

Practising on-farm diversification and its contribution to food accessibility among smallholder farmers of Balcad district, Middle Shabelle region, Somalia



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Dedication

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ABBREVIATIONS

MoAI	Ministry of Agriculture and Irrigation
FSNAU	Food security and unit
SWALIM	Somalia water and land
FAO	Food and agricultural organisation

ABSTRACT

Smallholder farmers' practise on-farm diversification has considered an optimal plan for farm decision to mitigating the varying degree of factors and risks surrounding food production. Moreover, directly benefit from increasing household income. Smallholder farmers in Balcad district practised on-farm diversification, and these households earn income. Based on the research among these household have good food access and living standards. The objective of the study was "To assess how on-farm diversification activities contribute to the household food access and the ability of the household to purchase food". The study was carried out in Balcad district in Middle Shabelle Region, Somalia, from mid of July to end of August 2018. The study purpose was to find how on-farm income-generating activities are significant determinants of the ability of the household to purchase food. The researcher employed desk study and field data collection. The desk study was conducted through literature review and data collection among 24 respondents were used Semi-structure interview, and 8 of them were observed. The findings of the household characteristics interviewed revealed that the majority of them were educated while two of them did not have an education background. The respondents were planting different crops and keeping livestock on their farmland. Cash crop (sesame) was a significant crop for 37% of the respondents involved, while staple food like maize and sorghum were the second important crops. Some respondents involved food crop and livestock at same; this livestock was used as back up when they need money and using as a coping strategy to sell it. The primary reason (42% of the respondents) found for practising on-farm diversification, according to the perception of the respondents, was that they benefit to increase their household income, while the remaining interviewees found different purpose such as to avoid risks related to farm and to meet the household necessity. The findings showed that remittance contributes to the key role to enhance on-farm diversifying

The study found that on-farm diversification has a positive relationship with household income. The increase of farmers' income positively influenced household food accessibility. However, smallholder farmers are facing different challenges included Lack of capital; poor seed quality and lack of government service have negatively affected on-farm diversification. The study's findings cumulated into these recommendations, create farmers' cooperative can also strengthen the social capital relationship between smallholder farmer. Improve the smallholder farmer knowledge; there is a need for training to enhance their skill and knowledge in the agriculture. These recommendations will help the Somalia Ministry of Agriculture and Irrigation to develop future programmes.

CHAPTER ONE

INTRODUCTION

1.1 Background

Somalia has a total land area of about 137,600sq km. The recent estimation of about 3% of the land was under cultivation from the total geographical area of the country. While 7% of the total land has the potential for agriculture production. Crop production and pastoralism have dominated the Somali economy. Around 67% of the population resided in the rural area with 55 per cent involved in agriculture and nomadic pastoralism. Almost every rural areas household relies partly or entirely on livestock and crop farming as income generation and food security (SWALIM, 2012).

Agricultural production is next in importance to livestock and its contribution to household economics. The principal cereal crops cultivated in Somalia are sorghum and maize. Each plant was fully grown under rainfed and under irrigated conditions. Commercial crops such as sugar cane, bananas, grapefruits and rice were also successfully cultivated in the south along the two rivers. The annual country rain ranges from 63 millimetres on the northern coastal areas to merely below 600 millimetres at higher elevations in the south and also the northwest. While Oasis farming, found in the northeast and west, is historically based on date palms, papaya, citrus, and Fodder production. In recent years, vegetable production has fully grown in importance coupled with the increased Population of the urban centres. The South and central Somalia initiated irrigation (pumped and flood) along the Juba and Shabelle rivers (European Union, 2010).

Agriculture is the primary sources of livelihood for the rural population, particularly in South Somalia. Ninety per cent of irrigated and rain-fed crop production comes from the alluvial plains and inter-riverine areas of the Juba and Shabelle rivers, where 60 per cent of the population lives. Considering that, rain-fed agriculture is dependent on limited and erratic rainfall, irrigated agriculture is crucial for food security and livelihood. Somali livelihood mainly describes three livelihoods. Pastoral who have land mass 470,000km² (approx. 72% of total area) and the population is about 2.3 million (29% of total). Agro-pastoral were estimated the land mass of 151,000km² (23% of total area) the number of the population is 2 million (26% of total). Riverine were estimated 13,300 km² (2% of total land) the population depend on this livelihood was estimated at 370,000 (5% of total) (Summary *et al.*, 2010).

Balcad district household food access seems to be the most prominent underlying cause of food insecurity and poverty. Smallholder farmers are seeking ways to help sustainably increase their income in farms. More than 6 million people live in a rural area where crop farming is their primary activity in Somalia. On-farm diversity income of cropping season (GU and Deyr) market food prices tend to be at their highest. Smallholder farmers become more food insecure during the dry season if they do not have saving food stock or credit. The prevalence of these rural communities is poverty, and it is absolute seasonal terms (FNSAU and FEWS NET, 2018). The achievement of secure and stable family income is typically presumed to be a fundamental step out of food insecure (Henriette D., 2007). Smallholder farmers living in Somalia face various types of risks such as climate change, pest and disease and price fluctuation. On-farm sustainability can be seen as a spontaneous reaction to prevent certain risks (Culas and Mahendrarajah, 2005). According to Frank, (2010) "households engage in multiple farm activities with their territory and sustain such portfolios to mitigate farm risks as well as increase household income".

Balcad district has a suitable ecological condition for crop production. Also, Smallholder farmers are mainly dependent on agriculture production, farming of cash crop in the area designated a significant enterprise and having the potential core source of income to the household. Balcad district farmers engage in a variety of farm activities. However, they do not have any government support. The main

farm activities in Balcad district are agricultural farmers (growing staple food, cash crop, vegetable), pastoralist (rearing livestock like cattle, goats and sheep) and agro-pastoralist (both crop and livestock).

The organisation of the thesis

This thesis paper is organised as follows: the first chapter is an introduction, describes the research problem and the problem owner, objective and research question. The second chapter is all about the presentation of relevant literature and the conceptual framework and operationalisation. Presentation of the research methodology including a description of the study area is the subject of the third chapter. The fourth chapter is where the findings from the household survey questionnaire and key information of the respondents are presented and discussed. Finally, the fifth chapter incorporates the conclusion and recommendations.

1.2 Problem statement

Somalia is one of the 22 nations in the world today in protracted crisis. This crisis has been caused and perpetuated by natural disaster and conflict. The most negative effect has been its impact on households overall welfare and their resilience. Households have experienced loss of livelihood capitals, food insecurity, loss of human dignity and acute poverty. These might have been some of the factors that lead to the unending conflict in Somalia. A World Bank report (2017) discusses many of the drivers of Somalia's conflict including poverty, food security, oppression, being the primary drivers of the conflict in Somalia. There is a mixed picture being shown about Somalia's poverty, inequality in household income indices as compared to the neighbouring countries' economies. Somalia's per capita income was estimated at \$226 US dollars, this is lower compared to that of Kenya and Tanzania at \$280 but higher than Eritrea and Ethiopia (World Bank, 2017). It is estimated that 43% of the people live in abject poverty; income inequality is very high in the country. Majority of Somalis' receive only 1.5% of all income generated in the country while some 10% receives over 35% of the income generated (World Bank, 2017).

Somali smallholder farmers rely almost entirely on growing a small range of crops. They are mainly dependent on a narrow livelihood base (growing one crop) that renders them vulnerable to external shocks (drought and flood) that affect vulnerable groups such as farmers and nomadic pastoral communities. Household heads and in some cases other members of the household have been forced at times to seek livelihood alternatives elsewhere to sustain their families (FAO, 2004).

Government support services to farmers have not always been effective as a result of the inadequate investment, rarely meeting the demands of farmers for inputs and capacity building. With the total failure of the central government and the resulting social disruption leading to insecurity, the provision of vital services further deteriorated. The situation is more severe and worse in South Central Somalia including Balcad District.

The Somalia Ministry of Agriculture and Irrigation has lack of knowledge on the contribution on-farm diversification to improve the household food accessibility. In addition to that, the role of on-farm diversification in the reduction of food insecurity particularly food access is not known. Therefore, the research aims to fill this knowledge gap.

1.3 Research Objectives

The study objective is to assess the contribution of on-farm diversification to household food access. The food access will address whether the households have enough resources to acquire an appropriate quantity and quality of food. The research will recommend to the Somali Ministry of Agriculture and Irrigation to support Balcad district communities to create livelihood interventions, improve the resilience of Balcad smallholder household and strengthen their food accessibility.

1.4 Research Question

This research project will answer the following research questions

Main question:

What is the contribution of on-farm diversification to household food access in Balcad district?

Sub-questions:

1. What are the household characteristics that determine the degree of on-farm diversification of smallholder farmers?
2. What forms of on-farm diversification are smallholder farmers in Balcad district engaged in?
3. What is the role of on-farm diversification to the household income?
4. How can increased household income strengthen food accessibility?

1.5 Hypotheses of the study

The following were the hypotheses of the study

1. The smallholder agricultural income of the mixed on-farm diversified (crop & livestock) farms is higher significantly different from that of the crop farm diversity diversified farms.
2. Household size and education level of a household significantly influence on-farm diversification income
3. On-farm diversification contributes significantly to overall household food access.

1.6 The significance of the study

This study can enrich the stock of existing but limited knowledge and literature whose focal point is on-farm diversification relation to food access of smallholder household in Somalia (Balcad) and thus can serve as reference material for Somali Ministry of Agriculture, academics and researchers. Most important to me, this study can give a better insight into the role of on-farm diversification to household food access and enhancing welfare situation and reducing food insecurity and therefore decrease the poverty of smallholder farmers.

1.7 Limitation of the study

As a researcher, there would always be a certain limitation. This study has also encountered specific challenges in the course of collecting data from the study areas. The first challenge was security; it was difficult to reach the initial study area of Jowhar because there was a security issue on the road between with the capital city of Mogadishu to study area of Balcad, it was a very high risk to travel that road. The terrorist group Al-Shabaab were targeting government officers who are travelling that road. Also, this situation forced to change the study area from Jowhar to Balcad district.

The second challenge was the timing of the field data collection occurred during the GU' harvest period, GU season is one of mainly cropping season in Somalia, and smallholder farmer after receiving rain of this season start cropping and that raining period is late April to June. (See Appendix Somali seasonal calendar), and respondents were busy on their farmland. To cope with this difficulty, I tried to work with them as a volunteer, take part in most of the activities going on the farm, and it helped to interview and observe some of these smallholder farmers.

CHAPTER TWO

Literature review

2.1 The concept on-farm diversification

Farm diversification as defined by Mitchell and Marsalli 2006 is the process by which an existing farm business incorporates other alternative enterprises. It is a combination that can include aspects like growing of different crops and the rearing of farm animals within a farm in an effort to increase both food accessibility and income (Mahendrajah et al. 2005). Mitchell and Marsalli (2006) go further to say that diversification is a form of a strategy geared towards farm adaptation and entails reallocation and recombination of farm resources, which lead to a shift from original main farm activity. Farm diversification does not always involve the use of farm resources and materials; it sometimes can involve one engaging in off-farm labour. As one engages in diversification, they are in a way trying to reduce vulnerability, and it also portrays how one is flexible in an era of risks. Like any other enterprises, in farming there lies risks and uncertainties, an example been drought. For that reason, it is wise for one to have alternative economic activities, which help the household to build resilience. Joane W.K. (2006) outlines that the effective management of multiple activities is a key dimension of most household livelihood system and that this ability helps to smooth seasonal peaks and troughs of household income.

In their definition of farm diversification, Barbieri and Mahoney (2009) say that a farm uses its agricultural resources such as land holdings, buildings, machinery and labour to produce income from activities that are not defined as conventional farming or towards processing of its on-farm raw materials. Farm diversification refers to activities both on or off the farm that encompass by-product activities of the agricultural production, or access to new markets within or outside the agricultural sector (Lange, Piore, Siebert and Zasada, 2013). Two types of farm diversification can be distinguished according to Bartolini F et al. (2013). The first one is when a farm business uses any of its farm resources to produce income from activities outside conventional agriculture, like farm shops and tourism, renting out of machinery and building as well as processing on-farm products. The second one entails diversification of the agricultural enterprises or farm business. The study will focus on the second type of on-farm diversity. This occurs when there is diversification of the agricultural enterprises through two or more agriculture enterprises, such as grain and milk (Bartolini, F. et al. 2013).

According to Barbieri and Mahoney (2009), farmer's decision to diversify their operations is due to different goals which can either be financial or non-financial related. The most important diversification goals are a generation of additional income and enhancement of quality of life. They further classify diversification goals into six dimensions which are: enhanced financial condition, revenues enhancement, family connections, growth and service markets, individual aspirations and pursuits, reduce uncertainty and risk. The research will focus on the two of dimensions include enhanced financial condition and reduce uncertainty risk of smallholder farmers. These dimensions contribute to household food accessibility. Farm diversification of particularly for small and marginal farm holdings is recognised as a survival strategy to generate additional income (Lange et al., 2013). The type and manner a household diversifies as a form of livelihood strategy depends on a number of reasons as well as the environment household is in but it is mainly driven by trying to curb against poverty. Maman et al 2008 highlights that farms tend to diversify in areas where water is available and household income is low. This is so as diversification is seen a mechanism that positively influences income and food security within a household.

2.2 Role of on-farm diversification

In as much as farm diversification leads to positive outcomes, it requires a certain level of capacity and capability for such an achievement to be obtained. Farm diversification remains a risk to embark on, though it is a way of reducing risk by itself. This thus calls for one to make decisions on the trade-offs between the current and the expected returns from diversification. Diversification requires a certain amount of investment, which may sometimes lead to a reduction in household income. According to Mitchell and Marsailli (2006), the expected profits from diversification must be weighed against the investments required to establish an alternative enterprise as a first step. They further on highlight that in their studies farmers who diversified tended to be older and had larger farms, which indicates the role that experience and business size plays inability to diversify as well as that farmer still diversified even though their incomes were reduced by it.

Farmers face many problems, which severely affects their farm productivity. In an effort to curb against adverse effects like the vagaries of nature farmers diversify. Maman et al. (2008) say that it is difficult for poor farmers to diversify due to their lack of resources and that diversifying is meant to bring food and income to a household if done properly. Mitchell and Marsali (2006) say that farmers diversify due to the multiple perceived risks like price and market fluctuations of each different enterprise, which can be either positive or negative. This notion is supported by Adam (2010) who says in making farms diversified; farmers would have the ability to grasp a range of benefits that would not be normally available in traditional farms. He goes further to say when smallholders shift from primarily just producing for consumption into the addition of other enterprises like cash crops farming, they increase their cash in hand, create salaried wage labour from non-farm business and ultimately stabilise total household income.

The onset of market liberalisation in sub-Saharan Africa in the early 1990s leads to incidences of a wave of price fluctuations as the farmers were now operating in an open economy. However, the negative side of it, in price fluctuations is a significant risk for farmers who heavily rely on a few crops for cash generation. This generally threatens the rural livelihoods of the farmers especially those that generally primarily produce for consumption reasons with a side cash crop for income generation. The market liberalisation also leads to most African governments developing policies that restrict development of private food staple markets as an unrestricted trade might lead to food security crises. Staple foods tend to have big margins between sales and purchase prices thus suffer from high seasonal price increments and scarcity in markets whenever supplies fall short. It is from diversification that new input markets are created as well as processing industries, which all lead to economic development. (Kimenju and Tschirley, 2008).

Smallholder farmers gradually shift farming systems as they venture into diversification through first venturing into cash crops or trading in livestock while at the same time making sure they have enough for household food consumption. Shawki et al. (2004) highlight that farm diversification motivates farmers to look at other opportunities and that by adding new activities emanating from the new enterprises, farmers learn to see what best suits their conditions and which activities to discard due to non-alignment to the farm environment. He further adds that the most notable reasons behind diversification are due to the need of reducing environmental shocks, ecological (pest and diseases) and economic risks.

2.3 Food accessibility

FAO (2006) outlines that a household can access food through home production, purchase, food aid or borrowing and that this food has to be sufficient in quantity and quality as well as been nutritious. In their definition food accessibility refers to either economic or physical accessibility of food. However, this research focuses on household food accessibility through on-farm diversification. Food should be easily accessible through home production, purchase, food aid and borrowing. For a household to attain food access or availability, there is need of it having the necessary essential resources that can be converted or exchanged in the process. The resources utilised can be acquired from different income or non-income generating activities. This can encompass activities like food production, wage labour or other business activities that allow a household to access food directly or indirectly (Hoddinott, 2012).

Smallholder farmer has suffered from a severe drought for several years, which led to a production failure characterised by a decrease in the production of crops. Moreover, it caused a significant increase in food price inflation, meaning that the available food was far more expensive. On-farm income-generation. As Mahendrarajah (2005) attest that, a household is able to mitigate against agriculture-related risks through diversification thus making the act a livelihood strategy. If a household has access to income-generating activities, their ability to purchase food increases. In the same manner, having food access is significantly increased by one having access to natural resources like agricultural land and water, which are the primary determinants for food production (Pieters et al. 2013).

With Somalia smallholder farmers termed as the primary producers of food, they thus play a significant role in the household food access chain. Food access is discussed under various measurements, which includes income and cash crop diversification. Lipton M (2005) identifies poverty is the major limiting factor contributing towards many developing countries inability for communities to access food. It is thus vital to centre on the primary producers of food, as a measure to try to increase food access as well as engage in farm diversification as increases food quantity and ability to have quality nutritious food from either production or purchase.

2.4 Household

Household formed as the social group that resides within the same place, share a similar meal, and makes joint or coordinated choices over resource allocation and income pooling.

2.5 Conceptual framework

The sustainable livelihood framework was used in the research because of it a tool that is used to analyse the complexity of people's livelihood especially the poor in society. Therefore, this research adopted the sustainable livelihood framework because it was used to analyse the small scale or peasant household farmers. An aspect of the framework used for the research was the vulnerability context of the area, some components of the livelihood assets. Assets looked in the study were a financial asset, financial, financial assets and human assets.

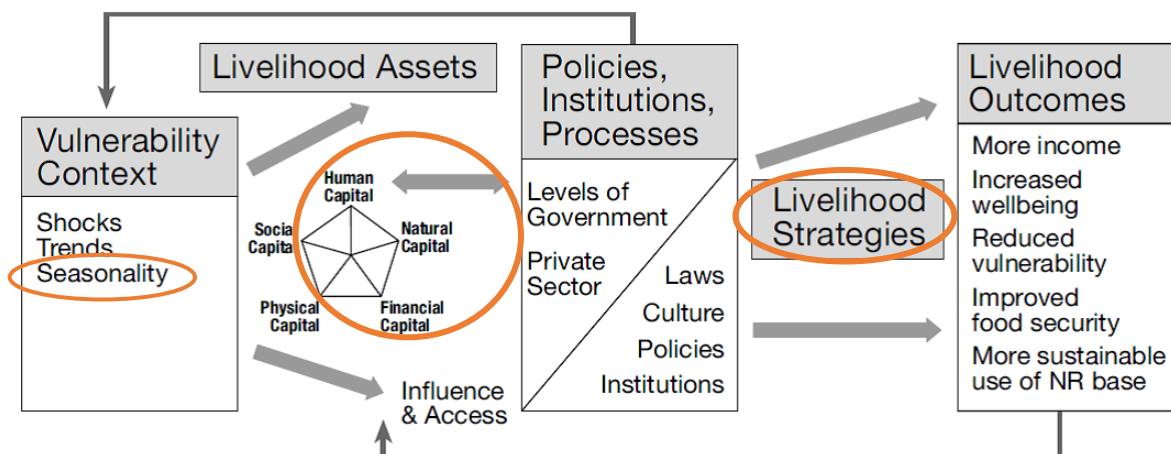


Figure 1 Sustainable Livelihood Framework (DFID, 1999)

2.5.1 Vulnerability Context

On seasonality, climate change is considered to increase the incidence of drought and removing vegetation from the range would increase runoff and may lead to flooding. A shift in food prices, shortage of rainfall, and food shortage on the dry season are another seasonal.

Smallholder farmers are dependent on on-farm diversity are also experiencing challenges, farmers are mainly dependent on rainy season, and they grow twice a year. The district distribution of the rain is uneven, and most of the rain is received between April to June (that is GU season) and September to December (Deyr Season), even though there is a third season well known Hagaa. However, the cultivation of this season is very low, and the rain they receive is not enough to plant. Also part of the smallholder farmers are dependent on irrigation, Balcad district has Shabelle River, which passes through the district. Shabelle River is the longest river inside Somalia, this river cover and relies on three regions.

2.5.2 Livelihood Assets

The livelihood assets research will focus on natural, financial and human capital

2.5.2.1 Natural

In respect of the smallholder farmers in Balcad district, the land tenure relies on customary. In general, the family often holds the land or individuals and an individual in the community may give out a piece of land to another member of family or non-family for use. The traditional land tenure system prevails for smallholders. According to Norton, G. (2008), "permanent Somalia pasture land was estimated at 56% while 13% estimated for suitable cultivation, and 20% is classified forest land."

Farm size in an arable area devoted to the primary goal of producing food. According to Kassie et al. (2012) argue that the farm size and land tenure is the pillar of farming livelihoods under any circumstance. This nature of small farms places a limit on the extension of on-farm diversification production area and emphasise the need for productivity increases. However, most of these farmers cannot increase because of lack of fertilisers, hybrid seeds and agro-chemicals, it will not allow all the land available to a household to be utilised for food production due to the subsistence nature of the farm practices, where a small area of land are required to produce subsistence food. Limitation in the availability of arable land means that Balcad district households who have small pieces of landholding do not have access to adequate operational land for crop production.

2.5.2.2 Financial Capital

Financial capital availability is a significant asset in enhancing increased on-farm diversification and household productivity. The household in Balcad District generally lack sufficient cash resources to meet their needs and access to credit is very difficult. However, numbers of NGOs have been playing an essential role in trying to address this challenge by providing the communities with seed and fertiliser relief. The general lack of credit can be attributed to absence of credit institution in the district.

Moreover, lack of collateral and reluctance by smallholder farmers to loans. Poor households of the community have access to some financial support. The Zakat of live animals, typically small ruminants like sheep and goat are given poor/vulnerable people during the first month of the Islamic calendar. Households in the village receive temporary loans; for example, the better household lends their lactating animals to another low-income family in the village so that they can obtain milk. Once the lactation period is over, it comes the animal to its owner.

Using of remittance it makes Somalia the first countries, and some of these remittance branches have found a town and village. The socio-culture of Somali population is very dependent on its people to help each other through money transfers. Remittance has played a critical role in cushioning the impact of the humanitarian crisis in Somalia. According to World Bank pointed, the remittances from American Somalis, estimated by the U.S Department of Treasury at close to \$100 million annually, have kept families from hunger and starvation. Remittance had other sources of income to the household in Balcad district.

The remittances allow to the households to top up own-generated income as measured by GDP per capita (FAO, 2010) remittances can help to smooth shocks and improve household welfare conditions, however, have a limited impact on the most vulnerable people. According to the World Bank (2017) pointed out that cash transfers provided an effective means of resilience to adverse shocks. It shows that they are an apt means for households to deal with such adverse shocks

2.5.2.3 Human capital

Human capital is the availability of skills, knowledge, and skills embodied in the ability to perform labour to produce economic value. The most vital source of farm labour in the smallholder farming system is the household itself. The education level of the household is always an essential indicator of the viability of the smallholder agriculture production. Education level particular skills have an influence on the nature of information accessed and the type of planning at the farm level. Education has a significant influence on the processes of inclusion and exclusion within communities UNESCO (2010). If the farmer has a low literacy level, it has a bearing on agricultural development as it affects the understanding capacity of the farmers and limiting the adoption of new techniques of on-farm diversification and agricultural technologies. According to FAO (2010) enhancing agricultural productivity goes beyond increased farm output, farmers must operate like entrepreneurs, and this requires education of some kind to make a reasonable decision.

2.5.3 Livelihood strategies

Livelihood strategy aimed at coping with temporary adversity or more permanent adaptation of livelihood activities. On-farm diversification involves developing a wide income-earning portfolio to cover all types of shocks or stress. The study will focus smallholder farmers coping mechanisms, which handle a particular type of seasonal shock. These smallholder farmers are typically divided into two, agro-pastoralists, which have mixed diversity of crop and livestock and crop farm diversity farmers (only crop diversity). Mixed farm diversity, are mainly depend on crop production and animal rearing, their income comes from the sale of crop, livestock and livestock production. These smallholder farmers are using as coping strategy to sell food stock, to sell their livestock, slaughtering of newborn livestock by getting income to protect other livestock, reduction of food consumption, decrease their household size by sending part of their children to live with close-relative in the city and getting social support by sending money through remittance. Crop farm diversity households are the most productive farmers in Somalia, as they rely on the river, their lands are close to the riverside, and their main income comes from irrigated cash crop. Their coping strategy included sell food stock, casual job particularly farm labour, migration from rural to urban to find job opportunities.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology that used in undertaking the study. In order to present the entire methodology in a logical flow, the chapter focuses on the study area, research design, study sample, data collection, data analysis and processes, and validity and reliability of the research. The chapter concludes on the ethical considerations.

3.2 Study area

The Middle Shabelle region is well defined as the existence of the largest river in Somalia called Shabelle river allowing farmers to use as irrigation to their farms, and also fishing opportunities as a source of income. The Middle Shabelle region is neighbouring by the capital city Mogadishu and creates a market opportunity for farmers export their products in Mogadishu. The economy of the regions depends on main agriculture, agro-pastoralist, fishing, and trade. In the region, the farming benefits from the Shabelle River and enabling to irrigation, which can be done without an irrigation pump. Balcad district is one of the Middle Shabelle regions of Somalia. The district is located about 36 kilometres northeast of the Benadir region (capital city of Mogadishu). Through the city of Balcad district passes on of Somalia's permanent river called Shabelle River, Balcad also has a neighbour of the Indian Ocean and has coast of about 70 km. Balcad district has an area of 4,400 square kilometres with an estimated population of 642,000 and 82 villages. The district is famous for livestock, agriculture and marine (UNDP, 2005).



Figure 2 Balcad District Map source: www.somalia.liveaumap.com

3.2.1 Economic Background

Before the collapse of the central government of Somalia, Balcad economic had depended on Somalitex manufactory, whose 154 automatic looms work fourteen hours on a daily basis, springing up nearly fourteen million meters (about fifteen million yards) of cloth annually the factory employed 3 thousand employees. The Somalitex fetus varies in thickness, colour, and style and most retailers within the marketplace stock them similarly as the foreign polyesters. The latter, though impractical within the tropical heat, torn merely and dearly won, appear to possess captured the style of Somali women by their bright patterns and varied textures. Given the best climate for cotton plantation in Balcad, The state-owned textile plants at Balcad may provide the local market (now not operating). Textiles are made at the SOMALTEX plant in Balcad that provides just about the completely domestic market. Balcad Textile manufactory was later upgraded and funded by West Germany. SOMALITEX facilities were greatly enlarged. It is thought of among the best-equipped textile plant in Africa. The investment in cotton showed fewer long-run results than the investment in bananas. The Administration of Balcad District of the centre Shabelle Region supported by the Somali federal government encourage the native and foreign investment in the Region.

Balcad district has two natural ports of Ceel Macaan and Ceel Cadde that located. These ports were the main gates for the incoming and outgoing goods of Somalia, before reopening Mogadishu port, likewise Cisiley airport during the decade and a half, when Mogadishu air and seaport were closed after the collapse of the central government.

3.2.2 The food security situation in the Balcad district

Balcad district poverty seems to be the most prominent underlying issue and cause of food insecurity. Also, lack of essential services contributes to chronic poverty and food insecurity in the district. On-farm income activities during the Jilaal season, followed by the Hagaa Season, while during both seasons market food prices tend to be at their highest.

As per the farm income falls and the price of food increases, the primary expenditure of the household goes to directly in food. Hence, the nutrition of the diet is worsening. The accessibility of necessary things like meat and milk decreases throughout the dry seasons and faced challenges like income reduction and an increase of the expenditures, and it is possibly the household become more food insecure during the Jilal season. The three main economic resources of Balad district are farming, pastoralism and fishing. Moreover, these three are interdependent, establishes the foundations for the current economy.

The rainy season of Gu', Hagaa and Deyr are periods of relative food security for significant numbers in both the rural and urban populations and see general economic growth. In district centres, the rainy seasons brings a greater supply of crop production and milk or other livestock products to the market, and that it cause improving dietary intake of the household and creating a high demand for non-livestock products in the rural area. Fishing is also a seasonal activity through October to June, the primary fishing season there is an influx of fishing labourers from rural and urban areas, who move back inland during the off-season.

3.3 Research design

The research strategy is forming the base of approach to study smallholder farmers in Balcad district. A desk study was used during the formulation of the research questions and gaining in-depth knowledge of the key concepts. Moreover, it is deciding which best approach to use to answer the research.

3.4 Study sample

The study followed the technique of sampling which was a random sampling. Random sampling was done for the semi-structured interviews. The first stage involved crop on-farm diversification in the study area, the smallholder farmers who are farming staple food, cash crop and vegetable. The second stage involved mixed on-farm diversification, smallholder farmers that have on-farm diversification of livestock and crop. The study sample was 24 smallholder farmers from the farmers in the Balcad district interviewed. 8 of these smallholder farmers were observed

3.5 Data collection

Data collection was undertaken from 7 July to 10 August 2018. The research method used was semi-structured face-to-face interviews as this engaging account of both, the farmers' lack of experience with research interviews and the innovative nature of this topic. Both primary and secondary data were used in carrying out this research. Primary data was obtained during fieldwork and data collection tools used include semi-structured interviews and observations. Secondary data was used during desk study, scoping the best approach to research as well as relevant literature for more in-depth understanding of key concepts. Observations were also done to see some of the on-farm activities.

3.6 Data analysis and processing

The majority of the data collected was qualitative data derived from open-ended questions were collected. The Data was collected by the use of audiovisual and was later transcribed into writings where the data was sorted into codes, categories and themes. All questions were asked into Somali, the native language of the respondents. Structuring qualitative data into various themes made it much easier for the researcher to categorise the type of responses and to identify contracting views or opinions that were entirely different from the common themes.

3.7 Validity and reliability of the research

To the extent that the main research questions and sub-questions were answered and were consistent with what was found in the literature. For the fact field data was collected using different qualitative methods like interview and observation. Data collected was later saturated with an emerging trend of similar or same responses from different respondents. The personal observation made on the field and reflected the information given by respondents. For the fact that the researcher used recordings and transcribed precisely what the respondents said without allowing his personal views and opinions, this limited the level of his biases to influence the outcome of the researcher. The research is reliable to the extent that if the same methods and tools were to be used by another researcher, he is of the opinion that variation would be insignificant. Data collected was purely on the views and experiences of respondents.

3.8 Ethical consideration

The research consent of respondents was sought first, and questions that the respondents felt uncomfortable to respond were given to them no right to answer. The names of farmer respondents are not used for this research. The researcher was humble and ensured that a message of gratitude was given sincerely. Moreover, the researcher ensured that the research objective was solely academic.

CHAPTER FOUR

RESEARCH FINDINGS

4.0 Introduction

This chapter will highlight the findings from the research falling under the research questions categories. And the results will mainly be descriptive.

4.1 How household size, level of education and land size determines the degree of on-farm diversification

This research question presents the determine degree of on-farm diversification to household size, land size and level of education.

4.1.1 Household Size

The study reveal that the household size of the respondents are, the male household head is made up 4 to 8 members followed by a female household by the female household head with 3-6 members. These results illustrate that the average household size of smallholder respondents is 6 members. The study defined household as persons living together in one house and sharing food.

The household size plays an important role in the decision of on-farm diversity, as well as on-farm diversification encourages family involvement in agricultural production. The respondent said, *“My household is composed of 7 people, all of us taking part in the farm and working together. Moreover, we do not need to hire labour; we are enough to grow our farms”*. Smallholder farmers with a large number of their family members sometimes help their neighbours.

Smallholder household that has a small number of family member meet the challenge; they are facing limit farm labour. Also, they find it difficult to send their children to school. Instead, these households prefer their children to help with the work on the farm. A respondent mentions, *“Before sending children to school, it is important for me to work in the farm so that we can build the household income, if I send children to the school, I and my wife not able to grow this land”*.

Small household sees farm diversity is a result of not bringing children to school. The core principle of the children did not get school is an opportunity cost, the household evaluating the cost hiring of labour and scarcity of farm income, preferring did not children or drop out to the school. The picture above can view how they rely on their children to the farm.



Figure 3 Children supporting their parents to farm activity

The assumption is made of the possibility that larger smallholder households had associated with a negative probability of being food secure that can be explained by the fact that large households mean competition for a limited food basket. When a household size is small, it is hard to find that the household is not enough for the harvest of the farm, as well as asking for help from other neighbour farmers. One respondent said, *“During the harvest season, sometimes happen to start early Hagaa*

rainy season (Xagaa season short rain received coastal farmers), and it is difficult to harvest your farm if you do not have people to help you". Farmers come together to help one another farmer in the field to either harvest, or any other task without payment thus is a form of labour exchange.

Table 1 Household size of the smallholder farmers

Household Head	Min of the Average size of the household	Max of the Average size of the household	The average size of the household	% of each sex household size
Female	3	6	5.125	29.71%
Male	4	8	6.0625	70.29%
Grand Total			5.75	100.00%

4.1.2 Household farm size

From the interviewees, the household size encourages the smallholder farmer to develop on-farm diversification. On-farm diversity contributes to the improvement of the farm production and increases the income of the household. The farm size is one of the most critical aspects of indicating the social capital in a smallholder agriculture system. From the interviewees, the average of the smallholder farmer in Balcad has to hold farm size of 4 hectares. Farm size in an arable area devoted to the primary goal of food production. The study area, landowner of a household headed by male farmers, is more than the female household head, with given priority to men for agriculture it reduces productivity household headed by a female. According to respondent, *"Household head by men have the highest size of land because the family led by men is more active than the other family led by women, and the farm requires a lot of work in different stages"*.

Smallholder farmers in the study area are farmers with low potential. There are many young farmers joining agriculture production in the district, the youth smallholder farmers mainly interviewed inherited the land from parents, after the death of both parents or the mother would have decided to let the son or daughter inherit the farm after the death of the father. Smallholder farmers who have obtained land inheritance have succeeded in applying on-farm diversification. Some of the smallholder farmers are thinking of expanding their land by using the income they have acquired in their farm, while other farmers face challenges. If these smallholder farmers get a more extensive land than what they have now, it may find it is difficult to increase production if they do not get support to develop their farming. One of the respondents argues, *"If today I get dual of the land that I own now, I do not have the capital to pay seed or other income"*.

This nature of small farms places a limit on the extension of on-farm diversification production area and emphasise the need for productivity increases. However, most of these farmers cannot increase because of lack of fertilisers, hybrid seeds and agro-chemicals, it will not allow all the land available to a household to utilised for food production due to the subsistence nature of the farm practices, where a small area of land are required to produce subsistence food. Limitation in the availability of arable land means that Balcad district households who have small pieces of landholding do not have access to adequate operational land for crop production.

4.1.3 The education level of the household

The findings reveal that households interviewed were mainly educated. Better knowledge of the household will bring the decision of access and use its nutrition and health food. For instance, it may lead smallholder farmers to increase their on-farm diversification. The respondents of the study were mostly educated male. Although there was female, who were educated even though their numbers were small. The study founded that 2 of the female respondents do not have a background in education, 6 of the interviewees finished primary school, 8 of them graduated from secondary education while 8 of the interviewees have tertiary education (See Table 2). Knowledge is essential for agriculture development; smallholder farmers skills are likely to support to increase income-generation and food production. *Respondent said, "I graduated from the Afgooye secondary school, before the collapse of the central government, my family was dependent on the farms when I recalled the way my parent's farms in this land and my current way is very different"*. The relationship between educational levels and poverty amongst smallholder farmers and came up with the conclusion that human capital is strongly related to the level of wealth.

Income generation and food production possibilities of the household are directly affected by individual characteristics such as the education level and health status. According to the respondents *"today I am an educated father by my farming knowledge and experience to give me the opportunity to raise my income, and the money I received from the farm gave me the opportunity to send my children to school"*. The results show that 92% educational attainment of the respondents household significantly affects positively to the food access status of smallholder farmers in Balcad district. Indicates that households with relatively better-educated household are more likely to be food secure than those headed by uneducated household. According to respondent *"during my little knowledge of agriculture I used the methods my parents planted in the farm when I learned about the biodiversity I discovered two to three crops that can be cultivated into one land"*. The schools in the district are private schools, which is because there are no schools managed by the government, before collapse of the government there were schools run by the government for free or low-cost was taken for small household, at the same time, there were schools studied agricultural science reached from elementary to secondary school. A secondary graduate student does not have a university in the district and goes to university education in the capital city.

Table 2 Educational level of the smallholder household

Educational Level of the respondent	Sex of the respondent	Number of the respondent
No formal education	Female	2
Primary education	Female	2
	Male	4
Secondary education	Female	1
	Male	7
Tertiary education	Female	3
	Male	5
		Grand Total = 24

4.2 Forms smallholder household of on-farm diversification

From the interviews, the forms of household on-farm diversification, smallholder farmers engaged in are; 64% of the respondents were only dependent on the cultivation of crops such as cash crop, the staple food, vegetable and fruits. While 36% of respondents were dependent on mixed on-farm diversification of crop and livestock. The study has relied on smallholder farmers practice on three or more of on-farm diversification portfolio activities. Smallholder farmers relying on only on-farm crop diversification were the most commonly interviewed because they were fewer the available mixed on-farm of crop and livestock farmers in the study area.

Smallholder farmers depend on crop cultivation; they are actively engaged in cash crop. According to the respondent, *"we are very dependent on the income gain sesame cultivation of cash crop when I harvest the middleman/broker come to my farm and buy from me and transport"*. The most of the respondents were mainly mention before starting on-farm diversification they were dependent on the cultivation of one crop, which often led to them the failure of the crop and creates themselves to disappoint agricultural production.

4.2.1 The reason of smallholder household practice on-farm diversification

Smallholder farmers in Balcad district play a significant role in ensuring food security by ensuring food access. From the interviews, the diversified farm shows that many farmers in the district involve and practised on-farm diversification for a variety of reasons. According to findings some of the respondents mentioned that they involve on-farm how to increase household income. Also, these respondents said, *"the things that encouraged us to use on-farm diversification is the greatest of the resources we receive from these different activities"*. *"My farm had been planting Maize in the past, and that maize was the only crop that I rely on, sometimes one season I have a lot of income and the other season I don't have it, then I thought of this way of on-farm diversification and benefited from much money to my household"*. *"The income, which I received from the farm, has not been much that the small family needs, but I started practising farm diversity, my household income increased and I was able to send children to school"*. These smallholder farmers were happy with the farm diversity that they adapted to their farms. If they go on this way, they may be developing today farming system rapidly. Smallholder farmers in the neighbouring countries of Somalia developing their farms by using different technology.

According to findings Another number of the respondents answered by using on-farm diversification to reduce risk related to the farm, *"The farm is planted Sesame, Maize and a piece of fruit and vegetable, as well as animal husbandry. When I need to buy something for this farm, I go to the market to buy one of the animals, and with that money, I can cover farm needs"*. Although it is obvious, that on-farm diversification is not driven by economic considerations, 6 of the interviewed household mention that they meet household necessity through on-farm diversification.

Although these smallholder farmers are dependent on on-farm diversity are also experiencing challenges, farmers are mainly dependent on rainy season, and they grow twice a year even though there is a third season well known Hagaa. However, the cultivation of this season is very low, and the rain they receive is not enough to plant. Also part of the smallholder farmers are dependent on irrigation, Balcad district has Shabelle River, which passes through the district. The river cover and relies on three regions the and the river is the longest river in Somalia.

4.2.2 Benefit applied on-farm diversification

The findings reveal that the benefit of applied on-farm diversity is enormous. The majority of farmers in the study area mentioned that household income increased. In relating to smallholder farmers received more income due to different types of crops are grown at the same time on the farm. Farm diversification may run throughout the season, and it may be possible that price fluctuation of the agricultural production is minimum. Some of the interviewees said that farm diversity of different crops have received much of their income and have made their family very dependable on their farm's production *"the crops we grow on GU season as an example we get enough financial resources that we use for the whole year"* respondent said.

Table 3 Contribution on-farm diversification to smallholder farmers in Balcad district

The main reasons for smallholder farmers to practice on-farm diversification	Benefit applied on-farm diversification	No. of respondents
Due to a decline in farm income	Household assets increased	1
To avoid risks related to farm	Reduced vulnerability to risk	7
To increase household income	Food status improved	10
To meet the household necessity	Quality of consumption improved	6

Smallholder farmer who uses mixed farming as a mixture of different crops and livestock benefited from acquiring their livestock fodder, which ensures the good health of the animal as well as the income benefit. These households have more benefits than those who rely on crop farm diversity, with research findings that outline 7 of respondents as proof that their food status has improved. As described by their household has sufficiency in food grain needs is complete because they have a crop to harvest and cattle milk, and they market part of their production to make cash income. Other findings of 5 interviewees define the dependence of on-farm diversity can be reduced vulnerability risk of the household due to the production of various crops on the farm.

Unexpected findings that smallholder farmers faced challenges that reduce their production. These barriers were lack of good seed quality and capital. Based on the observation that most of the interviewees do not have enough capital to invest in farm diversity to raise their productivity. Moreover, they argued that if they get enough capital, to be able to expand their on-farm diversification to increase their household income. Other respondents mention that poor seed quality is their main issue; these households explained that they did not have the good quality seeds and it caused some of the seed that they grow to bring the farm unknown insect and disease. However, there was a lack of proper seed in the country, which encouraged the entrepreneurs to import uncertified seed in the country. Mostly, this barrier of poor seed quality exit with farmers who are farming for vegetables, when they see the unknown insect and disease, they found it difficult to find suitable insecticide or pesticide to control. Smallholder farmer losses many varieties of vegetables that they plant each season because they do not have any support to identify how to control these unknown insects and diseases.



Figure 4 Smallholder farmer show it the unknown disease for vegetable

4.3 The role of on-farm diversification play in household income

4.3.1 Farm income

The findings reveal that the role on-farm diversification play in household income is enormous. The majority of farmers in the study area main source of income is from the sale of a cash crop (sesame) they cultivate alongside staple food and vegetable. According to respondent, *“the household is dependent on the farming industry, and there is no other option for a family member to look for a job if we do well enough to grow this farm is enough for family income”*.

The household in the study area is engaged in agricultural activities. More specifically, almost some of them are involved in crop production, and more than half of them engaged in both crop and livestock production. The principal crops produced in the study area include cash crop taken the first and most important crop, while staple food such as maize and sorghum are the diet based on daily food

consumption. The remaining food crops and livestock (poultry rearing, sheep and goat production are the primary livestock production activities in the study area).

Smallholder farmers that have high cash income from the farm probably have such a stronger preference to increase their capacity towards crop production. Cash income to this household may change the overall household food accessibility; they may also focus on cash crop in general. According to respondent said, *“Develop a market for staple food is more slowly than cash crop”*. The income from the cash crop production gives them an opportunity to buy the necessary inputs to their farm. Also, it may help them to be resilience of food shortage during the time of unexpected crop failures.

Smallholder farmers are mainly practising growing cash crops like sesame. That does not mean that other crops like staple food and vegetable have a lower value for weight than a cash crop. Sesame is mainly exported outside of the country and also processed into oil called “Mascaro” which is the most expensive oil in the country. While other crops like staple crop and fruits are only traded into domestically or regionally, and their requirements processing is more flexible. It may cause that smallholder farmers prefer to plant sesame on the most significant land on their farm. The table below shows the land allocation for various crops

Table 4 GU Season land allocation on-farm diversified farming in Balcad district

Activity household involve on the firm	No. of household involve in	Cash crop	Fruits	Livestock	Staple food	Vegetable
Cash crop, Vegetable, Fruits	5	9 h	4 h	-	-	6 h
Fruits, Staple food, Vegetable	3	-	5 h	0	10 h	-
Livestock, Cash crop, Staple food	5	5 h	-	9 h	9 h	-
Staple food, Fruits, Livestock	3	-	9 h	5 h	-	-
Vegetable, Cash crop, Staple food	8	15 h	-	-	12 h	5 h
Grand Total	24	29 h	18 h	14 h	31 h	11 h

*The average of the findings smallholder farmers in Balcad district holding farm size of 3 to 5 hectares.

4.3.2 Remittances

From the study, it was found that a number of the smallholder received money from remittances, most money is sent to these households when it comes to a stressful situation. According to one respondent *“my farm relies on river water, last year the river water decreased and dropped down to the level of water, it was difficult to get enough water for the crop. In order to get a generator, I talked to two of my sons to help me buying the generator. If I do not get the generator, my farm will be destroyed”*. Some of the riverine farmers use the generator to irrigate their farms. Although study area farmland is much lower than the river level. However, sometimes some farmers are forced to use the generator when the river level falls down. A small number of them told me that this money was regularly receiving every month and send them to their children who are living outside the country. Moreover, most of the household spend that income to develop their farms by buying farm tools and cover farm expenses.

Using of remittance it makes Somalia the first countries. and some of these remittance branches have found a town and village. The socio-culture of Somali population is very dependent on its people to

help each other through money transfers. Remittance has played a critical role in cushioning the impact of the humanitarian crisis in Somalia. According to World Bank pointed, the remittances from American Somalis, estimated by the U.S Department of Treasury at close to \$100 million annually, have kept families from hunger and starvation. Remittance had other sources of income to the household in Balcad district.

The remittances allow to the households to top up own-generated income as measured by GDP per capita (FAO, 2010) remittances can help to smooth shocks and improve household welfare conditions, however, have a limited impact on the most vulnerable people. According to the World Bank (2017) pointed out that cash transfers provided an effective means of resilience to adverse shocks. It shows that they are an apt means for households to deal with such adverse shocks. According to the study respondent mention to use farm diversity for many purposes. Major of the interviewees used to support expenses to buy farm input such seed and fertiliser. While other interviewees mention that, they use to buy farm tools or machinery. World Bank argued, *“High resilience on remittances leaves the households vulnerable to the volatility of diaspora incomes and the uncertainties around sending money to the region. The respondents pointed out the effect of remittance depend on whether household members use these fund to top income from work or to substitute for work activities”*.

4.4 How household income can help strengthen food accessibility

During the interviews, it was revealed that the majority of smallholder farmers mentioned their household food access experience was good. It means most of these respondents have the ability to purchase quality food. They also declared that they had changed their lives much when they practised on-farm diversity, with a variety of different crops that can contribute to their food accessibility. These interviewees are part of their agricultural product use as household food consumption while other segments such as cash crop taken to market to raise income.

Access to food by household was linked to the control they have over household resources and income. The household resources and food price are important drivers of food access. On-farm diversification does directly influence household food access; this aspect is also affected by the coping strategies that households adapt to deal with insufficient food access in the short term.

The interviewees mentioned that they have coping strategies including selling livestock, receiving money from relative or friend, selling food stock and using saved credit (See table 8). Smallholder farmers for crop farm diversification, the main thing dependent on was crop production, as well as they, have livestock, but they do not receive income from the livestock; they only use when they are facing a bad situation to sell the livestock to survive their lives. Other respondents are describing the copes of selling food stock and using saved credit; these two methods were used when the previous season gets high yield production and that production they store as food or sell them to save the money.

A variety of factors contributes to food access of smallholder farmers in the study area, including food availability, food price inflation and poor road infrastructure. The main respondents pointed out that food availability and food price inflation are the main primary barrier of their ability to food access. The quantity and quality of food access that smallholder household can gather given its assets will rely upon domestic food price that is commonly determined using food availability. In Balcad district, Shortages of food availability was accumulating from consecutive years of drought, while declines in food production failures contribute to household food access, this may also cause high food prices have seriously reduced herders' ability to the household food access. Positively when the food price increase may definitely affect household food access through improved food availability. Moreover, this may increase income may further enhance smallholder household food access.

Smallholder farmer has suffered from a severe drought for several years, which led to a production failure characterised by a decrease in the production of crops. Moreover, it caused a significant increase in food inflation, meaning that the available food was far more expensive.

Table 5 Smallholder household experience of food access and their coping strategies

<i>The primary barrier of household food access</i>	<i>Experience in household food access status</i>	<i>Coping strategies household used</i>	<i>No. of Respondent</i>
<i>Food availability</i>	Bad	receive money	1
	Fair	selling livestock	1
	Good	selling food stock	1
		using saved credit	1
	very good	receive money	3
		selling food stock	1
		selling livestock	1
	Subtotal = 9		
<i>Food price inflation</i>	Bad	selling food stock	1
		selling livestock	1
	Good	receive money	1
		selling food stock	2
		using saved credit	2
	Very good	selling livestock	1
		using saved credit	2
	Subtotal = 10		
<i>poor road infrastructure</i>	Bad	using saved credit	1

Good	selling food stock	1
	using saved credit	2
very good	selling livestock	1
		Subtotal = 5
<i>Grand Total of the respondents = 24</i>		

CHAPTER FIVE

DISCUSSION

5.1 The role of on-farm diversification play in household income

Agricultural productions of smallholder farmers in Balcad district are a central player in ensuring that food security (food access) is guaranteed through increased diversification of agricultural activities, for example, crop production, livestock, and fishing. The literature elaborates that while farming remains essential for rural households, people are looking for diverse opportunities to increase and stabilise their incomes Mitchell and Marsali (2006). Evidence from a sample of Balcad farmers shows that on average half of the household income come from cash crops, but livestock income used as back up on their farm. A study by Lemenih, et al. (2007) found that households who own livestock have good food security status as well as sustainable farming. Particularly in Balcad district is a place where crop failure is frequent due to poor rainfall, the level of a household's resources is a critical factor in combating such disasters.

Education plays an enormous role in supporting positive on-farm diversification; knowledge is essential for agriculture development, smallholder farmers skills are likely to support to increase income-generation and food production. The study pointed out that access to education is high demand. According to the study interviewees, smallholder farmers who practice to this farm diversity they were at least educated. The access to educational opportunities is highly gendered; the educational level of female respondents is less than male, so even when such opportunities exist, that access female is highly unequal. Education can change farmer attitude to develop traditional methods of farming. "Education is linked to the development of cognitive skills that are likely to support income generation and food production" (UN World Food Program, 2006). If the formal education is increasing the practising farm diversification of the smallholder will increase, but the absence of education this option is limited. Therefore, Better knowledge of the household will bring the decision of access and use its nutrition and health food. For instance, it may lead smallholder farmers to increase their on-farm diversification.

Smallholder farmers' diversity income enables households to modernise their production by giving to the household an opportunity to reduce the risk of food shortage during periods of unexpected crop failures through purchases and buy the necessary inputs of the farm to the coming season. The ability to grow cash crops can lead to positive results as far as food security is concerned. This view is supported by FAO (2006) discussion on food security as it notes that for households to be food secure, food must be available in sufficient quantities and of appropriate quality through either domestic production or purchase which may include food aid when necessary (FAO, 2006). Smallholder agriculture has a reliability aspect when it comes to ensuring availability and access to food. Wasswa et al., (2006) highlighted that reallocation resources would realise higher income to better-paying enterprises. Pinstrup-Andersen (2009) argued the ability to acquire sufficient food might not translate into actual food purchase. Therefore, the allocation of food access among household members may not be based on the needs of each member.

Anecdote about maize smallholder farmer in Balcad District "applied on-farm diversifying" into cash crop of sesame production and making lots of money and using the money to buy cattle! In 2010, this household looked hugely successful; more on-farm diversified income streams, wealthier, and diversified assets. However, not only were all these vulnerable to the same hazard (drought) sesame offered significantly fewer options in the event of crop failure—a failed maize crop could at least be fed to livestock as fodder.

On-farm diversification offers a chance to take advantage of the ability complementary and supplementary relationships between enterprises through progressed utilisation of the natural assets of the farm and on the market available operator and circle of relative labour and control competencies over the entire season. A Smallholder farmer with a much better quality of land allocates an excessive proportion of it to non-food cash crops that could expose some households to higher risks of a potential famine. "The proportion of land allotted to food crops declines because the farm size increases whereas the proportion of land allotted to non-food cash crops rise because of the size of farm increases" (Tabitha and Tidsell, 2003).

Agricultural production had increased extensively through the development of the area under cultivation, while livestock provides not solely food for the producers but conjointly alternative products, which could be sold to provide income Mitchell, et al. (200). Livestock contributes to households' economy, for example, the source of cash income, means of transport and additional food. Besides, livestock is considered a means of security and means of coping during crop failure and other calamities Mwaura, F. et al. (2007). On-farm diversification income source has been long survival strategy that smallholder household permit to reduction the chance chance (risk) of starvation for themselves and their families in periods of chronic or transitory food insecurity.

5.2 Contribution household income to strengthen food accessibility

The results of the study showed similar by Pieters (2013) if a household has access to income-generating activities, their ability to purchase food increases. In the same manner, having food access is significantly increased by one having access to natural resources like agricultural land and water, which are the primary determinants for food production. Access to natural resources such as fields and water resources are the primary determinant of the productive capacity of the food producing of the households. As Mahendrarajah (2005) mention that, a household can mitigate agriculture related risks through diversification thus making the act a livelihood strategy. The study of Hoddinott argued the returns to the investment of household resources in productive activities could be complemented by income and in-kind transfers from family to improve food access (Hoddinott, 2012).

Food access is discussed under various measurements, which includes income and cash crop diversification. Smallholder agricultures contribution to food security is reflected in its capacity to ensuring food access. Maman et al. (2008) point out that food access is related in large part to incomes including implicit income from small farmer's production. Small-scale farmers to balance food access also view diversifying livestock, staple food and cash crop as one of the best strategies. Smallholders in the district who focus on the production of cash crops for sale perceived capacity to strengthen their food security (food access), it is also often associated with increased food production and higher incomes. However, Mitchell and Marsailli (2006) illustrate that a longstanding concern is that production by smallholders for the market, especially of non-staples, usually results in smallholder farmers replacing their food crops for their consumption with cash crops for sale and thereby reduce their capacity to ensure food security. Farmers end up neglecting food crops in favour of cash crops which will not provide sufficient income to sustain the food security due to use of inadequate methods of farming and technology hence output usually will be low. Monetary boom from agriculture can also improve access to health care and education of the household.

Furthermore, these smallholder farmers in Balcad district do not have government support whether financial and technical. After the collapse, the central government MoAI was not provided extension services. For instance, the smallholder household who produce cash crop can increase their food security and nutrition, considering commercial production is regularly related to extended farm production and better earning, enabling individuals and households extra access to nutritious ingredients.

Barbieri and Mahoney (2009) point out that not only should smallholder farmers have access to food, but also it should be reliable. Further, that food availability should not vary significantly by season and year, but also people should feel secure of access to food; they should not fear that they will go hungry at some time, the growth in income profits allows smallholders to diversify the diet. Income generation is considerably strengthened when small-scale farms expand activities and integrate production and processing. It is usually the case with the product that is vital in local food markets and cultures. Despite the smallholder's size, the production systems occupy a significant cultural, social and economic place in many developing countries.

CHAPTER SIX

CONCLUSION & RECOMMENDATION

6.1 Conclusions

Regarding on-farm diversification, there is a considerable difference between the large and small household size member. A large household member can develop farm diversity because of their household member's involvement in the farm. Even though the small family member having difficult with less family support and they are looking to see a challenge on-farm diversification and cause them not to send or drop out the children from school, and they are thinking about the money they hire labour to their farm. It led to many children having lack of education while supporting to work with their parents on the farm. While the study respondents of the household head of smallholder farmers were educated (primary to tertiary), with little knowledge of these households were helping them to improve their farming productivity. Education or farming skills contribute to the development of its product based on on-farm diversification, the smallholder farmers to be able to experiment with a variety of farming system to advance their productivity. Although smallholder farmers in the study area did not have services provided by the Ministry of Agriculture including the extension service and research centre, these services could help farmers to improve their farm skills and get high seed production. Mainly the smallholder farmers in the study area, the main challenge to on-farm diversity was poor seed quality, and that seed causing their farms to unknown insects and diseases.

The on-farm diversification is a good strategy to reduce risks faced by smallholder farmers. Farmers in the study area are encouraged to rely on farm diversification and earn higher income from their farm, to raise their food security and a particular/partial food access. These farmers are dependent on two types of diversity, crop farm diversity (cultivating varieties of crops) and mixed farm diversity (crop and livestock). The most common source of income is the sesame cash crop, which can increase the economic potential of the crop that may result in increased land planted to that crop. Therefore, highly income depend on sesame crop can eliminate the on-farm diversity as well as the market of other staple food crops. According to them, a chunk of the income they earn from this on-farm diversification goes into the purchase of food especially so when own production in a particular year is low.

Comparing those households that are more involved in crop on-farm diversification and those that are mixed on-farm diversity involved, their food security and income situation are quite different. On-farm diversification have significantly improved income levels of those involved in it, and also they are more food secured, their vulnerability levels have reduced significantly, and the majority of them have increased their assets regarding landholding and more livestock.

6.2 Recommendations

1. To create farmers' cooperative, making a cooperative can help small family members to get support. Moreover, they are thinking or encouraging sending their children to school, as they have the labour support, they do not need from their children to help the farm. Cooperative can also strengthen the social capital relationship between smallholder farmers. The research recommends to the Ministry of Agriculture and Irrigation (MoAI) should help smallholder farmers to establish a cooperative, and MoAI should provide training and facilities that develop a cooperative partnership, supporting good professional advisers for these smallholder farmers.
2. Improve the smallholder farmers knowledge; there is a need for training to enhance their skill and knowledge in the agriculture, as well as to increase their production. This training can

help them more to rely on on-farm diversity and increase their resilience to food insecurity. The study recommends the Ministry of Agriculture and Irrigation conducting short training session like Good agricultural practice (GAP) to the smallholder farmers and distributes equally the training among them.

3. One of the main unexpected findings was poor seed quality that caused unknown insects and diseases, which reduce farm yield production. On this basis, the study recommends the MoAI should create a trial farm to test the seed as well as develop the productivity of the current seed.
4. Strengthen on-farm diversification to reduce household seasonal shocks. Smallholder farmers needed to have access to modern farm technology improved their agricultural skills and get government support at every level of on-farm diversity. One of the main findings was that smallholder farmers are more dependent on cash crop production, MoAI should develop the infrastructure of the road network and markets to improve income receive the household from other crops.

6.3 Further research suggestion

Given that this research did not attempt to consider the on-farm diversification contents of the other dimensions of food security by household (the study only focused on food accessibility), the on-farm diversification aspects of food availability, utilisation and stability at household level should be further researched on.

CHAPTER SEVEN

THESIS REFLECTION

7.1 Introduction

This chapter aims to outline my experience in the course of the whole research process leading up to my submission of thesis report. It also includes some personal growth I have accumulated over the whole year of study in the Netherlands. Let me first appreciate and thank my supervisor who provided support and guidance.

7.2 Reflection of the study

Scoping for relevant literature in line with my field of interest marked the beginning of my research, with me trying to develop a strong proposal, that is worthy of been accepted. This involved me visiting a number of websites, making use of the library, searching for databases, useful articles and published journals, which I would download and read later at home. Searching on the website showed a number of studies, but most were not recent and not from my country. Therefore, you had to make use of literature from other countries and those that were not so recent. Having settled on a topic, I designed my proposal and pitched it. It required a lot of amendments after and this I did in consultation with peers and my supervisor. The design of a well-meaning theoretical framework for my research, proved to be difficult for me as I had opted to design one of my own. The concept of creating a theoretical framework was new and the designing if indicators for each dimension created was not as easy as you were trying to make them smart. Also that, it was not coming out clearly as per your supervisor valuable input. It took a lot of time and you had no time to clearly formulate a good one.

After having my proposal, all set I had to go back home and start to do my fieldwork as per my plan. I started by going to see the district coordinator who happens to be my boss, and it was in our communication that I was told that it was not possible for me to go to the study area I had selected due to security reasons. This was due to the presence of an al-Shabaab terrorist group that was targeting government employees on the road. I then changed my area of study after having highlighted the issue to my supervisor. This made me realise how doing a desk study is different from fieldwork research, as during my scoping such information I had not encountered it. The reality on the ground when one starts doing work is different than all the assumptions written down before one undertakes field research. After undergoing all the preliminary introductions and formalities of entering an area by visiting the district authority accompanied by my district director from the Ministry of agriculture, I then started my data collection with semi-structured interviews.

The first days it was not easy for me to be able to ask questions without consulting the guideline. Sometimes I would realise farmer would have answered many things in one question that I would end up skipping some questions. Trying to come up with household income, which includes a lot of aspects and some end up omitted. Moreover, there are different interpretations of household income as most though you were asking if they are formally employed. After a few days, it became easy for me to ask questions without consulting the guideline and I could even probe, when I realises some possible information or interesting facts. I got to understand that interviewing is an art that requires certain skills in conducting. One's approach can influence the kind of information you get as well as there been need of one to be able to determine interviewee's character and how best to go about getting information. This includes aspects of ethical concerns. In my country, it is difficult to interview a woman without the presence of the husband due to religious issues. This sometimes affects the type of information gathered by a researcher as it's not possible to get accurate sensitive gender-related cultural issues information. As I had to convert my question guideline into the local language, it also proved difficult to find simple words to put in place of the scientific words as interviewees' education level was not high. This translation can also be seen as something that might affect the quality of

results obtained. In as much as I was excited to undergo the research, the experience though valuable, it was tiresome to stay in the field. I encountered two farmers who were not so open in highlighting their livelihoods, and no matter how much I probed, information given out was minimal. I ended up realising that some people are naturally shy and withdrawn and I have to accept that I will not get my way every time. The whole period of my fieldwork, I was warmly welcomed by the farmers in the area I had chosen. I also got to see that you get to have a lot of data if you let the farmers feel comfortable and this can be achieved by first building a rapport with them.

The time period for data collection coincided with the harvesting season, and it was difficult to conduct interviews. I had to conduct some of my interviews while helping out the farmers in field work, and this was difficult for me to be able to take notes or make recordings. I had to recall some of the main points soon after finishing our interview by jotting down in my notebook. This also created room for some data to be omitted and it may have affected results obtained. Given more time in fieldwork would have allowed me to have more time with farmers, though I am ok with the number of interviews I did as I got all the relevant information. The time period also makes one only be able to observe a few diversification methods employed, as some diversification depends on the season. This made me rely mainly on what the farmers gave me as their diversification strategies and only ascertain the one that coincides with period data was taken. The other issue of time coincided with harvesting period, and you had not to take more time from your farmers as they were also busy. More time allows more probing and more answers.

With so much data gathered in the field, the big task that lay ahead of data analysis, was daunting in my mind. Data analysis was difficult for me, and trying to transcribe everything obtained was difficult. However, making use also of peers, I managed to get how best to tackle it and also with assistance from my supervisor. I changed my framework from the one I had initially proposed before field work and started using the DFID sustainable livelihood framework. It made sense to me after advice from my supervisor, and it also helped to clarify a lot of my findings as the themes could be easily interpreted. This made me realise the value of feedback in the course of doing any work in life.

Fieldwork, I changed the Jowhar district that antecedent established in my research proposal. The problem was the safety scenario of the road; it was difficult to reach the previous study area. It was a high risk to travel the way. The terrorist group Al-Shabaab were targeting government officers who are going that road. Also, this case forced me to alter the study area from Jowhar to Balcad district.

The result of the challenges on the validity and reliability of the research is that the result might be different from another researcher who might do the same research because of those things. Especially that as a government worker, most farmers expect you to be the bridge between them and NGOs so they might lie about their livelihood, show it as bad, when they are actually in good condition. Another is that how you translated your question is different with how someone else doing the same research might translate English to local language and that affects answers and interpretation of questions by farmers and affects the results.

7.3 Personal growth

The course of undertaking both this masters course as a whole and the field research helped me significantly improve my interpersonal skills. The presentation skills I learned from the regular presentation assignments helped greatly to be able to express myself in English. It was difficult for me in the beginning to enter a conversation with others, but over time and with such a diverse cultural background I managed to break away from my fears and express myself. I have so much gained in terms of English writing skills as well. The different backgrounds of my classmates also helped me to have great understanding of some parts of the world and I am proud of the knowledge gained. In the course peer feedback was introduced to us during one of our modules, it helped me to realise my

flaws and strength and to be able to make use of them to the best of my capabilities. My professional conduct was also an area I needed to improve, and I am leaving this area have met that objective. The exciting lessons learned through the thesis notably was the depth of reasoning that is required to analyse a situation, and I am also proud to say I have departed this institution with the ability to conduct qualitative research.

7.4 Future Outlook

In conclusion, reflecting on my experience of writing a thesis, and my masters' course, I realised that I enjoyed this process and would like to continually seek all avenues employed in qualitative data analysis and further study. Having also laid a base in my English language abilities, I would want to continue engaging in the language, honing it has since been a developmental worker, it is vital to be fluent in it.

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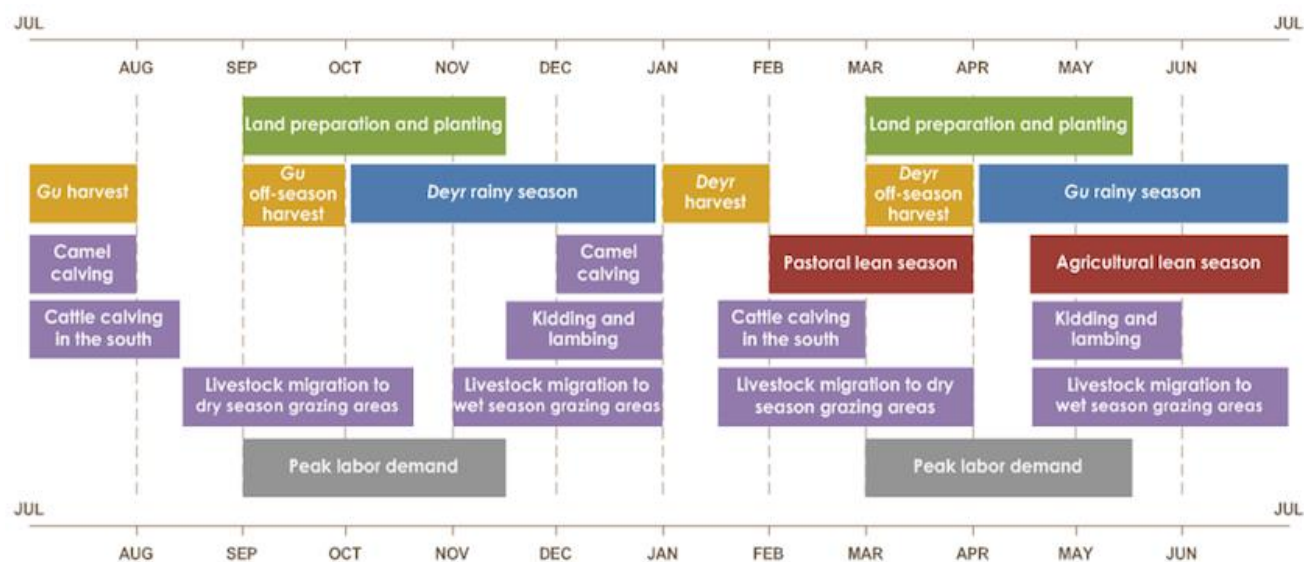
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Appendix

Appendix 1 Somalia seasonal calendar

Somalia Seasonal Calendar



Appendix 2 Farmer Questionnaire

Farmer Questionnaire

Questionnaire No.: _____ Date of Interview: ____/____/2018 District: Balcad

Location: 1. Urban / 2. Rural

Sex of the respondent: 1. Male (X) / 2. Female ()

Educational level of the respondents:

() No formal education () Primary education () Secondary Education () Tertiary education

Farm Size: _____ Ha

1. What is the average size of your household?

On-farm diversification

2. Are you or any other member of your household on this farm, involved in income diversification activities? If so, which on-farm diversification activities are you, or your family, involved with?
3. What is the reason for your household practice on-farm diversification?
4. What is the benefit on-farm diversification did you get?
5. What are the problems of limiting your participation in on-farm diversification activities?

Household Income

6. What kind of livestock, cash crop and staple crops for home consumption do you raise and get income? From which source the primary income comes from?
7. What were the main sources of CASH income for your households in the last months or last Deyr season?
8. What was the total cultivated area of your household in this Gu' season?
9. What are the major crops expected to be harvested this Gu' Season?
10. How much your household receive from remittances or local transfers? What is the purpose that you used?

Food Accessibility

11. Did your household have got limited food access due to a lack of financial income?
12. How can you describe the experience of your household with regard to its access to food?
13. What is the primary barrier to food accessibility to your household?
14. When you did not have enough food or money to buy food?
15. What coping strategies did you use and how often?
16. What is your household perception of food access status? Do you consider the household to be food secure or food insecure?

