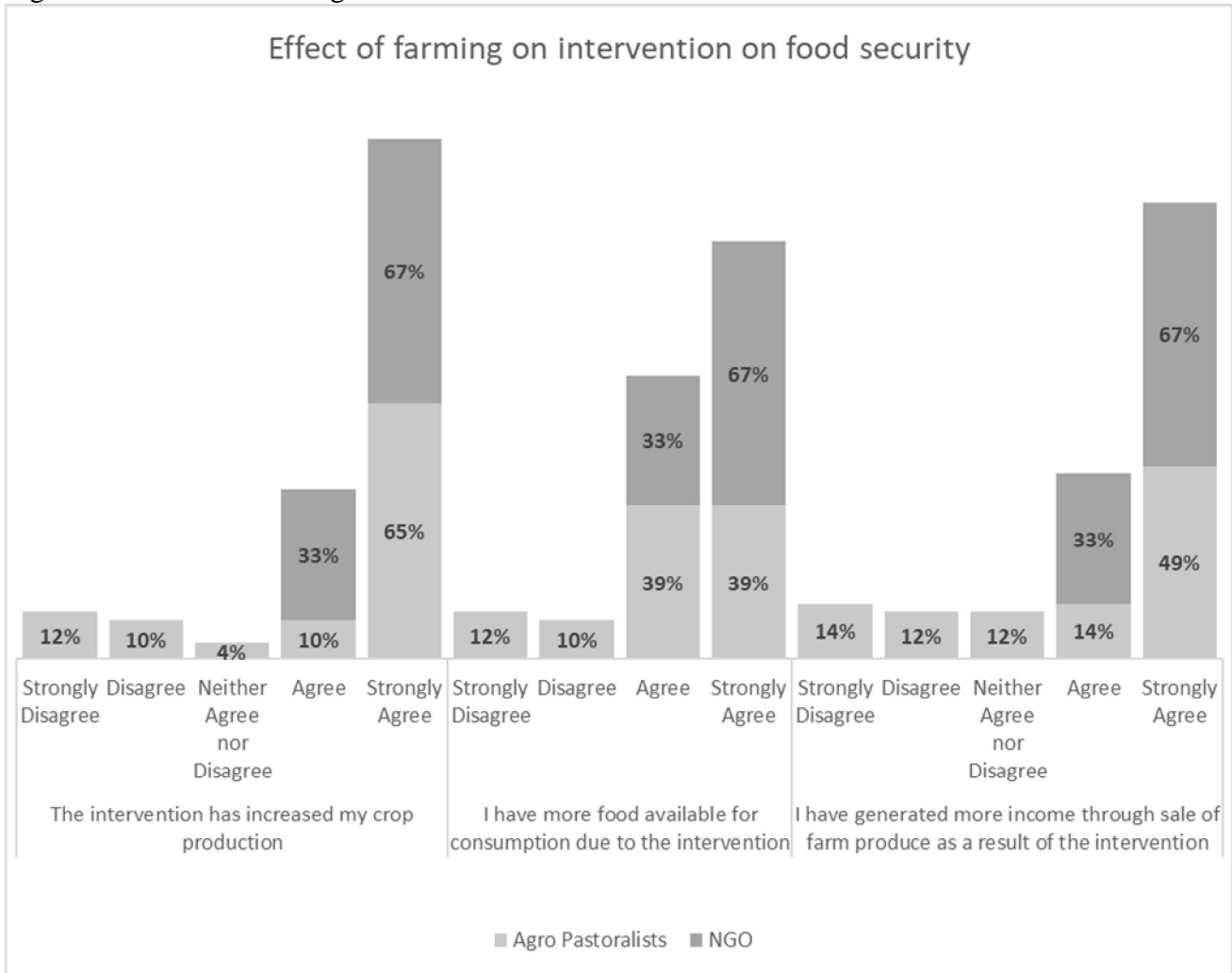


Figure 4.2 indicates 65% of agro-pastoralists and 67% of key informants strongly agreed the farming intervention increased crop production. 39% of agro-pastoralists and 67% of key informants strongly agreed more food was available for consumption as a result of the farming intervention. 49% of the agro-pastoralists and 67% of the key informants strongly agreed more income was generated due to the farming intervention.

These results agree with findings of other studies that reveal interventions that provide farm inputs had substantial effects on increasing production and thereby enhance food security. For example, in Malawi, a fertilizer subsidy increased production by 500kg per household and poverty declined from 52% to 40% (Bodnar, 2014).

The observations were subjected to Spearman’s correlation to determine the relationship between food security and the interventions. Table 4.1 shows the results.



**Table 4.1 Effect of farming interventions on food security**

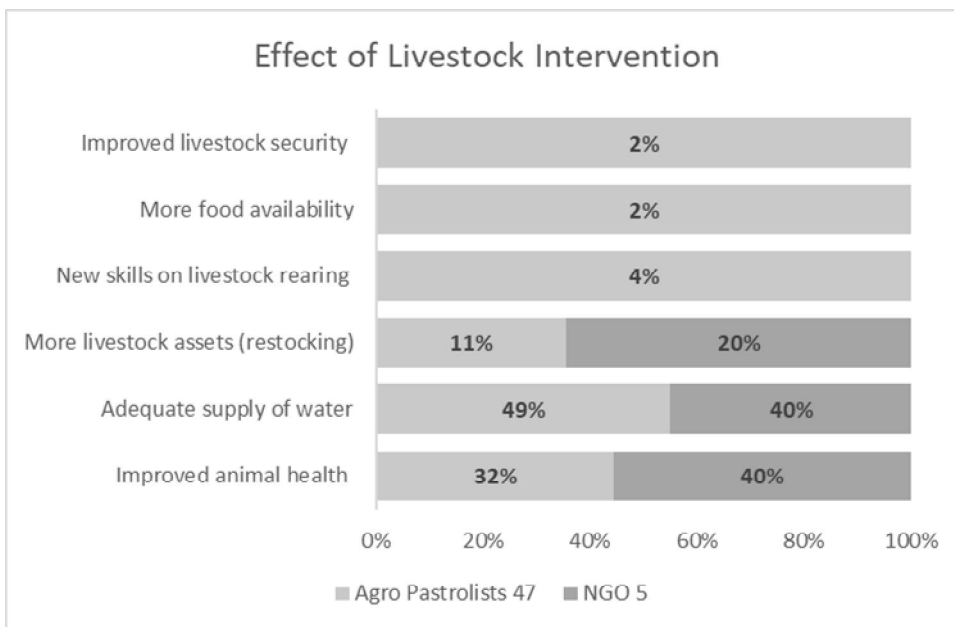
	<i>More food available for consumption</i>	<i>Increased crop Production</i>	<i>More income from sale of farm produce</i>
More food available for consumption	1		
Increased crop Production	0.68	1	
More income from sale of farm produce	0.9	0.70	1

Table 4.1 indicates that there was positive correlation between crop production and food consumption as demonstrated by  $r=+0.68$ . This means that as the crop production increases more food was available for consumption. Similarly, there was positive correlation between crop production and income ( $r = +0.7$ ). As crop production increases more income would be available from sale of farm produce. There was also positive correlation between income and food available for consumption as indicated by  $r = + 0.9$ . As income increases it enables households to purchase more food for consumption.

**21.0 Effect of livestock intervention**

In order to determine the effect of the livestock intervention, respondents were asked if the intervention was beneficial in anyway. Figure 4.3 and 4.4 illustrate the effect of the farming interventions.

Figure 4.3 Effect of livestock intervention



49% of agro-pastoralists reported having received adequate water supply as a result of livestock intervention, 32% improved animal health and 11% more livestock assets (restocking). Among the key informants, 40% indicated adequate water supply, 40% improved animal health and 20% more livestock assets as a result of the livestock intervention.

The findings indicate provision of alternative sources of water was a key priority intervention given that water is fundamental to the physiological equilibrium and well-being of all animals which, with the exception of some camels, cannot survive more than a few days without drinking water (FAO, 2016).

The findings indicate acquisition of new livestock assets (restocking) as a consequence of livestock intervention. The purpose of restocking was to help them rebuild households assets, or to build new livestock assets as a means to secure household livelihoods. Providing households with livestock, either for the first time or as replacements, supports their livelihoods in several ways since they can use the animals as a source of income, food or transport (FAO, 2016).

The findings also reveal improved animal health as a result of veterinary services that prevent sickness and death and help maintain the value of the surviving animals. Veterinary services enable; rapid diagnosis and treatment of diseases; treatment for parasites or by providing vitamins and minerals to malnourished animals and enabling rapid response to disease as a consequence of enhanced surveillance and disease reporting (FAO, 2016).

Figure 4.4 Effect of livestock intervention

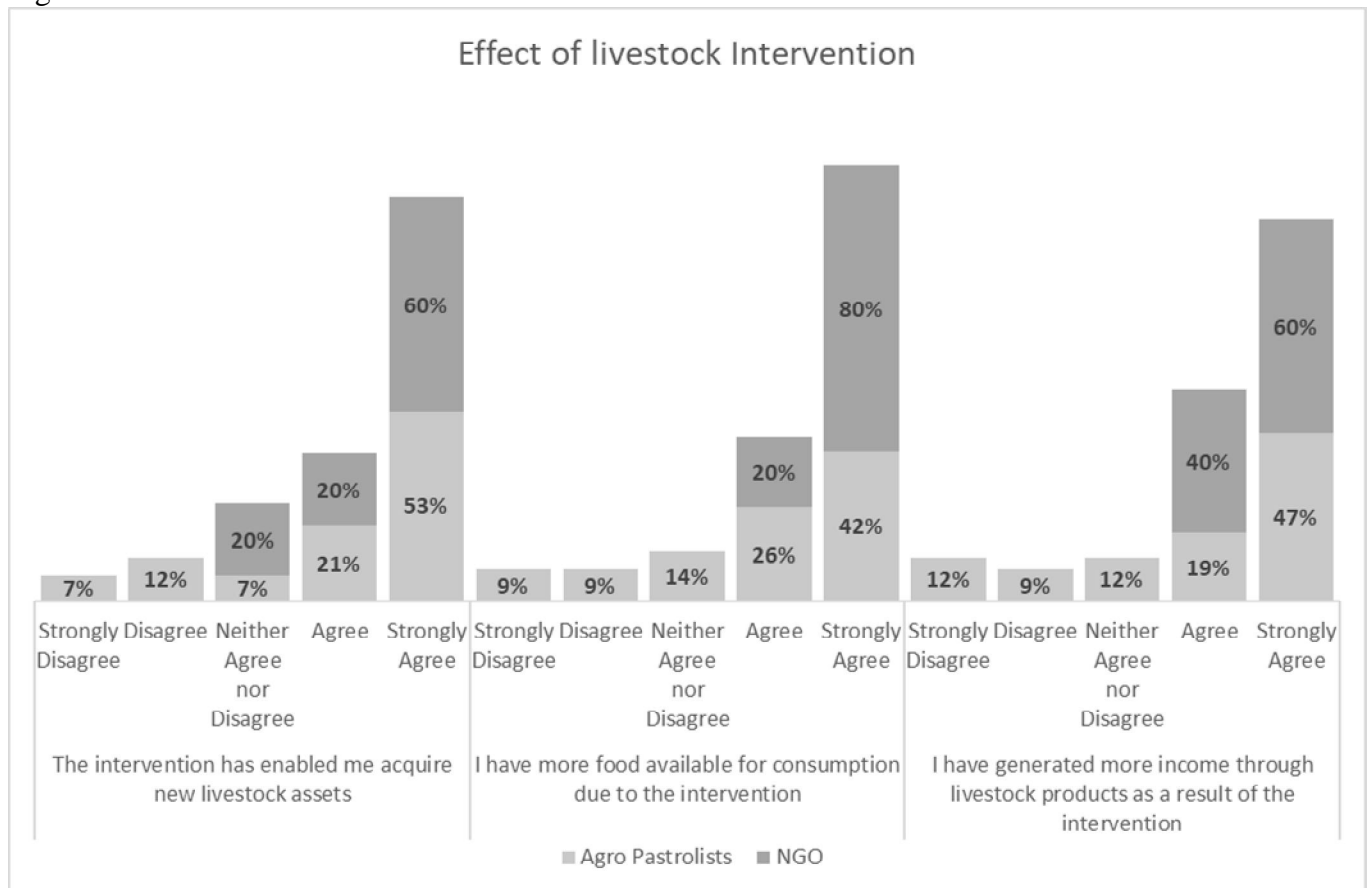


Figure 4.4 indicates 53% of agro-pastoralists and 60% of key informants strongly agreed that the livestock intervention enabled them acquire new livestock assets. 42% of agro-pastoralists and 80% of key informants strongly agreed more food was available for consumption as a result of the livestock intervention. 47% of the agro-pastoralists and 60% of the key informants strongly agreed more income was generated as a result of the livestock intervention.

The observations were subjected to Spearman's correlation to determine the relationship between food security and the interventions. Table 4.2 shows the results.

**Table 4.2 Effects of livestock interventions on food security**

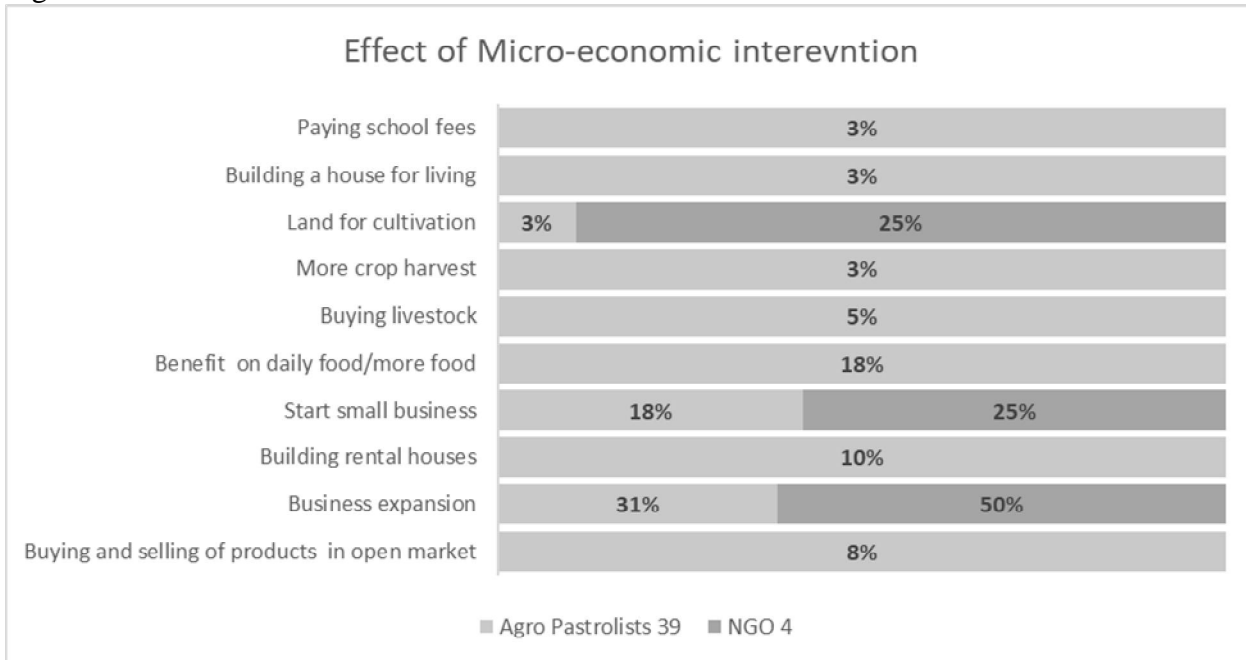
	<i>More food for consumption</i>	<i>Acquisition of new livestock assets</i>	<i>More income from livestock produce</i>
More food for consumption	1		
Acquisition of new livestock assets	0.9	1	
More income from livestock produce	0.9	0.9	1

Table 4.2 indicates that there was positive correlation between acquisition of new livestock assets and food available for consumption as demonstrated by  $r=+0.9$ . This means that as new livestock assets are acquired more food would be available for consumption. Similarly, there was positive correlation between acquisition of new livestock and income ( $r = +0.9$ ). As new livestock was acquired more income would be available from sale of livestock products. There was also positive correlation between income and food consumption as indicated by  $r = + 0.9$ . This means increased income enabled households to purchase more food for consumption.

## 22.0 Effect of Micro-economic intervention

In order to determine the effect of the Micro-economic intervention, respondents were asked if the intervention was beneficial in anyway. Figure 4.5 and 4.6 illustrate the results.

Figure 4.5 Effect of Micro-economic intervention



31% of the agro-pastoralists who were beneficiaries of Micro-economic intervention reported business expansion as a result of the intervention, 18 % started new business and 18% reported more food. 50% the key informants (NGO) indicated business expansion, 25% started small businesses and 25% purchased land for cultivation.

Figure 4.6 Effect of Micro-economic intervention

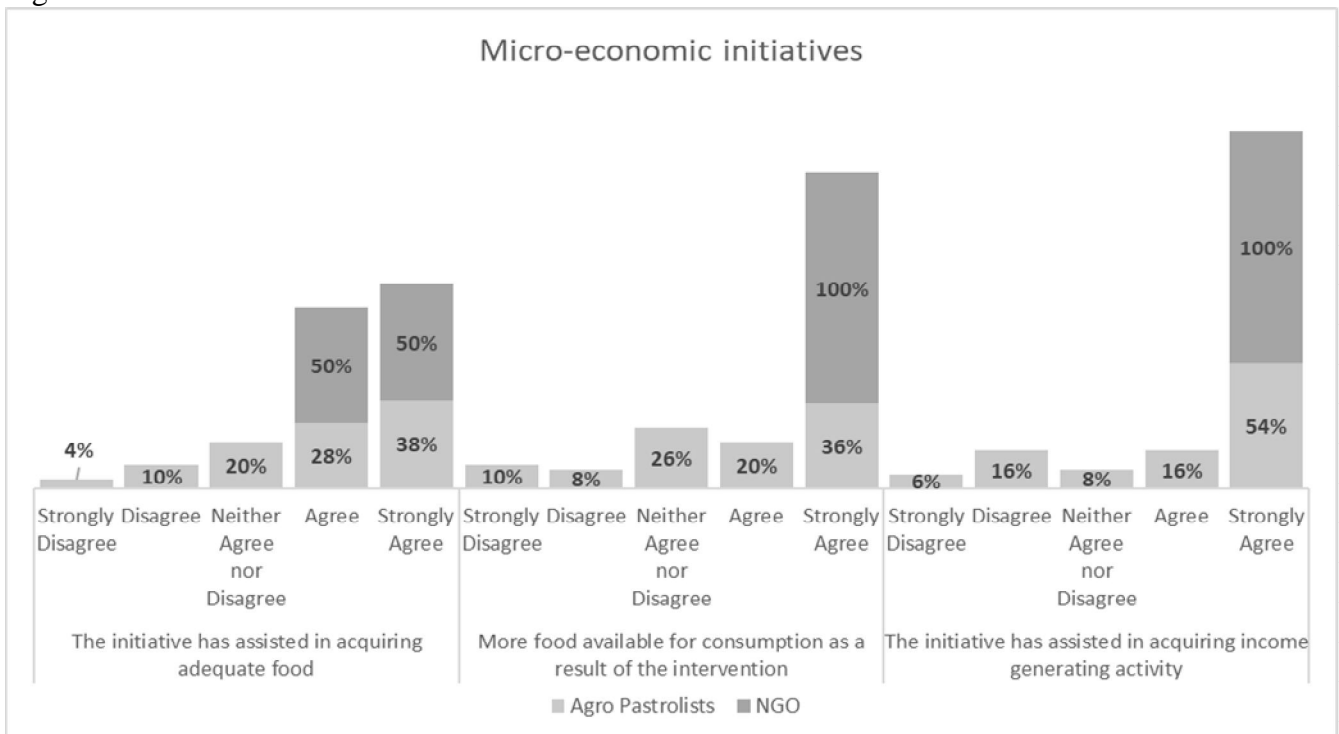


Figure 4.6 indicates 38% of agro-pastoralists and 50% of key informants strongly agreed that the Micro-economic intervention assisted in acquiring adequate food. 36% of agro-pastoralists and 100% of key informants strongly agreed more food was available for consumption as a result of the intervention. 54% of the agro-pastoralists and 100% of the key informants strongly agreed the initiative assisted in generating more income.

The findings compare with other studies that revealed in many countries, especially Zambia, Malawi, Ethiopia and Kenya, Cash Transfers are highly effective in increasing food consumption and the beneficiaries' accumulation of productive assets. Evidence also shows that while these measures effectively expand food consumption and asset accumulation, thereby increasing households' resilience, Cash Transfers must be linked to other interventions in order to sustainably move households out of food insecurity. In Sub-Saharan Africa, Cash Transfers have been proven to effectively fight hunger and helped to increase calorie intake and expand beneficiaries' access to food, primarily through increasing their productive assets (Burchi & Strupat, 2016).

Other evidence reveal that cash and vouchers can be as effective, and in some cases more effective, than food aid in improving certain measures of food consumption, and specifically that cash and vouchers tended to show stronger improvements in measures of dietary diversity than food aid (Bailey, 2013).

A study from Zambia revealed Cash Transfer increased expenditure on food, increased number of meals per day, increased consumption of nutrient-rich food items and increased proportion of food secure household. The results of study pointed to the conclusion that Cash Transfers had a large effect on food security, not only through increased consumption, but also through improved quality of diets and less severe experiences of food security (Hjelm, 2016).

The observations were subjected to Spearman's correlation to determine the relationship between food security and the interventions. Table 4.4 shows the results.

**Table 4.3. Effects of Micro-economic initiatives on food security**

	<i>More food for consumption</i>	<i>Acquisition of adequate food</i>	<i>Acquisition of income-generating activity</i>
More food for consumption	1		
Acquisition of adequate food	0.8	1	
Acquisition of income-generating activity	0.8	0.7	1

Table 4.3 indicates that there was positive correlation between income generating activity and food consumption as demonstrated by  $r=+0.8$ . Similarly, there was positive correlation between acquisition of income generating activity and acquisition of adequate food ( $r = +0.7$ ). This means income-generating activity had enabled households purchase more food for consumption.

### 23.0 Effect of intervention to improve living condition

In order to determine the effect of the intervention targeting living conditions, respondents were asked if the intervention was beneficial in anyway. Figure 4.7 and 4.8 illustrate the results.

Figure 4.7 Effect of intervention targeting living condition

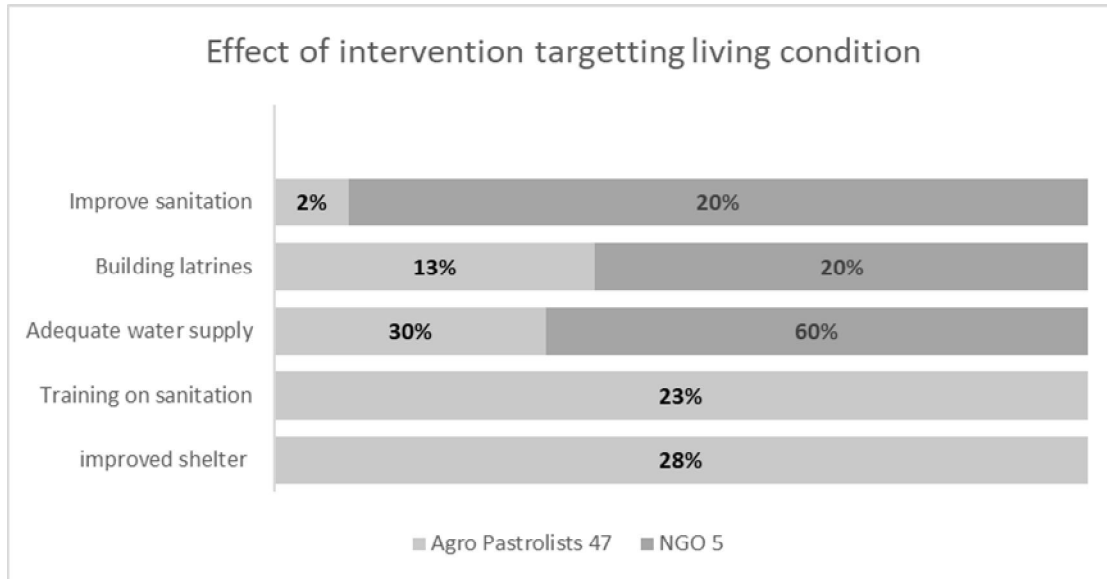
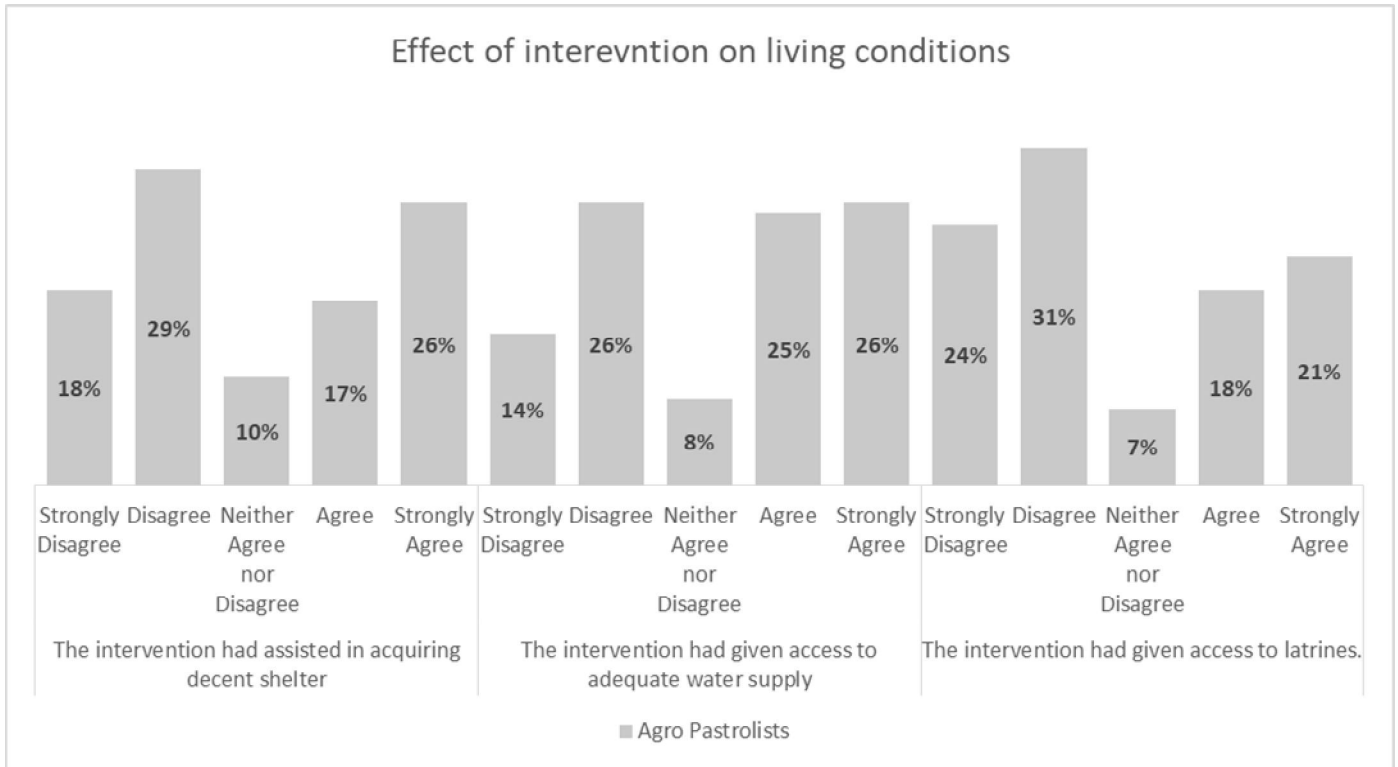


Figure 4.7 shows 30% of the agro-pastoralists who received intervention targeting living condition reported adequate water supply, 28% improved shelter, 23% training on sanitation while 13% indicated building latrines as a result of the intervention. Among the key informants 60% indicated having provided adequate water, 20% building latrines and 20% improving sanitation.

Figure 4.8 Effect of intervention targeting living condition



The results indicates 26% of the agro-pastoralists interviewed strongly agreed that the intervention targeting living condition assisted in acquiring decent shelter and access to adequate water supply. 21% of the respondents strongly agreed that the intervention had given access to latrines.

The observations were subjected to Spearman’s correlation to determine the relationship between food security and the interventions. Table 4.5 shows the results.

**Table 4.4 Effects of interventions targeting living conditions on food security**

	<i>Acquisition of descent shelter</i>	<i>Adequate water supply</i>	<i>Access to latrines</i>
Acquisition of descent shelter	1		
Adequate water supply	0.7	1	
Access to latrines	0.8	0.6	1

While interpreting the results of Table 4.4 it is important to bear in mind that decent shelter, adequate water supply and access to latrines are considered as elements of food security. Table 4.4 indicates that there was positive correlation between adequate water supply and decent shelter as demonstrated by  $r=+0.7$ . This means that adequate water supply contributes positively towards acquisition of decent shelter. Similarly, there was positive correlation between access to latrines and



decent shelter ( $r = +0.8$ ). This means access to latrines contributes positively towards acquisition of decent shelter.

The findings compare with the popularity of WASH (Water supply, Sanitation and Hygiene) programmes especially during disasters. The objective of WASH is to reduce transmission of diseases through promotion of good hygiene practices, provision of safe drinking water and reduction of environmental health risks (Ersel, 2015). Global health experts are recognizing that the challenges of food security will not be met until safe drinking water, sanitation and hygiene are available in the world's poorest communities (Teague, 2018).

When household's lack basic water and sanitation services it perpetuates cycles of gender inequality and poverty, reducing household resources and opportunities to access and afford nutritious foods. A study in Sudan revealed when the poorest households spend their income on water, that money is often taken from their food budget. In rural areas women spend much of their time collecting water and/or caring for family members who are sick from contaminated water. As a result they lose opportunities to participate in income-generating activities, further decreasing households' abilities to purchase nutritious foods. Another study in Bangladesh revealed that proper disposal of child faeces in an isolated space resulted in a 35 percent reduction in intestinal parasite infection. Handwashing with soap, a basic hygiene practice, can reduce the risk of diarrheal disease by approximately 45 percent (Teague, 2018).

Food security is about food availability (production) and access, however, it is also about food utilization. The latter aspect of food security (utilization) makes water, sanitation and hygiene (WASH) as elements of food security (Wendland, 2012).

## **24.0 CONCLUSIONS AND RECOMMENDATIONS**

### **25.0 Conclusions**

The study revealed that interventions targeting farming such as provision of fertilizers, farms tools and seeds resulted in increased crop production. Income of the households also rose from sale of farm produce. As a result, more food was available for consumption from both increased crop production and income that enabled households purchase more food. Majority of the respondents interviewed (65% of the agro-pastoralists and 67% of the key informants) strongly agreed farming intervention led to increased crop production. However, despite the significance effect of this intervention on food security, only 18% of the agro-pastoralists confirmed having received it.

The study showed livestock intervention enabled agro-pastoralists acquire new livestock assets. As a result, more income was generated from sale of livestock products which enabled households to purchase more food for consumption. Therefore, acquisition of new livestock assets (restocking) as an intervention contributes towards enhancing food security.

The findings of the study revealed Micro-economic initiative led to business expansion, set up of new businesses and increased income-generating activity. The increased income obtained through the intervention enabled households purchase more food for consumption. Therefore, Micro-economic initiative as an intervention contributes towards improving food security.

Finally, while analyzing the results of the forth independent variable (living condition) it is important to consider decent shelter, adequate water supply and access to latrines as elements of

food security. The results revealed that provision of adequate water supply and latrines are essential for the acquisition of decent shelter and therefore contributes towards attaining food security.

## 26.0 Recommendations

Pastoralism is the main livelihood of communities living in Northern Kenya. This livelihood is affected by frequent and protracted drought which renders the region food insecure. It would be worthwhile to encourage these communities practice crop production together with livestock keeping. This study revealed that supporting farming activity through farming interventions such as provision of fertilizers, seeds and farm tools led to more food availability for consumption. However, such intervention was low in the region as shown by the fact that only 18% of the agro-pastoralists interviewed confirmed having received it.

In order to improve the food security of the agro-pastoralists, it would be useful to provide new livestock assets (restocking) as a key intervention measure. This study showed acquisition of new livestock assets resulted in increased income from sale of livestock products which enabled households purchase more food for consumption. The livestock sector, especially in Northern Kenya, is envisaged to play a key role in promoting economic growth in Kenya by the year 2030 under the Strategy for Revitalization of Agriculture (SRA) set out by the Government of Kenya (GoK). Therefore, the realization of such a vision requires investment in the sector through interventions such as provision of water points, veterinary services and restocking, which this study revealed had a significant effect on enhancing food security.

The study revealed that Micro-economic initiative resulted in income generating activities that enabled households purchase more food for consumption. This initiative would be useful in terms of offering an alternative livelihood to communities especially during prolonged drought. The intervention would provide an alternative income generating activity that will help vulnerable communities cope with the effects of adverse weather by giving them an alternative source of income that will enable them acquire more food for consumption.

Finally, considering the fact that decent shelter, adequate water supply and latrines are elements of food security, the study revealed provision of adequate water supply and latrines promote or contribute towards decent shelter. We can only talk of decent shelter when we have adequate water supply and latrines. Therefore, any intervention aimed at providing decent shelter should include provision of water supply and latrines as a measure to enhance food security.

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