

# Market Value Chain Analysis of Mango: The Case of Arbaminch Zuria Woreda Melaku Haile, Arba Minch University

## Abstract

*Ethiopia has a variety of fruit crops growing in different agro ecological zones by small farmers, mainly as a source of income and food. The nature of the product, on the one hand, and the lack of market system, on the other, have resulted in low price for producer; and hence, low benefit for traders. This study aims at analyzing market value chains of mango in Arba Minch Zuria Woreda, Gamo Gofa, Zone with specific objectives of describing important marketing channels and actors involved in mango value chains; identifying constraints and opportunities as well as the determinants of supply of mango in the area. Three kebeles were selected based on the presence of higher amount of mango production. The data was collected from both primary and secondary sources. The primary data for this study was collected from 127 farmers and 23 traders through application of appropriate statistical procedures. To analyze the collected data, stata software was used. Multiple linear regression models were also used to analyze factors that determine mango market supply of the producers in the area.*

*Analysis of marketing costs and margins revealed that processors (juice house) received the highest (80.89%) marketing margin and producers received less than (20%) marketing margins in mango trade business. Based on regression model, the study has identified the main determinants of mango quantity supply. Quantity of mango produced, access to market, price of mango, access to extension, access to credit and education are factors that significantly affect quantity of mango supplied to the market positively at 5%, while access to extension service affects the supply negatively at 5% level. The findings suggests that, effective market information service has to be established to provide accurate and timely market information to farmers and traders on current supply of mango output, demand and prices at national and regional levels. Infrastructural development is also key to supporting the sub-sector. In this arena, emphasis should be given to improved storage, and transportation system, offering credit and other services to improve effective production and marketing of mango.*

**Key Words:** Market, Value Chain, Analysis of Mango, Arba Minch Zuria Woreda

## 1. Introduction

### 1.1. Background of the Study

Mango (*Mangifera indica*) is a fleshy stone fruit belonging to the panes *Mangifera*, consisting of numerous tropical fruit trees in the flowering plant family *Anacardiaceae*. Mango is native to South Asia from where it was distributed worldwide to become one of the most cultivated fruits in the tropics. Mango is produced in most frost-free tropical and sub-tropical climates. More than 85 countries in the world cultivate mango. The total production area of mango in the world is around 3.69 million hectares. The total amount of mango production in the world was around 35 million tons by the year 2009 (FAO, 2009). Mango is one of the most widely cultivated and globally traded tropical and subtropical fruit trees in the world (Clarke, et.al, 2011).

Mango serves as a commercial fruit and as a subsistence crop for families. It ripens at the end of the dry and at the start of the rainy season. Mango is a fundamental source of nutrition for the rural populations (Vayssières et al., 2012). Mango fruit is an excellent source of dietary antioxidants, such as ascorbic acid, carotenoids, and especially phenolic

compounds (Ma et al, 2011). Mango fruits are very much relished for their exotic flavor and delicious taste. They are also an excellent source of dietary fiber, provitamin A and vitamin C. A fruit with many versatile properties has naturally found application for processing into several products (Elias, 2007).

Mango is a highly seasonal tropical fruit, very popular among millions of people in the tropics. It also occupies a prominent place among the best fruits of the world. Though it is in constant demand, there is a pre-harvest scarcity and at times a post-harvest glut for this fruit. To increase the availability of this fruit throughout the year, the surplus production must be processed into a variety of value-added products (Saxena and Arora, 1997; Srinivasan et al., 2000; Singh et al., 2005).

The amount of mango production in Africa during 2009 is 13.6 million tones (FAO, 2009). In Sub-Saharan Africa (SSA), growing both domesticated and wild fruit species on farms diversifies the crop production options of small-scale farmers and can bring significant health, ecological and economic revenues (Keating et al.,2010; Weinberger and Lumpkin, 2005). Ethiopia is agro-ecologically diverse and has a total area of 1.13 million km<sup>2</sup>. Many parts of the country are suitable for growing temperate, sub-tropical or tropical fruits. For example, substantial areas in the southern and south-western parts of the country receive sufficient rainfall to support fruits adapted to the respective climatic conditions. In addition, there are also many rivers and streams which could be used to grow various fruits. Ethiopia has a potential irrigable area of 3.5 million hectares (ha) with net irrigation area of about 1.61 million ha, of which currently only 4.6% is utilized (Amer, 2002).

Arba Minch Zuria, a district (*woreda*) in the Gamo Gofa administrative zone of the Southern Region of Ethiopia, is known for its high potential in tropical fruit production (mainly mango, banana, lemon and papaya). The area contributes 10% to 15% of the estimated 135,000 tones of national fruit production. However, its potential is much higher and supply to the Addis Ababa market could be as high as 40% of the total amount delivered to the Capital City ([http://en.wikipedia.org/wiki /Arba Minch](http://en.wikipedia.org/wiki/Arba_Minch)).

There are nine major mango producing *kebeles* (villages) in the *woreda*, with an estimated 8,000 households. The average number of mango trees per household is 16 (ranging from 2 to 85 trees). Most of the farmers have planted two types of local varieties, which are not identified by names. These local varieties are fibrous and have large kernels compared to the ratio of fruit flesh. Since 2004, attempts have been made by different actors to introduce improved varieties. As a result, smallholder farmers have planted about 16,000 seedlings of Kent, Tommy Atkins and apple mangoes with an estimated 90% success.

([www.mwud.gov.et.web/Arbaminch](http://www.mwud.gov.et/web/Arbaminch))

Presently, mango sales contribute 10% of the household income in Arba Minch Zuria Woreda. The estimated total annual mango production in the Woreda is 32,384tons. Out of this, 25% (8,096 tones) is the estimated post-harvest loss. Thus the marketable amount of mango per annum from the Woreda is estimated to be 24,288 tons. From the potential marketable amount, only 1,440 tons (6%) are formally marketed through Addis Ababa fruits and vegetables wholesalers. The rest is retailed and consumed locally in Arba Minch and other towns in the region (Wolayita, Shashemene, Awassa, etc.), (Gamo Gofa Zone report, 2013).

## **1.2. Statement of the Problem**

Smallholders are supplying fruit throughout the year in Arba Minch Zuria Woreda, but they could not generate as much benefit from production. This might be due to improper understanding of the market situation by smallholder producers, and lack of previous study on key market chain actors within the Woreda. Getachew (2014) reveals that wholesalers (supplying the bulk to consumers) are making the highest net margin as they have short channels between producers and consumers, and as they relatively charge a higher price using their market power. The net margin for the smallholder farmers is highest only when fruits are sold to individual consumers through unions via consumer cooperatives (thereby reducing the numbers of middlemen across the market chain). Abraham (2013) found out that fruits and vegetable are passing through several intermediaries, little value being added before reaching the end users. Furthermore, the market chain is governed by wholesalers and exporters who have capital advantage over the other chain actors. Hence, farmers are forced to obtain a lower share of profit margin.

Among fruit crops produced in Gamo Gofa Zone, banana has relatively sustainable market while other fruit crops suffer severe lack of market during peak harvest. Many farmers complain about unworthy fruit price during peak harvest for mango, avocado and papaya. Fruit products are perishable and need maximum care during harvesting, transporting, and storing. So far, lack of preserving techniques has significantly affected Gamo Gofa farmers' bargaining power because they cannot wait with their product any longer and the only option is to surrender and collect any offer before they lose their total harvest.

Market distortions are common activities of middlemen in price setting. Some fruits are not creating time value due to their perishability. This enables middlemen to cut price, which further reduce producers bargaining power to sell their products at a price convenient for them. Under such circumstances, a study that focused on the analysis of fruit market chain actors and channels can play substantial role towards the improvement of the existing market situations. In addition, a study on the market information, producer organizations, and structure of the market are important to alleviate market distortion in the Woreda. Even though mango is economically and socially important, key mango marketing actors and channel and their characteristics have not well been studied and analyzed for the target study area, where great potential of mango production exists. Therefore, this study has the purpose of identifying key mango marketing actors and channels; investigating market structure of major actors; assessing market performance by quantifying costs and profit margins for key actors in the mango market chain. Furthermore, the study has assessed challenges that smallholder farmers face in the process of production and sell of mango. This elaborated the issue under discussion and contributes to better understand the marketing system for the benefit of smallholder farmers and other development actors involved in the marketing process. It has encouraged and used to be as an input for other researchers to further investigate the issue under study.

## **1.3. Objectives of the Study**

### **1.3.1. General Objectives**

The general objective of this study is to analyze mango marketing value chains in Arba Minch Zuria Woreda.

### 1.3.2. Specific Objectives

In line with the general objective, the researcher wants to address the following specific objectives:-

- To identify key mango marketing actors and channels;
- To identify the challenges faced by mango marketing chain actors;
- To estimate the determinants of mango supply to the market in the study areas; and
- To quantify costs and margins for key mango marketing channels in Arba Minch Zuria woreda.

### 1.4. Significance of the Study

This study analyzed the entire mango value chains from input supplier to the consumer within the country. It also provides a holistic picture of existing challenges and entry points in the mango value chains. Moreover, this study provided information on the determinants of mango supply to the market, marketing margin, benefit share of actors, and identified challenges of vegetables value chain in the study areas. Therefore, it sheds light on required efforts to enhance the production and utilization of mango at larger-scale to bring about economic development in the area. The information which was generated from the study also help a number of organizations including: research and development organizations, traders, producers, policy makers, extension service providers, government and non-governmental organizations to assess their activities and redesign their mode of operations and ultimately influence the design and implementation of policies and strategies. Further it can give a way for other researchers who want to make further investigation in the area and conduct detail researches on the problem.

### 1.5. Scope and Limitation of the Study

This study focused on identifying major Mango marketing channels, estimating the marketing margins and costs for key marketing channels, and identifying factors influencing marketable supply of mango in Arba Minch Zuria Woreda. The area coverage of this study was limited to three kebeles in the Woreda based on the level of production of mango, and the fruit were limited to Mango for its increasing coverage and the marketing problem it faces. The markets are purposively selected based on their relative importance for mango production. However, the study was focused only in Arba Minch Zuria Woreda due to budgetary and time limitations. Congruently, lack of record keeping by chain actors might be a challenge to collect relevant information in the channel. Thus, key informants and secondary sources were extensively used to complement preliminary information and to understand rationality behind the status of the market chains.

## 2. Methodology of the Study

### 2.1. Description of the Study Area

Arba Minch Zuria (Amharic "Greater Arba Minch Area") is one of the woredas in the Southern Nations, Nationalities, and Peoples' Region of Ethiopia. A part of the Gamo Gofa Zone located in the Great Rift Valley, Arba Minch Zuria is bordered on the south by the Dirashe special Woreda, on the west by Bonke, on the north by Dita and Chencha, on the northeast by Mirab Abaya, on the east by the Oromia Region, and on the southeast by the Amaro Special Woreda. This word also includes portions of two lakes and their islands,

Abaya and Chamo. Nechisar National Park is located between these lakes. City of Arba Minch is surrounded by Arba Minch Zuria (<http://en.wikipedia.org/Arbaminch>).

### **2.1.1. Demographics**

Based on the 2007 census by the CSA, the Woreda has a total population of 164,529, of which 82,199 are men and 82,330 women; none of its population is urban dwellers. The majority of the inhabitants are Protestants, with 53.91% of the population reporting that they belong to that belief, 29.31% follow Ethiopian Orthodox Christianity, and 12.6% practiced traditional beliefs (<http://wikipedia.org/wikw/Arba-minch-zuria>).

### **2.1.2. Location**

Arba Minch is found in northern part of the South Nation Nationalities and People's Regional State, in Gamo Gofa Zone at a distance 505 km from Addis Ababa, and 280 km from Hawassa, the regional Capital. Its astronomical location is 06<sup>0</sup> 05' North latitude and 37<sup>0</sup> 38 East longitude.

## **2.2. Data Source and Method of Data Collection**

Primary and secondary data were employed to address the objectives of this study. The primary data was collected using questionnaires and interviews. The primary data was collected from mango producing farmers on factors affecting mango market supply, quantity produced, access to market information, access to credit, access to extension services, access to market, experience of farmers on fruit production, and socio economic condition of the household. The interview schedule for traders include: types of traders (retailers, brokers and wholesalers), buying and selling strategies, source of market information and socioeconomic characteristics of the traders.

Secondary data were collected from different sources, such as: government institution, the Woreda agricultural development office, and websites.

## **2.3. Population and Sampling Technique**

The primary data for this study collected from the actors in Arba Minch Zuria Woreda. Those actors were producers, wholesalers, brokers, retailers, and consumers. It was difficult to decide on sample size due to variation of trade from time to time. In addition, there were time and resource limitation during data collection.

From Arba Minch Zuria, the researcher selected three kebeles with purposive sampling technique. While selecting, the researcher considered total output of mango which was produced in these kebeles. The three kebeles are Chano-Mile, Chano- Chalba and Lante. The producers and wholesalers in those kebeles are 553, 261 and 638 and 10, 8 and 16 respectively. The number of brokers and retailers in those kebeles are 44 and 190, respectively. Determining the number of consumers is difficult to identify because almost all are who lives in the study area with the major classification of community, university student and restaurants in some amount, so the researcher use a random of 15 consumers for the response.

Using the Slovincs sample size determination formula, the sample respondents for this study are given as follow,

$$n = \frac{N}{1 + N(e^2)} \quad \text{Key; - N= Number of total population}$$

n= sample size

$e^2$ =error term which is 10%

### Sample from Chano mile

$$\text{For producers} = \frac{553}{1+553(0.1^2)} = 84$$

$$\text{For retailers} = \frac{66}{1+66(0.1^2)} = 40$$

**Total** = 146

$$\text{For wholesalers} = \frac{10}{1+10(0.1^2)} = 9$$

$$\text{For brokers} = \frac{15}{1+15(0.1^2)} = 13$$

### Sample from Chano-Chalba

$$\text{For producers} = \frac{261}{1+261(0.1^2)} = 72$$

$$\text{For retailers} = \frac{48}{1+48(0.1^2)} = 32$$

**Total** = 122

$$\text{For wholesalers} = \frac{8}{1+8(0.1^2)} = 7$$

$$\text{For brokers} = \frac{13}{1+13(0.1^2)} = 11$$

### Sample from Lante

$$\text{For producers} = \frac{638}{1+638(0.1^2)} = 86$$

$$\text{For retailers} = \frac{76}{1+76(0.1^2)} = 43$$

**Total** = 164

$$\text{For wholesalers} = \frac{16}{1+16(0.1^2)} = 14$$

$$\text{For brokers} = \frac{26}{1+26(0.1^2)} = 21$$

Due to limitation of time and budget, the researcher using a stratified sampling method determines the sample from each stratum to constitute a total of 150 samples. To select sample size from the stratum which are  $N_1=44$  brokers,  $N_2=190$  retailers,  $N_3=1452$  producers  $N_4= 40$  and the total population  $N=1720$ .

Stratified sample size formula =  $n (N_i/N)$

$$\text{For brokers, } n_1 = 150(44/1720) = 4$$

$$\text{For retailers, } n_2 = 150(190/1720) = 16$$

$$\text{For producers, } n_3 = 150(1452/1720) = 127$$

$$\text{For wholesalers } n_4 = 150(34/1720) = 3$$

Thus the total sample respondents for this study are; -  $127p + 3w + 4b + 16r + 15c = 165$  **sample** respondent for the study area.

## 2.4. Method of Data Analysis

### 2.4.1. Descriptive Analysis

For data analysis, both descriptive statistics and econometric analysis were employed. The descriptive statistics like mean, min, max, standard deviation, percentage and frequencies were used to examine and understand the socio economic characteristics of the respondents as well as the structure, conduct and performance of fruit market.

The structure conduct and performance model was used to examine the relationship between structure, conduct and performance market, and is usually referred to as (S-C-P).

### 2.4.2. Econometric Analysis

Econometric analysis was also used to estimate the factors that affect the supply of mango fruit. Multiple linear regression model (OLS) was used because there is more than one independent variable. The data was analyzed by using stata 11 software.

## 2.5. Econometric Model Specification

Following Green (2003), the multiple linear regression models was specified as

$$Y_i = F(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11})$$

Where  $Y_i$  = quantity of mango supplied to market

$X_1$  = Sex of HH

$X_2$  = Age of HH

$X_3$  = Education level of HH

$X_4$  = Family size

$X_5$  = Market access

$X_6$  = Experience of the HH

$X_7$  = Price of mango in 2007

$X_8$  = Extension access

$X_9$  = Information access

$X_{10}$  = Credit access

$X_{11}$  = Size of output

Econometric model specification of supply function in matrix notation is the following.

$$Y = \beta X + U \quad (6)$$

Where:  $Y_i$  = Mango supplied to the market

$\beta$  = a vector of estimated coefficient of the explanatory variables

$X$  = a vector of explanatory variables

$U_i$  = disturbance term

## 2.6. Hypothesis and Definition of Variables

In order to identify factors influencing mango marketable supply both continuous and discrete variables were hypothesized based on economic theories and the findings of different empirical studies. Accordingly, in order to investigate the determinants of market supply, the following variables were hypothesized as follow,

### Dependent variable

**Quantity supplied (Qs) 2008:** It is a continuous variable that represents the marketable supply of mango by individual households to the market, which is measured in quintals.

**Independent variables:** The explanatory variables that are expected to influence the dependent variable are the following;

**Quantity of mango produced (Qm):** It is a continuous variable measured in quintals. The variable is expected to have positive contribution to the amount of mango supplied to the market. Farmers who produce more output per tree are expected to supply more fruit (mango) to the market than those who produce less

**Access to market (AM):** It is a continuous variable measured in walking time (minute) which farmers spend time to sell their product to the market. The closer to the market the

lesser would be the transportation cost and time spent. Therefore, it is hypothesized that this variable is negatively related to market participation and marketable surplus.

**Price of mango (Pm):** This is a continuous variable that measured annual average Price of mango in the reference market in 2007 i.e. the one year lagged price of mango. When mango price is high in the market in the previous year, farmers are motivated to take their produced to the market. Therefore this makes the supply to be directly related to the previous year market price.

**Age of the household (AGE):** Age of the household, a continuous variable, will be taken as one of the explanatory variables. The expected sign will be positive as age is one of the parameters of human capital. As an individual stays long, he will have better knowledge and will decide to allocate more size of land, produce more and supply more.

**Sex of the household head (SEX):** This is dummy variable that will take a value of one if the household head is male and zero otherwise. Both men and women participate in fruit production. Male households have been observed to have a better tendency than female household in fruit production and supply of fruit.

**Family size (FS):** It is a continuous variable, measured in man-equivalent, i.e., the availability of active labor force in the household, which affects farmer's decisions to participate in market. Since production is the function of labor, availability of labor is assumed to have positive relation with volume of supply. However, family size is expected to have positive impact on market volume of sales, but larger family size requires larger amounts for consumption, reducing marketable surplus. In this context family size will be expected to have positive or negative impact on market participation and volume of sale.

**Experience of the HH (EXP):** This is a continuous variable measured in number of years. A household with better experience in mango farming is expected to produce more amounts of mango than the one with only less experience; and, as a result, it is expected to supply more amounts of mango to market. Therefore, experience in mango production is expected to have positive relation with farm level marketable supply of mango.

**Access to market information (AMI):** This is a dummy variable taking value of 1 if the producer have access to market information and zero otherwise. It has been hypothesized that it affects the marketable mango supply of the household positively. The better information farmers have the more likely they supply fruit to the market.

**Access to extension (AE):** The objective of the extension service is introducing farmers to improved agricultural inputs and to better methods of production. In this regard, extension is assumed to have positive contribution to farm level marketable supply of mango. It is a dummy variable with value of one if a household head has access to extension and zero otherwise.

**Education of household head (EDU):** It is a dummy variable and refers to the formal schooling of a respondent during the survey period. Those household heads who will have formal education determines the readiness to accept new ideas and innovations, and easy to get supply, demand and price information and this enhances farmers' willingness to produce more and increase volume of sales. Therefore, formal education was hypothesized to positively influence market participation and marketable surplus.



**Access to credit (AC):** This is a dummy variable, which assumes a value of one if the farmers have credit access and zero otherwise. Access to credit would enhance the financial capacity of the farmer to purchase the necessary inputs and increases output. Therefore, it is hypothesized that access to credit would have positive influence on volume of sales.

### 3. Results and Discussion

#### 3.1. Socio-Demographic Characteristics of Farming Households

This section presents the profile of the sample respondents with regard to their age, sex, family size and education level. There were only 29 female headed households from the 150 sampled respondents. This will imply that there is less opportunity for females.

##### 3.1.1. Age of the Households

The survey on this major demographic factor, measured in years, provided a clue on working ages of households. The average age of the sample households was 39.427 years (Table 4.1), with a range of 54 years where largest proportions of the household head lie within a productive age i.e. (amid of 15 and 64 years). The overall result has thus indicated household heads are prone to use resources with expected positive effect on market participation and marketable surplus.

**Table 1: Socio-demographic characteristics of framing households (in average and %)**

Indicator	Farmers from the three kebeles	
	Mean	STD
Age of HHH	39.427	4.67
Family size	6.2933	4.33
Experience (Mango)	9.3467	4.23

Source: Survey result, 2008

##### 3.1.2. Family size

A family size ranging between two and 13 is witnessed in the farming households. The available data indicates that average family size in each household is 6.2933. Bigger family size has supported to boost volume of supply in the study areas to impact for better participation in markets. Thus existence of larger family size has positively affected the supply of marketable surplus mainly due to lower dependency ratio and reduced cost of input especially for labor.

##### 3.1.3. Experience

The respondents have average 9.3467of years of experience in mango production, (ranging from 3 to 20 years for mango). This reality implied that farming experience of more than seven years is witnessed by 85 %of the respondents in the study area.

### 3.1.4. Education

**Table 2: Education Level of Farm Household**

Education	Frequency	%
Illiterate	30	20.0%
Read and write	60	40.0%
Primary	10	6.67%
Secondary	20	13.33%
Certificate and above	30	20.0%
<b>Total</b>	<b>150</b>	<b>100%</b>

About 20% and 40% of the sample household heads were illiterate and can read and write, respectively. However, 6.67% and 13.33% had joined primary and secondary school respectively; whereas 20% are certificate holders and above. This increased educational entitlement has supported the production and marketing of mango in the study area and has also improved the ability to acquire new idea in relation to market information and improved production of the households, due to that the educational background of the sample household head is believed to be an important feature that determines the readiness of household heads to accept new ideas and innovations.

### 3.1.5. Access to Extension Service

Extension service in Arba Minch Zuria Woreda is fully provided by Woreda agricultural departments. The result highlighted that, learning and knowledge imparting has failed to support households to participate in the market chain.

**Table 3: Extension Contact (in percent)**

Description	%of Household
Totally no	26.67%
Monthly	33.33%
Bi weekly	20.0%
Weekly	13.33%
Twice a year	6.67%
<b>Total</b>	<b>100%</b>

Source: Survey result, 2008

According to the assessment, from all respondents, about 13.33% of them are visited once in a week, while 20%, 33.33% and 6.67% percents of the respondents are entitled to get extension access only once in two weeks, monthly and twice in a year, respectively; while 26.67% of the respondents reported that they had totally no extension visit. The assessment has therefore indicated that the extension service is largely in favor of crop production and is delivered unintentionally.

This is in line with Belay (2003) who indicated that agricultural extension service has failed to bring major impact on productivity of fruits due to weak link between stakes and associate workloads of extension agents.

### 3.1.6. Access to and Use of Credit Availability

Credit grant is important to facilitate the introduction of innovative technologies and for input and output marketing arrangements. Although one micro-finance and four governmental and private banks are available in the study area, no credit is reported by the

respondents from formal banks. Lack of definite credit service is recognized in the study area. Thus the lack of delivery has deterred the financial capacity of producers to purchase the necessary input for the crops. For this reason informal credit system has come up as prevailing feature where producers borrow money from wholesalers during slack seasons. And this condition affected farm-gate prices since farmers are forced to sell their produce at lower prices to their informal money lenders which ultimately triggered to lower returns.

### 3.1.7. Access to Roads

Availability and adequacy of roads is an important prerequisite to link producers with markets in reduced transaction costs. The assessments on this continuum, measured in single feet-hour, revealed 85% and 90% of respondents are reasonably nearer to the service where most households can access the entry within half an hour of normal walk.

### 3.1.8. Access to Markets

This is a distance measured in kilometers to reach the nearest market. The study revealed that the infrastructure in Arba Minch Zuria Woreda is generally satisfactory and it is comparatively close to nearby fruit markets; which in turn has assisted farmers to lessen their transport cost and augment their market surplus and margins. The access has further assisted to increase mango production by the farming households.

The overall research result highlighted closer markets have prompted farmers to plant high value crops such as mango since it is not much forced to transport their produce to distant markets where they sell at loss. The prospect has thus assisted to minimize the transport cost and augment their market surplus considerably.

**Table 4: Access to Services**

Indicator	Total of the three kebeles	
	Mean	STD
<b>Distance to nearest market (Km)</b>	49.80315	45.83615

Source: Survey result, 2008

### 3.1.9. Market Information

Closer look at access to market information depicted that there is no system in place that systematically collect, analyze and disseminate information relevant to the needs of different actors. The triangulation through Focus Group Discussions has also certified the desperate absence of the scheme which is in line with farmers' complaints to the services. The assessment depicted colleague farmers to be the first source of information followed by producers while traders, government extension workers and NGOs are second, third and fourth information sources in Arba Minch Zuria Woreda, respectively. But the overall assessment signified that farmers get limited market information than traders with their own efforts. Owing to inequitable access to information, large proportion of market power is captured by traders who have diversified information source including: neighbors, fruit traders, personal observation and better access to mobile technology which favored traders to adverse risks of loss to this product.

## 3.2. Socio-Demographic Characteristics of Traders

### 3.2.1. Age of the Household Head

The analysis on these demographic characteristics highlighted that, about 53% of traders are youngster between of 18-30 years of age. All the rest are adults with age group of 31- 50 years old. Congruently, with an average age of 30.0869 years (Table 4.5) the maximum and minimum age of HHH is reported as 30 and 54 years of age.

### 3.2.2. Experience

Traders had 5.478 years of experience on average. The research result indicated that, experience does not have much to do on trading as that of farming. According to the result, almost all traders are categorized in productive age group; and with this mere reality, the majority of traders in the sampled markets had a mean 6-10 years of experience. This may explain that, there is no barrier to entry in mango trade with respect to years of experience (Table 5).

**Table 5: Demographic Characteristics of Traders**

Indicator	Total of mango traders from the three kebeles	
	Mean	STD
Age of traders	30.08696	3.591822
Experience	5.478261	1.410015

Source: survey result, 2008

### 3.2.3. Education

Education is a crucial factor for skill development and enhancing marketing decisions. The assessment in this perspective signified 70% of traders are entitled to formal education. This increased educational entitlement has supported the ability to acquire new idea in relation to market information and new technologies.

## 3.3. Characterization of Fruit Production in Arba Minch Zuria Woreda

### 3.3.1. Average Trees Owned by Households

The assessment on average trees on the farming household depicted the existence of large difference between total average number of mango and bearing trees owned by individuals.

**Table 6: Mango Trees Owned by Growers**

Indicator	Total number of traders in the three kebeles	
	Mean	STD
Mango		
Bearing tree number	61.96063	11.74896
Non bearing	40.93701	7.187675

Source: survey result, 2008

## 3.4. Structure, Conduct and Performance of Mango Marketing

### 3.4.1. Market Participants, Their Roles and Linkages

Different mango market participants were identified in the exchange functions between farmers and final consumers. Market participants in the study areas include: producers, local collectors, wholesalers, retailers, processors and final consumers of the product. Even though, each participant was involved in different activities (wholesale, retail, assembly etc),

based on major activity undertaken, the sampled market participants were categorized into different categories. The categories are as follow;

**Producers:** These are the primary or first link actors who cultivate and supply mango fruit to the market. The land for the commodity to produce is on its own plot. Since the product is very perishable in nature, producers sell their produce right after harvest either at PA and/ or *Woreda* market. The process of mango selling had similar selling procedures; where matured fruits are collected once every week or on more intervals for almost four months. But right after collection, the products are taken either to a road side, or to a nearer PA market; and it will be handed-over to the local collectors, processors, retailers and a limited amount is sold directly to consumers. Similarly, due to lack of adequate, reliable and timely market information, farmers are forced to dispose their produce within limited period at low selling price. Basket '*Kirchat*' and containers made of plastic sacks '*madaberia*' are the customary packaging material for collection and product delivery of mango in the study areas. Thus, due to limited production and supply of mango, storage was not a problem at the moment, because what is produced now is marketed immediately right after harvest.

**Local collectors:** These are farmers or part-time traders in assembly markets who collect mango from farmers in village markets for the purpose of reselling it to wholesalers, retailers and consumers in Arba Minch and Hawassa markets. They use their financial resources and their local knowledge to bulk mango from the surrounding area. They play an important role, and they do know areas of surplus well. They often receive cash from wholesalers after or before sell.

**Wholesalers:** These are known for purchase of bulky products with better financial and information capacity. They are major actors in the channel and they purchase mango either directly from farmer or local collectors. They procure and consign large amount of mango to the regional market (Hawassa) and to terminal markets (Addis Ababa). They had two market outlets: they sell at the terminal market and process at regional markets.

**Retailers:** Are known for their limited capacity of purchasing and handling products with low financial and information capacity. Besides, these are the ultimate actors in the market chain that purchase and deliver mango to consumers. But the assessment indicated all respondents in the study area were not licensed to sell mango.

**Processors:** Mango processing in the study area is apparently limited to juice making; where cafes, restaurants and juice houses takes the leads in cuisine preparation.

**Consumers:** From the consumers' point of view, the shorter the marketing chain, the more likely is the retail price going to be affordable. Consumers for this particular study mean, those households who buy and consume mango. They are individual households; they buy the commodity for their own consumption only.

### 3.4.2. Mango Market Channel

Eight marketing channels are exhibited in the study areas, where all channels remained in the region. Accordingly, producer-wholesaler-retailer-consumer channel procure the largest volume of products (40 percent) followed by producer-local collector-wholesaler- retailer-consumer channel which accounted for 20 %of the total mango bought from the market. The volume that passed through producer-wholesaler-retailer-consumer channel is the most important since it accounted the largest marketed volume (40%).

**I. Producer-Retailer-Consumer Channel:** It represented 10% of the total mango in the study area during the survey period. The channel was identified to be the fourth important mango marketing channel in the study area in terms of volume.

**II. Producer-Processor-Consumer Channel:** It accounted for 15% of total mango marketed in the study area during the survey period. The channel was found to be the third important channel in terms of volume.

**III. Producer-Local Collectors-Processor-Consumer Channel:** It accounted for 3% of total mango marketed during the survey period. The channel was found to be the least important in terms of volume.

**IV. Producer-Wholesaler-Processor-Consumer Channel:** It accounted for 4% of total mango marketed during the survey period. The channel was found to be the second least important in terms volume.

**V. Producer-Local Collectors-Wholesaler-Retailer-Cconsumer Channel:** It represented 20% of total mango marketed during the survey period. The channel was found to be the second most important marketing channel in terms of volume.

**VI. Producer-Wholesaler-Retailer-Consumer Channel:** It accounted for 40% of total mango marketed during the survey period. The channel was found to be the first important in terms volume.

**VII. Producer-Consumer Channel:** Represented 5% of the total mango marketed. The channel is the fifth important mango marketing channel in the study area in terms of volume.

### **3.4.3. Market structure**

Market structure in fruit marketing is analyzed based on the number of buyers and sizes of enterprises within the system, the degree of market transparency (market information), and the condition of entry to and exit from trade (Scarborough and Kydd, 1992; Pender *et al.*, 2004). In this study the market structure of mango is assessed using market concentration ratio, degree of market transparency, flow of market price information within markets, and condition of entry into and exit from trade. Consequently, educational level, trade experience, lack of working capital and policy barriers are used as a clue to examine the fruit market structure in Arba Minch Zuria Woreda. The result is listed as follows:

#### **3.4.3.1. The Degree of Market Concentration**

Market concentration refers to the number and relative size distribution of buyers and sellers in the market. For an efficient market, there should be sufficient number of firms (buyers and sellers); firms of appropriate size are needed to fully capture economies of size; there should be no barriers to entry into and exit from the market and should have full market information. Concentration ratio was not calculated for mango due to low number of the sampled wholesalers.

#### **3.4.3.2. Degree of Market Transparency**

The degree of market transparency refers to the timeliness and reliability of market information that the traders have for their marketing decision. In a transparent market, participants have adequate information about their competitors regarding their source of supply and buying prices for better decisions.

Based on this essence, the assessment on the continuum indicated, only 20% and 43% of producers and traders respectively have reported as they have adequate, timely and reliable information in the study area. The research result has implied that, the market of the study area is well characterized by lack of transparency in timeliness and reliability. The result has also ascertained that traders have more privilege of information access than producers. The traders' survey result has indicated that about 75% of the sample traders got price information through combination of telephone, personal observation and other traders. The rest (25%) of the traders reported that they could guess market information from the acts of other traders (e.g. interest to buy large volume of mango at higher prices).

### 3.4.3.3. Barriers to Entry and Exit

Managerial know-how, working capital, legal and policy constraints are used to analyze barriers of mango market entry and exit. The table below summarizes barriers to entry and exit of fruit traders expressed in terms of education level attained, experience in fruit trade, main sources of capital, and access to credit of the sampled mango traders across the sample markets.

#### I) Managerial Know-how

Managerial know-how is assessed to measure the ability and knowledge of mango traders. The continuum is therefore examined by level of traders' formal education and their trade experiences.

##### a) Level of Education

The result of traders' survey in Table 7 indicate that, about 13.04% of the respondents were illiterate; while the remaining 39.13% and 30.43% of trading household heads have attended primary and secondary education, respectively. Since the majority of the traders are entitled to primary education which confirmed that traders' educational background seem to be a barrier to entry into mango trade.

**Table 7: Barriers to Entry and Exit of Mango and Traders (%)**

Barrier	Total number of traders from the three kebeles	%
<b>I. Managerial know- how</b>		
<b>a). <u>Education</u></b>		
<b>illiterate</b>	3	13.04%
<b>read and write</b>	4	17.39%
<b>primary(1-6)</b>	9	39.13%
<b>secondary education(7-12)</b>	7	30.43%
<b>b). <u>Business experience</u></b>		
<b>1-5 years</b>	7	30.43%
<b>6-10 years</b>	12	52.17%
<b>10-20 years</b>	4	17.39%
<b>II. Lack of working capital</b>		
<b>a)<u>Main source of fund</u></b>		
<b>Own capital</b>	10	43.47%
<b>Borrowed from informal sources</b>	4	17.39%
<b>Relatives and friends</b>	8	34.78%
<b>b)<u>Access to credit</u></b>		
<b>Did not have access</b>	15	65.21%
<b>Easy to get credit</b>	3	13.04%
<b>Did not need</b>	5	21.74%

Source: survey result, 2008

## **b) Business Experience**

Business or trade experience refers to the number of years that mango traders were engaged in the trading activity, where their business experience plays crucial role in decision making activity. The traders' survey results in Table 4.6 showed that most of the traders are well experienced in mango trading business for more than 5 years. Out of the surveyed traders about 30.4347%, 52.1739%, and 17.39% had an experience of 1-5; 6- 10 and 10-20 years of business experiences, respectively. The majority of traders in the sampled markets had 6-10 years of experience. This may explain that there is no barrier to entry in mango trade with respect to years of experience.

## **II) Lack of Working Capital**

### **a) Source of Working Capital**

Working capital refers to the amount of money required by mango traders to enter into the trading business. From the survey result, it was observed that the majority of mango traders (43.47%) had their own source of capital for the respective trading activities; while 34.782 % of the traders have got their working capital from their relatives and friends. But the remaining 17.39 % of the traders have borrowed their capital from informal credit sources.

### **b) Access to Credit Services**

However, traders' survey result revealed that about 65.217% of mango traders responded that they did not have access to credit where as 21.739% of the traders are not willing to get the service from the available formal credit sources due to collateral and other complicated processes. The above mentioned factors are reported as constraining reasons to expand the scale of operations and achieve greater efficiency in credit services. This implied that, lack of capital discourages entry into mango trading.

### **3.4.4. Market Conduct**

Market conduct refers to the patterns of behavior of firms. This implies analysis of human behavioral patterns that are not readily identifiable, obtainable, or quantifiable (Pomeroy and Trinidad, 1995). There are no agreed upon procedures for analyzing the elements of market conduct. Rather, some points are put to detect unfair price setting practices, and the conditions under which such practices prevail. In this study conduct of mango market is analyzed in terms of the traders' and price setting, purchasing and selling strategies.

#### **3.4.4.1. Producers' Market Conduct**

The research result pointed out that, supply of mango occurs mainly from April to October. November to March is months when prices of mango reach highest, while May to June is months when mango prices are lowest. According to the assessment mango was highly supplied to market from months of May and June.

The lack of modern post harvest handling practice, and lack of facilitated storage facilities have compelled producers to sell the fruits at prevailing prices. Knowing this, wholesalers put pressure on producers to sell at low price. Starting from production up to marketing, every farmer produces and sells on individual basis. This affected their bargaining power during the sale of mango.



### Price setting and Terms of Payment

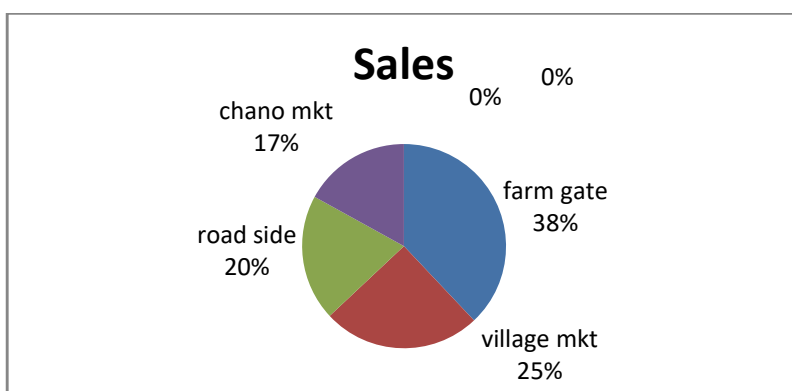
The assessment indicated among all respondents, 90.5% of the farmers have reported as they don't negotiate on price to sell their produce; indicating this large amount of producers are price takers. But 92.3 % of the respondents stated the term of payment is conducted through cash in hand system.

The selling strategy of the respondent farmers was open to any buyer. Thus, all producers sell their produce to anybody as far as they offer better price.

#### 3.4.4.2. Traders' Market Conduct

- **Place to Sell**

The survey result indicated that, almost all transactions made on mango marketing took place with direct contact between sellers and buyers. Similarly 38 % of mango traders purchase the fruit directly from the farmers at farm gate, while 25, 20, and 17% of mango traders purchase the fruit at village markets and roadside market, respectively.



Source: Survey result, 2007

#### Figure1. Market Place to Buy Mango

This is in line with Dawit and Hailemariam (2004), who stated that, three different selling options for horticultural crops which include: right in the field, sell at nearby markets, and least proportion option to access distance markets.

### Price setting and terms of payment

**Table 8: Method of Price Setting and Term of Payment**

Price setting strategy	The three kebeles	%
Negotiating with farmers	3	13.043%
Set by demand and supply	12	52.17%
My self	8	34.78%
Terms of payment		
As soon as you sold	10	43.48%
After some hours	6	30.43%
On the other day after sale	7	26.08%

Source: survey result, 2008

The method of price setting is of crucial importance in mango trading activity. Accompanied by expediency of 52.17 % of market demand and supply, 34.78 % of traders reported, as they set price by themselves. Simultaneously, larger proportion of traders (43.48 %) earn their money instantly after transaction while some of them (26.08 %) receive their money on the other day after sale.

### 3.4.5. Marketing Performance

#### 3.4.5.1. Marketing Costs

Table 13 indicates different types of marketing costs related to the transaction of mango by local collectors, wholesalers, retailers, and processors. The arrangement of marketing costs revealed that storage loss is the highest cost for each marketing agents, except for processors who incur large cost for processing (manufacturing). This is due to the perishable nature of the product. Thus, the storage loss is the highest amount followed by transportation cost. Processors incur highest cost of all other traders because they incur additional cost for processing.

**Table 9: Marketing Cost for Different Marketing Agents (Birr/qt)**

Cost of marketing	Agents				Mean
	Wholesaler	Retailer	Local collector	Processor	
<b>Sack</b>	2.50	2.00	3.00	3.00	2.63
<b>Fill and stitch</b>	2.00	2.00	1.50	3.50	2.25
<b>Load/unload</b>	4.00	4.00	4.00	4.00	4.00
<b>Transportation cost</b>	20.00	-	12	12.00	14.67
<b>Storage cost</b>	3.00	2.00	2.50	2.00	2.38
<b>Storage loss</b>	11.50	11.50	11.50	20.00	13.63
<b>Manufacturing cost</b>	-	-	-	250.00	250.00
<b>Telephone</b>	1.00	0.50	1.00	1.50	1.00
<b>Guard</b>	1.00	3.00	1.50	2.00	1.88
<b>Personal expense</b>	10.00	5.00	8.00	10.00	8.25
<b>Total cost</b>	55.00	30.00	44.00	308.00	300.69

Source: Survey result, 2008

#### 3.4.5.2. Marketing Margin for Mango

The computed marketing margin among different actors and channels indicated the total gross marketing margin (TGMM) of mango is highest in Channel II, III, IV and VII, which accounted for 88.89 % for each; followed by channel V, which accounted for 75.71% of the consumers' price. Similarly of all mango traders, juice houses (processors), get the highest TGMM which accounted for 88.89%, 77.78% and 67.32% of consumers' price. In general producers share in consumer price is less than 20% in all channels except in channel I, V and channel VI.

**Table 10: Marketing Margins of Traders in Different Marketing Channels**

Marketing margin	Mango marketing channels						
	I	II	III	IV	V	VI	VII
TGMM	59.5	80.89	80.89	80.89	76.51	68	80.89
TGMMR	59.5				30.57	34	
TGMMp							
TGMMw				10.11	27.43	54	9.8
TGMLLc			10.11		28.71		11.77
TGMMF	45.5	10.11	10.11	10.11	26.29	47	11.11
NMMr	43.5				21.43	20.4	
NMMp		48.76	34.65	34.65			27.19
NMMw				5.18	8.25	16.5	2.88
NMMlc			7.10		14.54		7.57

Source: Survey result, 2008

Similarly, among the different market actors, juice houses' obtain relatively highest NMM of consumer's price in channel II which accounted to 48.76% followed by retailers in channel I, which accounts for 41.5% of consumers' price.

### 3.4.5.3. Marketing Profit

**Table 11: Marketing Profit for Different Agents (Birr/qt)**

Agents	Mango marketing channels						
	I	II	III	IV	V	VI	VII
<b>Retailers Purchase price</b>	85				250	160	
<b>Market cost</b>	30				30	30	
<b>Selling price</b>	210				350	250	
<b>Market profit</b>	94				70	60	
<b>Processors Purchase price</b>		85	170	170			
<b>Market cost</b>		300	300	300			
<b>Selling price</b>		750	750	750			
<b>Market profit</b>		365	280	280			
<b>Wholesalers Purchase price</b>				85	175	85	175
<b>Market cost</b>				50	50	50	50
<b>Selling price</b>				170	240	170	250
<b>Market profit</b>				35	15	35	25
<b>Local collectors Purchase price</b>			85		85		85
<b>Market cost</b>			44		44		44
<b>Selling price</b>			170		175		175
<b>Market profit</b>			41		46		46

Source: Survey result, 2008

### Mango

The computation of marketing profits of traders indicated that profit of retailers was highest in channel I (Birr 94 per quintal), followed by channel V, and VI, which amount Birr 70 and 60 per quintal respectively. Profit is higher in channel I. This profit was made possible because of the direct purchase from farmers through total elimination of intermediaries (local collectors, wholesalers), and direct sale to consumers. The profit obtained by wholesalers was highest in channel IV, and VI, (Birr 35 per quintal) while the profit

obtained in channel V, and VII is 15 and 25 Birr per quintal respectively due to purchase from local collectors.

Local collectors are beneficiary in channel V, and VII which accounted Birr 46. This is because of direct purchase from farmers at farm gate while at channel III they got lower profit than channel V, and VII due to the lower quality mango purchased. In general, all marketing channels are profitable (efficient).

Processors obtain relatively highest profit per quintal in channel II, III, and IV which amounted 365, 280, and 280 respectively. Profit is somewhat high in channel II, due to direct purchase from farmers. Next to Channel II (i.e. sales direct purchase from farmers), channel III and IV (i.e. sales through local collectors and wholesalers) were comparatively the top three profitable (efficient) channels for sale of mango in the study areas.

### 3.5 Econometric Analyses

#### 3.5.1 Determinants of Mango Market Supply

Mango is produced mainly for market and this crop is an important cash crop among Arba Minch Zuria Woreda farmers in general and for the three PAs in particular. According to the research report, all sample households are good suppliers of the commodity to the market. Analysis of factors affecting farm level marketable supply of mango was found to be important to identify factors constraining mango supply to market. In this respect, 11 variables were hypothesized to affect farm level marketable supply of mango. Multiple linear regression models were employed to identify the factors. For the parameter estimates to be efficient, assumptions of Classical Linear Regression (CLR) model should hold true. Hence, multi-collinearity and heteroscedasticity detection test were performed using appropriate test statistics for each as follows.

**Test for multi co linearity:** All VIF values are less than 10. This indicates absence of serious multi co linearity problem among independent continuous variables.

Since there is no heteroscedasticity problem in the data set, the parameter estimates of the coefficients of the independent variables can be BLUE.

Eleven explanatory variables were hypothesized to determine the household level marketable supply of mango. Among these variables, only six variables namely (quantity of mango produced, education level, and access to market, price, access to extension, and access to credit) were found significant.

## Mango

**Table12: Determinants of Mango Quantity Supplied**

Variables	Coefficients	Robust Std. Err.	t	P- value
( Constant)	-3183.577	673.0935	-4.73	0.000
Sex of HHH	-252.0587	183.3761	-1.37	0.172
Age of HHH	22.23731	15.98274	1.39	0.166
Edu level of HHH	544.4879	128.2392	4.25	0.000
FS of HHH	-2.24888	13.2846	-0.17	0.866
AM	1000.728	198.3283	5.05	0.000
Qm	.3205485	.0465882	6.88	0.000
EXP	-31.46648	17.04717	-1.85	0.067
Price of mango (in 2007)	38.95874	4.735661	8.23	0.000
AE	-677.0551	180.923	-3.74	0.000
AMI	226.4812	162.8841	1.39	0.167
AC	322.2833	153.493	2.10	0.038

Note: Dependent variable- is Mango quantity supplied to the market

\*\*\* Significant at 1 %\*\* Significant at 5 %\* Significant at 10 percent

$N=150$   $R^2 = 0.8655$ ,  $Adjusted R^2 = 0.8547$

**Quantity of mango produced:** The result was as hypothesized. It indicates that households who had produced more amount of mango had also supplied more amount of mango to market than those who had produced less amount of mango due to insignificant consumption of mango at home. The value of the coefficient for production of mango implies that an increase in production of mango by one unit per hectare resulted in an increase in farm level marketable supply of mango by .3205485 quintals.

**Education level:** On average, if mango producer gets educated, the amount of mango supplied to the market increases by 544.487 quintal. This suggests that education improves level of sales that affects the marketable surplus.

**Access to market:** On average, if mango producer gets access to market, the amount of mango supplied to the market increases by 1000.728 quintals. This suggests that access to market information reduces farmers risk aversion behavior of getting a market and decreases marketing costs of farmers that affects the marketable surplus.

**Access to Extension** On average, if a mango producer gets extension contact the amount of mango supplied to the market decreases by -677.0551 quintals.

**Price:** The coefficient of price of mango shows a positive relation to the quantity of mango sold or supplied to market. The positive and significant relationship between the variables indicate that, as the price of mango at market rises, the quantity of mango sold at the market also rises, which in turn increases quantity of mango sold per household per year. The coefficient of the variable also confirms that a unit price increase in the mango market directs to the household to increase yearly mango sales by 38.95874 quintals.

**Access to credit:** On average, if a mango producer gets credit, the amount of mango supplied to the market increases by 322.2833 quintals. This suggests that access to get credit

service reveals information regarding minimization of risk by diversifying their range of access to credit.

However, all the other remaining variables such as: age of the household head, sex, total family size, experience, and market information access did not significantly influence the market supply of mango in the study area as they were expected.

### **3.6. Challenges along the Market Chains**

Shortage of plantings materials and lack of pre and post harvest management technologies are principal setbacks hampering the production of mango in smallholder producers. The overall activities created power imbalances among actors which are largely controlled by intermediaries, and it has resulted into under priced outputs and discouraged the total volume of production. Owing to lower socio-economic characteristics and high perishable nature of the product, farmers' bargaining power is too low to influence price.

Accompanied by dearth of technical expertise, the existing extension service has failed to support, and bring major impact on productivity of mango; this in turn has paved the way for accessing to inequitable information where large proportion of market power is captured by elite traders which favored them to govern the markets. Denial to access to formal credit is also one of the major setbacks which ultimately affected farm gate prices drastically.

Transportation and quality problem are among the priorities identified by mango traders. The way fruits are handled and transported, which expose the products to drastic weathering and physical damage is difficult. Most of the spoilage occurs at the level of packing into sacks, loading, and transporting on the rural rough road. The absence of specialized transportation facility has made mango hauling to become customary and compelled the transportation system to rely on traditional system just like transporting any other commodity on trucks or taxi.

## **4. Summary, Conclusions and Recommendations**

### **4.1. Summary and Conclusions**

Given the large potential for fruit production in the country, their contribution to the total output has been extremely low for many reasons. The most cited reasons include lack of market-oriented production which is too traditional and poorly supported by scientific recommendations; excessive margin mainly due to inefficient and costly transport; absence of fruit market information; inadequate government interventions; and absence of market regulations and legislations and its marketing activity is principally attributed to poor actors skill. As a result, fruit marketing needs due attention in any on-going or future fruit development plan.

Constraints hindering the development of mango are found in all the stages of the chain. At the farm-level, lack of quality seedlings and grafted seedlings has compelled farmers to use inferior and low-yielding materials. Storage facilities and absence of collective bargaining power has also forced individual farmers to accept unfavorable deals.

Due to entire absence of improved varieties, mango production is exclusively based on distribution of mixed materials; consequently the local seed system has come out as best-bet arena and is now a common route for seedling dissemination in Arba Minch Zuria Woreda.

Even though most payments are made instantly, in some areas small payments are some of the marketing malpractices reported in the study area. Small-scale deduction, quotation of lower prices and lack of market information are common challenges in the study area.

Absence of organized institutions and systems, group marketing has put traders in a better position to dominate the roost in pricing. The research result indicated the existence of seven mango channels in Arba Minch Zuria Woreda. Producers-Consumer channel was important to producers and consumers to get acceptable prices; whereas producer-wholesaler-retailer-consumer channel was the most important channel in terms of total volume marketed for mango.

Therefore, a number of actions need to be undertaken in order to promote the development of mango market chain. This particularly includes, capacity building, technological applications, improved extension and plant breeding activities. Infrastructural development is key to supporting the sub-sector. In this arena, emphasis should be given to improved storage and transportation system and offering credit and other services to improve effective production and marketing of the crops.

## **4.2. Recommendations**

Based on the results of the study the following recommendations are made;

- There is a great need to make information available to farmers at the right time and place in response to this challenge; it is also good to develop an integrated agricultural marketing information system that will be linked to Woreda information center, and to link them to government's program.
- Mango producers in Arba Minch Zuria Woreda use little inputs (like FYM). Hence, increasing production and productivity of mango per unit area of land is a better alternative to increase marketable supply of mango. Introduction of improved varieties, application of chemical fertilizers, using of modern technologies, controlling disease and pest practices should be promoted to increase production.
- It is recommended to design an efficient extension system, updating the extension agent's knowledge and skills; and providing farmers with improved production and marketing system.
- Stakeholders and Agricultural and Rural Development Offices have to create awareness about the specialty of markets. Continuous education and training on production and marketing will have a positive impact on their attitudes.
- Promoting potentially collective organizations (cooperatives) which are assumed to play important role in improving the bargaining position of the producers and creating, lowering transaction costs, reducing the level of oligopolistic market type by creating competitive market.

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