Effect of onion growing on the food accessibility of smallholder farmers: A case study in Tuurwa'ad village in North Jigjiga district, Somali Region, Ethiopia.

A research project submitted to Van Hall Larenstein University of Applied Sciences in partial fulfilment of the requirements for the degree of Master in Management of Development – Specialisation in Food and Nutrition Security

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DEDICATION

This work is dedicated to my mother, father, my wife, and children who are all beloved to me.

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LIST OF ABBREVIATIONS

ANRDB	Agriculture and Natural Resource Development Bureau
ETB	Ethiopian Birr (currency)
FCS	Food Consumption Score
FGD	Focus Group Discussion
FHH	Female Headed Household
HH	Household
KI	Key Information Interview
MHH	Male Headed Household
SSI	Semi-structured Interview
VHL	Van Hall Larenstein
WFP	World Food Programme

ABSTRACT

The study aimed to understand the effect of onion introduction on the food accessibility of smallholder farmers of North Jigjiga district. The study focused on Tuurwa'ad village where the intervention of the introduction of onion growing was implemented. Stratified random sampling was employed to select respondents. The respondents were organised into onion and non-onion growers to compare their food consumption. Qualitative methods were used to collect and analyse data. Primary data was collected with the help of household interviews, focus group discussions and key informant interviews. Data was analysed using qualitative data analysis techniques. Findings indicate that onion growing has significantly improved household income. Households use the income from onion growing to buy food, purchase assets like livestock and address other household needs. Purchased food items indicate poor nutrition awareness of the farmers. Income from onion sales is mainly controlled by men. The findings also show onion growing households have better food consumption than non-growers. Finally, the study concludes the introduction of onion growing has improved the food accessibility of smallholder farmers. ANRDB is advised to improve the nutrition education awareness of the farmers and introduce nutrient-rich crops to the farmers along with appropriate training.

CHAPTER ONE: INTRODUCTION

1.1. Background

Food insecurity remains a challenge for many people in the world. In 2019 close to 750 million people suffered from severe levels of food insecurity. When moderate and severe levels of food insecurity are considered, estimates indicate that 2 billion people worldwide lacked regular access to food in 2019. The hunger levels are higher in certain parts of the world. Africa has 250 million undernourished people – the second highest in the world after Asia and growing faster than in any other region of the world. Moreover, undernourishment is highest in Sub-Saharan Africa, affecting 22 per cent of the total population (FAO, et al., 2020).

Ethiopia is one of the African countries most affected by food insecurity. According to OCHA (2020), over 8.4 million people in the country are affected by food insecurity and in need of emergency food assistance. Close to 29 per cent of the food insecure people in the country live in Somali Region where this study is focusing (OCHA, 2020).

The Ethiopian economy depends mainly on agriculture which contributes 50 per cent of the Gross Domestic Product (GDP) and above 80 per cent of the export (Stellar & Kelboro, 2019). Agriculture remains the main source of livelihood for rural people (World Bank, 2020). Smallholder farmers dominate the agricultural sector in the country as they produce 95% of the main crops like cereals, oilseeds, pulses, vegetables, fruits, root crops, and cash crops (Stellar & Kelboro, 2019). Smallholder farming in the country is characterised by subsistence and low productivity. These farmers earn their income mainly from agricultural production. With no surplus to sell and lack of employment opportunities, smallholder farmers fail to earn a decent income to survive and hence are affected by food insecurity (Wondimagegnhu, et al., 2019; Mersha & Ayenew, 2018).

Cash crop production is one of the ways smallholder farmers can generate income on the limited resources they have. Cultivation of cash crops provides a higher value per unit area compared to the traditional crops that farmers produce (Kuma, et al., 2016). With cash cropping, farmers can generate more income and increase their purchasing power. Households can use the income to buy nutritious foods they need for food security purposes (Rubhara, et al., 2020). Through access to income, households can improve their food accessibility and eventually their food security (Li, et al., 2020; Mazunda, et al., 2015).

Onion is one of the most important cash crops grown by smallholder farmers in Ethiopia. About 734,921 smallholder farmers are engaged in onion production. The total area under cultivation stands at 36,373 hectares producing 273,859 tons of onion (CSA, 2020). Onion production has become popular among smallholder farmers due to its high profitability per unit area, ease of production and availability of markets. With the small plots they have, smallholder farmers can generate more income from onion production. According to Etana et al. (2019), analysis of the cost of production and yield indicates that onion production at the smallholder level is highly profitable. On the other hand, onion can be easily produced by propagation through both bulb and seed systems (Megersa, 2017). Onion is grown both under rainfed and irrigation in different parts of the country and is important for augmenting the income of many rural farmers. Onion growing brings a good source of income for the smallholder farmers engaged in its production. In Ethiopia, onion is consumed as part of the daily stews and vegetable food preparation of many households. (Etana, et al., 2019; Nigussie, et al., 2015).

North Jigjiga district

North Jigjiga district is one of the areas affected by food insecurity in the Somali region. Most of the district's population lives in the rural areas and depends on crop and livestock production for their survival. Smallholder farmers dominate the agricultural production system. The crop cultivation is based on a rain-fed system. Farmers produce primarily food crops like sorghum, maize, and wheat for human consumption. As they practice subsistence farming, many farmers are not producing enough to feed their families. On the other hand, income-earning opportunities are scarce in the district. With a lack of employment opportunities, households struggle to earn income to purchase the food they need (ANRDB, 2017).

To resolve the food insecurity problem, Agriculture and Natural Resource Development Bureau (ANRDB) has in 2017 introduced onion growing as a cash crop to the farmers in the district. The primary objective of the intervention was to improve food security by increasing household income through onion production. The increased income should enable households to buy nutritious food to improve their food accessibility. The intervention has targeted 180 smallholder farmers in Tuurwa'ad village. Tuurwa'ad is the only village where the intervention happened in the district. The beneficiary farmers were given training on onion cultivation and provided with onion seeds and farm tools (ANRDB, 2020).

Moreover, a recent report by ANRDB indicated higher food insecurity levels in the district affecting close to half of the rural farmers. Within the district, Tuurwa'ad village is experiencing food insecurity with 53% of its population affected by the problem (ANRDB, 2020).

1.2. Problem statement

Agriculture and Natural Resource Development Bureau has undertaken an intervention in Tuurwa'ad village North Jigjiga district which focused on the introduction of onion as a cash crop to increase farmers' income and consequently improve access to food. The intervention which has targeted smallholder farmers to produce onion has ended. Although it is now one year since the intervention has ended, its effect on the food accessibility of beneficiary farmers is not known. On the other hand, the level of food insecurity in the district and particularly in Tuurwa'ad village is high.

The commissioner (ANRDB) is concerned about the food insecurity levels in the village remaining high and lacks information on the effect of onion production on the food accessibility of the smallholder farmers. Therefore, ANRDB wants to understand the effect of the introduction of onion growing on the food accessibility of smallholder farmers in Tuurwa'ad village.

1.3. Research objective

The objective of this study was to assess the effect of the introduction of onion growing on the food accessibility of smallholder farmers in North Jigjiga to provide information on the outcome of the intervention and recommendations to ANRDB on ways of improving household food security.

1.4. Main research question

What is the effect of the introduction of onion growing on the food accessibility of smallholder farmers in Tuurwa'ad village of North Jigjiga district?

1.4.1 Sub questions

1. What is the effect of the introduction of onion growing on the income of smallholder farmers?
2. How do smallholder farmers spend household income supplemented from the growing of onion?
3. How do smallholder farmers exercise control over the household income supplemented from the growing of onion?
4. What is the effect of the introduction of onion growing on the food consumption of smallholder farmers?

CHAPTER TWO: LITERATURE REVIEW

This literature review has several sections. First, key concepts related to food security and its dimensions are defined. Then, literature on food accessibility, which is the focus of this study, is discussed. Finally, the conceptual framework of the study is drawn.

2.1. Definition of Concepts

2.1.1. Food security

The widely accepted definition of food security was developed in the 1996 World Food Summit. It states that food security exists ''when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life'' (FAO, 1996). This concept stresses the multiple dimensions of food security and comprises food availability, access, utilisation, and stability. The above definition was further refined to include 'social access' to food alongside physical and economic access (FAO, 2003).

Food availability

The availability dimension addresses the 'supply side' of food security and is determined by the level of food production, stock levels and net trade (FAO, 2008). It is concerned with the availability of adequate quantities of food supplied through domestic agricultural production or imports (FAO, 2006).

Food accessibility

The food access dimension relates to the demand side of food security. This dimension focuses on physical, economic, and social access to food. It includes income, expenditure and buying capacity of individuals or households. It addresses whether the individual or households have enough resources to obtain the proper quantity of food. So, access to sufficient resources is needed to obtain appropriate food for a nutritious diet (FAO, 2008).

Utilisation

Utilisation is about how the body makes the best use of nutrients in the food. The utilisation of food through adequate diet, clean water, sanitation, and health care to reach a state of nutritional well-being where all physiological needs are met. The importance of non-food inputs is highlighted in this dimension. (FAO, 2006).

Stability

This dimension states that individuals or households should all the time have access to sufficient food. They should not risk losing access to food because of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security. (FAO, 2006)

2.1.2. Smallholder farmer

Smallholder farmer is defined in a variety of ways depending on the location and intensification of farming systems. Generally, a smallholder farmer is regarded as a person engaged in cultivating mainly food crops but also small varieties of cash crops on a small plot of land. (Nyambo, et al., 2019; Herrero, et al., 2014). In many areas, smallholder farmers practice mixed crop-livestock farming, whereby the large number of ruminants kept is around 3-5 (Swai, et al., 2014). These farms are devoted to assisting household needs and hence the family provides labour (Nyambo, et al., 2019).

2.2 The concept of food accessibility

The presence of a sufficient supply of food at the country level may not itself guarantee household food security. People need to access it. To resolve inadequate access to food, policies focused on incomes, prices, expenditures, and markets (FAO, 2008). Food access represents the consumer determinant of food security and it is determined by economic, physical, and social dimensions (Leroy, et al., 2015).

2.2.1 Economic access

Economic access discusses the ability of households or individuals to purchase food. Factors like income, food prices, and the ability to acquire access to social support determine economic access. For many households or individuals, affordability is the key factor in accessing food. This depends on income and the cost of food (Capone, et al., 2014). Another study supporting the above factors states that food prices, monthly income, and expenses as factors influencing the food security status of rural households (Ahmed, et al., 2017). Additionally, household characteristics like household size, number of income earners in the family, the share of expenditure on food, education of household heads were found to influence economic access to food (Tumaini, 2020). On the other hand, access to resources increases the ability to access food which in turn can lead to improvements in the food security status of households (Abdullah, et al., 2019).

Income is crucial for household food accessibility and food security in general. This is particularly important for smallholder rural farmers who have limited access to resources. One way smallholder farmers can increase their income is through the cultivation of cash crops (Achterbosch, et al., 2014). Cash crop production was found to significantly improve household income (Li, et al., 2020). Production of cash crops enables smallholder farming households to raise their income by growing a crop that delivers a better return to their productive resources. (Kuma, et al., 2016). Onion is one of the cash crops that can generate high profit per unit area (Nigussie, et al., 2015). Farmers may use the income gained from the selling of these crops to buy nutritious food and other goods to improve their food security and wellbeing.

According to Kuma et al. (2016), household income from the sale of cash crops has a positive effect on food security. The study involved 1,600 Ethiopian smallholder coffee farmers and explored the contribution of income on household food security using a multivariate regression model. The study showed that income from coffee production has increased the purchasing power of farmers enabling them to purchase the food they need for their food security purpose. In this study, households with higher income from coffee farming have disclosed less food insecurity (Kuma, et al., 2016).

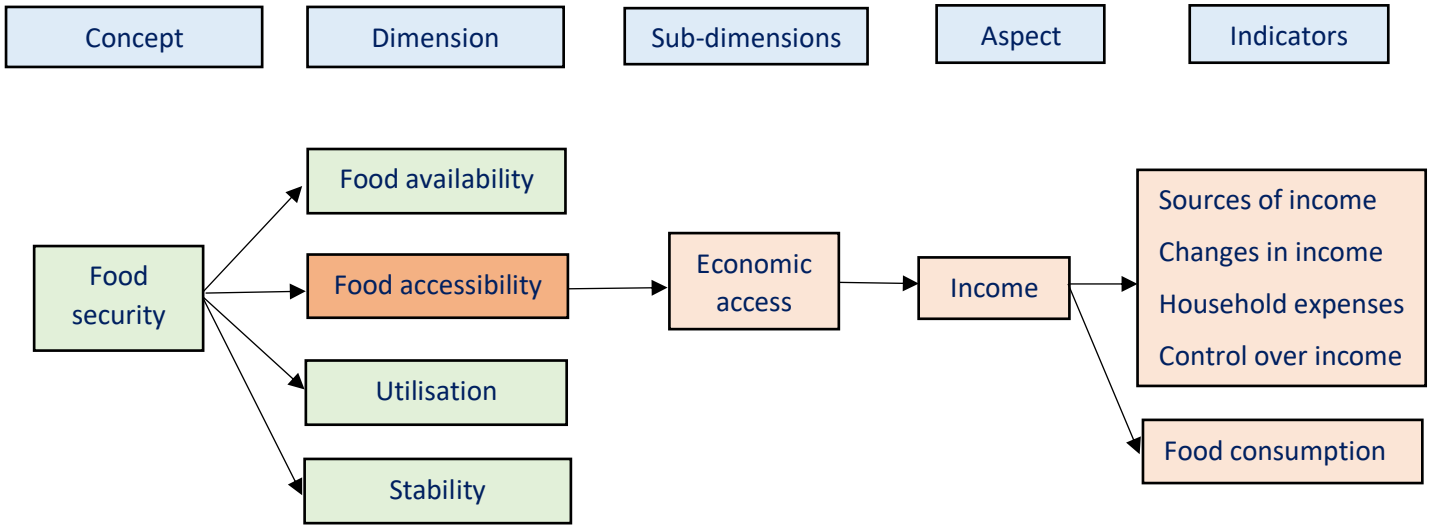
Control over household income by men or women has different implications on household food security. Empowering women to control resources like income plays a crucial role in improving the wellbeing of the family including food security. Women's control over the family resources benefits the household more than when men control resources (Dzanku, 2019). The priorities of men and women are different when it comes to expenditure and income control. Studies show that household and child nutrition improve when women manage household income than when men control income (Gallie, et al., 2019; UNICEF, 2011).

Increased income from crop production means better purchasing power for farmers to address their food and non-food needs. A study conducted in Zimbabwe that looked at the impact of income from cash crop production on household food security found that cash cropping positively affects household dietary diversity scores (Rubhara, et al., 2020). Likewise, households engaged in cash cropping in Malawi have shown improved household dietary diversity scores (Mazunda, et al., 2015).

2.3 Conceptual framework of the study

The conceptual framework shows food accessibility and its sub-dimensions. The study has focused on the economic access sub-dimension to assess the effect of the introduction of onion growing on the food accessibility of smallholder farmers. As with cash crop production, onion growing is associated with increasing household income. Households may spend their income on buying nutritious food to improve their food accessibility. They may also spend their income on the non-food needs of the household. So, the study will investigate the sources of income, changes in income due to onion growing, household expenditure, and who has control over the income of the household. Additionally, the study will explore the food types the household consumes to calculate the food consumption score.

Figure 1. Conceptual framework of the study



Source: Author, 2021

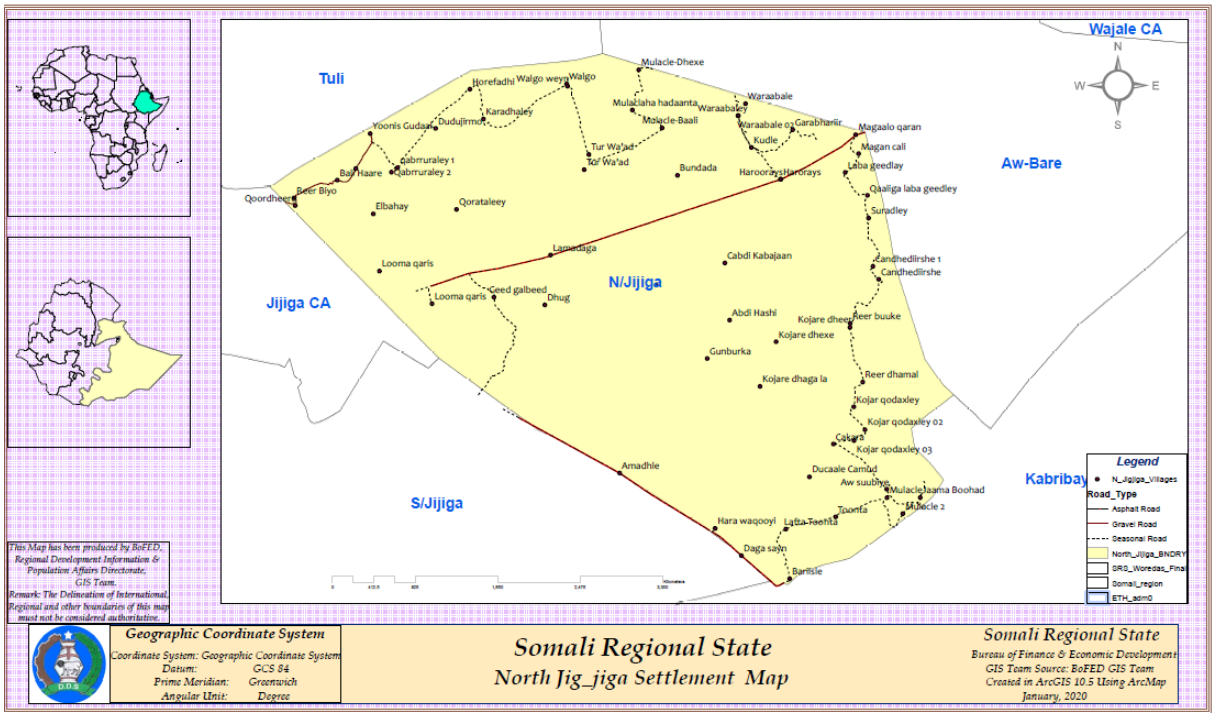
CHAPTER THREE: METHODOLOGY

3.1 Study area

The research was conducted in North Jigjiga district which is in the Fafen zone of the Somali region in Ethiopia. It is bordered by Jigjiga city administration in the south-west, South Jigjiga district in the south, Awbare district in the north-east, Tulliguled in the west, and Kebribayah district in the east. The district is organised into 10 centres and 27 villages and has a population of 35,671 people (5,945 households) of which 47.5% of the population is women while 52.5% is men. The population of the district relies on agricultural production for their livelihood. The area has two rainy seasons from March to May and July to October with average rainfall ranging from 300-1400mm. The average annual temperature in the area is 20^{0}C (BoFED, 2020). The district has fertile soil suitable for the cultivation of onion and other crops like sorghum, maize, and wheat.

This district was selected because it is where the intervention of the introduction of onion has happened and the beneficiaries are placed. The intervention has supported 180 smallholder farmers in Tuurwa'ad village in the district. Tuurwa'ad was the only village where the onion intervention was undertaken in the district.

Photo 1: Location of North Jigjiga district



Source: BoFED, 2020

3.2. Research strategy

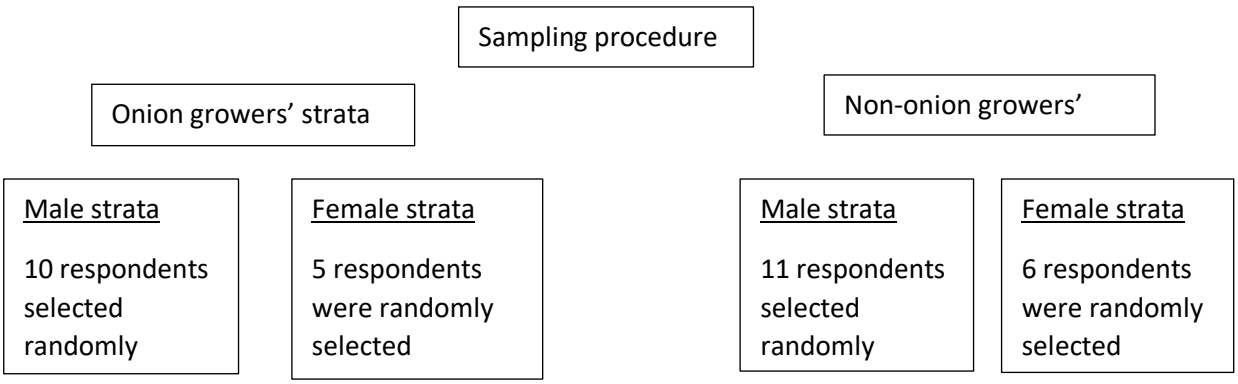
The research used a case study to assess the effect of the introduction of onion growing on the food accessibility of smallholder farmers. The case study was selected because it allows the research to have a better understanding of the situation and to gather in-depth information on the topic. A case study is important for investigating a contemporary phenomenon using various sources of evidence (Yin, 2009).

3.3. Sampling method

Tuurwa'ad village was selected purposively because it is where the intervention of onion growing was implemented. The study population is all the smallholder farmers living in Tuurwa'ad village. Then, a stratified random sampling method was used to identify and select respondents. Farmers in the village were organised into two strata, namely onion growers and non-onion growers as illustrated in Figure 2 below. Onion growers are smallholder farmers who benefited from the intervention of onion introduction, grow traditional food crops (maize, sorghum, and wheat), and keep livestock. Non-onion growers are smallholder farmers who grow only traditional food crops (maize, sorghum, and wheat).

As indicated in Figure 2 below, onion growers' stratum is further sub-divided into two strata – male-headed households and female-headed households to ensure FHHs are represented since they are outnumbered by MHH. From the male stratum, 10 respondents and the female stratum 5 respondents were randomly selected. On the other hand, non-onion growers were also sub-divided into male-headed and female-headed households. Then, 9 respondents from the male stratum and 6 respondents from the female stratum were randomly selected. A total of 30 respondents were selected (15 onion growers and 15 non-onion growers).

Figure 2. Sampling procedure



Source: Author, 2021

3.4. Data collection methods

Data was obtained from primary and secondary sources. Primary data was collected from respondents during the fieldwork. The tools used to gather primary data are Semi-structured interviews, focus group discussions and key informant interviews. Secondary data used was acquired from scientific journals, reports and documents related to food accessibility

Semi-structured interview

A semi-structured interview was used to gather data to answer all the sub-questions. SSI was conducted with the selected respondents at their homes and each one lasted between 40 minutes and one hour. A checklist with open-ended questions was used for the SSI. Before the actual data collection, the checklist was pretested with five farmers to check if it answers the sub-questions and modified accordingly. The SSI assisted the researcher to gather in rich information by probing further as needed. The researcher recorded the answers in writings in a notebook.

Photo 2: Interview with FHH respondent

Source: Author, 2021

Focus group discussion

After the SSI is completed with the respondents, two FGDs were conducted with male and female onion growers separately. The reason for the separation was to allow women to speak freely as they may otherwise feel intimidated by the presence of men. The Female FGD participants consisted of 5 members. Since the onion growers' strata had only five female respondents, all of them were selected for the FGD. Female FGD was conducted in the residence of the participants because women were busy with their household chores at the time. The male FGD participants comprised 8 members and the discussion happened inside a classroom of a primary school that was closed for the end of the school year. FGD was used to answer the sub-questions 1, 2, 3 and 4. The discussion lasted for about one hour.

Photo 3: Female FGD - Onion growers

Source: Author, 2021

Key informant interview

Key informant interview was conducted with two informants i.e., extension worker and district agriculture office head. The KIs last between 30 to 45 minutes and assisted in acquiring their perspective. KI was used to answer sub-questions 1 (what is the effect of the introduction of onion growing on the income of smallholder farmers?) and 4 (what is the effect of the introduction of onion growing on the food consumption of smallholder farmers?).

Photo 4: Interview with an extension worker

Source: Author, 2021

Food consumption score

Food consumption score is used as a proxy for measuring household food access. FCS is based on a 7-day recall of the food items consumed by households. It collects information on the frequency and dietary diversity of foods consumed (WFP, 2008). FCS was used to answer sub-question 4 (What is the effect of the introduction of onion growing on the food consumption of smallholder farmers?). WFP's standard food consumption scoresheet was used to collect information on the food frequency and dietary diversity consumed by both onion growers (15 respondents) and non-onion growers (15 respondents). According to the FCS sheet, each food group has a designated weight given. Food groups consumed by the household is noted on the FCS sheet and any frequency of consumption above 7 is recorded as 7. Household food consumption score is calculated by multiplying food group frequency with food group weight. Then the scores are summed up into one composite score. The score is compared against standard cut-off points which state that scores from 0 to 21 are regarded as poor food consumption, 21.5 to 35 is considered as borderline food consumption and a score above 35 indicates acceptable food consumption (WFP, 2008).

3.5. Ethical considerations

The researcher followed formal communication channels to reach the respondents. The researcher introduced himself to the Agriculture and Natural Resource Development Bureau and explained the purpose of the research. The Bureau has written a formal letter to the district authority directing them to help the researcher in the data collection. Then the local authorities acted on that order to identify the respondents.

Before conducting interviews, the researcher sought permission from the respondents. The purpose of the research was explained to the respondents. The researcher assured the participants will remain anonymous and codes will be used instead of their names. The respondents were informed the

research is voluntary and they can stop the interview any time they want. Before taking photos, consent of the respondents was sought.

3.6. Limitations of this study

This study was undertaken in a small village with a small number of respondents and the findings may not be entirely representative of North Jigjiga district. However, the findings provide useful insight into the food accessibility of smallholders in the area.

3.7. Data analysis

The data analysis process started during data collection in the field. Checking and cleaning of data were done together with data collection. Then, data was sorted, summarised and organised into arising themes based on sub-questions. Qualitative data was analysed with the use of the narrative method. The results were presented using graphs and tables.

CHAPTER FOUR: RESULTS

4.1. Profile of the respondents

This study involved 30 respondents in Tuurwa'ad village. For all the respondents, the interview was conducted with the head of the household. The respondents consisted of 20 males and 10 females and were organised into two groups of farming households - onion growers and non-onion growers.

Table 1. Respondents by group and sex

Respondents group	No of respondents		
	Male	**Female**	**Total**
Onion growers	10	5	15
Non-onion growers	9	6	15

Source: Primary data, 2021

Table 1 shows that onion growers interviewed were 15 smallholder farmers made up of 10 male-headed households (MHH) and 5 female-headed households (FHH). On the other hand, the non-onion growers interviewed were 15 smallholder farmers consisting of 6 FHHs and 9 MHHs.

Regarding the age of the respondents, the eldest was 67 years old while the youngest was 32 years old. Table 2 below indicates that thirteen respondents were in the age range of 30 to 45 years, fourteen respondents were aged between 46 to 60 years old, and three respondents were aged above 60 years. The average age of the respondents was 48 years.

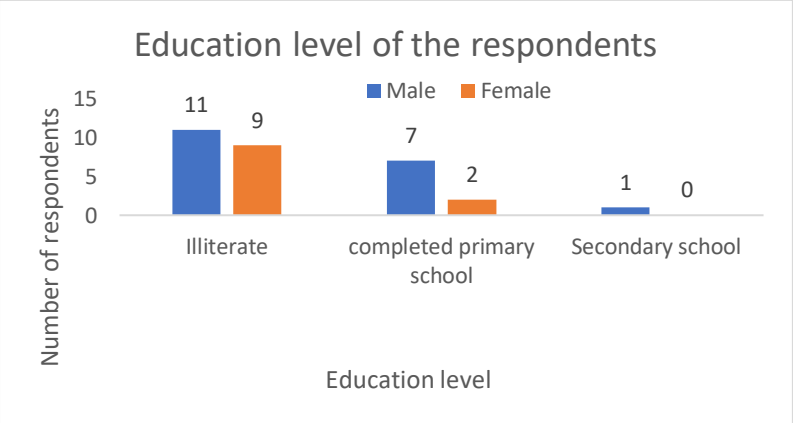
Table 2. Respondents by age and sex

Age range (years)	Onion growers			Non-onion growers		
	Male	Female	Total	Male	Female	Total
30 – 45	4	3	7	2	4	6
46 – 60	4	2	6	6	2	8
Above 60	2	0	2	1	0	1
Total	10	5	15	9	6	15

Source: Primary data, 2021

As indicated in Figure 3 below, most of the respondents were not schooled. Of the total of thirty respondents, 20 were illiterate while 9 completed primary school and one has finished high school.

Figure 3. Education level of the respondents



Source: Primary data, 2021

Concerning household members, the respondents had an average of 6 members. The household with the highest number of members was 9 and the one with the least members was 3.

4.2. Income sources (income-earning activities)

The income-earning activities of smallholder farming households include crop farming and livestock. The results from the household interviews show that all the respondents depend mainly on farming a variety of crops and keeping livestock. Further, providing labour on the onion fields is another income-earning activity some households use to supplement their income.

Table 3. Income source of respondents

Income source	**Number of respondents**		
	Onion growers	Non-onion growers	Rank
Crop farming	15 (100%)	15 (100%)	1
Livestock	15 (100%)	13 (87%)	2
Farm labour	-	5 (33%)	3

Source: Primary data, 2021

The result indicates that all households in both groups practice crop farming as the main income-earning activity. Additionally, 15 respondents in the onion growers and 13 in the non-onion growers keep livestock as another source of income. On the other hand, 5 respondents, in the non-onion growers, indicated that they work in onion farms during the weeding and harvesting.

The crops grown by smallholder farmers comprise sorghum, maize, wheat, and onion. As indicated in Table 4 below, all the respondents (15) in the onion growers group cultivate onion, sorghum, and maize, while only 6 respondents of the same group grow wheat. On the other hand, the non-onion growers, as indicated in the name, do not grow onion. Regarding other food crops, the household interview result shows that all 15 respondents grow sorghum and maize while 9 respondents grow wheat.

Table 4. Type of crops grown by respondents

Type of crops grown	**Onion growers**	**Non-onion growers**
	Number of respondents	**Number of respondents**
Onion	15	-
Sorghum	15	15
Maize	15	15
Wheat	6	9

Source: Primary data, 2021

Both FGD and key informant interview results confirmed that the growing of onion and food crops like sorghum, maize and wheat are the main income-earning activities of the smallholder farmers. They also stated that livestock (selling milk and/or the animals) represent another source of income for the farmers. Moreover, the FGD and key informant interviews results highlighted that some families who do not grow onion supplement their income by providing labour in the onion fields during weeding and harvesting times.

4.3. Changes in HH income

Respondents were asked about changes in income after the introduction of onion growing. According to the result from the interview with onion growers, all the respondents (15) mentioned that their income has increased since they started producing onion.

One of the respondents stated his experience below:

> "Before [the production of] onion, my income was very low. Covering my household needs like buying food was a constant struggle. I used to borrow food to feed the family and money to cover other household needs. But after I started producing onion, with the help of the agriculture bureau, my household income has increased from the sale of onion. I now get good income from the production of onion and I can feed my family and meet other expenses, thanks to Allah". (Respondent 2, MHH)

Additionally, in the following interview extract, a female respondent who is the head of the household elaborated how her income has increased after the production of onion:

> "My income has improved since I started producing onion. For example, I received 52,000 Birr (local currency) from the sale of onion last year. When I compare to my income before [growing onion], I can say there has been a high increase. It was around 15,000 Birr, you can tell how much it has changed" (Respondent 11, FHH)

FGD participants disclosed that their household income has significantly increased after the introduction of onion growing. Male FGD participants were enthusiastic in mentioning how their household income has improved due to the sales of onion. One participant happily explained, *"…onion growing brought me additional income. Last year, onion sales gave me 60,000 ETB, this is much more than I used to earn before onion*". Another participant revealed that onion growing generated "*considerable sums of cash*" for his household. Additionally, Female FGD participants stated that onion revenue has improved their household income as well. The discussion revealed that onion sales enhanced household income.

KI results confirmed there has been improvements in the household income due to the sale of onion produce. The agricultural extension worker stated during the onion harvesting season he has witnessed farmers receiving a lot of money from onion sales which they would not have got from traditional food crops. Additionally, the district agriculture office head confirmed the improvements in household income brought by onion sales. He said "*I have noticed the income of onion farmers has increased. These days I see them buying quality seeds for their farms which they didn't do much in the past*"

Table 5: Estimated Income from onion sales

Income range (ETB)	Number of respondents = 15	Average earning (ETB)
20,000 – 50,000	5 (33%)	27,000
50,001 – 80,000	7 (47%)	55,283
80,001 – 110,000	2 (13%)	83,000
110,001 – 140,000	1 (7%)	140,000

Source: Primary data, 2021

The respondents were asked to estimate income from onion sales. Table 5 above indicates that 5 (33%) respondents have earned income between 20,000 to 50,000 ETB with average of 27,000 ETB, while 7 (47%) respondents earned between 50,000 and 80,000 ETB averaging 55,283 ETB, 2 (13%) respondents made between 80,000 to 110,000 ETB with average of 83,000 ETB and one person has earned the most at 140,000 ETB.

4.3.1. Contribution of onion revenue to HH income

Revenue from the sale of onion represents a significant portion of the household income in the onion growers' group. According to the results from the household interview, income from the sale of onion produce represents, on average, 75.3% of the household income of the respondents interviewed. The lowest and highest share of onion income in household income is 60% and 89% respectively. To put

into a range, 4 respondents' share of onion income falls between 50% – 65%, 4 respondents onion income 66 – 75%, 5 respondents onion income 76 – 85%, and 2 respondents' onion income represents above 85% of household income.

Table 6: Contribution of onion revenue to HH Income

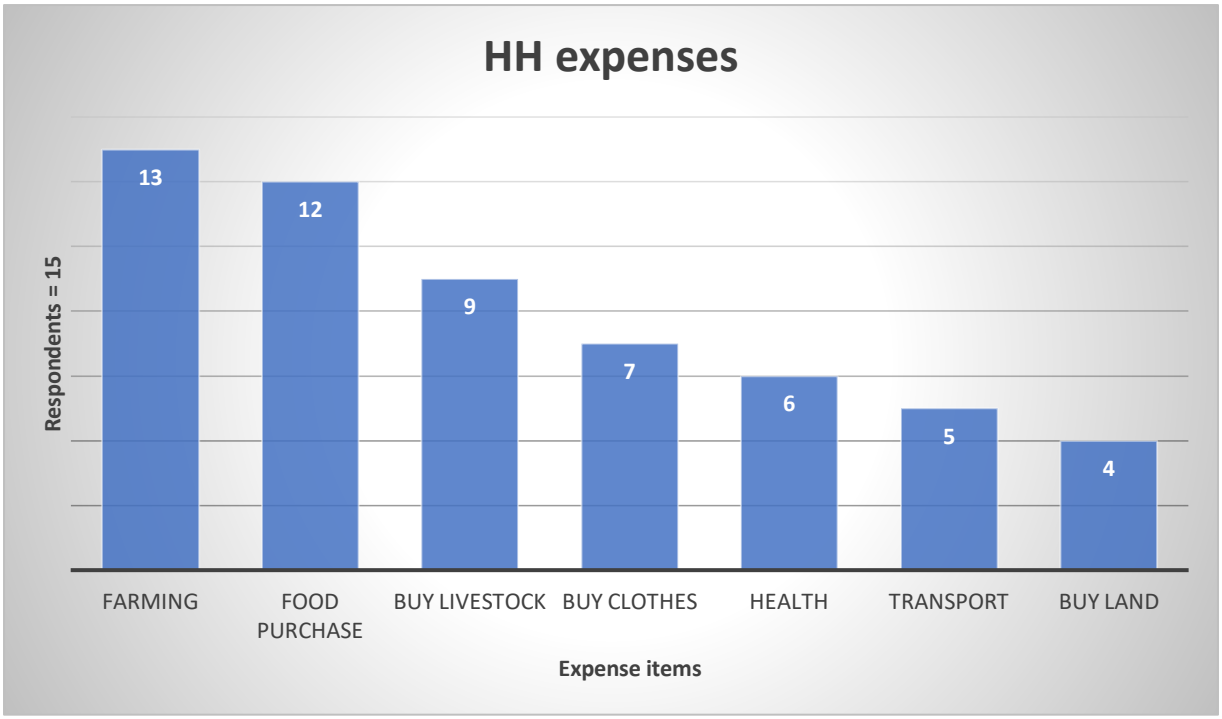
Onion revenue contribution in HH income	Number of respondents = 15
55 – 65%	4
66 – 75%	4
76 – 85%	5
Above 85%	2

Source: Primary data, 2021

4.4. Household expenses

The respondents were enquired to list the top seven items they spend on income from the onion production in the order from the highest expense to the least. Household interview results indicate that 13 out of 15 respondents mentioned farming expenses first. Respondents further stated that expenses on the farm include tractor rent for land preparation, seed purchase, planting, weeding, and harvesting of onion and other food crops. Spending on food purchases occupies second place as declared by 12 respondents. Buying livestock comes third followed by clothing, health, and transport expenses. Further, 4 respondents stated that they buy land in a nearby town.

Figure 4: Household expenses



Source: Primary data, 2021

Table 7 below illustrates the disaggregated data showing the difference in spending priorities between male-headed households and female-headed households. The top three expense items in MHH as ranked by respondents are farming, food purchase and buying livestock. While the FHH listed their top three expense items as food purchase, farming and health (treatment expenses).

In the following interview extract, a respondent describes his spending priorities.

> "With the money I get from onion sales, I try to spend it wisely on important areas. First, I have to allocate money for my farm expenses. I calculate the amount needed for the farm and set it aside. It is my main income activity. Then I pay for food purchases my family needs. Some of the money I spend on assets. I buy livestock and keep it for future use to address emergencies. The livestock also provides me with milk for household consumption. The remaining money goes to cover household needs" (Respondent 8, MHH).

On the other hand, in the following interview extract, a female respondent explains her spending priorities. She describes her top priority as food purchase followed by farming expenses and other family needs like health and clothing expenses.

> "My households needs are many. The priority is buying food for the family. I normally buy cooking oil, sugar, wheat flour and sometimes rice. After the food expenses, I plan for farming expenses which include tractor rent, seed cost and labour costs. I also pay treatment expenses of my children and buy clothes for them " (Respondent 13, FHH)

Table 7: Spending differences between MHH and FHH

MHH expenses		FHH expenses	
Ranking	**Expense items**	**Ranking**	**Expense items**
1	Farming	1	Food purchase
2	Food purchase	2	Farming
3	Buy livestock	3	Health
4	Clothes	4	Clothes
5	Transport	5	Buy livestock
6	Buy land	6	Transport
7	Health	7	Buy land

Source: Primary data, 2021

Male FGD results show that MHH gives priority to spending on the farm. The participants stated that they spend most of their income on operating the farm. One participant mentioned, "…*my farm is my life, I have to take care of it, spend money on land preparation, seed and other costs…*". The participants had the view that spending back on the farm is crucial for their food security. They stated that produce from their farm plots enables them to feed their family directly through consumption. Also, income from the sale of produce allows them to purchase food and meet other family expenses. Participants mentioned that food purchases are also one of the main household expenses. Additionally, the group discussion indicated MHH invest in buying livestock. Most of the participants described the reason for buying livestock is to save money. Some participants stated livestock is bought also to benefit from their milk for drinking. The discussion highlighted the importance of livestock in that it can be easily converted into cash when needed to address family needs.

The female FGD results indicate that FHH gives priority spending to food purchases. They described that food is important for their survival. After they purchase food, the remaining income is divided between farming expenses and other family needs. Spending on the farm is the second priority for FHH. The farm expenses include land preparation cost, seed purchase and hiring farm labourers.

The household interview and FGD results show that MHH and FHH purchase similar foods. The foods purchased include rice, wheat flour, sugar, and vegetable oil. FGD participants were asked about the reason for households not buying nutritious foods with the onion income. The participants were divided in their responses. Some stated that nutritious foods like meat are expensive and hence they

cannot afford to buy them regularly. Others stated that they think the food they already eat is nutritious enough for them to live a healthy life.

4.5. Control over HH income

To understand how households exercise control over income, respondents were asked about who is involved in the growing and selling of onion.

Adult household members and children who can provide labour participate in the growing of onion. Additionally, labourers are hired to work on the onion fields. According to the household interview results, 7 respondents (47%) mentioned men, children and women are involved in the production of onion, 2 respondents (13%) said a man is involved while 3 respondents (20%) indicated women and children are involved and the rest 20% (3) of the respondents stated that labourers are involved in the growing of onion. Respondents described those female-headed households who do not have grown children usually hire labourers to cultivate the onion. In the following interview extract, a female respondent explains how she cultivates onion.

> "I work in the onion farm myself and also do the household chores. Sometimes my children try to help me in cultivating onion, they are young they cannot do much. So, I hire labourers for the farm especially harvesting time which requires a lot of labour" (Respondent 14, FHH)

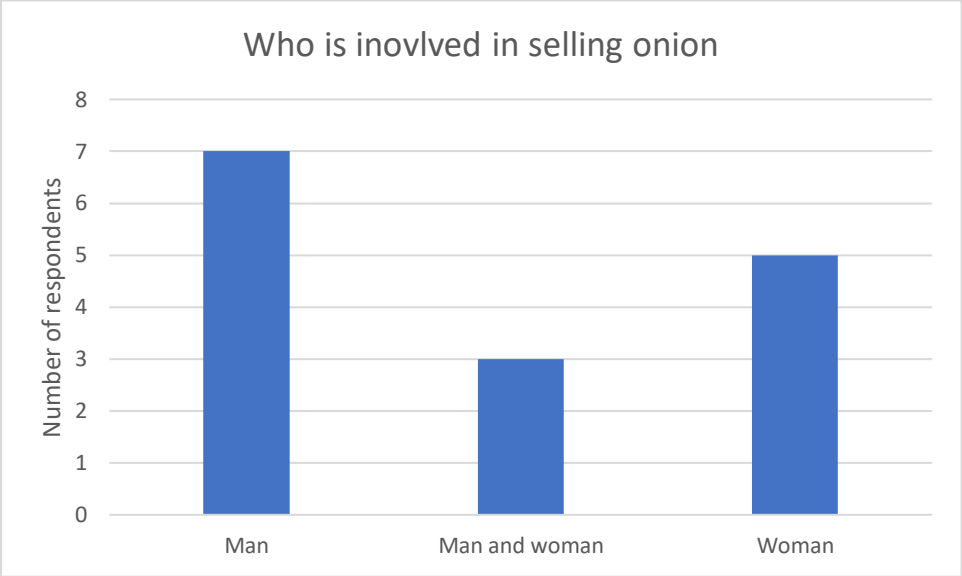
FGD results indicate that all able members of the household are participating in the production of onion. They stressed how the man leads the growing of onion. Most of the time it is the man who works on the onion farm since the fields are small. Women in MHH help in the weeding of the onion. The FGD participants described women in FHH who grow onion face difficulties in providing the labour needed as they are busy with household chores. So, they hire labourers to cultivate and harvest their onions. The result of the KI interview confirms that men, women, and children work on the onion fields and sometimes labourers are employed to help in the onion production.

Figure 5: Who is involved in growing onion

Source: Primary data, 2021

On the other hand, 7 (47%) respondents declared that only men are involved in the sale of onion. Men collect the harvest and sell it to buyers who come to the field. On the other hand, 5 (33%) respondents said only women are involved in selling produce. Respondents revealed that women in FHH are responsible for selling the onion produce. Further, 3 (20%) respondents stated that both men and women together are involved in the selling of onion produce.

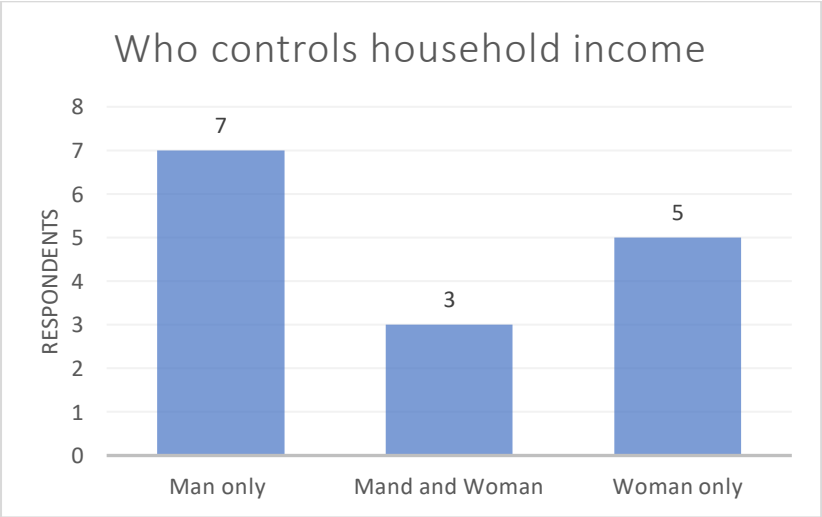
Figure 6: Who is involved in selling onion



Source: Primary data, 2021

Control over household income includes cases where only men have control, cases where only women have control and cases where it is shared between men and women. According to household interview results, 7 (47%) respondents stated that only men exercise control over income. Respondents revealed that men decide on what to spend on the income and the women execute the orders of the husband. They further stated that women provide information about the household needs like the food and clothing with the husband and he disburses the money accordingly. In contrast to this, 3 (20%) respondents mentioned that men and women jointly control household income. Husband and wife discuss savings and spending priorities and jointly decide on the action forward. On the other hand, 5 (33%) respondents stated only women exercise control over the household income. This indicates all women respondents in FHH are solely managing their household income.

Figure 7: Who controls household income



Source: Primary data, 2021

4.6. Food consumption score

This section describes the food consumption score of the onion growers and non-onion growers' groups. FCS is a proxy indicator for household food access. It considers information on the frequency and dietary of foods consumed (WFP, 2008). WFP's standard food consumption score sheet was used to gather information on household food consumption. Respondents were asked about the frequency of household food consumption of eight different food groups over the previous seven days. WFP's standard cut-off points were used to classify the scores which state 0 - 21 poor, 21.5 - 35 borderline and above 35 acceptable (WFP, 2008). Steps followed to calculate the FCS are described in Annexe 1.

Table 8: Food consumption score of onion growers and non-onion growers

FCS category	Onion growers			Non-onion growers		
	MHH	FHH	Total	MHH	FHH	Total
Acceptable (Above 35)	5	1	6	2	0	2
Border line (21.5 – 35)	3	3	6	3	2	5
Poor (0 – 21)	2	1	3	4	4	8
Total	10	5	15	9	11	15

Source: Primary data, 2021

Onion growers

The results in Table 8 show that out of 15 respondents, six (40%) have FCS that fit in the acceptable category while 6 (40%) respondents are in the borderline category and 3 (20%) respondents belong in the poor category. The results also indicate that out of the 5 FHH respondents, 3 belong to the borderline category while 1 respondent is in the acceptable category and 1 respondent falls in the poor category.

Table 9: Food purchased – onion growers and non-growers by sex

Foods purchased	**Onion growers**			**Non-onion growers**		
	MHH	**FHH**	**Total**	**MHH**	**FHH**	**Total**
Cooking oil	10	5	15	9	6	15
Sugar	10	5	15	9	6	15
Rice	7	2	9	3	1	4
Wheat flour	8	4	12	4	2	6
Meat	3	1	4	0	0	0
Beans	1	0	1	0	0	0

Source: Primary data, 2021

Most of the food items consumed by this group are the main staples such as maize, sorghum and wheat These foods groups are produced by the farmers themselves. Fruits and vegetables are not consumed while meat is rarely eaten. The results show that milk from owned livestock is consumed by farmers (Annexe 2). Food items purchased by farmers are rice, wheat flour, cooking oil and sugar as illustrated in Table 9 above. Farmers rarely eat meat because it is expensive as mentioned by the respondents.

In the following interview extract, a female respondent reveals the reason for not consuming meat.

> "We don't eat meat most of the time because it is expensive. We eat when we have celebrations or during funerals. Sometimes after a long time of not eating meat, I buy it and cook for the family just to have the taste of it" (Respondent 15, FHH)

Non-onion growers

The results in Table 8 show that most of the respondents at 53% (8) have FCS that belong to the poor category while 5 (34%) respondents have borderline FCS, and 2 (13%) respondents fall in the acceptable category. Out of the 6 female-headed households interviewed, 4 respondents have poor FCS, and 2 respondents are in the borderline category. The food items consumed by this group are main staples like maize, sorghum, wheat and sugar and cooking oil. Looking at the food purchases of this group, Table 9 indicates they buy cooking oil and sugar often, while wheat flour and rice are less frequent.

CHAPTER FIVE: DISCUSSION OF RESULTS

The results indicate that smallholder onion farmers depend on agriculture as a source of income. In agriculture, crop farming was found as their main source of income followed by livestock production. Onion growing has become an important income-generating activity for many smallholder farmers in Tuurwa'ad village. The farmers highlighted that their income has improved after they started growing onion. The research found that onion growing has significantly increased the household income of smallholder farmers. The results show that onion revenue contributes 60 – 89 per cent to the household income of smallholder farmers. This finding is consistent with the finding of Li et al. (2020) who found that cash cropping had a positive and statistically significant effect on the household income of farmers in low-income regions of China. Additionally, the finding of this research agrees with Klasen et al. (2013) who showed that households cultivating cash crops gained higher income than their counterparts cultivating traditional crops.

The aggregate results indicate that households spend more on their farms (13 respondents) to ensure continuity of production. Expense on purchases was stated as the second highest with 12 respondents. Further, many households (9 respondents) spend money on buying livestock. The disaggregated analysis indicates that MHH and FHH respondents have slightly different spending priorities. The top three spending priorities of MHH reveal that they spend on investments and food purchases. The investment includes farm expenses and livestock purchases. Farm expenses are related to land preparation, seed and harvesting costs. On the other hand, the top three spending priorities of FHH indicate they spend more on family needs than MHH. They ranked food purchase, farming and health expenses as the top three. The study found no differences in food purchases between MHH and FHH as they largely purchase starch foods. Based on the FGD findings, livestock is purchased primarily for saving to be liquidated for future household needs, and to less extent for milking purposes. It is interesting that some households are aware of the nutritional value of milk and hence purchase livestock for that purpose.

The results indicate that with the additional income from onion sales, households can buy nutritious food. Although their spending priorities indicate food purchases, the food items bought are largely less nutritious. FGD results indicated two reasons for not buying nutritious food; some said it is expensive to buy while others think the food they consume is nutritious. Those claiming nutritious food is expensive gave meat as an example. Both reasons seem to arise from poor awareness of nutritious food. There can be several food items they can afford in the local markets that can be a meat substitute. Based on the above results, the study found that households mostly spend onion income on farms, food, and livestock purchases. Their food spending indicates poor nutrition education awareness.

Smallholder farmers obtain most of their household income from the sale of onion produce (Table 6). Onion cultivation requires more labour compared to traditional crops. The results indicate that all household members who can provide labour partake in its production. Men, children, and women are involved in the cultivation of onion. FHH hire labourers to assist in the growing of onion (3 respondents). Men are largely responsible for the selling of onion produce while women are rarely involved (Figure 6). The results further indicate that men have the sole control over household income earned from the sale of onion (Figure 7). Based on the findings on onion sales and income control, the study found that men dominate the production of onion and the control of its income. The finding is consistent with a study in northern Ghana by Zakaria (2016) who showed that men lead cash crop production while women are more involved in farming food crops.

Food consumption scores of onion growers and non-onion growers were compared to understand the effect of onion growing on food consumption. Non-onion growers' main income activity is food crop farming supplemented by livestock with few families earning income from farm labour. Regarding their food consumption, the results indicate that majority of the non-onion growers (8 out of 15 respondents) have poor FCS, while a considerable number of them fall in the borderline category (Table 8). Compared to onion growers, they seem to consume less nutritious food like milk and do not eat meat(Annexe 2). In addition, consumption of staples is less frequent within the non-onion growers. Based on the results, this study found that the majority of non-onion growers have unacceptable (poor + borderline) food consumption scores. This may indicate that non-onion growers, due to their lower-income, are not able to buy the nutritious food they need and hence most of them have fallen into unacceptable FCS. Gender disaggregated analysis shows MHHs have better food consumption than FHH.

On the other hand, the study found that onion growers have a better food consumption score than non-onion growers. The results show that 6 out of 15 respondents have acceptable food consumption scores, while 6 respondents belong to the borderline and 2 have poor FCSs. Analysis of the results indicates that those with acceptable FCS cluster are educated (4 primary education, 1 secondary) except one respondent who is illiterate. The respondents in the borderline and poor consumption cluster are mostly uneducated. Additionally, the result indicates respondents belonging to the acceptable FCS cluster consume more nutritious foods like meat and milk compared to borderline and poor FCS clusters (see Annexe 2). This may indicate educated household heads have better nutrition awareness as they can better grasp nutrition education. The disaggregated analysis of the results reveals that onion growing MHH have a better food consumption score compared to FHH (Table 8).

In summary of the food consumption, the study found that onion growing is associated with improvements in food consumption. This finding is in line with Rubhara et al., (2020) who, in a study conducted in Zimbabwe, found that cash cropping had a positive impact on the household dietary diversity score of smallholder farmers in Zimbabwe.

Reflection as a researcher

Students at Van Hall Lareinstein (VHL) university are required to research to complete the master's degree. Because of my lack of research knowledge, I was worried about the task of doing a thesis. The modules delivered by the lecturers equipped me with the knowledge and skills to do research. The research Design and Implementation module was crucial for me in not only equipping me with the basic knowledge of research but also developing my practising skills with the mini-research assignment. Additionally, I found particularly helpful the teaching methods which combined theory and practice, individual and group works, and different assessment methods.

The selection of the thesis topic was a difficult task for me. First, I needed to find a commissioner for my work. Three months into my studies, I have learnt that my job position was given to another person and that meant I was unemployed. Losing my job did not affect me much as I continued to focus on progressing in my studies. Later, in the Research Design and Implementation module, students were expected to submit and pitch thesis topics. It is at this time that I felt the pressure to find a commissioner and agree on a thesis topic. In my pursuit of a commissioner, I found a government agency responsible for the development and dissemination of improved seeds stationed in my town. Together with the director of the agency, I have chosen a problem to research. Later, I have decided to drop the topic after discovering the same topic was researched in the area. Then, I have found another commissioner who provided me with several options (problems) for research. This provided me with the opportunity to commence the thesis proposal.

The thesis proposal development has presented me with both opportunities and challenges. It presented an opportunity to apply the knowledge and skills I gained during my studies at the university. There were also challenges to overcome. First, I have struggled to focus on my thesis work because some of our students in the residence were infected with COVID-19 and as a result, we were placed under lockdown to prevent further spread of the disease. The VHL university coordinators, lecturers and my mentor assisted us to cope with the stress in that difficult time. The lectures were rescheduled and the deadline for the submission of the thesis proposal was postponed. Another challenge was the doubt I had of whether I can produce a successful thesis. Support from family, peers, friends, and my mentor were useful to get me over this doubt.

During the thesis proposal development, I found formulating the research problem, objective, and research questions tough. I spent a lot of time and energy properly formulating these sections because they are the foundations of my research. After stating the problem well, I have unravelled the concept further, backed it up with relevant literature and developed a conceptual framework of the thesis. Then I have concluded with the description of the methodology. During this process, I have consulted previous studies, read lecture notes, books and relevant online literature to gain more understanding. The advice, input, and critical comments of the supervisor were vital for completing the thesis proposal. The comments of the co-assessor during the presentation of the thesis proposal were also crucial.

After the presentation of the thesis proposal, I have got the go-ahead to continue with the data collection. I departed the Netherlands in late June and headed to my country. I have spent the first two weeks of July preparing for the data collection. I have developed the data collection tools like SSI, FGD and Key informant interviews. Developing these tools presented a good experience for me since it was my first time doing so. I referred to the conceptual framework and research questions and operationalised the concepts further to prepare the tools. During this time, I contacted the commissioner and made logistics arrangements for the fieldwork. Before the data collection, I have

tested the tools with five farmers and modified them with the inclusion of additional questions and the removal of unnecessary ones.

After receiving permission from the authorities, the data collection process started on the 15th of July. I began with the sampling and identification of respondents. Unusually heavy rains and cold temperatures have interrupted the data collection the next day and continued for several days. The process resumed once the rains have stopped.

The data collection coincided with the planting season where farmers were busy with land preparations. I have realised that male farmers were working on their farms and women were busy with household chores. To minimise time loss, farmers were interviewed either in farm plots or in their residences. At the end of the interviews and FGDs, respondents were given incentives in the form of mobile phone credit top-ups as a value for their time.

I have gained valuable experience from the data collection work. It was my first time conducting such a kind of interview. Interviewing in my native language helped a lot in understanding the respondent's views. I have practised how to probe for further information when needed. The interviewees preferred Also, through the household interviews, I have honed my note-taking skills. FGD presented a different challenge than the household interviews. FGD required the ability to combine facilitation and note-taking skills. Since I had no research assistant, I acted as both the facilitator and notetaker. I have to tell participants to slow down the pace of the discussion so I can note down their points. While concentrating on note-taking, I may have missed noticing their facial expressions. My learning from this experience is that is difficult for one person to conduct FGD. So, in the future, I will make sure to have an assistant in FGD.

After collecting data from the field, the analysis followed. Although the analysis part posed an interesting challenge, the knowledge and skill I gained from the management of development professionalism module and the mini-research exercise helped me to overcome it. In the analysis, findings of the FGD, household interview and KIs helped the triangulation.

The whole process was a learning experience for me. I have improved my analytical and report writing skills. The interaction with different stakeholders helped me improve my teamwork and communication skills. The comments and feedback from my supervisor were instrumental in helping me to think critically and properly shape my thesis. Working with farmers helped me understand their livelihoods and food security in particular. The understanding I have developed of the situation of smallholder farmers is very important for my future work as a food security specialist.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

The study assessed the effect of the introduction of onion growing on the food accessibility of smallholder farmers in Tuurwa'ad village of North Jigjiga district.

The study concludes that the introduction of onion growing has significantly increased the household income of smallholder onion farmers. Income from onion sales has had a significant contribution to improving household income. As a result, onion growing has become a major income-earning opportunity for smallholder farmers.

From the findings, it is understood the income supplemented from onion growing provided an opportunity for the households to purchase the food they need and address other needs. Income from onion growing was spent on farming costs, food purchases, livestock purchases and other family needs. Farmers showed poor nutrition education awareness when purchasing food. MHH have shown a tendency to invest in an asset like livestock than FHH.

This study concludes that men dominate the control of the household income. Although women together with men and children participate in the cultivation of onion, it is the men who are largely involved in selling the produce and collecting the money. Men lead the production of onion.

The study concludes that onion growing has led to improvements in food consumption. It is possible to conclude the improvements were related to onion income spent on food purchases and livestock sales. Consumption of purchased food together with milk (from own livestock) have increased for those with acceptable food consumption scores. Despite improvements in food consumption, many households have unacceptable food consumption scores.

Therefore, it can be concluded that the introduction of onion growing has improved the food accessibility of smallholder farmers. The improvements can be attributed to the better food consumption of households brought by spending onion income on purchasing of food and livestock.

6.2. Recommendations

Based on the findings of this study, the following recommendations are made proposed.

- The ANRDB should work on creating awareness for the farmers on the type of nutritious foods they can purchase in their locality.
- The ANRDB should introduce high nutrient crops to the farmers and assist them with training on the cultivation methods. Farmers already have access to land and basic farming knowledge.

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ANNEXE

Annexe 1: Food consumption score calculation

The Food consumption score is a score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey (WFP, 2008).

According to WFP (2008), Steps for calculating FCS:

1. Using standard VAM 7-day food frequency data, group all the food items into specific food groups (see groups in table below).
2. Sum all the consumption frequencies of food items of the same group, and record the value of each group above 7 as 7.
3. Multiply the value obtained for each food group by its weight (see food group weights in table below) and create new weighted food group scores.
4. Sum the weighed food group scores, thus creating the food consumption score (FCS).
5. Using the appropriate thresholds (see below), record the variable food consumption score, from a continuous variable to a categorical variable.

Table 1.1: food groups and standard weights

	FOOD ITEMS (*examples*)	Food groups	Weight
1	Maize, maize porridge, rice, sorghum, millet, pasta, bread and other cereals	Main staples	2
	Cassava, potatoes and sweet potatoes, other tubers, plantains		
2	Beans, peas, groundnuts and cashew nuts	Pulses	2
3	Vegetables, leaves	Vegetables	1
4	Fruits	Fruit	1
5	Beef, goat, poultry, eggs and fish	Meat and fish	4
6	Milk yogurt and other diary	Milk	4
7	Sugar and sugar products, honey	Sugar	0.5
8	Oils, fats and butter	Oil	0.5
9	Spices, tea, coffee, salt, fish powder, small amounts of milk for tea	Condiments	0

Source: WFP, 2008

Annexe 2: Summary of food consumption score

Table 2.1: Food consumption score of onion growers by cluster

Cluster	FCS	Mean number of days food group consumed by cluster								Classification based on cluster
		Staples	Pulses	Meat	Milk	Vegetables	Fruit	Oil	Sugar	
1	65	7	0	7	4	0	0	7	7	Acceptable
2	49	7	0	3	4	0	0	7	7	
3	46	7	4	0	4	1	0	7	7	
4	41	7	0	0	5	0	0	7	7	
5	41	7	0	1	4	0	0	7	7	
6	41	7	0	2	3	0	0	7	7	
7	33	7	0	0	3	0	0	7	7	Borderline
8	33	7	0	0	3	0	0	7	6	
9	32	7	0	0	3	0	0	7	5	
10	29	7	0	0	2	0	0	7	7	
11	28	7	0	0	2	0	0	6	6	
12	27	7	0	0	2	0	0	5	5	
13	21	7	0	0	0	0	0	7	7	Poor
14	20	7	0	0	0	0	0	7	4	
15	19	7	0	0	0	0	0	5	5	

Source: Primary data, 2021

Table 2.2: Food consumption score of non-onion growers by cluster

Cluster	FCS	Mean number of days food group consumed by cluster								Classification based on cluster
		Staples	Pulses	Meat	Milk	Vegetables	Fruit	Oil	Sugar	
1	41	7	0	0	5	0	0	7	6	Acceptable
2	36	7	0	0	4	0	0	5	6	
3	29	7	0	0	3	0	0	4	2	Borderline
4	28	6	0	0	3	0	0	3	5	
5	27	7	0	0	2	0	0	4	5	
6	23	6	0	0	2	0	0	4	2	
7	23	7	0	0	1	0	0	5	4	
8	16	5	0	0	1	0	0	2	1	Poor
9	15	6	0	0	0	0	0	3	2	
10	15	6	0	0	0	0	0	3	3	
11	14	6	0	0	0	0	0	2	2	
12	14	5	0	0	0	0	0	4	3	
13	13	5	0	0	0	0	0	4	2	
14	12	5	0	0	0	0	0	2	1	
15	12	5	0	0	0	0	0	1	2	

Source: Primary data, 2021

Annexe 3: Data collection tools

Semi-structed Interview checklist

A. Household profile

1. Name of household head _____
2. Sex____
3. Age _____
4. Level of education _____
5. Number of household members _____

B. Income and expenses

1. What are your income-earning activities? _____please rank them in the order of importance
2. How much do you earn from each activity? Estimate_____
3. Is there a change in your income after the introduction of onion growing?
4. What change did you experience with your household income after the introduction of onion growing? Please compare your income before and after the growing of onion.
5. Who is involved in the cultivation of onion? Men, women, children, together….
6. Who is involved in the sale
7. How is household income controlled? Like who decides on what and how to spend?
    a. Husband only b. wife only c. Husband + wife d. other _____
8. What are your household priority needs? Please rank them in the order of importance___
9. What items do you spend on your household income?

C. Food consumption (food consumption score sheet)

- Food consumption score sheet

Focus Group Discussion (FGD)

1. Please describe the main income-earning activities in this area.
2. Can you describe how is onion grown in your village? Like whom is involved in its cultivation (men, women, children, all, other_____)
3. How is the onion produced from your village sold?
4. What type of change is experienced by farmers with regards to household income after the introduction of onion? Please elaborate….
5. Who is involved in the sale of farm produce?
6. On what items do households mainly spend on their income? Rank in terms of importance…
7. How is household income managed? Who controls, decisions on how to spend
8. Which types of food do households eat normally?
9. From where do they get the food they eat? Own production, purchase, food aid, gift, borrow
10. What types of food is grown by households in the farm?

Key Informant Interview

1. Can you describe the main income-earning activities of farmers in the village?
2. Is there a change in household income after the introduction of onion growing? Describe the type of change happening?
3. Please compare how is the food security situation before the introduction of onion growing and after? (types and frequency of food eaten, ….)
4. Can you describe the types of food eaten by households?
5. Can you describe the difference between foods eaten by onion growers and non-growers?
6. How do households get the food they eat? Own production, purchase, food aid, gift, borrow etc.
7. What types of crops do farmers produce?