Farm Productivity and Value Chain Analysis of Coffee
(Study in Nejo District of West Wollega, Wollega Zone, Oromia Region of Ethiopia)

Hika Wana¹ & Anteneh Temesgen²

¹Hika Wana & ²Anteneh Temesgen
Department of Agricultural Economics, Wollega university
Wollega Zone, Oromia Region, Ethiopia

Abstract: The contribution of wollega coffee to the total country’s export is high. Nejo is the very well-known district having large hectares of land for coffee production. However, benefit of coffee production in Nejo woreda tend to decline mainly due to low level of productivity, poor product handling practices, high input prices and limited access to market information. Therefore, coffee had to face several challenges in production and marketing. Hence, the study was designed to identify factors affecting coffee productivity; describe the value additions of the different actors in the coffee value chain; examine marketing costs and margins along the coffee value chains and identify constraints in the coffee value chains. The study was based on data generated from 123 coffee producers, 18 collectors, 7 wholesaler, and 2 exporters. Descriptive statistics and margin analysis were employed in the process of examining and describing farm household characteristics, coffee value chains actors, their marketing margin and role of marketing intermediaries and their characteristics. Multiple linear regression model with Cobb-Douglas production function was used to identify and estimate the effects of socioeconomic factors on coffee productivity. Value chain analysis showed that the major actors in coffee value chains in the study area are farmers, collectors, processors and exporters. With regard to gross margin the study also showed that the share of producers is 58.59% of the export price at f.o.b. price. The gross marketing margin of collectors, Wholesaler and exporters were 7%, 10.5% and 18.2% respectively. Results obtained from the model indicated that among the explanatory variables, farm size, education level of household, termite incidence and total livestock unit were found to be statistically significant factors affecting coffee productivity. Among the significant variables farm size and level of education were found to be positively related to coffee productivity. Therefore, government authorities and other concerned bodies should take into consideration the above mentioned socioeconomic and institutional factors to improve the productivity of coffee in the study area.

Keywords: Coffee, value chain, value chain actors, productivity, gross margin.
1. INTRODUCTION

1.1. Background

Coffee is the world’s most widely traded tropical product, produced in over 50 developing countries. It makes an important contribution to socio-economic development and poverty alleviation and is of exceptional importance to exporting countries, some of which rely on coffee for over half their export earnings. For the 25 million smallholder farmers and their families who produce 80% of world production, coffee is an important source of cash income and responsible for significant employment (ICO, 2010).

It is also one of the most important commodities in the international agricultural trade, representing a significant source of income to several coffee producing countries including Ethiopia. Coffee is exported to more than 165 countries and therefore generated US$15.2 billion for producing countries in 2007/08. It contributed to 52% of Burundi’s, 23% Honduran’s, 17%, Uganda’s and 17% of Nicaragua’s earnings from export. World coffee consumption has been increasing at a steady annual growth rate of 2.5% per annum, from 104.6 million bags in 2000 to 128 million bags in 2008. Consumption is concentrated in the mature markets of Western Europe and North America, but is now growing faster in emerging markets, such as those in Eastern Europe and Asia, and in the coffee producing countries themselves (ICO, 2009).

The amount of Cash crop production was decreased at increasing rate from the year of 2005/06 (1998 E.C) to 2008/09 (2001 E.C) and it starts increasing up to 2014/15(2007 E.C) in SNNP, Oromia and Amhara regions. In general, the cash crop production of Ethiopia is mainly comes from SNNP and Oromia region. Most of the Cash crops growing in Ethiopia are namely, coffee, sesame, nuege chat, sugarcane & Hops. Wollega coffee is produced in western Ethiopia found in Oromia Region. The medium-to-bold bean is mainly known for its fruity taste. It has a greenish-brownish color, with good acidity and body. Many roasters put this flavor in their blends, though it can also be sold as an original gourmet or special-origin flavor. In Wollega, coffee is produced in highly diversified with boreal forest especially it’s not uncommon in Qellem and West Wollega were almost all production is forest and semi forest coffee. In west wollega production of coffee and sesame production and gold mining is the common activities that surrounding communities are based for both consumption and income in their daily life.

1.2. Statement of the Problem

The importance of coffee in the world economy is clear because it is one of the most valuable primary products in world trade. Its cultivation, processing, trading, transportation and marketing provide employment for millions of people worldwide. Coffee is Ethiopia’s number one source of export revenue. According to CSA (2016), From 2014/15 to 2015/16, total production of coffee has increased from 3.92 million quintals to 4.2 million quintals and productivity has improved only by 2% at national level. The same source indicated that in Oromia region, the total area covered by coffee in the production year of 2015/16, were 381,514.61 ha of land at national level. The total production of coffee in the same year at Oromia region was 2.86 million qt. In the same year, the total productivity of the crop at Regional level was 7.51 qt per ha. This indicates that oromia Region has always plays a great role in coffee production than other region in Ethiopia. Nejo district, which is one of the districts of West Wollega zone, is known by coffee production. Out of the total 72601.7 hectares of land in the district, land used for cultivation occupies 40 percent of total land in hectares. As coffee is concerned for this study, it occupies 22.3% percent of the total cultivable land of the district. Farmers in the district produce coffee and supply it to Nejo town market wholesaler, broker and retailer and to other domestic consumers. In 2016/17 production year, the total production and productivity of Coffee in the district was 116,245 qt and 5.2 qt per ha respectively.

The main reasons for the low yield are poor management practices, limited supply of improved coffee cultivars for each of agro-ecologies of the country, disease problems, weak extension system, low level of adoption of improved technologies, and lack of incentives to produce more, owing to the low and fluctuating coffee price. In addition to the poor yield, coffee price are very volatile. Price volatility makes the life of coffee farmers difficult because they never know in advance what the international price will be when the harvest comes, and so cannot plan their production accordingly. As coffee yields are vulnerable...
to temperature as well as disease, the volume of production can vary widely from one year to the other (Slob, 2006). The smallholder producers’ market access is currently limited due to low level of productivity, poor product quality (attributed to poor harvesting, processing, and handling practices), weak bargaining power and market barriers. Accordingly, a thorough assessment of value chain is an essential prerequisite to find out the likely reasons that limit the overall performance of production and marketing of coffee and come up with specific workable solutions. It is for this very critical reason that the study was designed and conducted in the District. This shows as production and productivity of the crop remain in a good condition in Nejo. Hence, this study tries to analyze productivity and value chain of coffee production in one of the districts of West Wollega zone, known for the production of this crop, Nejo.

1.3. Research Questions
The central question that this research addressed is, how is the coffee value chain in the study area organized? Within the framework of this central question the study addressed the following specific research questions:
1) What are the factors that affect the productivity of coffee?
2) Which actors are involved in the different value chains?
3) What are the marketing costs and margins along coffee market chain?
4) What criteria need to be full-filled to improve the returns from coffee supply in international markets?
5) Who benefited more from coffee value chain?

1.4. Objectives of the study
The general objective of the study is to assess factors affecting farm productivity and value chain analysis of coffee in Nejo District and explore the better way through which linkages among different coffee value chain actors will be ensured so that it offers better future for those who depend on coffee for their livelihood following the supply chain. The specific objectives of the study are:
- To identify factors that affect the productivity of coffee in the study area;
- To describe the value additions of the different actors in the coffee value chain;
- To examine marketing costs and margins along the coffee value chains; and
- To identify constraints in the coffee value chains.

1.5. Significance of the Study
This study is undertaken in coffee supply potential area and investigates the contribution by each actor in coffee value addition along the supply chain that would be a foremost asset to design and implement appropriate coffee value chain management in the study area. The study also provides important information to government and donors who are interested to help coffee farmers in the study area to meet standards and even harness opportunities to add value to their products. Furthermore, this study attempts to fill the gap in literature by providing empirical evidence to the existing body of knowledge in coffee value chain and the potential productivity improvement in the study area for the smallholder coffee producers.

1.6. Scope and Limitations of the Study
The study focused on identifying factors affecting coffee productivity, major actors in coffee value chain and their relationship and evaluating the marketing margin of participants in Nejo District. Since the study was conducted in limited sampled kebeles it could not guarantee generalization for the region in the general, and in the zone in particular. However, recommendations could be applicable for identical locations having comparable agroclimatic and socio-economic features. In addition to this, accessibility of secondary data for coffee prices in different foreign markets is not as easy as local markets prices. Hence, the study did not include consumers and importers. Accordingly, prices at f.o.b. were used as end buyers’ price in calculating share of actors.
Additionally the data and information obtained, and used in this study was expected to have some errors. Therefore, its scope is limited in terms of coverage and depth owing to financial and time resources available and due to the nature of research complexity. Nevertheless, despite some expected limitations of the study, the results of the study can be used to develop formal research system to the area with beginning from the farmers’ knowledge dynamics and can also be used as a reference for other similar areas.

1.7. Organization of the research

Firstly an overview of coffee production, productivity and marketing were given. A review of the selected conceptual and methodological frameworks is dealt in chapter two. Chapter three introduces background information about the study area and verifies the methods of data collection and data analyses, followed by chapter four that presents the results of the study. Finally, chapter five offers a brief summary of the findings, conclusion and recommendations.

2. METHODOLOGY

2.1. Description of the Study Area

The study was conducted in Nejo District, West Wollega zone of Oromia National Regional State. The capital town of the District, Nejo, is found at about 498 km west of Addis Ababa.

Nejo is one of the 180 Districts in the oromia region of Ethiopia, Part of west wollega zone bordered on the southeast by boji, on the west by Jarso, on the northwest by newly emerged Lata sibu district and on the north and east by the benishangul-gumuz region. The administrative center is Nejo. Based on figures published by the Central Statistical Agency (2007), this District has an estimated total population of 148,891 from which 75,785 were males and 73,106 were females; 17.41% of its population are urban dwellers which is greater than the zone Average of 10.9%. whereas 82.59% are rural dwellers (Nejo WARDO, 2017). Farmers in the study area not give due and equal priority to food and cash earnings, which are manifested in land allocation pattern and household labor utilization. They give due attention for cash crops. Land allocation for different crops mostly follows market situation. Most part of farming land is meant for production of coffee and Maize. These are cash crops that fetch high amount of income.

Figure 1. Map of the study area
2.2. Methods of Data Collection

The data for this study was collected both from primary and secondary sources. Primary data included the whole situations of coffee marketing and production system from the producing farmer up to the exporters. It was through questionnaire-administered survey as well as participatory rural appraisal (PRA) data collection tools like, group discussions and key informant interview were utilized for data collection process. Enumerators, who have acquaintance with the local language and the culture of the local people were selected, trained and employed for data collection.

The main data types collected include production, buying and selling, pricing, input delivery and distribution, market participation, problem and opportunities, etc characteristics of the market. Besides, Secondary data were collected from Ethiopian Commodity Exchange Authority, Nejo District Agriculture and Rural Development Office, Nejo District Economic and Finance Offices, and different and relevant published and unpublished reports, bulletins and websites were consulted to generate relevant secondary data. Under the close follow up of the researcher, data collection process from producer and traders from the District were undertaken by using trained enumerators. The remaining primary data (like exporters' data) and secondary data were collected by the researcher.

2.3. Sample Size and Methods of Sampling

An important decision that has to be taken while adopting a sampling technique is about the size of the sample. Appropriate sample size depends on various factors relating to the subject under investigation like the time aspect, the cost aspect, the degree of accuracy desire, etc (Rangaswamy, 1995; Gupta, 2002). As sample size increases, the sampling distribution of the mean decreases in variability (the standard error decreases) and become more like the normal distribution in shape, even where the population distribution is not normal.

A sampling procedure was applied to draw the required number of sample units for the study. First, Nejo District was purposively selected as it is a representative of potential area for coffee production in the zone. It is the major supplier of west Wollega coffee. Secondly, three kebeles were selected randomly to establish the sampling frame to sample the respondents. Coffee producers in the selected Kebeles were used as the sampling frame and the sampling units were the household heads. Finally, total sample sizes of 123 household heads were selected randomly from randomly selected kebeles. List of farmers were identified in each kebeles using Probability Proportional to Size (PPS) sampling technique against the total number of coffee producers in the kebeles, which constituted the sampling frame. Traders were chosen at random from the group of Wholesaler and collectors found in the study area. Accordingly, 18 collectors and 7 wholesalers were interviewed. They were chosen depending on their population size.

2.4. Methods of Data Analysis

Two types of data analysis, namely descriptive statistics and econometric analysis were used for analyzing the data obtained from farmers and other market participants.

2.4.1. Descriptive statistics analysis

This method of data analysis refers to the use of ratios, percentages, means, variances and standard deviations and it was employed in the process of examining and describing marketing functions, farm household characteristics, role of intermediaries, market and traders’ characteristics.

Marketing margin

In agricultural marketing literature, no other term is more misunderstood than the concept of a marketing margin. A big marketing margin may, in fact, result in little or no profit or even a loss for the seller involved. That depends on the marketing costs as well as on the selling and buying price. A marketing margin measures the share of the final selling price that is captured by a particular agent in the marketing chain. It includes costs and typically, though not necessarily, some additional net income (Mendoza, 1995).
Computing the Total Gross Marketing Margin (TGMM) is always related to the final price or the price paid by the end consumer and is expressed as a percentage:

\[ TGMM = \frac{\text{End buyer price} - \text{First seller price}}{\text{End buyer price}} \times 100 \]  

(1)

The gross (profit) margin is the difference between sales revenue and cost price, expressed as percentage of the cost price or as discounted percentage of the sales price. The net (profit) margin is the same, excluding Value Added Tax (GTZ, 2007). It is useful to introduce here the idea of producer participation, farmer’s portion or producer’s gross margin (GMM) which is the portion of the price paid by the end consumer that belongs to the farmer as a producer. The producer’s margin or share in the consumer price \( GMM_p \) is calculated as:

\[ GMM_p = \frac{\text{End buyer price} - \text{marketing gross margin}}{\text{End buyer price}} \times 100 \]  

(2)

The consumer price share of market intermediaries is calculated as:

\[ \text{MM}= \frac{\text{SP} – \text{BP} \times 100}{\text{FCP}} \]  

(3)

Where: \( \text{MM} \) = Marketing margin (%)  
\( \text{SP} \) = Selling price at each level  
\( \text{BP} \) = Buying price  
\( \text{FCP} \) = Final Consumer Price

In marketing chain with only one trader between producer and consumer, the net marketing margin (NMM) is the percentage over the final price earned by the intermediary as his net income once his marketing costs are deducted. The percentage of net income that can be classified as pure profit (i.e., return on capital) depends on the extent to which factors such as the middleman’s own, often imputed, salary are included in the calculation of marketing costs.

\[ \text{NMM}= \frac{\text{Gross Margin} – \text{Marketing Cost}}{\text{Price Paid by End Buyers}} \times 100 \]  

(4)

### 2.4.2. Econometric analysis

It is necessary to understand the major factors affecting productivity of coffee to evaluate the impacts of determinants (explanatory variables) on productivity of coffee (dependent variable). Rationale behind for using multiple linear regression model is due to the fact that it is relatively simple and convenient to specify and interpret. Different studies were conducted using Cobb-Douglas production function. Tru (2009) has also used this model for estimating factors affecting lychee productivity. Cobb Douglas production function used to measure growth, impacts’ of variables and the likes on dependent variables (Gujarati, 2003). For this study, the function intended to be used is specified below:

\[ Y = A X_1^{\alpha_1} X_2^{\alpha_2} \ldots X_n^{\alpha_n} e^{\beta_1 D_1 + \beta_2 D_2 + \ldots + \beta_n D_n + U_i} \]  

(5)

The equation 5 above can be transformed into logarithmic function form as follows:

\[ \ln Y = \ln A + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \ldots + \alpha_n \ln X_n + \beta_1 D_1 + \beta_2 D_2 + \ldots + \beta_n D_n + U_i \]  

(6)

Where:

- \( Y \): Coffee productivity (quintal/Hectare)
- \( A \): The intercept that reveals combined impact of productivity
Parameters: \( \alpha_1, \alpha_2, \ldots, \alpha_n \) and \( \beta_1, \beta_2, \ldots, \beta_n \) will be estimated by OLS (Ordinary Least Squares) methodology via statistical software (STATA).

2.4.3. Variables definition and hypothesis

Different variables were expected to affect the productivity of coffee in the study area. The variables hypothesized to affect is tested whether they were statistically significant or not using appropriate statistical tests. Accordingly, the major variables expected to have influence on the productivity of coffee are explained below:

The dependent variable

Productivity (PROV): It is a continuous variable and represents the amount of coffee produced by sample producers measured in quintals per hectare.

Independent variables

Family size (FASI): It is a continuous variable and represents number of family members in the household. Primarily, large family size contributes to better farm management activity which in turns leads to higher farm efficiency. Hence, it was hypothesized to have positively influences on coffee productivity. The study conducted by Anteneh (2012) on productivity and value chain analysis of coffee witnessed that large family size increases yield.

Number of livestock owned (NOLIV): It is a continuous variable measured by TLU (Storck et al, 1991). Farmers who have large number of livestock are anticipated to specialize in livestock production so that they allocate large share of their land for pasture. Therefore, it is expected to have negative relationship with coffee productivity.

Education level of the house hold head (EDL): It is a continuous variable and refers to schooling year for formal education of a respondent during a survey period. Education broadens farmers’ intelligence and enables them to perform the farming activities intelligently, accurately and efficiently. Education is also recognized as an important factor affecting productivity through application of experience and investing knowledge in agricultural activity. Educated households tend to have higher productivity, improved use of information and emerging opportunities and are better able to decode new production techniques than the non-educated households. It is therefore, hypothesized to influence coffee productivity positively. Related deduction by Adinya et al. (2010) also supports this concept.

Extension service (EXSER): A dummy variable representing access to extension service as a source of information on technology. Those farmers who have contact with extension workers are more likely to know the advantage of cash crop production. Therefore, contact with extension agent is assumed to have direct relation with the productivity of coffee. Empirical results revealed that extension contact has an influence on farm households’ adoption of techniques to improve production (Nkonya et al, 1997).

Availability of credit (CRDT): Farmers can decide to use their own capital for other important production activities or household requirements. Getting credit is one way of improving farmers’ ability to make use of opportunities and improve their production (Legesse, 1992). Thus, getting credit would enhance the financial capacity of the farmer to purchase the necessary inputs. Therefore, it was hypothesized that
access to credit would have positive influence on productivity of coffee. Hence, the variable is a dummy variable taking the value 1 if the respondent got credit during the past production season, and 0 otherwise.

**Proximity to Farm site (PRTM):** It is a continuous variable measured in walking time (minute) which farmers spend to sell their product to the market. The closer the farmer to the nearest market, the more likely he/she will receive valuable information and/or input (Roy et al., 1999) to easily adopt improved technology. If the farmer is located in a village or distant from the market, he is poorly accessible to the market. The closer to the market the lesser would be the transportation cost and opportunity time spent so that it makes easy access to essential inputs influencing productivity of coffee. Therefore, it is hypothesized that this variable is negatively related to productivity.

**Coffee farm size (CFAS):** It refers to size of land allocated for coffee production. It is a continuous variable and measured in hectare. If the producer allocates more land to coffee production, he could be benefited from economies of scale of production. Thus, farm size for coffee is expected to have positive effect on productivity.

**Income from non-farm activities (NOFIN):** It is a continuous variable which measures income obtained from non-farming activities by the household head. Since both coffee production and non-farm activities conducted mainly for household cash requirements and hence, nonfarm income is expected to compete with coffee production. Therefore, it is assumed to have inverse relation with coffee productivity.

**Experience in coffee production (EXCOP):** Farmers with longer farming experience are expected to be more knowledgeable and skillful. Therefore, this variable is hypothesized to positively influence coffee productivity. Similar issue was studied by Tru (2009) on lychee productivity in Vietnam.

**Termite incidence:** A dummy variable representing incidence of termite as a factor of production and productivity. Those farmers who perceive his plot is affected by termite is represent “1” and “0” otherwise.

### 3. RESULTS AND DISCUSSION

So far, appropriate models were specified and input variables and variables that are hypothesized to determine efficiency of farmers in Coffee production in the study area were described. This chapter is devoted to presentation and discussions of the results obtained from descriptive and econometric models.

#### 3.1. Descriptive Analysis Results

#### 3.1.1. Household characteristics

The survey result showed that the total numbers of married, widowed, divorced and sample households during the survey period were 78.23%, 3.23%, 6.45% and 12.1% respectively. About 19.35% of the sample respondents were female headed and 80.645% were male headed. The average family size of the sample households was found to be 5.47, with minimum of 1 and maximum of 11. The average age of sample household heads was 36.17 years with maximum of 75 years and a minimum of 18 years. From the total of sample household heads, 19.35% were illiterate, while the remaining 80.65% had different levels of education, ranging from grade one to completion of secondary school. The maximum number of school years completed by the household heads was eleven years. About 27.42%, 45.96% and 7.26% of sample respondents attended 1 to 4, 5 to 8 and 9 to eleven level of education, respectively.
From the total of sample household heads, 19.35% were illiterate, while the remaining 80.65% had different levels of education, ranging from grade one to completion of secondary school. The maximum number of school years completed by the household heads was eleven years. About 27.42%, 45.96% and 7.26% of sample respondents attended 1 to 4, 5 to 8 and 9 to eleven level of education, respectively.

### 3.1.2. Farming experience

There is a wide range of farming experience in the study area, varying from 2 to 58 years. The average farming experience of sample households was 18.06 years. The average sesame production experience was 5.87 years with a minimum of 1 year and maximum of 9 years. The average time to reach their farm was about 40.92 walking minutes.

### 3.1.3. Livestock ownership

Livestock is an important component of the farming system practiced by the farmers, and it is an important asset for rural households in Nejo districts of West Wollega Zone in Oromia regional state and serves multiple purposes. Cattle provide draught power for crop cultivation, manure for household fuel, organic fertilizer, meat, milk and other products like hides and skin. Donkey is used for transportation. Farmers in the study area use oxen to undertake different agronomic practices, out of which plough and threshing were the major ones.

Conventionally, land preparation is done using a pair of oxen; as a result 33.7% of the sample households cannot independently plough their farm using own oxen. Hence, as an alternative, they will go for oxen exchange arrangements or rent-in from others. Oxen ownership among farmers in the study area was ranging from zero to seven. Generally, 45.97% of sample households in the study area have had a pair of oxen.

<table>
<thead>
<tr>
<th>Oxen ownership category</th>
<th>Sample households</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>18</td>
</tr>
<tr>
<td>1 ox</td>
<td>23</td>
</tr>
<tr>
<td>2 oxen</td>
<td>57</td>
</tr>
<tr>
<td>3 oxen</td>
<td>7</td>
</tr>
<tr>
<td>4 oxen</td>
<td>11</td>
</tr>
<tr>
<td>5 and more oxen</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Own survey (2018)
Actually in the study area, small ruminants are used to meet immediate cash need of the households and also for meat production both for cash and home consumption especially during holidays. Poultry is kept for egg and meat production both for cash and home consumption. In most cases farmers kept oxen as a source of draught power, cows are important sources of milk and milk products for consumption and satisfy immediate cash through the sale of butter. To make the unit of measurement uniform conversion factor developed by Storck et al (1991) as cited in Arega and Rashid (2005) was used to convert the herd size to in TLU.

Table 3. Distribution of Livestock holding among sample households

<table>
<thead>
<tr>
<th>TLU range</th>
<th>Total sample households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>0.00 – 2.00</td>
<td>91</td>
</tr>
<tr>
<td>2.01 – 4.00</td>
<td>18</td>
</tr>
<tr>
<td>4.01 – 6.00</td>
<td>9</td>
</tr>
<tr>
<td>6.01 – 8.00</td>
<td>2</td>
</tr>
<tr>
<td>≥ 8.01</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: Own survey (2018)

Table 4 shows that 73.39% of the total sample households have had less than or equal to two TLU. Only 26.61% of the total sample households have had greater than or equal to two TLU of which 21.778% ranges between two and six TLU. This means, on average, only 4.84% of the households have had greater than six TLU. Oxen ownership of sample household ranges from 0 to 7 with a mean and standard deviation of 1.99 and 1.44 respectively, while the total number of TLU ranges from 0 to 10.55 with a mean and standard deviation of 1.67 and 2.19, respectively.

3.1.4. Crop type and production

The farming system of the district is mixed crop-livestock where crop plays the major role in the households’ income. The major crops grown in the area include coffee, maize, sorghum, and nueg. The study area is characterized by both cereal and cash crop based cropping system in which maize dominates. Sorghum is also an important crop next to maize. Noug and sesame are the very well-known oilseed in the study area. Regarding the proportion of the area allocated for crops, most respondents had allocated more than half of their total land for the production of coffee and maize in 2017/18 production season.

Table 4. Major crops produced by sample households during 2017 production year

<table>
<thead>
<tr>
<th>Crop type</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std.</th>
<th>Min</th>
<th>Production (Qt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>123</td>
<td>0.125</td>
<td>2.5</td>
<td>1.012</td>
<td>0.65</td>
<td>0.5</td>
<td>19</td>
</tr>
<tr>
<td>Maize</td>
<td>81</td>
<td>0.25</td>
<td>2.0</td>
<td>0.975</td>
<td>0.41</td>
<td>8</td>
<td>80</td>
</tr>
<tr>
<td>Sorghum</td>
<td>98</td>
<td>0.125</td>
<td>1.0</td>
<td>0.259</td>
<td>0.25</td>
<td>1</td>
<td>10.5</td>
</tr>
<tr>
<td>Nueg</td>
<td>44</td>
<td>0.125</td>
<td>1.0</td>
<td>0.344</td>
<td>0.2</td>
<td>1</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Source: Own survey (2018)
3.1.5. Productivity

The average Coffee productivity (yield) obtained by the sample farmers was 5.2qt/ha which is less than 7.1 qt/ha at national level. The minimum and maximum yield level ranged between 2.52 and 8.5qt/ha with standard deviation of 1.43. In addition to the natural factors, the farmers’ management style plays a crucial role in determining the yield level of the management and crop protection are the most important factors affecting sesame yield. Increase in price of input, land acidity and termite and coffee disease affects coffee yield in the study area.

3.1.6. Off/non-farm activities

Farmers in the study area were engaged in various off/non-farm activities other than the main farming activities during the survey year. This may be due to the meager returns they obtain from the agricultural activities. The off/non-farm activities in which the farmers were engaged include selling local drink, butchery, handcrafts, sand carpenter, operators of Gold mining activities and activities marketing. The income they desperately need to obtain from such off/non-farm activities supplements the low income usually obtained from their farming main stay. About 48.8% of the sample farmers reported that they participated in different off/non-farm activities, while the remaining 51.2% responded that they did not participate in any off/non-farm activities. This shows that, almost half of the sample farmers in the study area highly dependent on agriculture.

3.1.7. Institutional support

3.1.7.1. Extension contact

In order to give effective extension service to the farmers, the region assigned three development agents in each kebele. This can help the farmers to know modern agricultural technologies. The concept of agricultural growth suggests two channels of impacts of extension in agriculture. Different extension programs have been implemented to support farmers and it is well known that there is a change in the use of agricultural technologies such as fertilizer and improved seeds over the past 15 years. This would not assure improvement in coffee productivity in the study area because development agent in the study area highly dependent on operation of cereal crops rather than cash crops. Therefore, it is important to evaluate whether the extension contact had significant impact in improving the productivity of coffee production in the study area.

3.1.8. Credit and saving services

Oromia credit and saving institution is the only formal source of credit in the study area. It provides credit to individual farmers under group collateral system. Out of the total 58.25% sample households who had credit access, 30% of them get their credit from Oromia credit and saving while the other 28.25% respondents get it from informal sources like relatives and neighbors. The households use the credit to purchase inputs, for medication and fulfillment of other basic needs. The advantage of borrowing from Oromia credit and saving is that it encourages borrowers to save some money on a regular basis.

Table 5. Distribution of credit source among sample households

<table>
<thead>
<tr>
<th>Credit source</th>
<th>Total Sample Households</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oromia credit and saving</td>
<td>40</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Relatives and neighbors</td>
<td>35</td>
<td>28.25</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>58.25</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own survey (2018)
Table 6. Summary of Descriptive Statistics (Inefficiency) variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>Percentage of the mean with dummy = 1</th>
<th>Percentage of the mean with dummy = 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>4.43</td>
<td>2.92</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Family size</td>
<td>5.47</td>
<td>1.97</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coffee Farming experience</td>
<td>18.08</td>
<td>11.25</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coffee prodn. experience</td>
<td>5.87</td>
<td>1.7</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Proximity to Coffee farm</td>
<td>40.92</td>
<td>29.84</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Farm Size</td>
<td>0.53</td>
<td>0.73</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Extension contact</td>
<td>2.09</td>
<td>0.76</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TLU</td>
<td>1.67</td>
<td>2.19</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Non-farm income</td>
<td>-</td>
<td>-</td>
<td>45.2</td>
<td>54.8</td>
</tr>
<tr>
<td>Credit access</td>
<td>-</td>
<td>-</td>
<td>58.25</td>
<td>41.75</td>
</tr>
<tr>
<td>Termite disease</td>
<td>-</td>
<td>-</td>
<td>80.645</td>
<td>19.355</td>
</tr>
</tbody>
</table>

Source: Own survey (2018)

3.2. Econometric Result

This section presents the econometric results of the study. The results of production and cost functions, efficiency scores and determinants of efficiency are discussed successively.

3.2.1. Multicollinearity test

Before running to the econometric analysis, Multicollinearity test for all variables was done using Variance Inflation Factor (VIF). Test for multicollinearity for all variables confirmed that there was no serious linear relation among explanatory variables.

R squared is equaled to 0.886 which implies that 88.6% changes of coffee productivity are explained by the explanatory variables in the model and the rest 11.4 % changes of coffee productivity due to other determinants. As indicated in Table 4 from the hypothesized variables organic education level of house hold and land size for coffee had positive effects on coffee productivity. This implied that if producers have more education level and land size then they gain higher productivity. Termite incidence and livestock unit affected negatively coffee productivity. Since OLS is linear estimator we can directly interpret after marginal effect analysis. Hence, a one percent increase in coffee farm size will increase the productivity of coffee by 87.4% and one percent increase in education level will increase productivity of coffee by 13.9%. Coffee, by its very nature, requires intensive management in terms of land preparation, input application, harvesting, marketing, transporting and storage and these all needs education. Hence, the education level of household positively affects the coffee production.
Table 7. OLS results of the production frontier for the sample households

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Std. Err</th>
<th>t-value</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education level of HH</td>
<td>.139</td>
<td>.046</td>
<td>5.358</td>
<td>.000</td>
</tr>
<tr>
<td>Family size</td>
<td>-.021</td>
<td>.047</td>
<td>-1.097</td>
<td>.275</td>
</tr>
<tr>
<td>Coffee production experience</td>
<td>.008</td>
<td>.008</td>
<td>.512</td>
<td>.609</td>
</tr>
<tr>
<td>Termite Incidence</td>
<td>-.052</td>
<td>.168</td>
<td>-3.072</td>
<td>.003</td>
</tr>
<tr>
<td>Non-Farm income</td>
<td>.015</td>
<td>.163</td>
<td>.915</td>
<td>.362</td>
</tr>
<tr>
<td>Availability of credit</td>
<td>-.018</td>
<td>.177</td>
<td>-1.160</td>
<td>.248</td>
</tr>
<tr>
<td>Extension contact</td>
<td>.015</td>
<td>.101</td>
<td>.812</td>
<td>.419</td>
</tr>
<tr>
<td>Coffee farm size</td>
<td>.871</td>
<td>.178</td>
<td>32.687</td>
<td>.000</td>
</tr>
<tr>
<td>Coffee farm distance</td>
<td>.010</td>
<td>.003</td>
<td>.632</td>
<td>.529</td>
</tr>
<tr>
<td>TLU</td>
<td>-.031</td>
<td>.392</td>
<td>-1.829</td>
<td>.070</td>
</tr>
<tr>
<td>constant</td>
<td>-.201</td>
<td>.392</td>
<td>-5.14</td>
<td>.608</td>
</tr>
</tbody>
</table>

Number of observation = 123, F (10, 102) = 21.09, Probability > F = 0.00, R-squared = 0.986, Adjusted R-squared = 0.971, *** indicate, statistically significant at 1% and 5% respectively. Source: Household survey, 2018.

The coefficient of farm size for coffee was positive and statistically significant at 1%. The positive coefficient of the farm size suggests that a unit increase in the variable in coffee production when other explanatory variables are held constant is consistent with increased output level. When land available to a household is too small to produce subsistence requirements from less profitable and risk consideration becomes increasingly important, farmers tend to shift to other high profitable cash crops. But if sufficient land is available to support subsistence requirements, farmers restore more to cropping of both food and cash crops. Allocation of large area of land for coffee farm can also indicate higher degree of attention in managing the farm. Therefore, an increase in land size allocated for coffee by 1% led to increase in coffee production by 0.875% keeping other variables constant. The significance of farm size highlights the importance land as an important input to agricultural production affecting farm output.

Similarly, education level of household tends to increase production. Increased education level of household may lead to better assessment of the importance and complexities of good farming decision making including the efficient use of inputs. Coffee farming in the study area is highly dependent on the education of farmers. Education level may lead to better managerial skills being acquired over time and experience of continuous experimentation and learning. Farmers develop and accumulate experiences including farm financing over time, and learn about farm technologies and subsequent productivity effects, market behaviors, and general physical and economic environments to make choices. Farmers may enhance coffee production, as they get more education, learn how to increase income-generating capacities and become able to use cost-effective strategies to cope with adverse shocks.

Contrary to the other variables increasing termite incidence led to decrease production, ceteris paribus. These implied that, termite is the dangerous and chronic factors that decrease productivity of coffee in the study area. At the same time coffee farmers are losing their production and productivity. Obviously, this incidence increase land acidity that directly affect coffee production and may have caused farmers to pay attention more to other profitable cash crops (such as sesame and nuiq) than coffee. Total livestock unit is also the most important variables and affect coffee production negatively in the study area. These indicate that farmers who have large number of livestock are anticipated to specialize in livestock production so that they allocate large share of their land for pasture and it might be due to using coffee plot for grazing and absence of communal land in study area.
3.2.2. Coffee Market Information System

3.2.2.1. Market information

Market information is a system needed to disseminate up-to-date market information to keep all coffee market participants at the same level of access for market information (price, time specific demands, quality information, etc.). This enables all market participants to make well informed decision in making transactions. In coffee marketing system, however, information is held as a private property and not equally shared among the different participants in the value chain and usually lacks trickledown effect. In this case, those that have the power to dictate the terms particularly those in the higher end of the chain act only in their own interests. This forces farmers who do not have countervailing economic power to also act in their own interests. The quality and quantity requirement demanded by the end-user does not properly go down to the lower ends of the chain.

Market information specifically included information on price, product demand, product supply, market place and buyers and sellers. Hence, out of the 123 of total interviewed farmers, 94.2% of the respondents had no accesses to market information on price and buyers. Respondent farmers also evaluated the price trend of last five years whether it had increased or decreased. Accordingly, 93.2 percent of them responded that the last five years price of coffee was increasing. According to majority of the respondents the reason for this price growth attributed to the inflationary situation.

Conversely, information about coffee production and associated cultural practices is not clearly understood at the higher ends of the chain. There is no significant investment in the relationship; rather the relationship in the market is based on mistrust. In this type of relationship, for the most part, farmers are considered as input suppliers rather than strategic partners in the value chains. The goal of the production system is only to satisfy producer's own deficit, without giving much emphasis to meet the market demand and ensure sustainable supply of coffee to the market. It also limits the development of value addition by various participants such as producers, collectors and processors.

3.2.2. Price information and setting

Market information supply was not transparent between levels that created high price variability and difference among selling farmers. Buying collectors got information from their partners while farmers not. This created the information asymmetry expressed by low prices at times when it was not. The main market information farmers’ used were the product selling price and number of buyers coming to the area. Farm gate buyers seemed to have better information attributed to their wide exposure. Collectors, with the help of their partners, got quick and readily information. Receiving information they pretended as if the price was not good and even informed some, as they could not sell what they collected some day before. Collectors provided the false information to farmers and forced to clear at the prevailing price, explaining ‘the air is not good’. However, some very loyal Processors relatively respected truth. These people usually buy at higher price than the pretended based only on the real information. In the overall chain, processors seemed to have the power influencing both backwards and forwards.

Price decision is a good measure of market transparency. In this study, respondents were asked to comment on who decided buying price. Eighty-seven percent; expressed price setting was by buyers for price decision. Nevertheless, ‘negotiation’ which was expressed by rest of the respondents was simply a term. Processors were the main source of information, which gave them chance to set a price that deserved them. The respondent farmers were also asked whether they perceived cheating or not and they reported as it was a day-to-day phenomenon. Collectors were the top cheaters. The cheating type included price, weight, and any combination of these.

3.2.3. Market Participants in Coffee Value Chain

In the face of the growing integration of global markets, a number of factors in the enabling environment play a critical role in promoting or preventing small holding farmers from integrating into
markets. Some broad factors include the regulatory environment, transaction costs, policies, regulations, and practices of specific markets play a critical role (UNIDO, 2009).

Analyzing the value chain actors and their interaction between them is also becoming more focused on understanding small coffee farmer’s current position and relationships within markets and pinpointing why particular market systems are not including and benefiting poor people. This process starts with identification of market participants and analyzing the private costs and returns that accrue to individual. The main actors involved in the coffee value chain in the study area include farmers, the local/primary collectors, processors and exporting firms.

Coffee value chain in the study area is relatively straightforward from producer through to exporter. The chain however is characterized by a large number of relatively small transactions, particularly close to production. There is little transparency in the market due to limited information flow. Producers typically harvest their crop, dry it and market to local collectors. These sales are usually small in volume, and the producer generally takes the price offered by the local collector. Local collectors then sell-on to larger collectors for consolidation. The product is then channeled to processors and finally to either the domestic market or exported. The value chain is inefficient due to fragmentation small transactions for producer sales and the large number of collectors.

Farmers: At the beginning of the coffee marketing chain are the producers (farmers), who plant and manage coffee trees and sell the dried coffee cherries to wholesalers or collectors at farm gate or nearby market. They are responsible for growing and harvesting coffee, thereby determining the amount and quality of coffee produced. Farmers’ average holdings are generally less than a hectare from which they produce about 150–200 kg of green coffee. Farmers will often harvest the green and black cherries, particularly late in the season, knowing that even though these will provide poor quality beans, they will nevertheless contribute to the overall weight. It is the weight of their coffee harvest that most determines what they are paid. There is some differential for coffee cherries that are ripe, properly dried, and well-formed but in most cases this is unreliable. Farmers have little access to the necessary skills, infrastructure, and technology to make such improvements and therefore may not feel that it is economically feasible to improve their quality levels.
Marketing information for the farmers is very scarce. Farmers usually depend on previous weeks market information or if available, the information which they get from the nearby markets. The marketing behavior of farmers varies from place to place. Farmers in study area add value to their coffee by engaging in activities like drying their coffee bean, cleaning and storing. Farmers in the area supply their coffee in the form of dry cheery and lezaza (lazaza is coffee which is not well dried) and in rare cases women’s also supply red cheery to the market in small quantity to meet urgent cash needs. According to the study 47 percent of the respondents sold at village markets. Obviously, the rest sold in Nejo towns.

Collectors: These are important market agents who make up the second link in the coffee chain, collecting coffee from their locality and remote areas and supply usually to processors. Many of them are opportunistic whereby they might be engaged in other business or farming in the rest months of the year. They used to buy in small amounts from surrounding farmers at the roadside and took to the nearest market center for sell. In most cases, these actors are independent operators who use their own capital to collect coffee from the surrounding and other remote areas. To some extent, processors often place orders with trusted collectors. Their essential role is to bring coffee from very remote areas to the market. They
have no warehouses of their own and therefore transfer the coffee to processors immediately. Collectors are usually constrained with financial capacity that limits their scale of operation. Many of them had a capital of 5000-100,000 ETB. Based on the developed personal trust, some collectors often receive cash advances from their buyers to fund their activities. The basis of the trust is usually some sort of family relationships. Although collectors typically act independently, they may also operate as agents for processors on a commission basis. In cases when they operate with the processors’ money, the commission for their services is Birr 0.10–0.25 per kg, in most of the cases.

The locations where collectors usually meet farmers in remote areas indicate lack of access to market by the producers and indicate the need to open up new primary market centers. In these inaccessible rural areas, they also serve as a means to transmit market information from the center to the farmers. In the process, however, there is a possibility of distorting information by these agents. They may distort market information according to the interest of their source and their own benefit. Thus, designing and implementing reliable information dissemination mechanisms is essential in order to develop significant levels of trust and cooperation among producers and other market actors in the remote areas.

**Wholesaler:** They are licensed traders without which they are not permitted to operate in coffee markets. According to Tadesse and Feyera (2008), the requirements to be met to qualify as a wholesaler are a working capital of 100,000 Birr, a coffee drying field and a warehouse, and their license is subject to renewal every year on a condition of good performance in the coffee market. Some have storage facilities as well as their own mill. They loaded one or more Isuzu of coffee per week. They have to process their coffee before bringing it to Ethiopia Commodity Exchange (ECX) warehouse of Gimbi branch for inspection of quality and grading. Another actor in coffee value chain was Cooperatives, this actor is highly disregarding their activity in the study area and farmers accused them as they are running for their profit only, thus this chain was negligible in Nejo District.

**Exporters:** These are participants who buy coffee for export at ECX trading floor through the ECX auction market from suppliers/ Processors. According to ECX marketing system both coffee buyers and sellers need to register as a member or agent to trade through ECX. After the exporters buy coffee through their respective agent in Addis Ababa they transport their coffee from ECX warehouse of Gimbi to their store house. Exporters add value to coffee by further sorting, cleaning, and blending different quality coffee to increase quality and take back to the Coffee and Tea Quality Control and Liquoring Unit (CLU) for inspection and certification for export. Coffee export and finally packed in bags (60 kg) labeled. Coffees that does not meet export standard are sold in the domestic market to wholesalers through ECX auction for rejected coffee.

### 3.2.4. Margin analysis of coffee value chain actors

The overall marketing margin is simply the difference between the farm gate price and the end buyer’s price. It is important to sort out the producers’ share in the value chain and also to know the shares of different actors. It includes assessing overall value added generated by the chain and shares of the different stages, the production and marketing costs at each stage of the chain, and the cost structure along the chain stages and the performance of operators. The problem is that all of these analyses are highly challenging since, hardly any farmer knows his costs of production, nor do the majority of primary collectors or processors. In most cases, analysts will have to be content with rough estimates. In any case, economic data generated in the context of value chain promotion can only give indications.

The important points to be considered in value chain analysis are marketing costs (cost for value located on the product at different level by market actors along channels), margin, number of intermediaries and share of producers as well as intermediaries from consumers’ price or end buyers. So as to investigate the shares and margins of several market agents, who are involved in coffee value chain, starting from producer price to end buyers for export markets at f.o.b. Price is considered. Based on the
data on buying, selling, prices and applying the gross marketing margin calculation formulae, the marketing margins for market participants in exported coffee value chain are discussed below. Before going to margin analysis and determining share of producers and other intermediaries it is important to use a standard conversion factor. Accordingly the jenife price per kg is roughly half that of the decorticated bean per kg (Tadesse, 2006). Based on this assumption, margins were calculated for the main actors.

3.2.4.1. **Collectors**

Usually, collectors purchase coffee from farmers in their locality and remote areas and supply to processors. They often mix different qualities having various moisture contents and this would affect the whole stock. Collectors sell either in red cherry or dry cherry forms. Their essential role is to bring coffee from very remote areas to the market. The average purchasing and selling price for collectors is 25.66 and 27.66 birr per kg respectively. Average cost of handling for collectors is about 0.511 birr per kg. At collectors stage little value addition works is implemented. They have no warehouses of their own and therefore transfer the coffee to processors immediately. Collectors don’t give much attention for the coffee type, i.e., they buy all coffee types. They buy defective for lesser price and mix with better quality coffee to get higher price. As far as quality is concerned, it is reported that many collectors do not care mixing different qualities, sometimes with pebbles in order to increase weight since processing agents are too busy in full campaign to properly check. The average Net margin of collectors was 1.5 (Birr/kg). Prior to the establishment of ECX Primary coffee collectors are locally licensed coffee traders purchasing coffee from individual farmers. But after the new ECX marketing system collectors are not allowed to engage in coffee marketing and directly sell to suppliers. Some collectors are functioning illegally in the study area by bringing coffee to town and the others are working with Processors as an agent.

3.2.4.2. **Whole seller**

Whole seller buy coffee from both farmers and collectors. Analysis showed that they pay relatively better price for collectors. A difference ranging between 0.10 and 0.25 birr per kg was observed. This is to create good customer buyer relation so that collectors always come to supplier and get credit/cash when needed. The average purchasing and selling price for processor is 27.86 and 31.5 birr per kg respectively and the average net margin was 2.75 birr/kg.

Before delivering the coffee to the ECX auction market, Processors/ add value to the coffee. As they often buy dry cherry, they take the coffee to hullers for processing. Processing and transport costs vary with the oil price, supply and demand for transportation, and distance from central market (Gimbi). On average, the total marketing costs for Processors including costs at the ECX auction market is about 2.5birr per kg.

3.2.4.3. **Exporters**

Exporters are only allowed to buy coffee from the ECX auction market. After buying coffee from the ECX auction market, exporters reprocess the coffee for export. Coffee that meets the country’s export standard is exported while those coffees that doesn’t meet export standard are sold in the domestic market for wholesalers. Wholesalers sell the coffee at domestic market for retailers, and retailers sell to consumers. The average purchase and export price for exporters is about 40.5 and 47.5 birr per kg respectively. The average marketing costs for exporters from auction market until it reaches Djibouti port is 3.14 birr per kg. The net marketing margin for exporters was 3.66 Birr/kg.
Table 8. Marketing margins for market participants in exported coffee value chain

<table>
<thead>
<tr>
<th>Actors</th>
<th>Average Purchasing price (Birr/kg)</th>
<th>Average Selling price (Birr/kg)</th>
<th>Average Marketing cost (Birr/kg)</th>
<th>Gross Margin (Birr/kg)</th>
<th>Net margin (Birr/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collectors</td>
<td>25.66</td>
<td>27.66</td>
<td>0.511</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Processors</td>
<td>27.86</td>
<td>31.5</td>
<td>2</td>
<td>3.64</td>
<td>2.75</td>
</tr>
<tr>
<td>Exporters</td>
<td>40.5</td>
<td>47.5</td>
<td>3.14</td>
<td>7.00</td>
<td>3.66</td>
</tr>
</tbody>
</table>

Source: own computation, 2018.

3.3. Coffee Value chain Constraints
3.3.1. Producers level constraints

Coffee value chain constraints at producers’ level were identified with coffee producers and key informants such as kebele association administrators and development agents. The result indicated that though there are variations in ranking of constraints, similar constraints were identified in all the sampled kebeles. No extension contact for coffee production, Termite, Low yielding varieties, shortage of land, low price for the produce, price setting and drought followed by pest and disease like (coffee leaf rust and high incidence of coffee berry disease), shortage of chemical and fertilizer supply was reported as the major constraints. Lack of timely and reliable market information about the prevailing coffee price, demand and supply situation, lack of fair weight and lack of labor supply were also another constraint identified by coffee producers. Farmers of the area largely depend on the informal communication among themselves and local collectors to make marketing decisions. Table 7 presents constraints at producer’s level.

Table 9. Constraints at producer’s level

<table>
<thead>
<tr>
<th>Constraints</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No extension contact for coffee production</td>
<td>97</td>
<td>0.80</td>
</tr>
<tr>
<td>Drought &amp; irregularities in rainfall</td>
<td>92</td>
<td>0.77</td>
</tr>
<tr>
<td>Diseases and pest, termite</td>
<td>90</td>
<td>0.75</td>
</tr>
<tr>
<td>Shortage of chemical supply &amp; high cost</td>
<td>86</td>
<td>0.72</td>
</tr>
<tr>
<td>Lack of labor supply</td>
<td>65</td>
<td>0.54</td>
</tr>
<tr>
<td>Shortage of land</td>
<td>93</td>
<td>0.78</td>
</tr>
<tr>
<td>Lack of market information</td>
<td>80</td>
<td>0.67</td>
</tr>
<tr>
<td>Lack of fair weight</td>
<td>67</td>
<td>0.57</td>
</tr>
<tr>
<td>Price setting &amp; Low price for the produce</td>
<td>92</td>
<td>0.77</td>
</tr>
</tbody>
</table>

Source: own computation, 2018

According to the informants market information available to coffee producers was only limited to village level rural markets and the neighboring village markets. In the area there was no formal institution that provided information on the prevailing market situation of other urban centers including central markets to the coffee producers. Information transfer from exporter upstream to producer is also poor and adversely affects quality. There were no identified and applied quality standards that resulted in absence of discriminatory pricing accounting for quality and grades. In general, poor access to information and know how makes it difficult for value chain operators especially poor farmers to meet/comply with the standards and other product requirements. Producers hardly earn better premium for quality of coffee they supply and therefore they do not give attention to quality.
3.3.2. Trader level constraints

In addition to identifications of coffee value chain constraints at producer’s level discussion was also made with coffee traders in order to identify and prioritize major coffee marketing bottlenecks they face in the coffee trade in the study area. Accordingly, natural quality problem, adulteration, shortage of working capital, poor road infrastructure, high marketing cost and mixing different quality coffee beans having various moisture contents were identified as major marketing constraints.

4. SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1. Summary

The main theme of this research was to analyze the determinants of coffee productivity and Value share and profit distribution of different coffee value chain actors. The specific objectives included identifying factors affecting coffee productivity; describe the value additions of the different actors in the coffee value chain; examine marketing costs and margins along the coffee value chains and identify constraints in the coffee value chains. A very wide number of respondents at all stages of the market were interviewed. The analysis was made with the help of descriptive and econometric tools employing and STATA software. Summary of results obtained were the following.

A total of 123 farming respondents drawn from three sampled kebeles in Nejo District, 20 collectors from village markets and District towns (Nejo), 6 processors from the same towns and 2 exporters from Gimbi were interviewed using structured questionnaires. Rapid market appraisal with the help of focus group discussion and key informant discussion were the other primary data collection tools employed in the process. Secondary data collection was also the other tool. Descriptive analysis for this study showed that the average Coffee productivity (yield) obtained by the sample farmers was 5.2 qt/ha which is less than 7.1 qt/ha at national level. The minimum and maximum yield level ranged between 2.52 and 8.5 qt/ha with standard deviation of 1.43 this implies that the productivity this crop will be under question if remedial action will not have taken concerned body. Multiple linear regression model was used, to identify factors that affect coffee productivity. The result indicated that Education level, termite incidence, coffee farm size and livestock unit were significant variables that affect the productivity of coffee. The test statistics undertaken also confirmed that there was significant amount of variation in productivity among farmers. Alternatively, the traditional average response function is not an adequate representation of production frontier.

Analysis of farmers’ collected data showed that the largest land allocated was to coffee for about 1.02 ha, maize 0.975 ha, and 0.344 ha for oil crops. Twenty percent of respondents got extension service concerning coffee and the remaining 80 percent got no extension service related to coffee. Estimation of determinants for coffee productivity based on the Cobb-Douglas production function estimates revealed that Termite incidence had negative effects on coffee productivity. This implied that if land for coffee production have highly affected by termite, it decreases coffee productivity, citrus Paribas.

With regard to gross margin the study also showed that share of producers is 58.59% of the export price at f.o.b. price. Gross marketing margin of producers is the highest in the chain. The gross marketing margin of the collectors, wholesaler and exporters were 7%, 10.5% and 18.2% respectively. In addition to this inadequate coffee cultivation technology and largely ineffective extension leave the farmers unable to capture considerable additional value from their crops. Poor processing infrastructure, primarily for drying and hulling, tend to further reduce quality and diminish incomes. Low productivity is exacerbated by climatic change, along with inadequate post-harvest methods, contributes to low quality and subsequent high levels of lost value. The limitation in the quality of extension service was among the strong problems cited apart from pest and disease challenges, price instability and lack of reliable market information. The marketing channel of coffee was through the interconnection of different actors namely producing farmers, primary collectors, wholesaler, cooperatives and exporters. Wholesaler seemed to control the whole channel (because of asymmetric market information). Among the different actors processors were the main actors in the system. There is no coherent grading system and standards are loose and typically defined at the local level on an ad hoc basis. This increases transaction costs and distorts value throughout the chain.
4.2. Conclusion

In the study area coffee production is in sharp decline. This is mainly due to lower productivity, Termite incidence, non-availability of improved coffee varieties, pest and disease, limited production and marketing extension support, unorganized input delivery, imperfect pricing system. The coffee value chain is relatively straightforward from producer through to trader/exporter. The chain however is characterized by a large number of relatively small transactions, particularly close to production.

There is also little transparency in the market due to limited information flow. Farmers typically harvest their crop, dry it and market to local collectors. Farmers also hold their coffee at the household level until sale is necessary to meet cash needs. These sales are usually small in volume, and the farmer generally takes the price offered by the local collector. Local collectors then sell-on to larger collectors for consolidation. The product is then channeled to processors and finally to either the domestic market or exported. The value chain is inefficient due to fragmentation small transactions for producer sales and the large number of collectors.

The factors that affect the productivity of coffee were identified, to help different stakeholders to enhance the current level of production in coffee production. Accordingly, education level of house hold and farm size of coffee were positively and significantly affected coffee productivity. This implies that farmers with high level of education, better farm size to coffee production credit can promote coffee productivity in the study area. Also termite incidence and livestock unit was affected coffee productivity negatively.

4.3. Recommendations

Based on the research findings of this study, the following points are recommended; the finding justifies that coffee productivity improvement, demands more education which is proxy of coffee farming experience and more Farm size and high consideration should be taken on livestock unit and termite incidence why they affect coffee productivity negatively. As it is observed from the econometric result that, in addition to its productivity improvements attribute, many of the fundamentals of coffee farming are not being followed and with some technical assistance, could improve plant health, yields and quality. Since, coffee from the area is one of the specialty coffees where Ethiopia has comparatives advantage in international coffee market. Enhancing the quality and production of this coffee bring benefits for smallholder as well as for the country as a source of foreign exchange. Hence, among the possible measure to be considered to improve the system the following coffee management practices should be given attention on: improve nursery management, introduce shade trees, improve (or introduce) pruning techniques and stump old trees, remove and re-plant and planting more trees to reduce land acidity which is results decrease in productivity of coffee in the study area.

Although different coffee research centers recommended appropriate coffee preparation procedures for either wet or dry processing methods with respect to coffee growing ecologies, farmers/traders mostly practice their local preparation way. Therefore, extension intervention could be the best possible approach to enhance awareness among coffee producers to keep typical coffee quality profile of their garden through processing that finally adds value to their crop.

The survey result also shows that coffee farmers in the study area use traditional method of drying like raised beds using local materials and drying on the ground. Often, there is a mixture of various maturities and coffee cherries from different days are mixed in the same batch. Dried cherries are then stored for a period ranging from 3 months to 1 year. Hence, every effort has to be exerted as it is at this stage coffee gets contaminated by taking the taste of anything it comes into contact. This helps the coffee to be free of undesirable tastes which it picks if dried on the ground. Thus, providing adequate trainings on continuous basis to producers on pre- and post-harvest management practices are vital. These will further increase volume of export coffee of the area. Technical assistance can help minimize defects and also strengthen centralized storage of dried product. Recommended measures include: improve harvesting techniques by sorting cherry at the farm level, improve drying techniques and understanding of quality drying and improved hulling equipment to reduce bean breakage.
Regarding market information, the study result shows that due to asymmetry of market information there is wide mistrust and disagreement among value chain operators. Although different support institutions are responsible to provide information to producers and local intermediaries and regional actors, it seems no market information is available to producers and small traders’ levels. Thus, market information gaps are also another problem need to be sorted out. The need for an organizational set up that could work as market management board that not only involves in tax and fee collection, but also other functions like facilitating and serving market and price information to farmers seem imperative. Similarly promoting and encouraging farmers form groups/associations through which can take advantages of bargaining power in the input and output markets. This in turn will increase farmers input purchasing power in the input and output markets. In effect, it was remarkable that a coffee grower is the sole stakeholder, who is not represented during the ultimate vital decisions of margin sharing. That means, coffee growers associations could be very useful to members by attending various meetings, defending and dealing with coffee issues on behalf of members.

Moreover, farmer’s associations might also be useful in improving the quality and quantity of the product. Associations could also buy their green coffee at the right price and weight which would automatically remove traders and their wrong weighing and payment practices (such as wrong prices and weighing, speculation loans) that have been fatal to farmers’ earnings. In the long-run, associations could not only be limited to take part in the buying, storage and transport facilitation activities, they could even grow their own plantations, organize their own buying/selling centers and similar other systems for many other farm activities that farmers would need at reasonable price, on the basis of credit grants or at low rates of interest. This would allow producer groups to improve quality, engage in bulking at the local level and deliver higher-volume consignments to larger processors. Consolidating the product in the hands of producers and adding value through improved quality will build market bargaining power and help farmers improve their margins. Building quality compliance upstream into the production network will strengthen coffee industry and the industry’s international position.

5. REFERENCES
AAFC (Canada, Agriculture and Agri-Food Canada), 2004. Value-added Agriculture in Canada. Report of the Standing Senate Committee on Agriculture and Forestry 2004, Canada, Agriculture and Agri-Food Canada


Zambrut Journal, Link Access;
https://zambrut.com
https://zambrut.com/productivity-value/

© Copyright 2019 International Journal of Zambrut | Zambrut, Inc.