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COLLAGE OF BUSINESS AND ECONOMICS

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Wisdom at the source of the Blue Nile

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Approved by Board of Examiners

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List of acronyms

ADLI- Agriculture Development Led Industrializations

CCI- Crop Commercialization Index

CSA- Central Statistics Agency

DFID- Department for International Development

FAO-Food and agriculture organization

GDP- gross domestic product

GTP- growth and transformation plan

KM – kilometer

VIF- variance inflated factors

MDG- millennium development goals

MOFED – ministry of finance and economic development

OLS: ordinary least square

USIAD- united state agency for international development

SIDA – Swedish international development agenda

TFP- total factor productivity

TLU- tropical livestock unit

WDR- World Development Report

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ABSTRACT

The purpose of this study was to analysis the determinants of commercialization teff and its factor productivity outcomes. Particularly , the study investigate the level of commercialization of teff production, total factor productivity outcomes of teff production of households operating at different levels of commercialization and factors that affect household participation in the teff out put market. Stratified random sampling was applied to select sample kebeles and the stratification variable was agro ecological zone and 220 sample respondents were selected based on simple random sampling technique from the five sample kebeles. Structured questioner was a main tool to collect cross sectional data from the sample respondents.. The descriptive analysis revealed that the level of commercialization in the study area was on average semi commercial one. Moreover, one way ANOVA test was applied to cheek the existence of significant total factor productivity variation among households operating at different levels of commercialization. Censured Tobit regression was applied to analysis the factors that affect market participation of households' in teff output market. The result revealed that from the total 12 explanatory variables, five variables were statistically significant. Of which, land size (land allocated for teff production) and previous year market price of teff was positively related with market participation and while participation in the off farm income activities, access to credit service from formal financial institution and educational level of the household heads related negatively with quantity or volume of teff sold. Thus, emphasis and intervention should be given for household to increase market participation and improve levels of commercialization.

Key Word: Commercialization, Households, Teff, Factor Productivity, market participation

Chapter one: Introduction

1.1 Background of the study

The Ethiopia economy experience mainly three economic sectors .these are agriculture, manufacturing and service sectors. From these , agriculture sector plays a vital role for employment creation, foreign exchange generation, means of income and livelihoods. According to (CSA, 2007/2014), the agriculture sectors provide 83% of employment from the total population and constitute for more than 50% of gross domestic product (GDP) growth for the country.

Even though agriculture sector entitle various benefit, but the practice and performance has been characterized as smallholder farming and subsistence. This means the agriculture activity conducted through inhering of family labor, the labor to land ratio is too high and few degree of specialization. Thus, lower productivity, lower income and lower standard of living are common. Furthermore; smallholding farming is a means for life sustenance (Goitom, 2009).

Households aiming to reduce poverty, to achieve for sustainable food security, maximize welfare and to improve livelihood, subsistence agriculture must be structured /shifted to commercialization (Pingali, 1997).

Different countries and worldwide development agencies puts critical focus on smallholder farming intensification and commercialization aiming to reduce poverty and suggest direction to countries exercise in their official policy (Leave and pouiton, 2007).

To integrate farm households in to market, different activities are curried out from 1950s up to now .during 1950s the major concern were improving productivity and reducing economic dependency on subsistence agriculture and in 1960s the focus were developing agro industry economy and increments in foreign earning. After the derg regime come to power, the major attempts were adopting socialism economy and the current government strongly concerned on smallholder farming, poverty reduction and promote intensification of agriculture (sharp et al, 2007).

Commercialization in agriculture refers to the progressive shift from household production for auto-consumption to production for sale in the market. This shift entails that production and input decisions are based on profit maximization, reinforcing vertical linkages between input and output markets (Olwande *et al*., 2015).

It is obvious that, commercialization is long run process that farming shifts from subsistence (non commercial) to semi-commercial farming, and then to fully commercialized agriculture. In the case of open market economy, commercialization of agriculture enables to welfare gains for farmers through comparative advantage and increased total factor productivity growth (Pingali and Rosegrant, 1995).

Increase the extent of commercialization of farming among Sub-Saharan Africa's generally semi-subsistence, low-input, low-productivity smallholder famers have seen as playing a significant role in poverty alleviation (Olwande *et al*, 2015).

Commercializing smallholder agriculture has seen as a means to bring the welfare benefits of market-based exchange economies, and is central to an inclusive development process (Arias *et al*., 2013).

Commercialization has been advanced as a means of improving smallholder farmers' income and reducing rural poverty in many developing countries and it has also been considered as a major strategy of ensuring household food security (WDR, 2008).

For subsistence agriculture, commercialization may not be the whole process and that involves the importance of equity issue. Moreover, smallholder farmers excluded from the benefit of commercialization practice this is because lowers access for infrastructure and service and the existence of transaction cost emanate from newly emerging market organizations .besides to this the change in the economic development brings the increment of per capita income, progress in technology use and urbanization that leads the change of food marketing in developing nations (Reardon and Timmer, 2007).

Since 2005 the government of Ethiopia gives strong prioritization for commercialization of farming in the development agenda. According to MoFED (2006) commercialization of agriculture, based on the support of intensification of marketable farm outputs for

domestic and foreign market by both small and large scale farmers and encourage off farm private sectors growth.

Growth and transformation plan of Ethiopia focused on meeting the MDGs goal through rising crop production by adopting better farming practice, increase cultivated agriculture land, improve extension service utilization and agriculture inputs . Moreover rural development strategy intended to contribute to the transformation of productive rural sector from primary subsistence to more market oriented sectors, contribute to the overall growth and poverty reduction (sharp et al, 2007).

Teff is produced by smallholder farmer at the central, eastern and northern highland of Ethiopia and it constitute about 20% of all cultivated area of Ethiopia followed by maize 15% and covers about 2.7 million hectors and in hire 6.3 million farmers . Moreover total national production of teff was (3.7 million tons) which is lower than maize (6.1 million tons). Teff is the major food crops that consumed by both rural and urban households since it contains better miniral and amino acid. At national level, 44,714,618.94 quintal of teff was produced in 2015/2016 fiscal year and averages on 25,278,068.38 quintals were used for consumption. In addition to this, it is the second most crucial crops next to coffee and generate about $500milion income per year for rural farmers (Birara , 2017).

Teff is the leading cereal crop from other crops in terms of area coverage and quantity of output produced in amahara region and around 1,137,844.14 hectares of land was covered with teff and produced 19,328,573.65 quintals of teff in the past fiscal years. Moreover, the average yield of teff was 16.99 quintal per hectares (CSA, 2016/17).

When we see the studying area, the dominant agricultural output has been still teff. In the past fiscal year 25,250 hectares of land was covered by teff and 670,033 quintal of was produced which yields 26.5 quintal per hectares on average. In the current year 27,705 hectares of land is covered by teff and the will expect to produce 784,059 quintals .thus; the average yield will be 28.3 quintal per hectares. Now this indicates the average yield increase with 1.8 quintal per hectares as compare to the previous years.

1.2 Statements of Problem

Overcoming the challenge of improved rural income in Africa require some form of transformation out of semi subsistence, low productivity farming system and low income that currently characterize rural Africa (Govereh ,1999) .

According to mahlet (2007), smallholder farmers cultivate 95% of total crop land and produce around 95 % of agricultural outputs. Besides agriculture sectors generates 90% of foreign exchange earnings. This indicates that Ethiopia economy is dominantly subsistence and non commercial.

The Ethiopia government prepares plan and strategy in the development policy agenda in order to transform subsistence farming to commercial one .To do so; agriculture development led industrialization (ADLI) policy have been in practice since 1994. This policy integrate various ingredient that promote the growth of agriculture such as finance, market integrations (internal and external), private investment, rural infrastructures and technology .The focus of this policy has been commercialization of agriculture, provide access to credit service for stallholder farmers, improve food security and industrialization (Sharp et al 2007).

But the reality behind commercialization of smallholder farming currently is not too enough for farmer to benefit from income increase and to escape from subsistence oriented agriculture due to the agriculture sector is highly dominated by small scale subsistence agriculture and low productive (Birhanu and Moti, 2010) and also the occurrence of market imperfection and high transaction cost hinders smallholders not to enjoy and benefit welfare from commercialization unless better environment is created (Bernand et al, 2007).

Growth and transformation plan (GTP) of Ethiopia was aimed to increase productivity of dominant crops through good agricultural practice .Since poverty reduction strategy seeks growth that combine commercialization of smallholder agriculture (MoFED, 2010).

Samuel and sharp (2007) noted that four categories that represent potential complementary pathways for commercialization policy in Ethiopia. These are smallholder farmers (subsistence), small holder farm(market oriented), small investor

farms and large scale agro business .on average around 11.5 million Ethiopia farmers are found under the smallholder subsistence and smallholder market oriented (MoFED,2006). Likewise majorities of farmer who are engaged in teff producuction of Awabel Worreda are characterized under the categories of subsistence small farming and market oriented smallholder.

The study area is well-known in the production of different staple food crops that are grown at different agro ecological zones such as teff, maize, wheat, barley, sorghum, chickpea, and beans "guaya" and various fruits and vegetables. From this, Teff are the most dominant crops for the farm households and the area ranked 12th from 25 major teff growing area in Ethiopia (James et al, 2015). Now the principal motive for researcher interested to deal with teff is that, it is the most marketed and highly demanded both cash and food crops in the studying area. But there is still unsatisfied demand in the market since the supply of teff is mainly seasonal. That implies farmers sold teff during the harvest season and rarely at summer to purchase agricultural inputs.

Cognizant of this fact, commercialization of teff that enhance productivity, food security, poverty reduction and rise of income can be affected by different socio- economic, political, environmental and institutional factors. Accordingly, commercialization can be affected both locally and internationally. Locally, it is affected by input marker, institution, consumption preference, culture, and price, level of production, infrastructures and access to information. But at the international levels, commercialization also affected by international trade, globalization, population growth, urbanization, growth of different economic sectors and infrastructure (Pender et al, 2007).

There are related literatures on commercialization of smallholder agriculture. For instance Goitom,(2009) in his study commercialization of smallholder farming indicates that the role of commercialization on household welfare and measure household participation in the output market by using multiple linear regression . likewise, Samuel and Sharp(2007) in their study commercialization of smallholder agriculture in selected teff growing area in Ethiopia also measure household participation in the output market two stage least square method . But this method simply shows the linear relationship between market participation and other explanatory variables. Therefore, the researcher

determine households participation in the output market by using **Tobit regression** models since the output variable can censured in to commercial(high participant) , semi commercial(medium participant   and   subsistent(low participant).Moreover, the researcher adds access to training and access to extension service as a new independent variable that is not considered by former researchers.

Finally the researcher is interested to deal with commercialization of teff since there is no scientific and systematic research work conducted in the study area by the title with determinant of commercialization of teff and its factor productivity outcomes. Therefore, the researcher likes to clearly show the issue of level of commercialization, factor that determine households participation in the teff market and how factor productivity influence households operating at level of commercialization in the studying area.

1.3 Objectives of the Study

1.3.1 The General Objective

The general objective of the study is to explore the determinant of commercialization of teff and its factor productivity outcomes in the case of Awabel Worreda, Amahara region Ethiopia.

1.3.2 Specific Objective of the Study

These are the specific objectives that support to answers the general objective.

- ❖ To examine the current levels of commercialization of teff production in the studying area
- ❖ To measure total factor productivity outcomes at the different levels of commercialization
- ❖ To analysis the factor that affect households participation in the teff output market

1.4 Basic Research Questions

The researcher puts the following basic research question to give feedback for the stated specific problems. These are:

- ❖ What is the current level of commercialization of teff production in the study area?
- ❖ What measure the total factor productivity outcomes that could influence commercialization at different levels?
- ❖ What determine household participation in teff output market?

1.5 Significance of the Study

Primarily, the study emphasize on commercialization of teff and its factor productivity. Therefore it provides several benefits for users. It gives information about levels of commercialization, total factor productivity and determinant of commercialization for the reader and concerned body. It can also helps to wider the awareness of farmer regarding to how to participate in the teff market. Moreover, enable policy maker to develop appropriate marketing policy and strategy. Finally the study could be used as an input for other researchers interested in commercialization of teff.

1.6 The scope of the study

This part of the research indicates the extent in which the study covers .the study focus only on teff from other cereal crops at small holder farmers. Moreover, the study bound to identify the current level of commercialization, what determine households to participate in the output market and how total factor productivity affect household operating at different levels of commercialization the case of awabel woreda, amahara region ,Ethiopia .

1.7 Limitation of the Study

The study would focus on determinant of commercialization of teff and its factor productivity outcomes. In other word, the study doesn't concern with the commercialization of other crop types. Moreover, the study only targets the rural farmers' households. The study also assumes all households don't participate in the teff market and the study don't measure agricultural productivity and determinants of input market commercialization

1.8 organization of the paper

This part constitutes the content of the entire research work. The paper organized into five chapters. Chapter two contains both theoretical and empirical literature review and the third chapter is about research methodology and includes description of the study area, data source and data type, sample size and sampling technique, specification of econometrics model and ethics of the research. The fourth chapter also contains result and discussion of the study. Finally, the fifth chapter includes the conclusion and recommendation of the study. Moreover, it contains the reference and appendix section of the study.

Chapter –Two

Literature Review

2.1 Basic Concept of Smallholder and Agriculture Commercialization

2.1.1 Definition of smallholders /small farms

Different scholars define smallholders or small farms in their own perspective and thus, there is no uniform definition. For instance chamberlain (2008) explains smaller holders as households that the availability of land is very limited.

Chamberlain (2008) also identified four important themes that distinguish smallholders /small farms from others. These are land hold size, wealth, market orientation and level of vulnerability to risk. Accordingly, smallholders are households that have limited land availability, subsistence oriented, poor resource endowment and higher level of vulnerability. But smallholders may or may not hold the four themes at the same time.

According to (Heidhues and Brüntrup,2003) small farms and smallholders are used interchangeably for one to another and can be characterized as subsistence, family labor, low income , low land holding ,low inputs and low technology farming practice .

Narayanan and Galati (2002) also expressed small farmers as "a farmer (crop or livestock) practicing a mix of commercial and subsistence production or either, where the family provides the majority of labour and the farm provides the principal source of income".

Food aid organization (FAO, 2015) puts the characteristics of small holder as farmers who have limited resource endowment relative to other farmers in the sectors and the amount of land has been less than 2 hectares of crop land. According to hazell et al (2007), there is a common set numeric valve to characterize smallholders. Some literature points out that smallholder are "those with less than two hectares of crop land" while others define smallholders as those endowed with 'limited resources,' such as land, capital, skills and labor. Similarly, there are also those authors who often describe small farms in terms of the low technology they mostly use, their heavy dependence on household labor and their subsistence orientation. Generally there is no clear cut

definition for smallholders/ small farms. Thus, Nagayets (2005) describe that the sole consensus on small farms may be the lack of a sole definition.

When we look smallholder farmers in Ethiopia, it contains majorities of population and food grain production (Betre, 2006). It cultivates around 95% of total cropland, produce 90% of total agricultural outputs and hold the average land size of 1.18 hectares per farm households (CSA, 2007/8). Besides scholars like Mahlet (2007) and Betre (2006) characterize small holder farmers of Ethiopia as subsistence oriented, resource constraint like inputs, technology and capitals, dominantly relies on family labors and exposure to risk such as reduced yield, crop failure and lower price .

2.1.2 Definition of Agriculture Commercialization

Govereh *et al*. (1999) define agricultural commercialization as "the proportion of agricultural production that is marketed". According to these researchers, agricultural commercialization aims to bring about a shift from production for solely domestic consumption to production dominantly market-oriented. Likewise, Sokoni (2007) defined commercialization of smallholder production as "a process involving the transformation from production for household subsistence to production for the market." Hazell et al. (2007) point out that most definitions refer to agricultural commercialization as "the degree of participation in the output markets with the focus very much on cash incomes." However, there are some writers who attach profit motive as an integral part of agricultural commercialization. Pingali and Rosengrant (1995) noted that agricultural commercialization goes beyond just selling in the output market. It constitute households claim to the decision both on output and inputs market that aimed to maximized profit. Moreover, commercialization doesn't only exist with reorientation of agriculture to high value cash crops but it exist by reorienting agriculture to prior food crops (Hazell et al. 2007).

According to Von Braun et al 1994 (cited by giotom, 2009) commercialization of subsistence agriculture has different forms .these are inputs side and output side.

Commercialization can exist on output sides of production through increase market surplus and also occur in the input side with the increase of purchased inputs. Furthermore, commercialization is not limited to only to cash crops. It includes

traditional food crops that frequently marketed at the considerable extent. Increased commercialization is not necessarily identical with expansion of the cash economy when there would exist considerable inland transactions and payments with food commodities for land use or laborers. Finally, commercialization of agriculture is not identical with commercialization of the rural economy.

2.2 Measures of agriculture commercialization

2.2.1 Modes of agriculture production

Leavy and poulton (2007) found out that the three different modes of agricultural production exist side by side and interrelated one another. These are:

1). **Small scale farmers:** these modes also further categorized into two branches.

Type A (small scale non commercial farmers): these farmers are subsistence oriented but may also sell some of their production in the output market; but they cannot wholly dependent on agriculture for living.

Type B (Small-scale commercial farmers) – these are better integrated with the market than the first group. In fact, they produce crops both for own consumption as well as for the market. They even exert effort to specialize on high value cash crops.

2).**Small-investor farmers**: these are exclusively engaged in market-oriented agriculture even though their size dictates their modest scale production. Samuel and Sharp (2007) refer to this people as being often educated and urban-based. They are known also as emerging commercial farmers.

3). **Large-scale business farming**- these refer to the capital intensive enterprises that are either private or state-owned (Samuel and Sharp, 2007). These three categories indicate the different policy scenarios the government can possible adhere to in the course of assisting smallholder farmers to increase their income and mainly to overcome problems of poverty.

2.3 Levels of commercialization

According to leavy and poulton (2007) there are three fundamental levels of market orientation in line with food production system concerned. The three levels are: subsistence system, semi commercial system and commercial system. The bench mark to categorize into different levels of commercialization depends on the objectives of farm households to produce crops, source of inputs, product mix and the source of household income.

Subsistence system: this type of levels of market orientation can be characterized as follow. The objective of farmers producing certain crops has been to achieve food self sufficiency and the source of any inputs obtains from non traded activities (household generate) more over the product mix looks like non specialized (wide range) .eventually households generate their income from agriculture.

Semi commercial system: this level of commercialization is somewhat important than from the subsistence one. Now the objective of the farmers lies with surplus production (farmers aim to producing beyond food self-sufficiency) and their inputs obtains from both traded and non traded activities. The types of outputs produced by semi commercial farmers have been moderately specialized and farmers generate their income source from both agriculture and non agriculture economic activities.

Commercialized system: it is the special one that the aim of farmers producing certain agricultural crops in ordered to maximize profit and the source of inputs are predominantly traded inputs. The product mix of farmers' exhibit highly specialized .furthermore the source of households income generate from non agricultural activities.

Generally the way to set this form of levels of commercialization may not be working for developing nations as easy it is. But for African and south east Asian, it is possible to set level of commercialization since there is dominant smallholder agrarian economy.

2.4. Measuring Agriculture Commercialization

Different scholars develop varies technique or method that enables to measure level of commercialization at household levels in order to   make comparison on their commercialization and to strength the integration of household in to the market or

facilitate the selling of outputs and the purchase of inputs (Edward, 2013). Moreover, smallholder commercialization considered as dynamics process since it shows that at what speed output sold and input purchased changes over time at household level (Moti et al, 2009).

Putting the appropriate commercialization index enables to develop the three fundamental level of agricultural commercialization. Govereh et al. (1999) point out that " commercialization can be measured along a continuum from zero (total subsistence-oriented production) to unity (100% production is sold)" and Strasberg et al. (1999) suggested a measurement index called household Crop Commercialization Index (CCI) which is computed as the ratio of gross value of all crop sales over gross value of all crop production multiplied by hundred. The aim of developing this index enables to avoid crude distinction between commercial and non commercial farm house holds.

Generally, von Braun et al (1994, cited at Edward, 2013) develop the three fundamental induce measure of commercialization at household levels. These are: output and input side commercialization, commercialization of rural economy and degree of household integration in to cash economy.

The first induce of measure of commercialization is output and input side commercialization which can be measured by the ratio of gross value of agricultural outputs sold to gross output produce multiplied by one hundred. It is possible to notice from both input and output side.

Agriculture commercialization (output side): it is the ratio of gross value of output sold by households to gross value of all output produced multiplied by one hundred. It implies that how much output marketed from the total output produced in the given fiscal year by the households.

Agriculture commercialization (Inputs side): it is the ratio of gross value of inputs acquired from the market to the agriculture production value multiplied by hundred.

The second induce is commercialization of rural economy which can be measured with the ratio of gross valve of good and service acquired from market transaction to gross value of household income multiplied by hundred and it assume that transaction may be involve in kind For instance payment for food commodities to land use.

The third commercialization induce is degree of household integration in to the cash market which can be measure by the ratio of gross value of good and service acquired from cash transaction to the gross value of household income multiplied by hundred and also assume that transaction made with cash.

2.5 Benefits of Agriculture Commercialization

Commercialization of production system is process in which households setting the goal to change from subsistence to market oriented so as to maximize profit by producing outputs based on consumers' preference (chanayalew et al, 2011).

Commercialization provides multidimensional benefits to smallholder farmers. For instance Kennedy and von Braun (1994) point out that agriculture commercialization brings a vital role to rise incomes and encourage rural growth via improving employment opportunities, increasing agricultural rural productivity and direct income benefit for employees and employers, expanding food supply and potentially improving nutritional status . Mostly, these increased incomes have led to increased food consumption and improved nutrition (Pender and Dawit, 2007).

Moreover, another benefit of commercialization obtained from comparative advantage perspective. For example Govereh et al. (1999), illustrate that "commercialization increases productivity and income." The basic assumption embedded in the comparative advantage is that farmers produce mainly high value cash crops which provide them with high returns to land and labor and buy household consumption items using the cash they have earned from cash crop sales. However, govereh et al (1999) explained that the above assumption cannot work if the market for non-cash crops is constrained by 'risks and high costs in the food marketing system'.

According to Bernard et al (2007), smallholder agriculture commercialization significantly integrated with higher level of specialization, higher productivity and higher

income and Fafchamps (2005) further explain that the above stated outcomes provide the way to improvement in nationwide growth, food security and poverty reduction.

Different researchers determine the outcomes of commercialization regarding to the occurrence of efficient markets or not. According to fafchamps (2005), commercialization leads to the separation of production from consumption, provide food variety and bring household level stability .furthermore, improve allocative efficiency at macro levels and overcome problem of food security if the market system is efficient. However, inefficient market increase diseconomies of scale and transaction cost, reduce the benefit enjoy from commercialization and discourage specialization.

Samuel and Sharp (2007), pointed out that agricultural commercialization is a bridge through which smallholder farmers are able to achieve welfare goals. They describe farm household welfare to represent consumption of basic food (grains), high value foods (livestock products), expenditure on clothes and shoes, durable goods, education and health care. They also note that greater engagement in output markets would result in higher agricultural productivity which is, in itself, an intermediate outcome rather than a welfare goal. Nonetheless, agricultural productivity can facilitate the achievement of the welfare goals of small farms.

Commercialization of smallholder farming also brings transformation of agriculture from subsistence to market oriented production .for instance Doreen (2012), pointed out that agricultural transformation enables farmers to have high bargaining power and increase competitiveness, enhance to have well integrated market linkage ,increase income and ensure better livelihoods in sub Sahara Africa. Likewise, Berhanu and Moti (2010), explained that transformation of smallholder agriculture in Ethiopia provide clear and market information based production decision and also strength households participation on both inputs and outputs markets.

2.6 Determinants of commercialization of smallholder agriculture

Commercialization of smallholder agriculture can be influenced by both internal and external factors (Edward, 2013). External factors that affect commercialization of smallholder agriculture includes; population growth and demographic change,

technological change , development of infrastructure and market institutions, development of the non-farm sectors, changes in labor opportunity costs, trade and the foreign prices. Moreover, Pender et al 2006, (cited at Edward, 2013), found out that commercialization could be externally influenced by factors such as: growth of resource and commodity market, institutions (like, culture, property right and land tenure), consumption preference, agro climatic condition, market and production constraint and risk.

On the other side commercialization can be affected by internal factors. The prominent factors are endowment of basic inputs like land; labor, capital, entrepreneurs, physical and human capitals. For successful commercialization of smallholders agriculture, leavy and poulton (2007) had identified three necessary conditions. These are access to market, asset accumulation and access to staple food (food market or production).

1). **Access to market:** access to well integrated market significantly promote commercialization and enable farmers to bring broader benefit for the rural poor, strength relationship with market transaction and farmers obtain sufficient market for their product . Market access can be supported by different international organizations such as USIAD, SIDA & DFID to benefit the smallholder farmers as the result of growth of agriculture and infrastructure development. Furthermore, market access to encourage the smallholders to focus on the need for better access to market information, well organized farmers union and promotion contract farming that increase specialization and new method of production.

2). **Access to staple food (food market or production):** the second necessary condition for the commercialization of smallholder agriculture is access to food market or food production. There are two contrasting views with regard to whether smallholders should focus on food crop or cash crop production. There are those who disagree with the claims of those who suggest that small farms should produce and sell high valued cash crops and buy food crops from the market with the income from the cash crops. They argue that such venture has high risk of food insecurity and price variations given the imperfections of rural food markets in Africa. Hence, smallholder priorities for subsistence farming are considered to be rational even if these farmers could have earned better incomes by

diversifying into cash crop production. On the other side, there are those who argue that farm households producing cash crops to the market would mostly integrate food crops in their production system. Therefore, they are less susceptible for food insecurity; rather, they get better yield from the food crop production than purely subsistence based households (Leavy and Poulton 2007).

 3).**Asset Accumulations**: it focuses on accumulation of land and animal or livestock traction. Particularly land plays significant role to increase per capital income and Jayne et al (2003) explained that the causes for lower opportunity to marker participation was due to lack of capital, education and land. Thus, lower land hold size farmers used their land for food crop production and poorly linked with market .moreover, Jayne et al suggest that for successful commercialization; intervention on supply of improved seed and high value crops supply of fertilizer at affordable price and create strong linkage with market is advisable. The second most important asset accumulation is animal (livestock) traction. It provides double benefits for smallholders' farmers. Firstly it increase responsiveness to rain through provision of manure and secondly provision of manure enhance soil fertility, as a result outputs or yield of households become increases.

According to Mahlet (2007), there are different factors that positively or negatively affect commercialization of smallholder agriculture in case of developing countries particularly in Ethiopia. The factors includes, distance to market, access to market and road, access to extension service, access to information, access to credit , output and inputs price ,land size , access to modern inputs and irrigation .

2.7 Impact of commercialization

Different researcher and international organization give due attention for the impact of commercialization at household levels .for instance, Moti et al (2009), describe that impact of commercialization of through setting categories such as first ,second and third orders. Accordingly, the first order impact of commercialization basically related to employment and income that influence the household welfare and the second order impact focus on nutrition and health condition that relies on their levels of income. The last and the third order impact of commercialization also considered as the higher order and give higher emphasis for environmental consequence and macroeconomics variables.

Moreover, commercialization also enables households to have higher annual income than the subsistence one, increase the hiring of family labor since high value cash crops are labor intensive in their production and directly and indirectly influence value chain actors through increasing market participation of households.

2.8 Teff production in Ethiopia

We know that, teff is grown only in Ethiopia and Eritrea. In Ethiopia, it is the most significant cereal crops in terms of both production and consumption which constitute about more than 40% of households food expenditure and more than 60% of calorie intake from cereals (Birara Endalew, 2017).

CSA (2017), reports reveal that 19,326,448 smallholders' farmers cultivate exactly 10,219,443.46 hectares of land and produce around 253,847,269.69 quintals from all cereal crops. Moreover, teff production also dominantly carried out by smallholders and it covers 3,017,914.36 hectares of land and produced about 50,204,400.47quintals with the average yield of 16.64 quintals per hectares in Ethiopia. In line with data from CSA (2017), maize ranked first in terms of both total production and average yield which accounts 36.75 quintals per hectares and 78,471,746.75 quintal was produced. It is also possible to examine five top potential teff producing region based on area coverage, total production and average yield.

Region	Area cultivated in hectares	Total production in quintals	Yield (qt/ht)
Oromia	1,441,029,78	24,737, 963.79	17.17
Amahara	1,133,844.18	19,328,573.65	16.99
Tigrai	167,584.33	2,410, 116.77	14.38
SNNP	246,099.24	3,412, 547.66	13.78
Bebishangul	24,432.50	303,184.32	12.41

Source (CSA, 2017)

From the above table, oromia region has been ranked first in all aspects like percent of land cultivated with teff, volume of production and average yield and also contribute the higher share in its production as compared to the other region and followed by amahara

region. Teff is important for consumption to most Ethiopian as a form of Injera and porridge. e.t.c and contains basic nutritional minerals like iron and calcium. More over protein also existed; it is free of gluten and neutral from fibre (FAO, 2015).

Different researchers reveal that teff production has various opportunities such as; it gives higher earning since it has high demand and high market value, it is not affected by weevils and storage pests, fewer disease and pest problems and low risky crop (Engdawork, 2009). To the contrary production of teff can be hampered by different challenges such as shortage of agricultural inputs, week market integration, limited amount of capitals, lower selling price, collusion between buyer in the price sitting, limited access to extension service soil erosion and inconvenience taxation system (Mohammed, 2011).

2.9 Empirical literature review

Different researchers studied commercialization of agriculture by using various econometric models and found out different empirical results. The models that had been used by researchers include; Copp Douglas production function, simultaneous equations, logit, Tobit and probit models. Samuel and sharp (2007) , in their study on commercialization of smallholder agriculture for selected teff growing area of Ethiopia used simultaneous equation to examine the determinants of households participation in output market by using gross value of output sold as endogenous variable. Besides they used Copp Douglas production function to explore the factor that affect output produced and regressed gross value of output produced as a function of both physical and non physical inputs. Samuel and sharp (2007) also found that off farm income negatively affect gross value of output sold but land size and total value of farm production affect positively.

 Goitom (2009) in his study on, smallholder agriculture commercialization determinant and welfare outcomes in Enderta district of Tigray Ethiopia, applied probit model to investigate households' decision to participate in product market and also secondly two stage switching regression models was used in order to understand the extent of market participation. He also found that access to irrigation and land size positively affects total value of output sold. Furthermore the study by workneh and Michael (2002) on

intensification and crop commercialization in northern Ethiopia, examined the farmers decision to participate in commercialization and food crop marketing by using logistic regression model and analyzed the factor that affect crop intensification through applying Copp Douglas production function.

Adam (2009), in his study on , determinants of commercial orientation of smallholder farm households in risk-prone areas of Ethiopia, analyzed the effect of commercial orientation on smallholder farmers' crop productivity taking a total measure of productivity known as Total Factor Productivity (TFP) as an index to deal with the tradeoff between commercial orientation and productivity. Moreover, he measures productivity as partial and total. The partial measure indicates output per specific inputs. For instance output per labor or output per land. The second measure is total factor productivity which is the ratio index of agricultural output to index of inputs. This enables to understand the change in productivity. Therefore for this study, to measure factor productivity out comes, the researcher adopt total factor productivity measure than partial one.

The other study on commercialization of smallholders is the study by Berhanu and Moti (2010). In their study on, "is market participation enough?" examined households' participation in both output and input market through applying Tobit model. Moreover, they treat household as buyer when they participate in the inputs market and as a seller if it participates in output crop markets the study found out that age, literacy, access to credit and proximity to the market positively affect output crop participation. But off farm income and livestock size influence participation negatively. Moreover, input market participation could be positively influenced by livestock size, family labor, access to road and literacy.

Pender and Dawit (2007), in their study on determinants of smallholder commercialization of food crops theory and evidence from Ethiopia, analyzed the determinant of teff sells and purchases by applying non-linear least square regression. Furthermore, their study reveals that age of the household and land size positively and significantly affects teff sale and purchase but livestock size affect negatively.

Edward (2013) in this study on factor influencing commercialization of smallholder agriculture in the Effutu municipality of Ghana, developed the tobit regression models to examined magnitude and direction of factor that influence intensity of maize and cassava commercialization. The study revealed that output price, farm size, age and education positively influence commercialization of maize but off farm income and distance from the market negatively influence the sale of maize .for cassava, variables like off farm income, farm size and experience in farming positively influence the sales of cassava.

2.9.1 Conceptual framework of the study

In this study, Households participation in the output market based on the gross volume or quantity of teff sold and their levels of commercialization also determined by their participation in selling. Basically, there are demographic, socio economic and institutional factor that affect commercialization or market participation in the output market.

Commercialization of		
Demographic factors • Sex hh • education level of hh • age hh	**Socio economic factor** • Land size • Livestock size • Income • Participation off farm activity	**Institutional factors** • Credit service • Market information • Training, extension
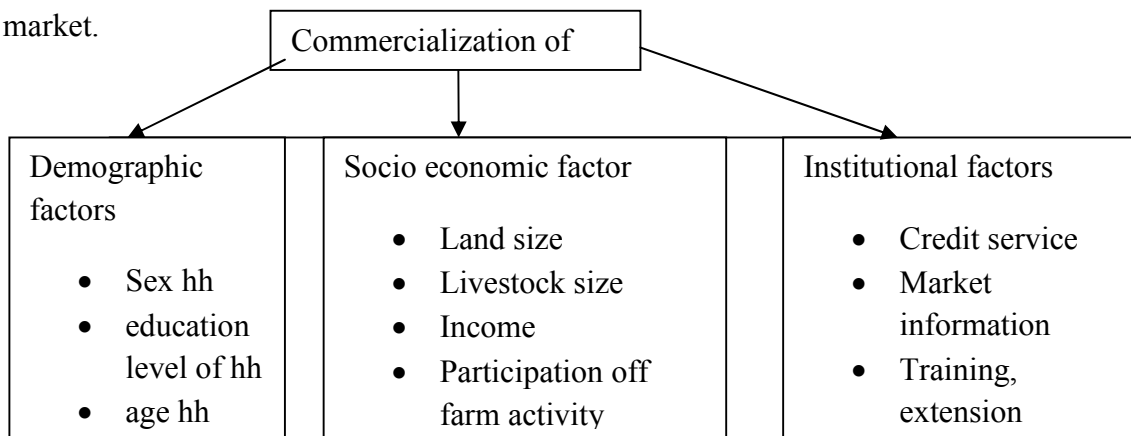
Fig 1.conceptual framework of the study

Chapter three

Research methodology

3.1 Description of the Studying Area

Awabel woreda is located in East Gojjam administrative zone of Amhara regional state .It is surrounded by Gozamen woreda in the west, Debaye Telategen woreda in the north, Basoliben woreda and Abaye Gorge and Oromia region in the south, Dejen woreda in the East .The town of the woreda is so called lumama, it fars 259 Km from Addise Abeba and 306 Km from state city Bahirdar and 40 Km from zonal city Debere Markos.

According to central statistical agency data (CSA, 2009), awabel worreda has a total of population 147, 431 that live in both urban and rural. .when we see the distribution of population by sex and location, rural dwellers are the dominant one. From the total population of 147,431, 126, 794 people live in rural part of the woreda and of which, 62,388 are males and the remaining 64, 406 are female one. Moreover, the remaining 20,637 people are urban dwellers; of which 10,559 are male and the rest 10,078 are females.

Awabel woreda has a total area of 787.22 kilometer squares. From this 75% of the land form is Plato and the remain 25% is mountainous. The agro ecological zone of the woreda includes only the three zones from the five. that is Dega, Woynadega and kola. When we see the special variation and climate condition of the woreda, 60% woyinadega, 25% Kola and the rest 15% covers Dega climatic zone. The annual rain fall distribution ranges between 1100mm-1400mm, and the mean annual range of temperature $7.50C$-25^0C. The major soil type of the woreda consists of   55% Vertis- sol , 30 % Nito- soil ,and the remaining 15% of cambi-soil .

Awabel woreda has a total of 28 kebeles of which, 25 kebeles are rural and only 3 urban kebeles. From the total 28 kebele, only one kebele (Enemochera) is not teff producing area.   Around 89 % of the populations are agrarian and their livelihoods are predominantly rain feed agriculture. This can be characterized as subsistence and mixed farming that implies households practicing crop production and animal rearing. The

remaining 11% of the population manage their livelihoods through involving with trade, small and micro enterprise, public servant and informal sector. Awabel wereda has many government organization among these 11 regular first cycle primary school and 29 regular 2nd cycle primary school , and 1 secondary high school. There are also has 25 health post, 3 youth health office, 1 health office and 1 referral hospital. The map looks like as follow.
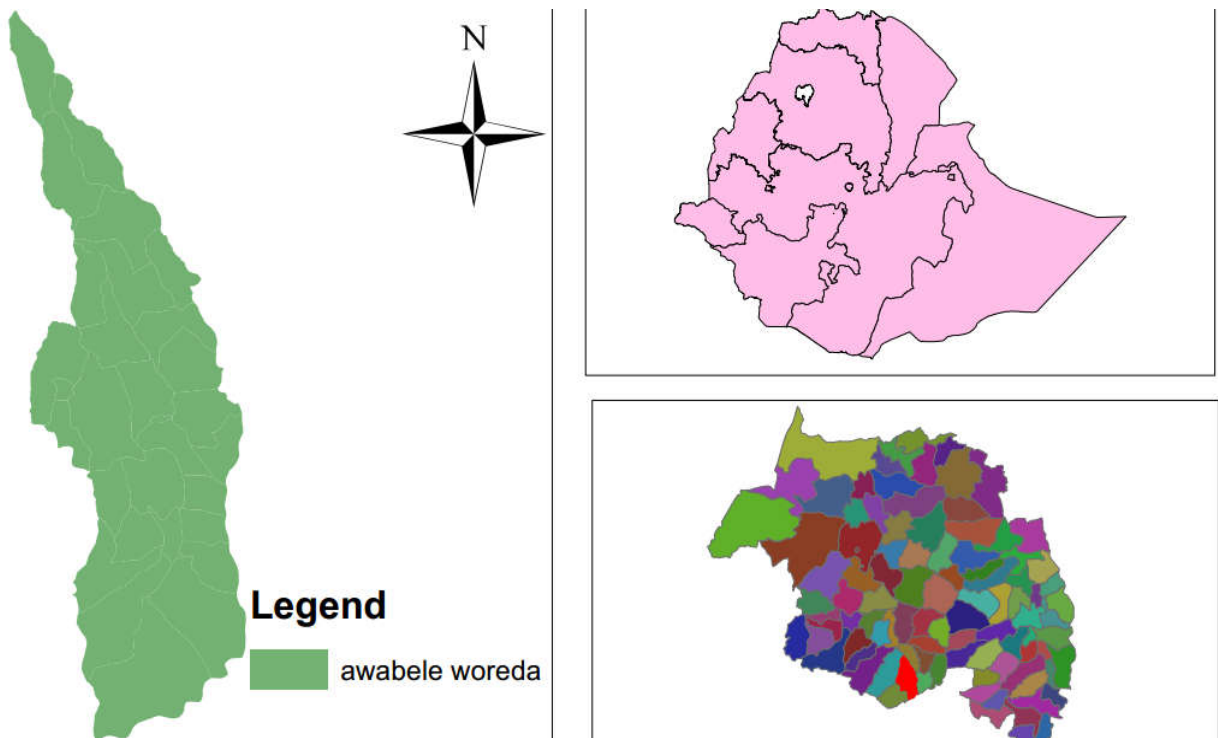
Fig 1: Geographical location of the study area

3.2 Data Type and Source

Data is important inputs that enable researchers to conduct research and solve specific societal problems. The nature of the research determine the types of data (cross sectional or time series) required by the researchers. To conduct the study, the researcher would use cross sectional data types since it covers a point at a time. Besides, the nature data that would be used is only quantitative data

The other important part of this section is data source .The researcher would use both primary and secondary source of data in order to carry out the study. Primary data is fresh and first hand data and would obtains from rural household survey of awabel woreda .the

other source of data is secondary data source. It is not fresh and obtains from records of the worreda.

3.3 Data collection procedure:

Data can be collected by different procedures such as; questionnaire (structured vs. non structured), interview, direct observation, key informant interview and focus group discussion (FGD) and others. For this study, to collect the desired data, the researcher applied mainly structured questionnaires that would be distributed for the sample rural households.

3.4 Sample Size and Sampling Procedure

Sampling procedure (technique): It is important to identify the appropriate respondents so as to undertake the study. Basically there are two types of sampling technique which have been applied in research work that is probability and non probability sampling procedure. The researcher would apply only probability sampling technique which is stratified random sampling. The stratification variable is agro ecological zone .firstly, kebeles would be sub grouped into three strata based on their ecological zone as Dega, Woyna Dega and Kola. There are 6 kebeles at the Kola zone, 4 kebeles at Dega zone and the rest 18 kebeles are Woyna Dega including the 3 urban kebeles. Secondly, to select representative kebeles, simple random sampling technique would use. Therefore, the researcher randomly selects five kebeles from the three agro ecological zone. Of which, three of them would select from Woyna Dega (Denta mariam, Duke and Wojjel Ankerak), one from kola (Tsid mariam) and from Dega (Yesenbet). Finally, Proportionate sample determination method would use to decide numbers of sample from each kebele.

Sample size: according to C.R Kothari (2004), the representative sample size must be optimum. This means samples should neither be too large nor too small. Therefore, so as to determine the optimum level of sample in any study, researchers must consider the following four prominent factors such as: level of confidence (α), margin of error (e), variability of the population(s) and the number of groups within the samples. Moreover, method of analysis, objective of research, cost, and time determine the type and size of

the sample to be employed. Agriculture and rural development office of awabel woreda report reveals that the total numbers of population for the woreda at the household levels are 25,000. The researcher would select five kebeles that includes Denta mariam, Duke, Wojjel ankerak, Tsid mariam and Yesenbet. The total numbers of population are 650, 750, 500, 580 and 560 respectively. For finite population, the best sample size determination have been used Yamane (1967). Generally the model can be specified as:

$$n = \frac{N}{1+N(e)^2} \quad \ldots\ldots \ldots\ldots\text{.. Equation (1).}$$

From the above equation, N represents the total number of population of the studying area at household level. N equals 25,000. N; represent the sample size and e; measures the levels of precision (allowance for error) and mostly taken the value 1 up to 10 %. For this study, e would be 7 %. Therefore, n= 25,000/ (1+25,000(0.07)^2) which implies 202 households. To overcome problem of defections, it is advisable to add from 5% to 10% of the sample. Then 10% of the sample would use. 202 ×0.1 = 20.2. Thus, the total number of sample size (n) equals 222 households. Proportionate method would employ to decide the numbers of households that would select as a sample. Generally it can specify as follow:

Name of sample kebeles	Total population at household level	Sample selected
Wojjel ankerak	500	36
Duke	750	55
Dinta mariam	650	48
Tsid mariam	580	42
Yesenbet	560	41
Total	3,040	202+ 20= 222

Source: own computation 2018

3.5 Methods of Data Analysis

So as to analyze the collected data, the researcher has used both descriptive and econometrics analysis.

3.5.1 Descriptive analysis

This ways of data analysis is important to explain or illustrate demographic and socio economic variables by using maximum, minimum, mean and standard deviation. For this research, to answer the first (levels of commercialization) and the second specific objectives, descriptive analysis has applied.

The first specific objective of the study is determining the levels of commercialization of teff in the study area. According to Govern et al (1999) and Strasberg et al (1999), level of commercialization at household level can be measured as the ratio of gross value of all crops sold in a year per gross value of all out put produced by the same year. Since this study only concerned on teff, household level commercialization can be drown as follow:

Household commercialization index (HCI) = $\frac{\textbf{gross value of teff sold by hh inthe markrt}}{\textbf{gross value of teffproduced by hh}} \times 100$

Based on the commercialization index developed above, the value ranged between 0 and 100%. Thus, If the HCI become zero, the household is subsistence or not commercial. But if it is approached to 100% it is commercialized. Leavy and polton (2007) also have developed the three fundamental levels of commercialization as subsistence (non commercial), semi commercial and highly commercial. For this study, levels of commercialization can be also categorized into three based on the cut off developed by (Goitom , 2009 and Salisu et al., 2017) as:

- ✓ Non commercial(low level) - if the households sale less than 25% of output they produced
- ✓ Semi commercial(medium levels)- if the households sale b/n 26% -50% of output they produced
- ✓ Highly commercial(high levels) – if the households sale above 50% of output they produced

The second objective of the study is about total factor productivity outcome which varies across different levels of commercialization. Total factor productivity encourages agricultural development and increase market sale (Rios et al, 2009). Tornqvist TFP index has been used to measure factor productivity outcomes. That implies it is the ratio output commercialization index per input commercialization index multiplied by hundred. Basically total factor productivity includes land, labor, capitals, fertilizers, special seeds and pest sides. Generally, tornqvist TFP index can be modeled in logarithm form as follow:

$\ln TFP = \ln \frac{O}{I} = ln0 - \ln I$; Where, o= output index, I=input index and TFP = total factor productivity. Moreover, total factor productivity index enables to show the difference in output across groups. For this study, to measure factor productivity outcomes of teff in the sample household that operate at different levels of commercialization, One Way ANOVA (analysis of variance) has been used. One way ANOVA analysis is important to compare the mean of the sample or groups to make inference about the population mean. The basic assumptions of one way ANOVA analysis is equal mean of population (Independence).

3.5.2 Econometrics Analysis

The third specific objective of the study is about factor that affects household participation in the teff market. This objective requires econometric analysis to examine the relationship and impact of explanatory variables on outcome variable. The dependent variable for this study is market participation of households in the teff market. It is the ratio of gross value of output sold per gross value of all output produced multiplied by one hundred and its valve ranged between zero and one. . Therefore, market participation of households can be determined by using censured Tobit regression models since the dependent variable is censured from true zero value. According to Tobin (1958), the general form of the model can be specified as follow:

$Y_i = \beta X_i + \varepsilon_i$……………from this equation,

Yi ≤ 0 …..For households don't participate in the market (zero sales)

Yi > 0 ….. For household do participate in the market

Where: Yi=the limited dependent variable, represent index of market participation

Xi = vectors of explanatory variables

Bi = vectors of unknown parameters

ε_i = represent the disturbance term

i= 1, 2 …n (numbers of possible observation)

Assumption Tobit regression model

The Tobit regression model basically holds the basic assumption of ordinary least square regression model. To meet fitness of goodness of the models, different econometrics assumption of the models must be cheeked. The most common assumptions are:

 No or little multicolluniarity: this assumption implies that there shouldn't be relationships among the explanatory variables each other. Or independent variables should be independent of each other. This assumption could cheeked with different techniques such as; variance inflated factor (VIF), correlations matrix and condition index. Under correlation matrix method, the Pearson correlation coefficient must be less than 0.08. Moreover, under condition index, the value must be not more than 30(10-30 value are accepted). The most frequently used detection technique was VIF. In this method, the value of VIF for each variables must be not more than 10 and the mean VIF less than 2.Therefore, for this study there is no multicollunearity problems since the mean VIF is 1.25 and VIF of each variables is less than 10 **(** see appendix E**).**

 Hetroscedasticity: this problem is basically happened when the variance of the error term is not constant for observations. This test is important to cheek the classical linear regression assumption of the error term has constant variance. To know the existence of this problem, the most common method used was Breusch- pagan /cook- Weisberg test.

Under this test, the null hypothesis holds constant variance. So, if this hypothesis is rejected, the problem of hertoscedascity is existed. Moreover, the p value must be greater than 0.05. Therefore, in this study the p value is prob > chi2 =0.07. This indicates that there is no problem existed. (see appendix D).

Normality: it assumes that all variables must be normal and tested with histogram and a fitted normal curve plot. Moreover, it would be cheek with goodness of fitness. Thus, the kernel density distribution revealed that there was almost normal distribution (see appendix F).

3.6 Hypothesis and Variable Definition

Dependent variable: The outcome variable for this study is market participation of households in the teff market. It is a categorical variable and grouped as low participant (subsistent), medium participant (semi commercial) and high participant (commercial).

Explanatory variables: The researcher specifies the most important explanatory variables that affect household participation in the teff market. These are:

Age of the household head: Basically age is a continuous variable it can be measured with number of years. It measure farmers' experience and attitude towards risk. According to chalachew et, al (2011), having sound experience and wise utilization of inputs at the older age positively affect households participation in output market. Moreover, as attitude towards risk become higher, age of the households negatively affect output sold. Therefore, it may affect positively or negatively.

Family size: It is a continuous variable that indicates the total number of individuals live under the household. The higher the number of the family size, the higher the consumption demand and the lower in participation of sell (Birhanu and Dirk, 2007). Thus, it is expected to affect market participation of households in the teff market negatively.

Education levels of household head: It is a categorical variable that can be grouped into five different levels. According to Goitom (2009), households with higher education level

can have better access to information and easily understand the market. Thus, education would affect market participation of households in the teff market positively.

Land size (% 0f land allocated for teff): It is a continuous variable that measures the total land holding size allocated for teff production in hectares. Farmers with more hectares of land holding have high crop diversification. As a result, households' integration in to the output market becomes higher (Pingali, 1995). Thus, land size would affect market participation of households in the teff market positivity.

Access to irrigations: It is a dichotomous variable and measured as one for households who are participating in irrigation practice and zero otherwise. Irrigation practice can increase crop production in the off season by producing more than once at the fiscal year. (Chanyalew et al, 2011). Thus, access to irrigation would affect market participation of households in the teff market positively.

Access to credit service: It is dichotomous variable that can be measure as one for the households that have access to formal credit and zero otherwise. Access to credit strength financial capacity of households to buy different modern agricultural inputs and this improve productivity (Dawit and Pender, 2007). Therefore, it may affects market participation of households in the teff market positively.

Access to extension service: It is a dummy variable that express the contact of households with experts. It represents as one for the household that has access to extension service and zero otherwise. The farmers that have access to extension service have better information and integrate modern technology in their production. Moreover, it increases experience or knowledge about commercialization (Goitom, 2009) .Therefore extension service expected to affect market participation of households in the teff market positively.

Access to training service: It reflects the access of training given for farmers during the production period. Moreover, it is dummy variable and represent by one for households that participate in training and zero otherwise. Training service enhances the farmer to fill the gap about technique of production, input usage and adopt new technology

(Chanyalew et al, 2011). Therefore, it would expect to affect market participation of households in the teff market positively.

Distance from the market: It is continues variable that represents how many kilometers do the farmers travel to reach the nearest market center. The nearest to the center, the lowest transport and information cost expense. Moreover, it reduces the time spent. This enables the farmers to sell more of it (Adam, 2009). Hence, it might market participation of households in the teff market negatively.

Livestock size: It is also a continuous variable that measures the total amount of livestock the households holding. Farmers with more livestock holding have alternative income source with sale of this livestock and this reduce the sale of crops (Birhanu and Moti, 2010). Therefore, livestock size would expect to affect market participation of households in the teff market negatively.

Participation in off farm income: It is a dummy variable which measures participation of farmers outside the farming practice. Households that participate in the off farm activity represented by one and zero otherwise. It provides extra income and this enable to invest off farm earning to foster production and sales (Edward, 2013). Thus, it influences market participation of households in the teff market positively.

Access to market information: It is a dummy variable which can be nominate as one if the households have access to market and zero otherwise. Market information influence decision making households through providing information about price, demand and supply of outputs (Chanyalew et al, 2011).Thus, access to market information would expect to affect market participation of households in the teff market positively.

Market Price of Teff: It is a continuous variable that could be measured with birr and take previous year average price of teff. When the price of the previous year higher, households supplies more and encouraged to increase production (Edward, 2013). Therefore, it would expect to affect market participation of households in the teff market positively.

The following table shows that the summary of variables

Variables	Types	Measurement	Expected sign
Market participation of households in the teff market	continuous	ratio	
Age of the head	Continuous	Years	+/-
Education levels	Categorical	1= illiterate, 2, = read and write only,3= 1-4 grade ,4= 5-8 grade, 5 = 9-12and above	+
Access to credit	Dummy	1 for user and 0 otherwise	+
Access to extension	Dummy	1 for user and 0 otherwise	+
Access to training	Dummy	1 for trainer and 0 otherwise	+
Access to market information	Dummy	1 for informed and 0 otherwise	+
Access to irrigation	Dummy	1 for user and 0 otherwise	+
Distance from the market	Continuous	Kilometer	-
Participation on off farm income	Dummy	1 for participant and 0 for non participant	+
Land allocated for teff	Continuous	Hectares	+
Family size	Continuous	Numbers	-
Livestock size	Continuous	Tropical livestock units	-
Market price of teff(last year)	Continuous	Birr	+

Chapter Four: Results and Discussions

4.1 Demographic characteristics of the households

This part of the research basically contains the description of demographic variables such as religion, sex, age, educational level and marital status with in the form table and the result expressed with percentage.

Table 1: religion status of the household based on sex

Sex	Christian	Muslim
Male	144 (65.45%)	13 (5.9%)
Female	62 (28.18%)	1 (0.47%)
Total	206 (93.63%)	14(6.37%)

Source: Based on own survey data 2018

From the above table, the researcher can draw that from the total sample households, ninety four (93.63%) the respondents are Christians. of which, 65.45% of the respondents are male household and the remaining 28.18% are female heads. On the other hand, Muslim heads are very small in number and they account just only 6.37%. Of which, there is only 0.47% of female head and the remaining 5.9% are male heads. Now we can conclude Christian households are the most dominant which is 15.5 time higher than the Muslim households. Regarding to sex, 71% of the respondents are males and the remaining 29% are female heads.

Table 2: educational levels of the households based on sex

Educational levels	Male		Female	
	frequency	percentage	Frequency	Percentage
Illiterate	38	17%	34	16%
Read and write only	61	28%	24	11%
1-4 grade	39	18%	5	2%
5-8 grade	13	5%	-	
9-12 and above	6	3%	-	
Totals	157	71%	63	29%

Source: survey of 2018.

Table 2 explains the relationship between educational levels and sex status of sample households. From the table, 33% of sample respondents are illiterate .of which, 17% are male heads and 16% are female heads. The second category of educational levels of households is writing and read only. It covers the higher percent of the respondents, which is 39%. Of which, 28% of are male and 11% are female heads. Moreover, 20% of the respondents have educational levels of 1-4 grades. From this, 18% of the respondents are male heads and the remaining 2% are female heads. The other categories of educational levels of the households are 5-8 grade and 9-12 and above .within this class of categories, only male household heads are existed. That is 5 % of male heads under 5-8 grade and 3% are 9-12 and above grade. Generally, from the table the researcher can conclude female household heads have little record in the formal education as compared with male heads and only 2% of the female respondents have formal education levels. Moreover, from the total sample households, only 28 % of the respondents have formal educational levels. But the remaining 72% of the sample households are categorized under illiterate and write and read only levels. The average educational levels of the households   were read and write only.

Table 3: Marital status of the sample households

Marital status of the households	Numbers of respondents		Totals
	male	Female	
Single	12	4	16 (7%)
Married	135	23	158 (72%)
Divorced	9	22	31 (14%)
Windowed	1	14	15 (7%)
Total			220 (100%)

Source: based on own survey data 2018.

Marital status of the respondents is another demographic variable that describe households as single, married, divorced and windowed. From the above table, 7% of the respondents are single and 72% of the respondents are also married. The remaining 14% and 7% of the respondents are divorced and windowed respectively. From the table, the researcher also concludes that most of the sample households are married than the other categories.

4.2 Socio economic characteristics of households

Access to credit: Access to credit from formal financial institution is very important variable that enables the households to have others source of incomes and strength the financial capacity of the households to purchase different inputs. From the total respondents, 28.18% are credit user from formal financial institutions. The following table explains use of credit service from formal financial institution by the household heads

Table 4 access to credit based on sex of the household

Access to credit	Males respondents	Females respondents	Totals
User	42 (19.09%)	20 (9.09%)	62 (28.18%)
Non user	115 (52. 27%)	43 (19.01%)	158 (71.82%)

Source: Based on own survey data 2018

The above table shows that the access to credit service from the formal financial institutions based on sex of the households. Now from the total sample households, 28.18 % are user of credit service. Of which, 19.09% of the respondents are male heads and the remaining 9.09% are female heads. On the other hand, 71.82 % the sample respondents have no access to credit service (non user). From this, 52.27% are male heads and the remaining 19.01% are female heads. Generally, the researcher possibly concludes that, the habit of the use of credit service from the formal financial institution relatively low since user are twice less than from non user .moreover , based on sex male household heads are non user as compare to females .

Access to market information Market information reduces transaction cost. On average, 40.45 % of the respondents have access to market information .The following table shows households access to market information to sale the teff out put to the nearest market.

Table 5. Access to market information of the household heads

Access to market information	Frequency	Percentages
Non informed	131	59.54%
Informed	89	40.45%
Totals	220	100

Source: Based on own survey data 2018

The above table indicates that, from the total sample respondents, 59.54% the respondents have no access to market information and the remaining 40.45% of the respondents have access to market information to sales their teff output in the market. Generally, the non informed are larger from the informed one by almost ha

Access to training and extension service

Table: 6 accesses to training service of the sample households

Access to training service	Frequency	Percentage
User	100	45.45%
Non user	120	54.55%
Total	220	100%

Source: Based on own survey data 2018

Training service is crucial for households to share knowledge, technologies and experience that minimize their gaps. As it shown from the above table 6, on average, 45.45% of sample respondents are user of training service and 54.55 % of the respondents are non user of the training service.

Table 7: access to extension service of the sample households

Access to extension service	Frequency	Percentage
User	139	63.13%
Non user	81	36.87%
Totals	220	100%

Source: Based on own survey data 2018

This table conveys the use of agricultural extension service by sample households. Agricultural extension service helps the farm households to used modern inputs like special seed, fertilizers, and pesticides. Moreover, it helps the household to grow market

oriented output through improving their awareness. From the table 7, the researcher concludes that, on average, 63.13% of the sample households are benefited from agricultural extension service .whereas, the remaining 36. 87% of the respondents are non user of agricultural extension service. This implies that user of agricultural extension service are greater than by almost by half from non user.

Participation in off farm activity

Off farm activities are economic activities which are done out of agricultural activities as a means of generating additional income source.

Table 8: participation in the off farm activity based on agro ecology zone

Off farm activity	Agro ecology zone			
	Woynadega zone	Dega zone	Kola zone	Totals
Participant	56 (25.45%)	11 (5%)	18(8.18%)	85(38.63%)
Non participant	82 (37.27%)	31 (14.09%)	22(10%)	135 (61.37%)
Totals	138 (62.72%)	42 (19.09%)	40 (18.18%)	220 (100%)

Source: Based on own survey 2018

From the above mentioned table 8, the participation of households in the off farm activities are on average 38.63% from the total sample households. But the remaining 61.37 % of sample respondents are non participant on the off farm activities. With regarding to agro ecological zone, 62.72% of the respondents are live in woyna dega zone. From this, 25.45% of the households are participant in the off farm activities and the rest 37.27% are non participant. The other agro ecological zone is dega zone. It covers 19.09 % from the total respondents. Of which, only 5% are participant in the off farm activities and 14.09% of the respondents are non participant. Lastly, kola zone covers 18.18 % from the total respondents' .likewise, 10% of respondents in the kola zone are non participant and the remaining 8.18% are participants. Generally, the

percentage of non participant in each agro ecological zone is greater than from participant in each agro ecological zone.

Access to irrigation: it is the practice of growing agricultural output in addition to the normal production season. It is important to produce output more than one times.

Table 9: access to irrigation of the households

Access to irrigation	Frequency	Percentage
Participant	71	32.27%
Non participant	149	67.73%
Totals	220	100%

Source: based on own survey data 2018

From the table mentioned above, the participation of households in the irrigation activity is lower by half from the non participant. On average, 32.27% of the sample respondents are participant in the irrigation activities. On other hand, 67.73% of the respondents are non participant in the irrigation activities.

Table 10: summary of presentation of continues explanatory variables

Variables	Obs	Means	Std.dev	Min	Max
Agehh	220	49.42727	10.78047	26	75
Distance	220	4.105455	3.016646	1	6.5
Fasize	220	3.922727	1.15408	2	7
Livsize	220	6.266136	3.327429	1.7	18
Pyprice	220	1803.568	33.30871	1700	1900
Lansize	220	2.505682	1.274406	0.5	6

Age is socio economic and demographic variable the express the sample households. The summary of the table indicates that, the maximum age of the respondent is 75 years and the minimum age is also 26. Moreover, the mean age of the respondents is 49 years old.

To sale their agricultural outputs specifically (teff), households must travel somewhere with a limed distance. On average, households travel 4.1 kilometers to reach the nearest markets and the maximum distance that the households travel is 6.5 kilometers. To the contrary, the minimum distance is 1kilometer.

Teff production is labor intensive activity. Therefore, households with higher numbers of family size have high labor share. As it seen from the tables, the average family size of the sample respondent is almost 4. The maximum family size of the respondents is 7 members and the minimum family size is only 2 members. Thus, imply that on average sample respondents have small family sizes.

Livestock size is also another important socio economic variable that shows the sample households endowment of cattle. Livestock endowment includes oxen, caws, horses, donkeys, sheep, goats, hens and mules. It is used as source of income through selling them and to carryout different activities. From the table mentioned above, there researcher depicts that; the average livestock size of the respondents is 6.3 tropical livestock unit. Moreover, the maximum livestock size of the sample respondent is 18 TLU and the minimum holding is 1.7 TLU.

Households take in to account the previous year market price of teff when they are interested to sale their output in the markets. The above mentioned table illustrate that, the previous year average market price of teff in quintals was 1803.56 birr. Besides the minimum price of teff was 1700 birr per quintals and the maximum price that household's sale a quintals of teff was 1900 birr. There is significant difference among households with the sales of teff in quintals. On average, there are 33. 3 birr deviations.

Land is an important resource for all living things. Higher percentage of Land allocated to teff production enables to the household to surplus product. As shown from above table, the researcher depicts that land allocated for teff could be measured with hectares

and on average; the sample households allocate 2.5 hectares of land for teff production. The minimum land allocated for teff production was 0.5 hectares and the maximum land size allocated for the teff production was 6 hectares.

4.3 Levels of commercialization

According to leavy and poulton (2007), households have three different levels of commercialization that operates as subsistence (non-commercial), semi-commercial and commercial.

Table 11: levels of commercialization of teff production for the respondents

Levels of commercialization	Frequency	Percentage
Commercial	35	15.91%
Semi-commercial	120	54.54%
Non- commercial(Subsistence)	65	29.54%
Totals	220	100 %

Source: survey of own computation 2018

The above table depicts that the levels of commercialization of sample households that participate in the teff production and selling activity are strongly vary across their levels. From the table 11, 54.54% of sample respondents are categorized under semi commercial levels, 29.54% of the sample households are categorized under non commercial levels (subsistence) and only 15.91% of the sample respondents are commercial one. Generally, from the table the researcher could conclude that on average the sample respondents in the study area are semi commercial one.

The levels of commercialization also vary across households based on sex and agro ecology zone. The following tables show that levels of commercialization based on sex and agro ecology zone.

Table 12: levels of commercialization of households based on sex

Sex of the households heads	Levels of commercialization		
	Commercial	semi commercial	Non commercial
Male	24(10.9%)	85 (38.63%)	48(21.81%)
Female	11(5.01%)	35 (15.91%)	17(7.73%)
Totals	35 (15.91%)	120(54.54%)	65(29.54%)

Source: survey of own computation 2018.

From the above tables, 71.63% of respondents are male households head. Of which, 10.9% of the sample respondents are commercial one, 38.63% are semi commercial and 21.81% are non commercial (subsistence). On the other hand, 28.37% of the sample respondents are female head. From the total female respondents, 5.01 % of respondents are commercial, 15.91% are semi commercial, and lastly7.73% of respondents are non commercial (subsistence). Generally commercial males' heads covered 17.5% from the total male households (24 of 137) and female commercial heads (17.4%) from the total sample female respondent (11 of 65). this indicates that males are more commercial than females.

Table 13: levels of commercialization of households based on agro ecology zone.

Agro ecology zone	Levels of commercialization		
	Commercial	Semi commercial	Non commercial
Woyna dega	28(12.72%)	90(40.9%)	20 (9.09%)
Dega	2(0.9%)	17(7.7%)	23((10.45%)
Kola	5(2.27%)	13(5.94%)	22(10%)
Total	35 (15.91%)	120 (54.54%)	65(29.54%)

Source: Based on own survey data 2018

The above mentioned tables shows the levels of commercialization of teff of sample households that live in the three agro ecology zone of the study area. From 15.91% of total commercial households, 12.72% are found in woyna dega zone and the remaining 0.9% and 2.27 % of the commercial households are found in Daga and kola agro ecology zone respectively. This indicates dega zone is had the lowest share of commercialization.

The other level of commercialization of teff production was semi commercial. 54.54% of the respondents are semi commercialized one. Of which, 40.9% of the semi commercial households are found in woynadaga zone. Moreover, 7.7% and 5.94% of sample respondents under semi commercial levels are found or live in dega and kola zone of the study area respectively.

The third level of commercialization was non- commercial (subsistence). From 29.54% of total subsistence respondents, 9.09% of the sample respondents found in woyna dega zone, 10.45% of the respondent is found in dega zone and the remaining 10% are respondents are under kola zone. Generally, woyna dega zone was highly commercial as compare to the other two agro ecology zones.

4.4 Total factor productivity outcomes of teff commercialization

Priority aim of commercialization has been directly attached to household's welfare maximization through its positive effects on income, employment, education, health, consumption and other expenditure (Goitom, 2009). Likewise, sharp and Samuel (2007) measured welfare outcome of commercialization through land productivity, consumption expenditure and labor productivity. Moreover, they pointed out that farm productivity was considered as an immediate outcome that could be achieved by high involvement in the output market.

This study consider only factors productivity outcomes of teff output from other crop outputs and the factor production included fertilizer, pesticides, labor, land , oxen and special seeds . Moreover, it could be measured with the ratio of output commercialization index per input commercialization index. The interest was to examine the influence of total factor productivity outcomes on different levels of commercialization. Basically, levels of commercialization at household levels can be categorized in to three groups based on their selling of crop outputs. These are commercial (if households sold 50% and above), semi commercial (if households sell 26- 50%) and   subsistent (non commercial, if households sold less than 25%).

Table 14: TFP outcomes of teff production of sample households based on levels of commercialization

Levels of commercialization	Observation	Total factor productivity(TFP)	
		Mean	Std. dev
Commercial	35	3.2531576	1.0107803
Semi commercial	120	2.3683349	1.1816963
Subsistence (non commercial)	65	1.2135402	.61090929
Totals	220	2.1679128	1.2276129

Source: Based on own survey data 2018

One-way ANOVA test was applied to cheek the existence of significant factor productivity difference among households that operate under the three levels of commercialization. The ANOVA test revealed that there is statistically significant difference in factor productivity outcomes among households that operated in commercial, semi commercial and subsistence levels of commercialization. In this case null hypotheses that ANOVA holds is, there is equal mean among the groups and if it's not hold true, accept alternative hypotheses and reject the null. Based on table 14, the mean of total factor productivity outcomes that operate in the commercial, semi commercial and subsistence levels of commercialization is 3.25, 2.37 and 1.21 respectively. The average total factor productivity outcome of the total sample respondents is 2. 167. Moreover, the overall significance of factor productivity outcomes of teff production can be cheeked with F value in the one way ANOVA (prob> F= 0.000). Thus, factor productivity outcomes are significant among the levels of commercialization at 1% levels of significant (see appendix H)

4.5 Factor that affect market participation

To analyze the factors that affect households' participation in the teff output market, multiple linear regression analysis was used. Households' participation in the teff market or commercialization of teff could be affected by both demographic and a socio economic variable as it was explained in the descriptive analysis. The dependent variable is market participation of households in the teff market. It is a continuous variable that

ranges between zero and one. Therefore, the researcher use censured Tobit regression model**.**

There are numbers of demographic and socio economic variable that affect households participation in the teff market. The factors includes; age, educational levels, access to market information, access to credit, access to extension service, access to training, participation in the off farm activity, livestock holding or endowment, family size, land size (land allocated for teff production), distance to the nearest market, market price of teff (previous year) and access to irrigation .

Table 15 Tobit estimate result of determinants of market participation

Maktpa	Coefficients	T	P>t	Marginal effects
OFFAM	-.1274909	-9.73	0.000	-.1274909
Lansize	.0356661	6.27	0.000	.0356661
Pyprice	.0003676	1.79	0.074	.0003676
Livsize	.0019229	0.92	0.358	.0019229
Fasize	-.009343	--1.60	0.112	-.009343
Mktinfo	.009247	0.72	0.469	.009247
Distance	-.0022117	-0.49	0.622	-.0022117
Accext	.0053734	0.40	0.687	.0053734
Training	.0069927	0.55	0.586	.0069927
Accrt	-.0398256	-2.85	0.005	-.0398256
Eduhh				
2	.0312838	-2.07	0.040	.0312838
3	-.0500824	-2.55	0.012	-.0500824
4	-.0216815	-0.71	0.481	-.0216815
5	-.0136166	-0.32	0.748	-.0136166
Agehh	.0003708	0.50	0.616	.0003708
_cons	-.3381207	-0.91	0.362	

Source: based on survey of own commutation

The above table (15) depicted the Tobit estimation of determinant of market participation of households in the teff output market. The F value indicates that the overall significant

of the model. Prob> chi2 = 0.000 indicate that the model was accurately predicted by the explanatory variables.

Moreover, the Tobit regression model shows that from 12 independent variables, five explanatory variables were statistically significantly at 1%, 5 % and 10% levels of significance. Of which, participation in the off farm activities (1%), land allocated for teff (1%), last year price of teff (10%) , access to credit (5%) and education levels (read and write only at 5% and 1-4 grade levels at 5%) statistically significant .

Last year price of teff: last year market price of teff affect market participation of households in the teff market positively and statistically significant at 10%. This implies that the higher last year market price leads the households to participate more in the teff market. From the Tobit estimation, as last year price of teff in the market increased by one birr (β=0.003), households participation in the market increased by 0.3%. This indicated that since price is incentives to household's to supply and sale more. Households more likely participate in the market as last year price of teff were higher. This finding is consistent with the fining of Edward (2013).

Access to credit: it was statistically significant and negatively associated with market participation of households in the teff market. Market participation of households with access to credit service from formal financial institution is 39% lower than those without access to credit service. This finding is inconsistent with the finding of Agwu et al (2013) that implies households with credit service from financial institution more likely participate in the market as compare to non user. Since credit service enhance the farmer to link with modern technologies (such as fertilizer, special seed and crop protection), to invest in modern machinery and overcome constraints of inputs supply. But accesses to credit service decrease market participation of households in the teff market since households are reluctant to take credit service from low cash flow performance sector and fraud of uncertainty in the interest rate and repayment schedule.

Land size (% of land allocated for teff): land allocated for teff production was statistically significance at 1% and positively affect market participation of households in the teff market. Higher Land size enhances households for surplus production through

economies of scales and increase crop diversification (partly cash crop and partly food crops). Thus, market participation of households increased by 35.6 % as land allocated for teff increased by one hectare. This finding is consistent with the finding of (Edward, 2013, Chalachew et al, 2011 and Adam, 2009) that implies households with larger land allocated for teff able to produced marketable surplus and more likely participate in the market.

Participation in the off farm income activity: participation in the off farm activities statistically significant at1% and negatively affect market participation of household in the teff market. Market Participation of households with participation in the off farm activities is 12.7% less than from the non participant. This is because income obtained from participation in the off farm activities is not invested in the farm technology and other farm improvement activities. Therefore, households who participate in the off farm activities less likely participate in the teff market. This finding is inconsistent with the finding of (Edward, 2013) that implies participation in the off farm income activities increase the money base and this increases investment on agriculture that encourage productivity and sales.

 Education level: Education levels of the household   are a categorical variable with five categories and consider the first level as a baseline. Of which, level 2 (read and write only) and level 3(1-4 grade level) are statistically significant at 5% and negatively influence market participation of households. These indicates households with read and write only level and 1-4 grade levels less likely increase market participation of household as compare to illiterate households. This is because educated households mostly migrate to the nearest urban area that is employment is prevalent and divert their skill to off farm employment opportunity. This indicates households reduce dependency in the agriculture activity and limit market sale. Generally, households with read and write only and 1-4 grade level participate in the market 3.1% and 5% less than illiterate households .This finding is consistent with the finding of Ataul and Elias (2015) .

Chapter five

Conclusion and Recommendation

5.1 summary and conclusions

Commercialization enhance the farm households maximize welfare, smooth consumption through increasing agricultural productivity, reduction of poverty, increase household income, and strength market linkage. It is also the prior development agenda and poverty reduction strategy of Ethiopia government to transform smallholder farmer from subsistence to profit maximizing (commercial).

This research addressed the determinants of commercialization of teff and its factor productivity outcomes, the case of Awabel Woreda, Amahara Region, and Ethiopian. Particularly, the research analyzed the levels of commercialization of teff production at household levels, examined the factor that affect household participation in the teff output market or commercialization and the influence factor productivity outcomes that operate at the different levels of commercialization.

The method of data collection technique applied in this research was structured questioners and the target populations were rural farm households that could produce teff outputs. Basically primary data were collected through this tool. Furthermore, 220 sample respondents were selected from the three agro ecology zone .i.e Woyna daga, Dega and kola zone and stratified random sampling was adopted to select representative sample kebeles/ village and there are only 2 defected households during the data collection.

The study was analyzed by both descriptive and inferential statistics. The descriptive statistics was applied to analysis the levels of commercialization. There are three categories of levels of commercialization at the household levels. These are commercial, semi commercial and subsistence levels. Moreover, one way ANOVA test was used to examine factor productivity outcome that varies on different levels of commercialization. Accordingly, there was a significant difference in the factor productivity outcomes of teff production among the sample households that operate at the different levels of

commercialization. This indicates that households with the higher TFP index participate in the teff output market more as compare to households with lower TFP index.

Basically, the descriptive analysis revealed, the average educational levels of the households in the studying area was read and write only categories. Moreover, male household heads were more educated than female heads. Regarding to religious status, households are almost (93.63%) Christian. The average age of the sample respondents in the study area was 49 years old and cultivate on average 2.5 hectares of land for teff production.

The descriptive analysis also depicts that the levels of commercialization of teff production in the study area is characterized as semi commercial level. On average, 54.54% of sample respondents are semi commercial, 15.91% of respondents are commercial one and the remaining 29.54% of the respondents are subsistence. Based on sex, male household heads are more commercial one as compare to female heads. Likewise, based on agro ecological zone, levels of commercialization was high in Woyna dega zone as compare to Kola and Degazone. Households in the dega agro ecological zone were almost subsistence or non commercial.

The censured Tobit regression result revealed that from the total 12 explanatory variables, only five variables are statistically significant at 1%,5% and 10% levels of significance and determine market participation of households. Of which, education level (read and write only and 1-4 grade level) , access to credit service and participation in the off farm activities negatively affect market participation of households in the teff market . To the contrary, land allocated to teff and last year market price of teff positively and significantly influences market participation of households.

Previous year market price of teff was significant and positively affects market participation of households. This is because price is an incentive for farm households to supply more output in the market. Likewise, Land allocated for teff (by hectors) also positively influence market participation of the household. This implies that larger land size enables the households to produce diversified crop (cash and food crop) and attain surplus production through economies of scale.

To the contrary, access to credit service from the formal financial service negatively affects market participation of households in the teff market. This is because households are reluctant to take credit and fraud to uncertain interest rate and repayment schedule. Likewise, participation in the off farm income activities also negatively influence market participation of households. This is because income earned from participation in the off farm activities is not invested in farm technology and other farm improvement activities.

Finally, education levels (read and write only and 1-4 grade level) of households also negatively affect market participation of households. This is due to educated households mostly migrate to the urban area that employment is prevalent and divert the generated skill to off farm employment opportunity .

Generally, the levels of commercialization of teff producing rural farm households in the study area were lower. Even though levels of commercialization was lower, there were significant factor productivity difference among households at each levels

5. 2 Policy Recommendations

Based on the finding obtained from the discussion, the following policy recommendation has been drawn.

The level of commercialization of teff production of households in the study area was semi commercial levels. This indicates that households produce half for consumption and half for sale. Thus, to achieve high welfare, reduce poverty and increases income, government should strongly support the rural farm household to transform from semi commercial to commercial level through creating market linkage and short term agricultural training .

Land allocated for teff was positively affect market participation of households. Teff is highly demanded and consumed cash and food crop particularly in the study area. Thus, there should be development of off farm activities because labor shift from farm to off farm activates and this increase availability of land. Moreover, government should consolidate fragmented farm structure and functioning land reform policy.

Previous year market price of teff also affects market participation of households positively. Therefore, government should control and monitor unnecessary intervention of broker or intermediary that benefit with the expense of farmers. Moreover, government price regulation policy should consider not only manufacturing good but also agricultural output to solve seasonal fluctuation in price.

Access to credit service from the formal financial institution negatively influences market participation of households. Therefore, financial institution should manage the interest rate and repayment schedule. Moreover, awareness creation should be done to avoid reluctant behavior of households.

Participation on the off farm activities negatively affect market participation of households. Therefore, the concerned body should create awareness and provide training for households to invest the money obtained from participation in the off farm activity in to farm technology and other farm improvement activities.

Education levels of the household (read and write only and 1-4 grade level) negatively affect market participation of households. It is recommended that government or the concerned body should create sound environment to reduce migration of educated households to the urban area

Suggestion for future research

Determinants of commercilizaation of teff and its factor productivity outcome: the case of awabel worreda , amahara region, Ethiopia . It is better to be done the case of Ethiopia, include the urban farmers and take account determinants of input commercialization.

Reference

Adam Bekele. (2009). Determinants of commercial orientation of smallholder farm households in risk-prone areas of Ethiopia: Analysis of the central rift valley. Ph.D. Dissertation submitted to School of Graduate Studies of Haramaya University.

Arias,P .,Hallam,D.,Krivonos,E and Morrison J.(2013).Smallholder integration in changing food markets. Food and Agriculture Organization of the United Nations, Rome.

Ataul Gani Osmani,and Elias Hossain, (2015). Market participation decision of Smallholder farmers and its determinant in BANGLADESH, *Economics of Agriculture* 1/2015

Berhanu Gebremedhin and H. Dirk, (2009). Staple food Crops turning into commercial crops: Case studies of teff, wheat and rice in Ethiopia. Revision submitted to the *Ethiopian Journal of Economics.* Addis Ababa, Ethiopia.

Berhanu Gebremedhin and Moti Jaleta. (2010). Commercialization of Smallholders: Does market orientation translates into market participation? Improving productivity and Market Success (IPMS) of Ethiopia farmers project Working Paper 22. Nairobi, Kenya, ILRI.

Betre, A. (2006). Geography of Small-Holders' Commercialization: the Case of food grains in Ethiopia. Paper submitted for Ethiopia Strategy Support Program (ESSP) Policy Conference 2006, IFPRI and EDRI, 6-8 June 2006, Addis Ababa, Ethiopia.

Birara Endalew**. (**2017). Teff Production and marketing in Ethiopia; A *Journal of Radix International Educational and Research Consortium*, volume 6, Bahirdar university.

Chalachew Seyoum, Tesfaye Lemma and Ranjan S. Karippai. (2011). factors determining degree of commercialization of smallholder agriculture: the case of Potato growers in Kombolcha district, East Harrghe, Ethiopia.

Chamberlin, J. (2008). It's a Small World After All: Defining Smallholder Agriculture in Ghana. IFPRI Discussion Paper No. 00823

CSA (Central Statistical Agency) (2009/2017). Summary and statistical report of the 2009 population and housing census: Population Size by Age and Sex.

CSA (2007/2014). Agriculture sample survey, Addis Ababa, Ethiopia.

Edward Mertey. (2013). Factors Influencing Commercialization of Smallholder Agriculture in the Effutu Municipality of Ghana. A Tobit regression.

Engdawork, T. (2009). Understanding Teff: A Review of Supply and Marketing Issues Ethiopia Commodity Exchange Authority.

FAO (2015). Analysis of price incentives for Teff in Ethiopia. Technical notes series.

Goitom Abera. (2009). Commercialization of smallholder farming: Determinants and welfare outcomes: A cross-sectional study in Enderta district, Tigray, Ethiopia. M.Sc. Thesis Presented to University of Agder, Kristiansand, Norway

Govereh, J., T.S Jayne, and Nyoro, J. (1999). Smallholder commercialization, interlinked markets and food crop productivity: cross country evidence in eastern and southern Africa, the Department of Agricultural Economics and the Department of Economics, Michigan State University.

Greene, William H. (2003). Econometric Analysis, Fifth edition (Prentice Hall, Upper Saddle River, NJ).

Gujarati, D.N. (2003). *Basic Econometrics*. Fourth Edition, Tata Mc-Graw-Hill Publishing Company Limited, New Delhi, India

Hazell, P., Poulton, C., Wiggins, S. and Dorward, A. (2007). The Future of Small Farms for Poverty Reduction and Growth. 2020 Discussion Paper No.42, IFPRI.

James warner ,tim stehulak and leulsegged kasa .(2015). woreda level crop production ranking in Ethiopia, pooled data approach. International food policy research institute

Jayne, T.S., Yamano, T., Weber, M.T., Tschirley, D., Benfica, R., Chapoto, A. and Zulu, B.(2003). Smallholder Income and Land Distribution in Africa: Implications for Poverty Reduction Strategies. Food Policy 28(3): 253-275.

Kothari, C.R. (2004). Research Methodology: Methods and Techniques, 2nd Edition. Wishwa.

Leavy J. and Poulton C. (2007). Commercialization in agriculture: a typology. Paper presented at the Fifth International Conference on the Ethiopian Economy, EEA, Addis Ababa

Mahelet Getachew, (2 0 0 7). Factors affecting commercialization of smallholder farmers in Ethiopia: the case of North Omo Zone, SNNP region. Paper presented at the Fifth International Conference on the Ethiopian Economy, Addis Ababa, and June 7-9

MoFED (Ministry of Finance and Economic Development) (2010). Growth and Transformational Plan (GTP 2010-2015). Addis Ababa.

MoFED (Ministry of Finance and Economic Development), 2010. Growth and Transformation Plan (GTP): 2010/11 – 2014/15. Ministry of Finance and Economic Development. V-II, Nov, 2010, Addis Ababa.

Moti Jaleta, Berhanu Gebremedhin, and H. Dirk, (2009). Smallholder commercialization: Processes, determinants and impact. Discussion Paper No. 18. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project, ILKRI, Nairobi, Kenya. 55pp.

Muhammed Urgessa,(2011). Market Chain Analysis of Teff and Wheat Production in Halaba Special Woreda, Southern Ethiopia.

N.M. Agwu, C.I. Anyanwu and E.I. Mendie. (2013). Socio-Economic Determinants of Commercialization among Smallholder Farmers in Abia State, Nigeria. *Invited paper presented at the 4th International Conference of the African Association of Agricultural Economists, September 22-25, 2013, Hammamet, Tunisia*

Oksana Nagayets, (2005). Small Farms: current status and key trends, prepared for the future of small farms, Research Workshop, Wye College, June 26–29.

Olwande J. ,Smale,M., Mathenge,MK., Place, F. and Mithöfer,D .(2015). Agricultural marketing by smallholders in Kenya: A comparison of maize, kale and dairy. Food Policy 52: 22-32.

Pender J. and Dawit Alemu, (2007). Determinants of Small hold Commercialization of Food Crops: Theory and Evidence from Ethiopia. Vol.745. International Food Policy Research Institute.

Pingali P. (1997). From subsistence to commercial production System: The transformation of Asian agriculture. American Journal of Agricultural Economics 79(2):628–634.

Pingali, L.P. and Rosegrant, M.W. (1995). Agricultural commercialization and Diversification: Process and polices. *Food Policy* 20(3):171–185.

Salisu Mustapha, Mohammed Tanko, Iddrisu Abukari.(2017). Application of Multinomial Logistic to Smallholder Farmers Market Participation in Northern Ghana .*International journal of agricultural economics.2 (3): 55-62.*

Samuel Gebreselassie, and Sharp K. (2007). Commercialization of smallholder agriculture in selected tef-growing areas of Ethiopia, Ethiopian Journal of Economics, Volume XVI, and No1.

Sharp, K. Ludi,E. and Gebreselassie,S. (2007).Commercialization of farming in Ethiopia: Which pathways? Ethiopian Journal of Economics 16(1):39-54.

Sokoni, C.H. (2007). Commercialization of smallholder production in Tanzania: Implications to sustainable resources management. Draft Paper presented at the workshop on Resource Management and Sustainable Development: White Sands Hotel, Dares Salaam 13-17th Aug.

Strasberg PJ. Jayne TS., Yamano T., Nyoro J., Karanja D. and Strauss J.(1999). Effects of agricultural commercialization on food crop input use and productivity in Kenya. Michigan State University International Development Working Papers No. 71. Michigan, USA.

Von Braun, J. and Kennedy, E. (1994). Agricultural commercialization, economic development, and nutrition. Johns Hopkins University Press, Baltimore, Maryland, USA.

WDR (World Development Report).(2008). Agriculture for Development, World Development Report, Washington, D.C.

Workneh Negatu and R. Michael. (2002). Intensification and crop commercialization in Northeastern Ethiopia. Ethiopian Journal of Economics, 11(2): 83-105

Yamane, Taro. (1967). Statistics: Introduction to analysis .New York: Harper and row?

Appendix

Appendix A: Questionnaires for household survey

Determinant of commercialization of Teff and Its factor Productivity Outcomes:

   (The case of Awebel Woreda, Amahara Region, Ethiopia)

Name of the household_____   Household ID_____

Name of the kebele_____signiture_____

Focus: hello! My name is Ermias Abineh. Now I am Development Economics post graduate student at Bahirdar University in department of Economics. Currently I am on the way of doing research to fulfill the requirement of masters of Science in Development Economics. The aim of this questionnaire is to collect data from respondents regarding to determinant of commercialization of teff and its factor productivity Outcomes: the collected data will employ for academic purpose that is to conduct master thesis**.** The respondents kindly requested to provide their response for each question. Thank you in advance for your cooperation.

Part I: Demographic characteristics

1. Religion status of the household head; _____
2. Sex of the household head _____1=male ,0= female
3. Age of the household_____years.
4. Marital status of the household head:
       1= single, 2= married, 3=divorce, 4= windowed
5. Education levels of the household head :
       1=illiterate, 2, Basic education, 3= 1-4 grade, 4= 5-8 grade, 5= 9-12 and above

Part II: socio economic variables

6. Family size by sex and age (adult equivalence)

Name of the household member	Age	Sex

8. How many gemed[1] of teff do you cultivate annually?_____

9 Livestock's size (endowment)

Name of live stock s	Quantity in units
Cows	
Oxen	
Horse	
Donkey	
Goats	
Chickens	
Sheep	

10. Annual income ………………….

11. Do you participate in the off farm activities?

       1) = yes, 0) = no.

12. Do you have access to agricultural training in the given production period?

       1) = yes, 0) = no

13. Do you get extension service from the agricultural experts (DA) in the production period?

   1)= yes   0) = no

14. Do you have access to credit from the formal financial institutions so far?

        1) = yes, 0) = no

15. If your answer for question 16 **yes**, for what purpose do you use?

1	To purchase fertilizer
2	To rent land
3	To purchase live stocks
4	To purchase chemicals, pest sides and special seeds
5	Others

16. Do you have access to irrigation facilities?

       1) = yes, 0) =no

17. Do you have access to market information?

      1) = yes, 0)= no

18. How long it takes to arrive at the nearest market from the home?_____

19. How many quintals of teff do you produce in this year (2009/10)?_____

20. How many quintals of teff do you sell annually?_____

21. How much is the selling price of teff per quintals in this year?_____

22. How much was the previous year selling price teff per quintals?_____ (In birr).

23.   Input usage of farmers for 2009/10 year of production

Input name		Measurement	Quantity	Price per unit	Total Cost
Fertilizer	DAP	Kg			
	UREA	Kg			
	Other	Kg			
Chemicals		Lts			
Pest side		Lts			
Special seed		Kg			
Rent of land		Gemed			
Capitals (BBM)		Number			
Rented oxen		Number			

24. Do use hired labor? 1) yes , 0) no

25. If your answer for question 29 yes, how much is the wage rate of labor per day?_____

Appendix B: summary of continuous explanatory variable

```
sum agehh incohh distance fasize livsize pyprice lansize
```

Variable	Obs	Mean	Std. Dev.	Min	Max
agehh	220	49.42727	10.78047	26	75
incohh	220	44146.95	14263.93	15000	85000
distance	220	3.929545	1.470219	1	6.5
fasize	220	3.922727	1.15408	2	7
livsize	220	6.266136	3.327429	1.7	18
pyprice	220	1803.568	33.30871	1750	1900
lansize	220	2.505682	1.274406	.5	6

Appendix C: sum of all variables

sum

Variable	Obs	Mean	Std. Dev.	Min	Max
reghh	220	.9363636	.2446607	0	1
sexhh	220	.7136364	.4530923	0	1
agehh	220	49.42727	10.78047	26	75
eduhh	220	2.072727	1.004184	1	5
incohh	220	44146.95	14263.93	15000	85000
accrt	220	.2818182	.4509112	0	1
traing	220	.4545455	.4990651	0	1
accext	220	.6318182	.483411	0	1
distance	220	3.929545	1.470219	1	6.5
mktinfo	220	.4045455	.4919231	0	1
accirr	220	.3227273	.4685856	0	1
fasize	220	3.922727	1.15408	2	7
livsize	220	6.266136	3.327429	1.7	18
pyprice	220	1803.568	33.30871	1750	1900
lansize	220	2.505682	1.274406	.5	6
OFFAM	220	.3863636	.488026	0	1
qtsf	220	7.840909	6.076869	0	30
marstatu	220	2.204545	.6682474	1	4
agrozone	220	1.554545	.7832302	1	3
TFP	220	2.167913	1.227613	0	10.5
levcomm	220	2.136364	.6617711	1	3

Appendix D: Hetroscadasticity test

```
. estat hettest

       .
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of maktpa

        chi2(1)      =      0.09
        Prob > chi2  =    0.7623
```

Appendix E: mutlicolunearity test

```
vif
```

Variable	VIF	1/VIF
agehh	1.70	0.588171
eduhh	1.53	0.651608
lansize	1.42	0.702716
livsize	1.30	0.767380
pyprice	1.23	0.810624
fasize	1.17	0.853737
distance	1.17	0.855417
OFFAM	1.12	0.890168
traing	1.11	0.899721
accext	1.11	0.904232
accrt	1.07	0.931566
mktinfo	1.06	0.947360
Mean VIF	1.25	
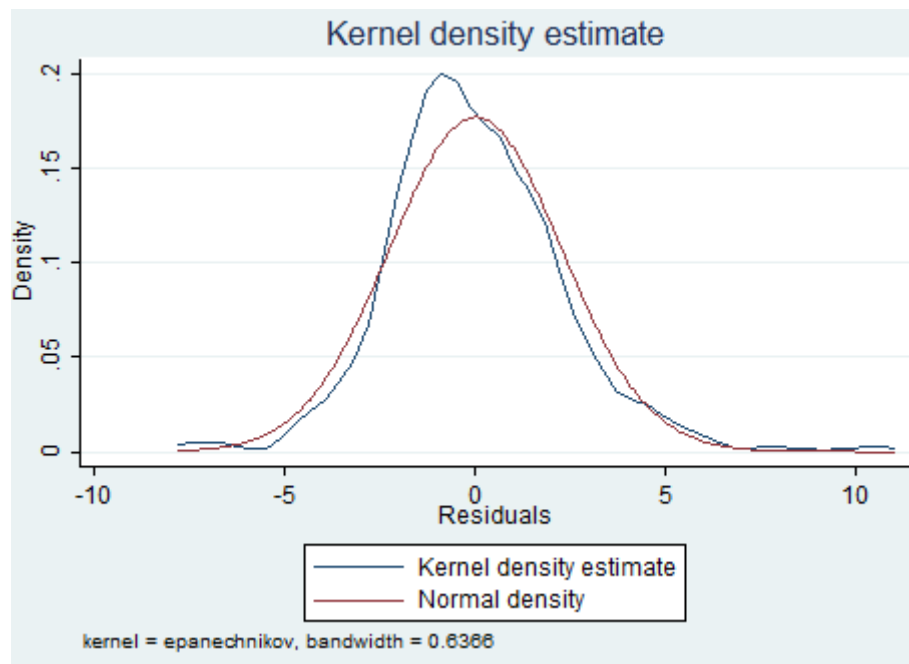
Appendix F: normality test

Appendix G : Censured tobit regresion result and marginal effect

```
. tobit maktpa OFFAM lansize pyprice livsize fasize mktinfo distance accext traing accrt i. eduhh agehh, ll(0)

Tobit regression                                Number of obs   =        220
                                                LR chi2(15)     =     138.25
                                                Prob > chi2     =     0.0000
Log likelihood =  208.32441                     Pseudo R2       =    -0.4966
```

maktpa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
OFFAM	-.1274909	.0133231	-9.57	0.000	-.1537588	-.101223
lansize	.0356661	.0056912	6.27	0.000	.0244453	.0468869
pyprice	.0003676	.000205	1.79	0.074	-.0000366	.0007717
livsize	.0019229	.0020861	0.92	0.358	-.0021901	.006036
fasize	-.009343	.0058494	-1.60	0.112	-.0208757	.0021897
mktinfo	.009247	.0127548	0.72	0.469	-.0159005	.0343944
distance	-.0022117	.0044819	-0.49	0.622	-.0110483	.0066249
accext	.0053734	.0133321	0.40	0.687	-.0209122	.031659
traing	.0069927	.0128178	0.55	0.586	-.018279	.0322644
accrt	-.0398256	.0139893	-2.85	0.005	-.067407	-.0122443
eduhh						
2	-.0312838	.0151428	-2.07	0.040	-.0611395	-.0014281
3	-.0500824	.0196457	-2.55	0.012	-.0888159	-.0113489
4	-.0216815	.0306761	-0.71	0.481	-.0821626	.0387995
5	-.0136166	.042357	-0.32	0.748	-.0971279	.0698947
agehh	.0003708	.0007377	0.50	0.616	-.0010836	.0018252
_cons	-.3381207	.3701075	-0.91	0.362	-1.067826	.3915845
/sigma	.0895867	.0043378			.0810342	.0981391

```
Obs. summary:         4  left-censored observations at maktpa<=0
                    216     uncensored observations
                      0  right-censored observations
```

64

Marginal effects for Tobit models

```
. margins, dydx( OFFAM lansize pyprice livsize fasize mktinfo distance accext traing accrt eduhh agehh)

Average marginal effects                              Number of obs   =        220
Model VCE    : OIM

Expression   : Linear prediction, predict()
dy/dx w.r.t. : OFFAM lansize pyprice livsize fasize mktinfo distance accext traing accrt 2.eduhh 3.eduhh 4.eduhh 5.eduhh agehh
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf. Interval]	
OFFAM	-.1274909	.0133231	-9.57	0.000	-.1536037	-.1013781
lansize	.0356661	.0056912	6.27	0.000	.0245115	.0468206
pyprice	.0003676	.000205	1.79	0.073	-.0000342	.0007694
livsize	.0019229	.0020861	0.92	0.357	-.0021658	.0060117
fasize	-.009343	.0058494	-1.60	0.110	-.0208076	.0021216
mktinfo	.009247	.0127548	0.72	0.468	-.015752	.034246
distance	-.0022117	.0044819	-0.49	0.622	-.0109961	.0065728
accext	.0053734	.0133321	0.40	0.687	-.020757	.0315038
traing	.0069927	.0128178	0.55	0.585	-.0181298	.0321153
accrt	-.0398256	.0139893	-2.85	0.004	-.0672441	-.0124071
eduhh						
2	-.0312838	.0151428	-2.07	0.039	-.0609632	-.0016044
3	-.0500824	.0196457	-2.55	0.011	-.0885872	-.0115776
4	-.0216815	.0306761	-0.71	0.480	-.0818055	.0384425
5	-.0136166	.042357	-0.32	0.748	-.0966349	.0694016
agehh	.0003708	.0007377	0.50	0.615	-.001075	.0018166

Note: dy/dx for factor levels is the discrete change from the base level.

Appendix H : one way anova test

```
. pwmean  TFP, over( levcomm) mcompare(tukey) effects

Pairwise comparisons of means with equal variances

over          : levcomm
```

	Number of Comparisons
levcomm	3

TFP	Contrast	Std. Err.	Tukey t	P>|t|	Tukey [95% Conf. Interval]	
levcomm						
2 vs 1	-.8848227	.195526	-4.53	0.000	-1.346246	-.4233991
3 vs 1	-2.039617	.2133893	-9.56	0.000	-2.543197	-1.536038
3 vs 2	-1.154795	.1567479	-7.37	0.000	-1.524706	-.7848838

```
.
. oneway  TFP  levcomm, tabulate
```

levels of commerciliz ation	Summary of total factor productivity Mean	Std. Dev.	Freq.
1	3.2531576	1.0107803	35
2	2.3683349	1.1816963	120
3	1.2135402	.61090929	65
Total	2.1679128	1.2276129	220

Analysis of Variance

Source	SS	df	MS	F	Prob > F
Between groups	105.245512	2	52.6227561	50.80	0.0000
Within groups	224.794798	217	1.03592073		
Total	330.04031	219	1.50703338		

Bartlett's test for equal variances: chi2(2) = 30.0295 Prob>chi2 = 0.000

Appendix I: test for omitted variable

```
. estat ovtest

Ramsey RESET test using powers of the fitted values of maktpa
       Ho:  model has no omitted variables
                F(3, 204) =      2.34
                  Prob > F =      0.0741
```

Animal category	TLU
Calf	0.25
Weaned Calf	0.34
Donkey (Young)	0.35
Donkey (adult)	0.70
Camel	1.25
Heifer	0.75
Sheep and Goat (adult)	0.13
Caw and Ox	1.00
Sheep and Goat young	0.06
Horse	1.10
Chicken	0.013

Appendix J: conversion factors for livestock

Source: sharp and Samuel (2007)