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COLLAGE OF AGRICULTURE AND NATURAL RESOURCE

DEPARTMENT OF AGRICULTURAL ECONOMICS

DETERMINANT OF COMMERCIALIZATION OF TEFF FOR SMALLHOLDER HOUSEHOLD IN THE CASE OF KINDO KOYSHA DISTRICT WOLAITA ZONE SOUTH ETHIOPIA

Senior Research Project Submitted To Department Of Agricultural Economics College Of Agriculture And Natural Resource Department Of Agricultural Economics

Prepared By: Mesaye Beyene

Id No: Nsr\1692/14

Advisor: Moti. D (M.Sc)

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ABBREVIATIONS AND ACRONOMYS

CSA	Central Statistics Agency
GDP	Gross Domestic Product
GVCP	Gross Value of all Crop Production
GVCS	Gross Value of Crop Sales
MoARD	the Ministry of Agriculture and Rural Development
PASDEP	Plan for Accelerated and Sustainable Development to End Poverty
PRSP	Poverty Reduction Strategy Paper
RMA	Rapid Market Appraisal

ABSTRACT

The main purpose of this study was to evaluate the determinants of teff commercialization in kindo koysha district. It is widely accepted that teff commercialization is one of the objective of farmers to fulfill their family basic needs. Having recognized this, the proposal has conducted this study by focusing on the teff commercialization and the influencing factors. To this end, data will be collected from primary sources. 94 individuals were randomly selected in proportion to the membership size of the teff commercialization. The data were collected through questionnaire. Both descriptive statistics and econometric analysis were employed for analytical purpose. The result shows that from the total respondents,32.98 % were female who commercialize teff while 67.02 %, were male teff commercializes. In the regression analysis, variables like sex of house hold head ,distance to nearest market, family size ,intensity of fertilizer, farm experiences, and land size were found to have significant relationship to the commercialization of teff. Among these significant variables sex of household head, intensity of fertilizer ,and farm experience, total cultivated land size have positive relationship while distance to nearest market, and family size have negative relationship with teff commercialization. Based on the result, responsible producers need to give due attention to overcome strengthen, build their capacities mainly in teff commercializing and decision making that ultimately could increase their production of teff

keywords : commercialization teff smallholder households

1. INTRODUCTION

1.1 Background

Agriculture continues to dominate the national economy of Ethiopia, accounting for 36.7% of overall GDP and 70% of foreign exchange earnings. The sector provides employment for 72.7% of the population and is a means of generating livelihood for about 83% of the rural population (ATA, 2017; ADEA, 2014; FAO, 2015). In Ethiopia 95% of the total area under agriculture is cultivated by smallholder farmers and contributes to 90% of the total agricultural output indicating the dominant contribution of smallholder farmers to the overall agricultural production (MoARD, 2010; Gebreslassie and Bekele, 2012). According to MoFED (2010, 2015), the Ethiopian government, in its two-consecutive five-years Growth and Transformation Plan (GTP-I and GTP-II), has given much emphasis on agricultural commercialization, among which the second pillar intends to achieve growth and thereby improve people' livelihoods and reduce poverty.

Commercialization of the smallholder farmers has been viewed by the government as the major source of agricultural growth in Ethiopia. The government of Ethiopia implemented agricultural commercialization clusters with the primary goal of commercialization of smallholders' agriculture and agro-industrial development, offering a strategic entry point for private sector engagement (Pauw, 2017). Commercialization entails agricultural production decision intended for market based on market signals and produce offered for sale and use of purchased inputs (Berhanu and Moti, 2010). The welfare gain of agricultural commercialization can be achieved through specialization, comparative advantage, economies of scale and flow of ideas due to regular interaction (Barrett, 2008). In the agricultural sector, cereals cover about 80% of the total grain crop area (9.97 million hectares) and contribute about 87% (23.1 million tons) of the grain production (CSA, 2016). Among cereals, teff (Eragrostis teff) stands first in terms of land area, followed by maize and wheat (CSA, 2016).

Ethiopia is the center of both origin and diversity for teff (Vavilov, 1951).. The Teff is a staple food and one of the most important crops for generating farm income, cultural heritage, national identity and nutritional security study area is found in wolaita zone of south region, southern Ethiopia. There is a dearth of information in terms of identifying the determinants of smallholders' commercialization of teff producer particularly in kindo koysha district wolaita

zone of south region, one of the potential areas of teff production in southern Ethiopia. Such information is essential for making knowledge-based decision that are geared towards improving market participation of farmers in teff and contribute to the national development goals of eradicating poverty and improving food security.

However, the supply of teff in the study area still can't satisfy the existing market demand and the farmers are not benefited from teff price increment. Since teff is the most economically and socially crucial crop, there is a strong need to address the prevailing information gap and contribute to proper understanding of determinants of commercialization of smallholder farmers in kindo koysha district. Such information is also required to contribute to the success of GTP-II plan of the country through improved decision of smallholder farmers in teff production and marketing. Therefore, this study analyzes the level of commercialization and identify factors affecting the level of commercialization of teff producers (Minten et al.2013).

Major production crops in study area are maize , teff (Eragrostis tef) , sweet potato ,taro , enset (musa ensere) ,wheat , and others. Teff ,coffee and ginger are the main cash crops in study area.

1.2. Statement of the Problem

In Ethiopia, small-scale subsistence farmers dependent on low input, rain-fed mixed farming agriculture dominated with traditional technologies accounts for about 95% of the output (CSA,2016). Agricultural production and productivity is very low and the growth in agricultural output has teff kept pace with human population growth. This small-scale subsistence agriculture remains by far the most important sector in Ethiopian economy and directly supports about 85% of the population in terms of employment and livelihood; contributes about 50% of the country's gross domestic product (GDP); and supplies around 73% of row material requirement of agro-based domestic industries. It is also the major source of food for the population and hence the prime contributing sector to food security. In addition, agriculture is expected to play a key role in generating surplus capital to speed up the country's overall socio-economic development, (Gebreslassie,2012). Agricultural marketing is a very important factor in economic development and lack of a well-functioning agricultural market and marketing system severely hinders the increase of social welfare, income distribution, and food security of developing countries. Moreover markets and marketing system do not develop simultaneously with economic growth.

Markets and marketing system should be organized deliberately to enable economic development (Leykun,2014).

Improved information and marketing facility enables farmers to plan their production more in line with market demand, to schedule their harvest at the most profitable time, to decide which market to sell their produce to and negotiate on a more even footing with traders and it also enables traders to move their produce profitably from a surplus to deficit market and to make decisions about the economics of storage, where technically possible. Thus the market information is critical to the law of one price and to the price discovery process (Pauw,2017).

Provision of improved and high yielding varieties, chemical fertilizer, pesticides and insecticides may favor the farmer in increasing production; however, this is not an end by itself. Therefore, Osmani and Hossain, (2014) without modern marketing system, including communications, transportation, storage facilities and financial arrangement this is not possible.

The efforts of increasing agricultural production and productivity have to be accompanied by a well-performing marketing system which satisfies consumer demands with the minimum margin between producers and consumer prices. Higher prices for producer can encourage farmers to adopt new technologies, increase production, (MoFED,2015). However, there are external and internal problems that influence the marketing efficiency in Ethiopia. This has to do with lack of pertinent market information, development of marketing institutions and marketing infrastructure such as storage, transportation etc (Bachewe et al.2018)

The possible increment in output resulting from the introduction of improved technology could not be exploited in the absence of well-functioning marketing system. An efficient, integrated, and responsive market mechanism is of critical importance for optimal allocation of resources in agriculture and in stimulating farmers to increase their output (Mebrahtom,2014). A well-functioning marketing system is not limited to stimulation but it also increases production by seeking additional output.

In Ethiopia, agricultural growth induces higher overall growth than non-agricultural sectors. This leads to faster poverty reduction since it generates proportionately more income for farm households who represent the bulk of the poor. From within agriculture, staple crops have stronger growth linkage resulting from more than proportionate increase in total GDP. Moreover, such growth linkage becomes stronger overtime(Diao*et al.* 2007).

Supply of agricultural crop in the study area was subjected to seasonal variation where surplus supply at harvest is the main feature. The nature of the product on the one hand and lack of properly functioning marketing system on the other, often resulted in lower producers' price. , barely, teff, wheat and bean are the major cash crops grown in the study area mainly for market. However, marketing aspects of only barely and bean were undertaken by Osmani andHossain (2014) while leaving marketing of teff which have potential production volume and marketability, unresolved. Moreover there is a need to employ a market chain approach to fully understand and resolve the problem of teff and wheat at all levels. Yet there is no such study which tries to look into the whole spectrum of marketing chain of these crops and determinants of their supply kindo koyshaWoreda. This makes the undertaking commercialization of teff and wheat in the Woreda imperative.

The Kindo Koysha District, known for its potential in teff production, lacks comprehensive studies that analyze the factors affecting the commercialization of this vital crop. Additionally, while various studies have highlighted the agricultural marketing system's inefficiencies, little attention has been paid to the unique socio-economic dynamics at play within this district that may hinder or facilitate effective commercialization.

Conducting this research is intended to fill this knowledge gap by providing empirical data and analysis on the determinants of teff commercialization at the local level. This study aims to offer insights that can help policymakers, agricultural extension services, and local organizations design targeted interventions that support smallholder farmers in improving their market participation and ultimately enhancing their livelihoods. By focusing specifically on Kindo Koysha, the research aspires to contribute to the understanding of local agricultural practices and inform strategies that can promote sustainable economic growth through enhanced commercialization of teff.This study was designed to address the prevailing information gap on the subject and contribute to proper understanding of the challenges and assist in developing improved market development strategies to benefit of smallholder farmers, traders, and other market participants.

1.3 Research Questions

This study will be attempted to answer the following research questions:

What are factors affecting the commercialization of teff for smallholder households in Kindo Koysha District?

What are challenges and opportunities the commercialization of teff for smallholder households in Kindo Koysha District?

1.4. Objective of the study

1.4.1. General objective

To analyse determinants of commercialization of teff for smallholder household in the study area.

1.4.2 Specific objectives.

To identify factor affecting the commercialization of teff for smallholder households in the study area.

To Identify challenges and opportunities of commercialization of teff for smallholder households in the study area.

1.5. Scope of the Study

Evaluating the role of in grain marketing, economic and social contributions of farmers at rural level is main task of this research hypothesis. The analysis of teff commercialization role at regional and national level critically depends on response parameters from individual farmer members and societies. Thus, the purpose of this study was to contribute to the analysis and study of the teff commercialization in kindo koysha district. Moreover, it will help as an input for researchers who want to engage in further study and address the needs and problems of the farmers.

1.6. Significance of the Study

This study focuses on the determinants of teff commercialization and constraints of teff production in kindo koysha district. The information is expected to assist the teff producer to understand the production potential, and analyze the performance of teff commercialization activities which could serve as a major input to formulate appropriate marketing policies and strategies in kindo koysha district by identifying interventions that improve efficiency of the

marketing system. The study can also serve as an additional source to conduct detailed studies by identifying research agenda.

The study was generate valuable information on teff commercialization that might assist policy makers at various levels to make relevant decisions to intervene in the development of teff commercialization and designing of appropriate policies and strategies. The findings of the study might also be useful to government and non-governmental organization input suppliers, producers, traders, consumers, and marketing agents to make their respective decisions. It may also serve as a reference material for further research on similar topics and other related subjects.

2. LITERATURE REVIEW

2.1 Theoretical review

2.1.2 Historical background of teff commercialization

The poverty-reduction strategy adopted by Ethiopia seeks to achieve growth through the commercialization of smallholder agriculture. The Plan for Accelerated and Sustainable Development to End Poverty (PASDEP), Ethiopia's strategic framework for 2005/06 – 2009/10, relies on a massive push to accelerate growth. This is to be achieved by efforts in two directions: commercialization of agriculture, based on supporting the intensification of marketable farm products (both for domestic and export markets, and by both small and large farmers); and promoting much more rapid non-farm private sector growth (MoFED, 2015).

2.1.3 Definition of commercialization

In most literature, a farm household is regarded as commercialized if it produces significant cash commodities, allocates resources to marketable products, and sells a considerable portion of its agricultural outputs (MoARD, 2010). However, commercialization encompasses more than just supplying surplus products to markets (Pauw, 2017); it also involves both input and output sides of production, along with the decision-making behavior of households in production and marketing. Furthermore, commercialization is not limited to cash crops, as traditional food crops are also increasingly marketed (Mebrahatom, 2014). Thus, the concept of commercialization implies that households target markets in their production decisions, rather than merely selling surplus products (Tekalign, 2014). In essence, commercialized farmers base their production decisions on market signals and comparative advantages, while subsistence farmers focus on meeting household needs and sell any remaining surplus.

According to Tadele and wudineh (2017), commercialization of subsistence agriculture takes many forms. They state that: "Commercialization can occur on the output side of production with increased marketed surplus, but it can also occur on the input side with increased use of purchased inputs. Commercialization is not restricted to just cash crops: The so called traditional food crops are frequently marketed to a considerable extent, and the so-called cash crops are retained, to a substantial extent, on the farm for home consumption, as, for instance, groundnuts in West Africa. Also, increased commercialization is not necessarily identical with expansion of the cash economy when there 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."

The Millennium Development Project's Hunger Task Force concluded in 2005 that "the world could meet the MDG of halving hunger by 2015", and that "development of agriculture is critical to that goal" (ATA,2016). Rural areas are the home of the majority in Africa and small scale agriculture is the mainstay of the rural economy serving mainly as a source of food income (ATA,2016). The literature shows that "with the adoption of improved technologies and modern techniques, access to agricultural inputs and investment in infrastructure, rapid growth in agricultural incomes is achievable in Africa" (Tura,2016). Smallholder agriculture, which is the predominant source of livelihoods in Africa, has proven to be as at least as efficient as larger farms when farmers have received similar support services and inputs (seed, fertilizer, and credit) (Alemu,2015).

Many countries and international development agencies give due concern to intensification and commercialization of smallholder agriculture as a means of achieving poverty reduction; and thus they have reflected it in their official policies (ATA,2016).

In Ethiopia, there were many attempts to integrate the farmers into the market since the 1950s.In the 1950s the emphasis had been on improving productivity and reducing economic dependence on agriculture whereas in the 1960s, it shifted to agro-industrial economy and increment of foreign earnings (CSA,2016). In the 1970's the focus shifted to small holder potential after inefficiencies were observed in mechanized farms. In the 1980's the country adopted the socialist agricultural development strategy following the rise of the Derg regime to power. Since the coming to power of the current government in the 1990s, strong focus has been given to smallholder farming and poverty reduction, and supporting agricultural intensification (Pauw,2017).

According to MoFED, the Ethiopian government has prioritized commercialization of farming as a policy agenda since 2015 and this priority is demonstrated by the central place this issue has gained in the second Poverty Reduction Strategy Paper (PRSP) (Habtewold,2017). The second Poverty Reduction Strategy Paper for Ethiopia (PRSP), known as the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP), is established up on eight pillars; the second pillar intends to achieve growth and thereby improve people's livelihoods and reduce

poverty (Kim,2016). The plan has set out two directions in order to achieve the aforementioned objectives: “commercialization of agriculture, based on supporting the intensification of marketable farm products (both for domestic and export markets, and by both small and large farmers); and promoting much more rapid non-farm private sector growth” (MoFED, 2015).

According to Tura (2016), the Ethiopian government has shown commitment to re-orient smallholder farmers from subsistence to market focused production while also strengthening the development of large-scale and export oriented farming ventures to seize the benefits of large-scale production systems. There are approximately 11.5 million smallholders in Ethiopia (Alemu,2015).

The Ministry of Agriculture and Rural Development (MoARD) has, under its 2010 master plan for enhanced market-oriented production, identified several crops, viz. teff, wheat, barley, lentil, chickpea, haricot beans, cotton, sesame, coffee and spices as priority crops (MoARD, 2010 cited in Samuel and ATA,2015). Accordingly, “the rural development strategy intends to contribute to the transformation of the productive rural sector from a primarily subsistence oriented to a more market-oriented sector, contributing to overall economic growth and poverty reduction” (Alemu,2015)

According to ATA (2016), the final intention of going commercial is not just making a shift from subsistence to market oriented farming but, by doing so, to achieve better welfare outcomes for the smallholders. To the minimum, welfare can be represented by increased consumption of basic and high valued food (livestock products), higher expenditure on education, healthcare, shoes and clothes and durable goods.

2.1.4 Teff production in Ethiopia

Ethiopia is commonly regarded as the only country in the world where teff is a significant crop. In Ethiopia it is particularly popular in the western provinces (Leykun and Jema,2014).

Teff is a resilient crop, and in areas where it can be cultivated most farmers grow it as a security crop. During the Derg regime, from 1974 to 1991, the cultivation of teff was discouraged, as it was considered to be of little value in terms of nutrition. Wheat, sorghum and maize were promoted as alternatives. However, this policy did not put an end to teff cultivation in Ethiopia. Whereas in 1960, approximately 40% of the country’s total area used for cereal cultivation was devoted to teff, by 1980 this figure had grown to 50% (Leykun,2014). And despite various policy

challenges, teff has remained important for most Ethiopians: it is often the only crop that survives and bears grain during difficult periods.

According to Pauw (2017) the Ethiopian germ plasm collection held 3892 teff accessions in 2005. He also refers to the existence of 2255 pure-line accessions. The IBC gene bank holds 4540 teff accessions, although some of these may be copies of the same accession. Since 1970, 32 varieties of teff have been released in Ethiopia. Eighteen of these have been released by Debre Zeit Agricultural Research Centre, with the rest coming from other federal research centers (two from HolettaAgricul-tural Research Centre and one from Melkassa Agricultural Research Centre) and regional research institutes.

2.2. Review of Empirical Evidences

2.2.1 Teff in the Ethiopian economy

Teff is particularly interesting in the context of smallholder commercialization and food security, since it has high value as both cash and a food crop. Many poorer farmers with suitable land grow it almost entirely for sale, using the proceeds to buy cheaper staples; although, as they become more prosperous, they may retain more for their own consumption. It is grown entirely by smallholders, and has been actively marketed for many generations. Until recently its market was almost wholly domestic, within Ethiopia (and formerly Eritrea): however, a promising niche export market is now developing in Europe and America, based on teff's increasing reputation as a “super-grain”, being gluten-free and high in protein and calcium as well as micronutrients such as iron and B vitamins.

Farmers' preference for growing teff is due to production characteristics as well as consumer demand. The crop has a wide altitude range, and its resistance to diverse biotic and abiotic stresses makes it "low-risk" for cultivation (Osmani,2014). It also stores well, since the very small size of the grain makes it resistant to post-harvest damage by insects. Among Ethiopia's 11.3 million small grain farmers, about 46% (5.2 million) grew teff in 2005/06 (CSA, 2016).

This makes teff the second most widely-grown annual crop after maize, which will be cultivated by 6.8 million farmers. During the same year, teff will be grown on over 2.24 million hectares which is a little over one fifth (21%) of the total land planted to grains. The average farmer cultivated teff on 0.43 hectare, on which he or she produced 4.2 quintals , implying an average

yield of 9.8 quintals per hectare. The national production of teff has increased tremendously over the last twenty years, from 11.8 to 21.8 million quintals (a rise of nearly 85%). However, this encouraging performance must be interpreted in the context of high population growth and poor conditions in the base year. Per capita production grew by only 23% (1.9% per year) over the same period, and has never exceeded 30 kg.

It is also a matter of concern that most (64%) of the growth in production is attributable to area expansion, while improved yields contributed only 12%. This indicates the enormous difficulty of achieving broad- based agricultural productivity growth, which is critical to lift the majority out of poverty In Ethiopia, Cereal production and marketing are the means of livelihood for millions of smallholder households and it constitutes the single largest sub-sector in economy.

Cereal accounts for roughly 60% of rural employment, 80% of total cultivated land, more than 40% of typical household's food expenditure, and more than 60% of total caloric intake. The contribution of cereals to national income is also large. According to available estimate, cereal production represents about 30% of gross domestic product (GDP). This calculation follows from the fact that agriculture is 48% of the nation's GDP (World Bank, 2013), and that cereals' contribute to agricultural GDP is 65% (Diao et al, 2012) .Ethiopia,s current cereal production with a citation , according to the latest data from the food and agriculture organization of the united nation (FAO) database as of august 2023,total cereal production in 2023 was approximately 35.2 million metric tons.

According to latest data from world bank as of august 2023 cereal production contributed approximately 12.5% to the country total GDP 45% of Ethiopian total agricultural GDP ,contribution to agricultural GDP of the various cereal crops (such as maize , wheat,teff sorghum, barley) collectively made up about 65% of Ethiopia overall agricultural GDP in 2023

In the country, cereals are also the major stable food crops taking a significant share of area cultivated and volume of production obtained. Out of the total grain crop area, 79.69%(8.7million hectares) of grains cultivation area (CSA, 2020).

cereals also contributed to 85.11% (about 137.1 millon quitals)of the total grain production. The contribution of teff will 18.57% (34.8 million quintals) of the total Meher cereals produced in the same order (CSA, 2016)

Teff found that proximity to all weather road and urban centers positively influenced teff sales and commercialization in the amhara region (Bachewe et al.2018). According to (Gebre et al .2019) reported that transcation costs,market information and collective market in through farmer cooperatives were important determinants in the oromia region. Limited research on effect of digital technologies (mobile platforms) and market infrastructure development of teff value chain integration ahd smallholder commercialization

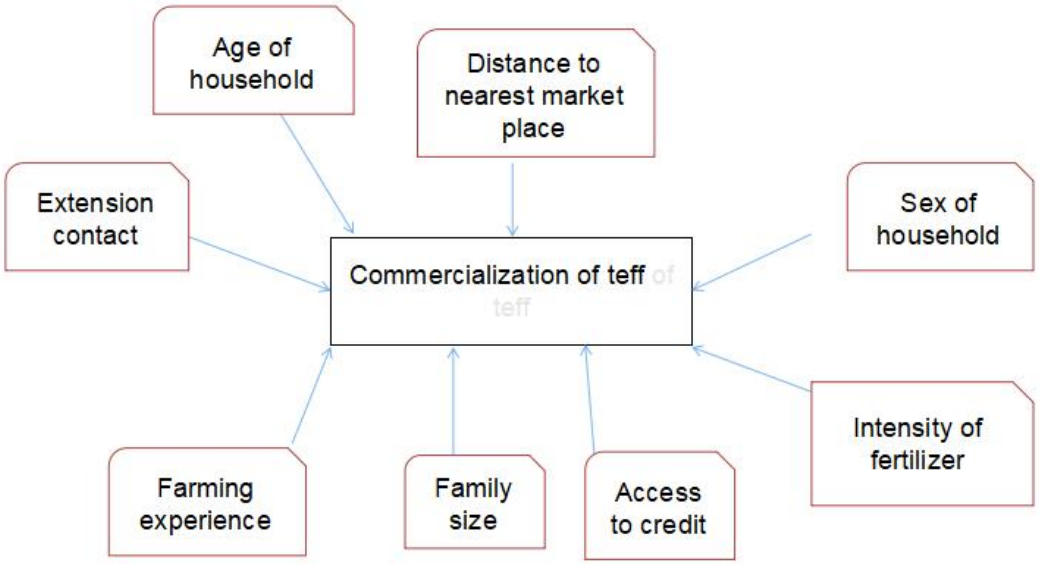

Figure 1 :Conceptual framework of the study

3.METHODOLOGY

3.1 Description Of The Study Area

The study was conducted in kindo koysha. It is one of the woreda in the south Region State of Ethiopia. Kindo koysha is one of the wolaita zones of south regional state. Kindo koysha is bordered on the south by offa and on the south west by kindo didaye, on the north by boloso bombe region, on the West by dawuro zone. Located in the wolaita Zone of the south region about 431 km from Addis Ababa the capital city of the countries,36 km from wolaita sodo town. It characterized by warm climate with an average annual rainfall of about 690-766mm, annual mean temperature of 18.4 degrees centigrade with mean minimum and maximum temperature of 17.4 and 23.3 degrees centigrade respectively. The latitudes and longitudes of 827N and 36 21 E respectively. Its altitude ranges from 1600-2100 meters above sea level.

According to 2020 national census reported a total population for kindo koysha is 118,157 of total population,58,510 were men and 59,647 were women. The majority of the inhabitants practiced Ethiopian Orthodox Christianity, with 34.98% reporting that as their religion, while 10.04% of the populations were Muslim, and 54.98% of the populations were protestant. The majority of the society engaged and their income is mainly depends on agriculture. The crop grow in the area is coffee, wheat, teff , sorghum, maize, chick pea, barely mug bean and from vegetable horticultural crop cabbage, tomato onion, garlic, carrot and orange, lemon, banana, are commonly grown in the area.

3.2. Sampling Techniques and Sample Size

The target population for this study was sample households of kindo koysha district. The simple random sampling technique has applied for gathering necessary information for the study. The reason for selecting simple random sampling method was the fact that the kindo koysha district has above 80% homogeneous population. The woreda have 15 kebeles. From these kebeles,we us in research want to select three kebeles. These were namely, fachena,soreto and oydu chama.

Therefore, fachena has total household of 657, soreto has total household of 481 and oydu chama has total household of 454. In order to take a total sample size relevant to target study apply Yamane formula (1967) of $n= N/1+N (e)^2$. In addition to this, we are going to use proportionate sampling that was enable us in taking samples from each sub strata' which are to be selected from the target population.

N = 657+481+454 where, N = the total number of households

N = 1592 e = the margin of error

e =10 % or 0.1 n = the total sample size of households

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{1592}{1+1592(0.1)} \qquad n = 94$$

The proportionate sampling to obtain how many respondents are selected from each stratum by using formulas: nh =nh(Nh)/N

Where: nh = Sample size for stratum h

Nh= is the numbers of households for stratum h

N= is the total numbers of households and n is the total sample size.

Table 1 Sample size with respect to the sample select kebeles

No	Kebeles	Total number of househoulds	Number of sample household
1	fachena	657	39
2	soreto	481	28
3	Oydu chama	454	27
	total	1592	94

3.3. Types and Source of Data

Both qualitative and quantitative data type were collected from different source. The sources of data are both primary and secondary sources. The major data collection methods were discussions with individuals, focus groups, rapid market appraisal, observation and formal survey.

3.4 Methods of Data Collection

To collect the quantitative and qualitative data, this study was using the following main data collection methods namely questionnaire, interview and organizational document from quantitative data collection techniques and key informant interview from qualitative data collection techniques.

Primary data collection metho*d*: firstly, the whole situations of the marketing system from the producer farmer up to the end consumer assessed through rapid market appraisal. Informal survey was employ on rapid market appraisal (RMA) technique using check list. Secondly, To collect primary data, a questionnaire was prepared.The questionnaires were pre-tested and revised based on the feedback. Finally, focus groups (discussion and interviews) were also hold with input suppler, farmer, traders, processor, consumers and agricultural expertise from both governmental and non-governmental organization. Moreover, checklist prepared to guide focus group discussions. Primary data on teff producer, the existing market situation and linkages, volume of trade, market institutions and facilities, marketing problems, credit facilities, household characteristics (sex, farming experience etc.), role of marketing agents, selling and buying strategies, marketing facilities, and other socio-economic variables were collected by using semi-structure questionnaire. The use of a semi-structured questionnaire allows for a flexible approach to data collection, combining both standardized questions and open-ended inquiries.

Secondary data collection method: Secondary data collect from kebele and district level agriculture and rural development offices, district micro finance office, Ethiopian revenue and customs authority, central statistical agency.

3.5. Methods of Data Analysis

In this study two types of data analysis,namely, descriptive statistics and econometric analysis was used for analyzing the data collected to meet the objectives of the study.

3.5.1. Descriptive analysis

By employing descriptive statistics I can compare differences among categories of sample units with respect to the desired characteristics. In this study, descriptive statistics such as mean, percentages and frequency of occurrence were used along the econometric model, to analyze the collected secondary and primary data. A multiple linear regression model was used to identify

the determinants of level of teff commercialization among the farmers (producer). The most common approach used in measuring the level of teff commercialization at the household level has been using the proportion of sales from the total value of agricultural production (von Braun 1994).

3.5.2. Econometric model

Multiple Linear regression models were used to model relationships between a dependent variable and a set of independent variables.

Regression Functions

The equation of regressions on this study is generally built around two sets of variables, namely dependent variable (teff commercialization) and independent variables (Distance to nearest market place (DISNMK),Sex of the Household Head (SHH), Family size (FAMZ), Access to credit (ACCRD), Extension contact (EXCON), Farm experiences (FMEXP),,Total cultivated Land size(TETCLS) and Intensity of fertilizer (AVFZR).The basic objective of using regression equation on this study is to make the study more effective at describing, understanding and predicting the stated variables.

$$Yi = \beta 0 + \beta 1 DISNMK + \beta 2 SHH + \beta 3 FAMZ + \beta 4 ACCRD + \beta 5 AVFZR + \beta 6\ EXCON + \beta 7\ FMEXP + \beta 8 TETCLS$$

Where:

Yi= is the response or dependent variable- amount of teff.

DISNMK = Distance to nearest market place,

SHH= Sex of the Household Head,

FAMZ = Family size,

ACCRD= Access to credit,

AMFZR= Amount of fertilizer use,

EXCON= Extension contact,

FMEXP= Farm experience.

TETCLS=Teff total cultivated land size.

Coefficient of Multiple Determinations

The multiple coefficient of determination represents the percentage of variability in Y that is explained by the estimated regression equation. We have $0 < t<1$ as in the case of simple regression. The positive square root of t^2 is the multiple correlation coefficients between Y and the set of control variables.

The dependent variable of the model

It is continuous dependent variable and measured in percentage. It represents the actual degree of teff marketed by farm households.

Independent (explanatory) variables

Distance to nearest market place (DISNMK): Distance to the market is a continuous variable measured in kilometers from the household residence to the market centers. The closer the residence of the household to the rural market center that reduces cost of transportation so the more was volume of teff marketed(Tekalegn, 2014). The assumption here is that the closer a household is to the market, the more the household will increase volume of teff marketed. Therefore, this variable was expected to have an inverse relationship with the teff commercialization.

Sex of the Household Head (SHH): this is a dummy variable, which takes a value of one if the household head is male and zero, if female. Literature indicate that female-headed households have less access to improved technologies, land, and extension services as compared to male headed households. is in line with the findings of Leykun and Jemma (2014) and Tekalign (2014) which found that household head is male, he has enough time compared to female headed to get more information about commercialization of teff. This variable is expected to have indeterminate effect on teff commercialization.

Family size (FAMZ): this variable is a continuous variable and refers to the total number of family members (adult equivalent) in the household. The size of economically active family members within a given farming household affects the crop production activities positively. Thus, in this respect family size is expected to have positive impact on commercialization. This result is similar with findings of Efa *et al*. (2016) and Girma (2015) who showed that larger family

size requires larger amounts for consumption.Therefore, family size can affect teff commercialization either positively or negatively.

Access to credit (ACCRD): This is a dummy variable, which takes a value of one if the amount of credit received and utilized by farmers from different organizations like micro finance institution, cooperatives and other institutions operating in the area. According to Demeke (20014), credit makes traditional agriculture more productive through the purchase of farm equipment and other agricultural inputs, and technological developments and zero otherwise Credit can also be used as an instrument for market stability. Rural farmers can build their bargaining power by establishing storage facilities and providing transport system acquired through credit. Therefore, this variable is expected to have a positive relation to the level of teff commercialization

Land size (LS): The total land used for teff production is measured in terms of number of hectares the house hold owns and it is expected to affect the household level of commercialization of teff positively because, a producer who owns a large area of land for teff production than a producer who own less area of land and under the same input utilization condition can produce more(Blarel *et al.,* 1992).

Extension contact (EXCON): this variable is treated as a continuous variable and measured by number of visits made by the extension agents to sample households. Extension visits were help to reinforce the message and enhance the accuracy of implementation of the technology packages (Demeke,2014). More frequent DA visits, using different extension teaching methods like attending demonstrations, field day, and participation on on-farm trials can help the farmers to adopt a new technology. The finding of Tura (2016) identified that extension visit was negatively related to pepper market entry decision and marketed pepper volume. However, all farmers may not have equal access to extension services. If the farmers get better extension services, they are expected to adopt improved teff production technologies than others.

Therefore contact with extension agents was positive direct relation with the level of commercialization.

Farming experiences (FMEXP): it is a continuous variable measured in number of years stayed in teff production and marketing. Household with better experience in teff production and marketing was expected to produce more amounts of teff and supply to the market than those

with only less experience and, as a result, it is expected to supply more amounts to market(Berhanu and Moti, 2010). Therefore, experience in teff production will be expected to have a positive relation with the level of commercialization.

Amount of fertilizer (AMFZR): it is a continuous variable and measured in Kilogram. It refers the availability of fertilizer to teff producers. According to the finding of Tekalign(2016) intensity of fertilizer is not included his finding but If fertilizer is available in the right amount and time it will be increase teff production. So directly the volume of marketed was increased. Hence, this variable had expected positive relation with production of teff (Dickinson *et al.*1990).

Table 2 hypothesis the relation between independent variables and dependent variable

Variable	Type	measurement	Expectation
Amount teff commercialization(AMTC)	Continuous	percentage	
Distance to nearest market place(DISNM)	Continuous	Km	-ve
Sex of the Household Head(SHH)	Dummy	0=F,1=M	+ve/-ve
Family size(FAMZ)	Continuous	Number	-ve
Access to credit (ACCRD)	Dummy	0=own,1=non own	+ve
Amount of fertilizer(AMFZR)	Continuous	Quntal	+ve
Extension contact(EXCON)	Continuous	Number of vists	+ve
Farming experiences(FMEXP)	Continuous	years	+ve
Teff total cultivated land size(TETCLS)	Continuous	Hectares	+ve

4 .RESULTS AND DISCUSSIONS

4.1 Descriptive analysis

In this chapter the main findings of the study are presented. Discussion results of the commercialization of teff, tables, percentages,are used to present the distribution of farmers. Descriptive analysis results such as mean and standard deviation are also included.

Table 3 Determinants that affect the commercialization of teff continuous variable and dummy variable.

Variable	Obs	Mean	Std. Dev.	Min	Max
Continuous					
Distance to nearest market	94	14.79787	3.440992	5	20
Family size	94	5.542553	1.493102	2	8
Amount of fertilizer	94	3.542553	1.441881	1	6
Extension contact	94	5.5	1.714894	2	10
Farming experience	94	5.276596	1.642214	2	9
Land size	94	0.7703191	0.5700395	0.25	3.15
Amount Teff comm.	94	70.20606	11.54208	45.5	95

Variables		Frequency	Percent	Cumulative percent
Sex of hh head	female	31	32.98	32.98
	male	63	67.02	100
Access to credit	no	65	69.15	69.15
	yes	29	30.85	100

Source: survey result 2024\2025From the result of stata 64 regression shows, from 94 respondent

As I observed from the survey of 2024\2025 Out of the total respondents there are 32.98 percent of female who can commercial teff and, 67.02% were male who can commercial the teff and 69.15 percent is the farmers who have no access to credit and 30.85 percent is the farmers who have access to credit in the studied area.

Distance to Nearest Market: The average distance to the nearest market is approximately 14.79787 kilometers, a standard deviation of about 3.440992 kilometers with a minimum of 5 kilometers and a maximum of 20 kilometers. , indicating its variability among households. This distance reflects the accessibility of markets for farmers, which is critical for commercialization. Shorter distances typically benefit farmers by allowing them quicker access to sell their produce, reducing transportation costs, and ensuring fresher market offerings. In contrast, farmers who reside farther from markets may face logistical challenges that can hinder their ability to commercially sell teff, as longer journeys may incur additional costs and time delays. The engagement and profitability in commercialization can therefore be significantly impacted by how far farmers must travel to reach market opportunities.

Family Size: With an average family size of 5.54 members (standard deviation of 1.49) with a minimum of 2 and a maximum of 8. , this variable plays a crucial role in determining agricultural dynamics. Larger family sizes often translate to more labor available for farming activities, positively impacting production capacity. Increased labor availability can enhance productivity,

leading to higher output levels, which can then be sold in the market. However, larger families also mean greater consumption needs, potentially limiting the amount of teff available for sale. Therefore, while larger family units may contribute positively to agricultural activities, they may also present challenges for commercialization if the produce is primarily consumed by the household.

Amount of Fertilizer: The average use of fertilizer by farmers is recorded at 3.542553 (on a scale with a standard deviation of 1.441881) with a minimum of 1 and a maximum of 6. , indicating a range of practices among the households. Fertilizer is a critical input in agricultural production as it can significantly enhance soil fertility and increase crop yields. The effective application of fertilizers can lead to improved teff production, making it more viable for market sales. A higher adoption of fertilizers potentially allows farmers to produce surplus crops that can be marketed, thus enhancing commercialization prospects.

Extension Contact: The mean score for extension contact is 5.50, suggesting a moderate level of interaction between farmers and agricultural extension services, with a standard deviation of 1.71 a minimum of 2 and a maximum of 10 Agricultural extension services are vital for providing farmers with essential information regarding best practices, pest management, and market dynamics. More frequent contact with extension agents can empower farmers with the knowledge and skills necessary for maximizing production and effectively marketing their products. Consequently, an increase in extension services can correlate with higher levels of teff commercialization, as it aids farmers in overcoming barriers to market access and improving their operational efficiencies.

Farming Experience: The average farming experience among respondents is approximately 5.28 years, a standard deviation of 1.64 with a minimum of 2 and a maximum of 9. This experience level ties closely with farmers' abilities to enhance productivity and efficiency. More experienced farmers typically have a better understanding of market demands, are adept at managing their farms, and exhibit resilience in the face of challenges such as climate variability. This experience plays a crucial role in determining how effectively farmers can engage in commercial activities. Therefore, seasoned farmers may be more inclined to seize market opportunities and adopt innovative practices that contribute to increased commercialization.

Land Size: The average land size cultivated for teff is noted at 0.77 hectares (standard deviation of 0.57), with a minimum of 0.25 hectares and a maximum of 3.15 hectares. Land size significantly influences agricultural productivity; larger plots can yield more substantial crop volumes, which can enhance market participation. The capacity to cultivate a larger area may allow farmers not only to produce enough for household consumption but also to sell excess produce, thereby boosting commercialization. However, limitations on land size can restrict farmers' ability to operate at scale, posing challenges for achieving sufficient market supply.

Teff Commercialization: The average level of teff commercialization is recorded at 70.21 (standard deviation of 11.54),with a minimum of 45.5 and a maximum of 95. showcasing the extent to which farmers are able to sell their produce in the market. This variable serves as a key indicator of market engagement, reflecting the cumulative effects of the preceding variables. The extent of commercialization is intertwined with factors such as market access, resource use, and agricultural practices. A high level of commercialization suggests that farmers are successfully navigating market conditions and optimizing production for sale, while lower levels would indicate barriers or challenges in reaching markets.

Several factors were expected to influence the commercialization of teff through farmers and 8 variables were hypothesized to affect the commercialization of teff of respondents. Out of these explanatory variables 2 explanatory variables were removed by their highly insignificant nature shown in the model. The rest 6 explanatory variables selected and entered the regression model for analysis by testing their relative contribution to the regression mode:

4.2 Econometric analysis

Econometric analysis was also employed to identify the most important factors influencing the commercialization of teff in the study district.

The probable variables expected to influence commercialization of teff which were included in the estimate of, distance to nearest market place ,sex of the household head, family size , access to credit ,intensity of fertilizer, extension contact, farm experiences and teff total cultivated land size. Multiple linear regression models were employed to estimate commercialization of teff factors. For the parameter estimates to be efficient, assumptions of Classical Linear Regression

(CLR) model should hold true. Hence, multicollinearity detection test was performed using appropriate test statistics for each as follows.

1 Multicollinearity problem

Before interpreted the result we should have to check whether the variable multicollinearity or not.

As we are producing multiple correlations and regression model we need to be aware of certain features of the multicollinearity. That means, when two or more independent predictors are highly correlated with each other this is known as multicollinearity. As a general rule of thumb, predictor variables can be correlated with each other as much as 0.8 before there is cause for concern about multicollinearity (Perry R. et al., 2004: 323). But, here a pair wise correlation is below 80%, which indicates the absence of series problem of multicollinearity in the regression equation as indicated in the appendix c correlation matrix. And also in order to identify the multicollinearity problem of the quantitative variables by using VIF (variance inflation factor). As general rule of thumb, the VIF of each quantitative variable less than 10 indicates the absence of series problem of multicollinearity in the regression equation as in indicated the appendix b table.

2. **Goodness of Fit**

One of the techniques used to assess the goodness of fit of a model is R square and F test. The test is used to accept or reject the alternative hypothesis "the model adequately describes the data". If the significance level of the test is less than 0.05, it indicates that the alternative hypothesis is rejected and the null hypothesis which states the inadequacy of the model to describe the data is accepted. In the case of this study, the significance level of the test was found to be less than 0.05.Thus, the alternative hypothesis which states that the model is adequate to describe the data was accepted. The R square also greater than 50%.

Table 4.Determinants of teff commercialization(multiple linear regression estimates)

	Coef.	Std. Err.	t	P –value
Distance to nearest market	-0.937684	0.3836612	-0.24	0.0808*
Sex of the house hold head	0.7749768	2.612167	0.30	0.0767**

Family size	-0.6608383	0.8655524	-0.76	0.0447**
Access to credit	4.156746	2.772485	1.50	0.138
Amount of fertilizer	0.6125476	0.9202766	0.67	0.00507*
Extension contact	0.6550327	0.7318163	0.90	0.373
Farming experience	1.294391	0.7593317	1.70	0.0092*
Land size	1.199139	2.139912	0.56	0.00577*

Source: survey result 2024\2025 *significance at 5% and **significance at 10%

Number of obs = 94 Prob > F = 0.0000

R-squared = 0.755 Adj R-squared = 0.7318

Distance to nearest market place: It was hypothesized that distance to nearest market negatively related to commercialization of teff. Truly, the stata 64 indicated that there is negatively significant relationship between distance to nearest market and commercialization of teff at *P>|t|0.1* significant level. As a result negatively relationship and significant at 10% probability level indicated on Table.....is that as Distance to nearest market increased by one unit ,commercialization of teff decreased by 0.937684 because due to distance there are some constraints ,such as transportation problem.This finding is in line with Geoffrey (2014) who found that a greatest distance to the market increases transaction costs and marketing costs and this hampers the extent of teff market commercialization.

Family Size There were family members in the 94 farmer households with the maximum family size of 9 persons. It was hypothesized that family size may have negative relationship with commercialization of teff. That means, as family size increase, consumption also increases that may influence commercialization of teff.. The study also clarifies that one unit family size increase, commercialization of teff decreased by 0.6608383 units because when family size increase, consumption of family also increase.This result is similar with findings of Efa *et al.*(2016) and Girma (2015) who showed that the larger family size consumes more output of tef produced, have the lower marketed surplus and less is available for sales.

Sex of the Household Head:sex of house hold head has significant relationship with commercialization of teff (at p> |t| 0.1 level) and positively influenced the commercialization of teff. As members'household heads is male commercialization of teff increase by 0.7749768 units

because male is more performs more at field level and manage more than the female.This result is in line with the findings of Leykun and Jemma (2014) and Tekalign (2014) which found that male-headed households have a better access to information who would provide them with better ability to manage their farms and produce more output for market as compared to female headed households

Amount of fertilizer: There was significant positively relationship between fertilizer use and the commercialization of teff at P>|t| 0.05 significant level. From the result of stata 64 regression when farmer use one unit of fertilizer, the commercialization of teff increased by 0.6125476 units. Because agricultural inputs specifically DAP (Di-Ammonia Phosphate) and Urea chemical fertilizers are known for their response in increasing productivity to this area where farming is practiced for several years and severe soil erosion has been occurring due to poor agricultural practices.This result aligns with the findings of (Hailu, T., & Mulugeta, A. (2021)) who demonstrated that higher fertilizer application significantly enhances the commercialization of the teff market.

Farming experiences : There is another important factor for the success of teff commercialization in farming business. Stata64, the multiple linear regression shows that there is significant postive relationship between Farming experience and commercialization of teff at p>|t|0.05.Farming experience has postive relationship with significant at 5% probability level and farming experience increased by one unit, commercialization of teff increased by 1.294391 units.This finds are consistence to those of Moono, L. (2015) Argued that, small holder farmers with high farming experiences were more involved in selling their produce to market.

Teff total cultivated land size : Land is one of the major factors for the production of teff commercialization. The size of land the stata 64 computed p>|t|0.05 shows that there was positive significant relationship between teff total cultivated land size and commercialization of teff. The positive and significant relation between the teff total cultivated land size indicates that a one unit increased, commercialization of teff also increased by 1.199139 units. This result is consistent with the findings of Efa *et al*. (2016) and Leykun and Jemma (2014) who reported that land size cultivated has a positive significant outcome on being transition and commercial farmer and the larger area allocated to production increases the quantity of produce available for sale.

4.3 Analyzing challenges and opportunities of teff commercialization

Different constraints of teff production and marketing were identified based on the data obtained from key informant interview. So, the following factors are the bottle necks of teff production and marketing. These are: price fluctuation (due to seasonality teff products) , lack of adequate processing systems, farmers not fully engaged in teff production (lack of teff based livelihood system), shortage of input, disease, shortage of land, awareness of farmers about teff production (processing, management practice, means of income etc) and lack of market information.

Additionally identifying challenges, and available opportunities,Illustrates the problem for decision makers and is suggested as useful information for policy makers in deciding where to intervene. Using simple descriptive analysis this study obtained different challenges and opportunities of teff commercialization in the area of study.

Table 5 . Challenges/Constraints and Opportunities at commercialization of teff

Challenges and opportunitites	Percentage	Frequency_94
Shortage of input	74.5	70
Shortage of suitable irrigation	50	47
High cost of fertilizer	60.6	57
Limitation of land	67	63
Shortage of improved variety	47.8	45
Shortage of teff drying facility	40.4	38
Low price for the products,	71	67
Price fluctuation	79.7	75
Limited access to market information	89	84
Inadequate transportation access	87.3	82

Shortage of proper storage with adequate facilities	82.18	78
Weak linkage between research, extension services and producers	74.46	70
Limited communication, infrastructure and logistics	94.68	89
Poor initiative for utilization of new agricultural technologies	53.19	50
Poor harvest and post-harvest practices	63.8	60
opportunities (result of survey		
Existence of suitable soil type and topography	77.65	73
Availability of local seedlings	67.02	63
Regular professionals follow up	84.04	79
farmers having better land holding and irrigable areas with potential water	50	47
high demand for teff available	63.82	60

Source: Household survey data, 2025

5 .CONCLUSIONS AND RECOMMENDTIONS

5.1 Conclusions

Cereal crops do have prominent roles in the agricultural sector of the national economy and are supposed to improve the commercialization of teff there by increasing the livelihood of small households in the rural area. They are also organized to render economic benefits such as economies of scale. The objectives of the study were to identify the level of commercialization of Teff and to analysis the major determinants of commercialization of teff in the study area.

The stata 64 showed that there was significant mean difference in the commercialization of teff and determinants or variables includes:- distance to nearest market, sex of the household head , family size , use of fertilizer, farming experiences and teff total cultivated land size.

The multiple linear regression model result revealed that among 8 explanatory variables included in the model, six explanatory variables were found to be significant between 0.00 and 0.09 probability level.

More specifically, these variables include:- sex of the household head, use of fertilizer, farming experiences and teff total cultivated land size were found to be positively significantly affecting the commercialization of teff. On the other hand, distance to nearest market, and family size have negative relationship with commercialization of teff. Therefore the level of commercialization, however, differs widely across sampled households, which implies a correspondingly wide variation in the potential and constraints for further commercialization. Therefore, any agricultural commercialization strategy should be customized for different groups of farmers.

Challenges identified of the commercialization of teff.: price fluctuation (due to seasonality teff products) , lack of adequate processing systems, farmers not fully engaged in teff production (lack of teff based livelihood system), shortage of input, shortage of land, awareness of farmers about teff production (processing, management practice, means of income etc) and lack of market information.

5.2 Recommendations

In this study, major problems that affect the level of commercialization of teff were sex of the household head, use of fertilizer, farming experiences, distance to nearest market, family size and total cultivated land size of teff were found to be significantly affecting the commercialization of teff among the others.

Distance to nearest market place: From the econometric result of stata 64 indicated above, as the distance of the market place increases, the level of commercialization of teff decreases. So it is highly recommended that the government or other concerned body should give attention for this by for instance building market places near to their residence, establishing farmer cooperatives etc.

Sex of house hold head: As can be observed from the data obtained from the econometric analysis, sex has direct effect on commercialization of teff. When the household head is male the commercialization of teff is at better condition than females. So it is important to improve the potential of women by giving some incentives such as facilitating access to credit.

Family Size: When the family size is large the amount of teff to be sold would decrease highly. Because more would be used for consumption purpose, since they produce at subsistence level. So to improve this, the possible option would be lowering family size using family planning etc.

Amount of fertilizer: As one can see from the above analysis, the amount of fertilizer used in the production of teff is directly proportional to the amount of teff produced. The more fertilizer used, the more higher the yield will be. The sufficient supply of fertilizer at reduced cost to farmers will enable them to produce more and commercialize their produce. Therefore, attention should be given to the proper allocation of farm inputs at an appropriate time and reasonable price**.**

Farming experiences: Ploughing of farm for successive years with the variety crop would increase its productivity. As we have observed from the econometric analysis, the production of teff in successive manner has a increasing trend, so has increased the level of teff commercialization . So, to improve this, farmers should get training and consultation from extension agents about alternative methods of farming such as cropping patterns, use of fertilizer, high yielding varieties etc.

Land size: Land size is the major constraint for commercialization of teff. As the result obtained from the statistical analysis depicts that as the land size is high the yield is also high and there would be marketable surplus. Nevertheless, farmers can increase their commercialization of teff by using modern technologies and farm inputs. Emphasis should be given to intensive farming system. Government policies should also be formulated in a manner that improve the living standard of small scale farmer

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7.APPENDEXES

Wolikete Univesity College of Agriculture And Natural Resource

Department Of Agricultural Economics

Name :mesaye beyene ID :NSR/1692/14

Questions prepared for producers

I. General Information

1. Name of Respondent: _____

2. Zone: _____ Woreda _____ Kebele _____

3. Sex of the respondent (√): 1☐ Male ☐ Female

Household and Resource Data.

3.Family size: _____(Number of family members)

4. Total cultivated land size:…… hactrs.

Amount of fertilizer

5. Have you ever used fertilizer for the production of teff? (√) 1. [ ] Yes 2. [ ] No

6. If your answer for Q.1 is No, what was the main reason behind?.....

7. If your answer for Q.1 is yes, how much did you used in the teff production process last year? _____quintal.

Farming experience

8. How long have you practiced production of teff products?_____ Years

Access to Credit

9.Do you have an access to credit? (√) 1. [ ] Yes 2. [ ] No

10.If your answer for Q.1 is Yes, how much do you get?_____birr

11.If your answer for Q.1 is No. what are reasons?

1. [ ] Limited supply of credit 2. [ ] Limited access to transport

3. [ ] Huge bureaucracy 4. [ ] Others (specify)

Extension contact

12. Have you ever get extension contact on Teff production practices? (√)

1. [ ] Yes 2. [ ] No

13. If your answer for Q.1 is No, why? (√) (Multiple responses is possible)

1. [ ] No service provider nearby 2. [ ] Availability of contact farmers

3. [ ] Do not have time to get the service 4. [ ] Others (specify)

14. If your answer for Q.1 is Yes, How frequent were you visited by extension agents last year? _____visits

Distance to nearest market place and road

15. How long distance from nearest market place? _____Km

Quantity of teff produced and marketed

16.Have you engaged in the production of teff last year? 1, yes 2, no

17.If yes, how much? _____quintal.

18.How much quintal of the produced amount is sold in the market? _____percentage.

19.If no, why?_____

APPENDEX B

Source	SS	df	MS	Number of obs	=	94
Model	935.250081	8	116.90626	F(8, 85)	=	32.74
Residual	11454.1722	85	134.754967	Prob > F	=	0.0000
				R-squared	=	0.755
Total	12389.4222	93	133.219594	Adj R-squared	=	0.7318
				Root MSE	=	11.608

commercial~n	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
distance	-0.937684	0.3836612	-0.24	0.0808	-.6690528	.8565896
sex	0.7749768	2.612167	0.30	0.0767	-5.968664	4.41871
family	-0.6608384	0.8655524	-0.76	0.0447	-1.060112	2.381788
credit	4.156746	2.772485	1.50	0.138	-1.355697	9.669189
fertilizer	0.6125475	0.9202766	0.67	0.00507	-1.217209	2.442304
extension	0.6550327	0.7318163	0.90	0.373	-2.11008	.8000142
experience	1.294391	0.7593317	1.70	0.0092	-.2153642	2.804146
land	1.199139	2.139912	0.56	0.00577	-3.055579	5.453858
_cons	58.07176	8.470729	6.86	0.000	41.22968	74.91384

APPENDIX C vif

Variable	VIF	1/VIF
fertilizer	1.22	0.823018
distance	1.20	0.831379

family	1.15 0.867554
credit	1.14 0.874224
extension	1.09 0.919990
experience	1.07 0.931836
sex	1.05 0.950536
land	1.03 0.973778
Mean VIF	1.12

APPENDIX C correlation matrix

	distance	sex	family	credit	fertil~r	extens~n	experi~e	land	commer~n
distance	1.0000								
sex	0.0445	1.0000							
family	0.2853	-0.0180	1.0000						
credit	-0.1894	0.0276	-0.0114	1.0000					
fertilizer	0.1155	0.2180	-0.1532	0.1649	1.0000				
extension	-0.0756	0.0597	0.0021	0.1283	0.2240	1.0000			
experience	0.1413	-0.0059	0.1004	-0.1977	0.0222	0.0687	1.0000		
land	-0.0337	-0.0124	-0.0094	0.1329	0.0840	0.0705	-0.0594	1.0000	
commercial~n	0.0595	-0.0184	0.0981	0.1317	0.0746	-0.0457	0.1553	0.0687	1.0000