Value Chain Analysis of Banana in Mizan Aman Town of Benchi Maji Zone, Southwest Ethiopia

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Abstract— This study was aimed at analyzing value chain of banana in Mizan-Aman town, Bench Maji zone with specific objectives of describing important marketing channels and actors involved on banana value chain, dealing the determinant of supply of banana and identify constraints in value chain of the banana. The data were collected from both primary and secondary sources. The primary data for this study were collected through application of appropriate statistical procedures. The data were analyzed by using both descriptive and Econometric models. Accordingly, the value chain activities in the survey period were production, marketing and consumption. To identify factors affecting farm level marketable supply of banana, OLS regression analysis was employed. About 10 variables were hypothesized to affect farm level of marketable supply of banana in the study area. Age of respondent, experience, family size, education level of the household head, market information and distance to the market affects farm level marketable supply of banana positively and negatively. The study result exhibited also that banana producers are faced lack market, lack of cooperatives and low price of banana. The result revealed that banana passes through several intermediaries with little value being added before reaching the end users. Therefore, farmers are forced to capture a lower share of profit margin. The highest marketing cost is incurred by wholesalers and the highest market profit is shared by retailers. The value chain analysis revealed that the major actors in the area are producers, local collectors, wholesalers, retailers and consumers. The study showed that Input Suppliers, Improved infrastructure and strengthening the linkage/interaction among value chain actors is necessary for good marketing of banana.
Keywords—Value chain analysis, banana, Mizan-Aman town, market supply of banana, Value addition, determinants.

I. INTRODUCTION

Dessert banana and plantain *(Musa sp.)* are the fourth most important staple food crops in the world after rice, wheat and maize (Salvador, 2007). Dessert banana in particular is a commercially important crop in the global trade, both by volume and value, as a leading fruit (Salvador, 2007). For many African, Asian and Latin American countries, banana is as well one of the most important crops for foreign exchange earnings (FAOSTAT, 2012).

Banana is one of the major fruits produced and consumed domestically in the country. It is produced by both large-scale commercial farms and small-scale producers. Currently, one can get banana in small shops to large supermarkets, which shows the growing of the market. Retailers also sell by roadsides; while moving from place to place (Dawit A.andAsmare D., 2008). Dessert banana is also the major fruit crop that is most widely grown and consumed in Ethiopia. It is cultivated in several parts where the growing conditions are favorable. Especially in the south and southwestern parts of the country, it is of great socioeconomic importance contributing significantly to the overall well-being of the rural communities including food security, income generation and job creation. Banana in Ethiopia covers about 59.64% (53,956.16 hectares) of the total fruit area, about 68.00% (478,251.04 tones) of the total fruits produced, and about 38.30%(2,574,035) of the total fruit producing farmers [CSA, 2014]. On the other hand, about 68.72% (37,076.85 hectares) hectares of land covered by banana, about 77.53% (370,784.17 tones) of the banana produced and 22.38% (1,504,207) of the banana producers in Ethiopia are found in the Southern Nations Nationalities and Peoples' National Regional State- SNNPRS (CSA, 2014). Gamo-Gofa, Bench-Maji and Sheka zones are among the major banana producing zones of the SNNPRS, of which Gamo-Gofa zone alone covers over 70% of the total banana marketed across the major market outlets in Ethiopia (CFC, 2004).

Despite the above stated facts and the concerted effort being made by the government of Ethiopia to promote and diversify its agricultural outputs as well as exports at large, the attention given to banana especially in terms of research, extension services, investment endeavors and overall value-chain management has been very limited. In most parts of the country, its production has yet been limited to backyard and small-scale productions with the

produce largely supplied to local markets. Large scale banana production in Ethiopia covers only 0.19 % (1,910.97 hectares) of the total area covered by banana and 0.22% (17, 924.59 tones) of the total banana produced in Ethiopia (CSA, 2014). As stated by (Tekle et al., 2014), lack of improved varieties is as well one of the critical factors that affect the production and productivity of banana in Ethiopia. As a result, the productivity of banana in most places in Ethiopia is 5-8.95 tons/ha [CSA, 2014], which is far below the world average of 15.8 tons/ha (FAOSTAT, 2012). A summary report by [Nicholas, 2013] based on a baseline survey results of the Agricultural Transformation Agency of Ethiopia (ATA) also indicate that the average yield and revenue obtained from banana sales by banana growing households in Ethiopia is only 8,759 kg/ha and 21.3 Birr/year respectively.

Various studies have identified that the yield of several crops including banana is influenced by various determinants (factors) such as inputs of production, agronomic and management practices, and producer and farm characteristics (Bathan, B.M. and Lanican F. A. (2010)., Ahmad et al., 2005, Javed et al., 2001, Bakhsh, 2005). However, banana trade beyond a local scale be it domestic or foreign, suffers from lack of production efficiency, exacerbated by recent disease outbreaks, and a lack of marketing systems' efficiency and market knowledge (Akankwasa et al., 2008). However, in Ethiopia, no empirical data is so far available in this respect whereby theexplanatory variables that influence the yield of banana could be identified and quantified. In order to fully utilize the production and export potential of banana, there need to be efficient market domestically. However, little is known as to the exact production potential, how the national banana markets function and what are the major constraints and opportunities in the market chain starting from production (Dawit A.andAsmare D., 2008).Cognizant of this, this study was undertaken to assess and identify banana value chain and the factors Affecting market supply of banana with a subsequent aim to provide relevant information that help reinforce concomitant interventions into the future.

II. RESEARCH METHODOLOGY

2.1. Description of the Study Area

Mizan Aman is capital town of Benchi Maji zone in southern nation nationalities of Ethiopia located at 7'o N35'85' E with elevation of 1451 meter above sea level. The town is located in 561 km far from adds Ababa 836 km far from Hawassa which is the capital city of SNNPR. Based on the 2007 census conducted by CSA Mizan Aman has total population 34,080 of whom 18,138 are men and 15,942 women the Majority of inhabitant are orthodox Christian 45.997% of the population 38.83% are Protestants 17.71% are Muslim and 10.05% practical traditional believer (https://en.m.wikipedia.org./wiki/Mizan-aman).

2.2. Methods of Data Collection

Both quantitative and qualitative data collection methods were employed in the primary and secondary information collection process. The primary data was collected through interviews by using a semi-structured questionnaire with key informants from the supply chain actors, all the way from the producers' level up until the final consumers. The structure of the questionnaire was designed as both open and close ended questions. In addition to the questionnaires, focus group discussions were carried out with all banana value chain actors (producers, traders, farmer cooperatives/unions, researchers, extension workers and regulatory bodies). The secondary data was acquired from published reports of different levels of actors such as line national, zonal, district and village level agricultural extension, research, marketing as well as internet (website) search based information.

2.3. Sampling and Sampling Technique

For this study, in order to select a representative sample a multi-stage purposive and random sampling technique were implemented to select banana producer kebeles and sample farm households. In the first stage, with the consultation of agricultural experts and development agents, Mizan Aman town were selected purposively. In the second stage, out of five kebeles in the town 4 banana producer kebeles were purposively selected based on the volume of banana production, accessibility and communication. In the third stage, using the household list of the sampled kebeles 80 sample respondents were selected randomly based on proportional to the population size of the selected kebeles. The next step was determining the actual sample size. The sample size was determined based on the following simplified formula (Yemane, 1967).

$$n=\frac{N}{1+N(e)^2} n=\frac{400}{1+400(0.1)^2} \quad n = 80$$

respondents

Where, **n** is number of respondent farmers,

nis the total number of fruits farmers,

eis the precision level. A 90% confidence level will be taken and e= 0.1,

2.3. Data Analysis

The SPSS (Statistical Package for Social Science) software was used for data entry and analysis. A descriptive statistics was used that include parameters such as sum, mean, percentage, etc. In order to identify the determinants of the

banana productivity, multiple linear regressions was used for identifying the determinants of market supply.

2.3.1. Model specification

Econometric analysis will be used to determine the relationship/association between dependent and independent variables (Jeffery, 2000; Green, 2003; Gujarat, 2004). Hence in this study multiple linear regression models were used to analyze determinants of marketable supply of banana in the study area. The economic model specification of the variables indicated as follows.

$$Yi = B0 + B1 X1 + B2 X2 + B 3X3 + B 4X4 + B 5X5...+ B 10X10$$

Where: B0= is the intercept, B1, B2...B10 = are coefficients, Yi = Quantity of potato supplied to market, X1...Xn= Explanatory variables.

III.   RESULTS AND DISCUSSION
3.1. Descriptive analysis

As it shown in table 1, the sex distribution of respondents were male dominated; i.e., 42 (52.5%) were males and 38 (47.5%) were females. This implies that the participation of women in banana cultivation was very low; this might be related with the culture and belief of the society. The marital status of the respondents were dominated by unmarried farmers; i.e., the overwhelming majority of the respondents 44 (55.0%) were unmarried and the remaining are married which accounts for 36(45.0%) of total respondents. This implies that the workload of single individual will increase if they are unmarried and simultaneously it also decreases the productivity of an individual.

Table.1: Demographic profile of sample /respondent/ farmers

		Frequency	Percent
Sex of respondent	Male	42	52.5
	Female	38	47.5
	Total	80	100
Marital status	Married	36	45
	Unmarried	44	55
	Total	80	100
Educational level	Literate	50	62.5
	Illiterate	30	37.5
	Total	80	100

As revealed in the study, the majority of farmers 50(62.5%) were literate, while the remaining are illiterate which accounts 30(37.5%). As the educational entitlement increased the production and marketing of banana in the study area also increased and also improved the ability to

acquire new idea in relation to market information and improved production of the households. This is in line with result of Ayelech (2011) a study on market chain of fruit in Gomma Woreda, Oromiya region, suggested that if fruit producer gets educated the amount of fruit supplied to the market increases, which suggests that education improves level of sales that affects the volume of fruits supplied to the market.

3.2. Respondents profile on continuous variable

The mean age of respondents was between the age group 18 to 65 which is on average 27.85. This shows productive age group. This implies that all respondents were able to use resource wisely and work hard.With respect to the family size of the respondents, as depicted in Table 2, the average family size for the sampled respondents were 5.02. The existence of high family size will have a positive impact on the volume of banana production and marketing and it reduces the labor cost. The descriptive result indicated that the location of main road from the farm place on average for sampled farmers is 1.06 km which means as the distance of main road decreases the volume of banana transported to market become increases and transportation cost becomes lower. The average number of years that an individual stayed in production and supply of banana were 14.80 years.

Table.2: Respondent's status on continuous variables

	N	Mean	St. deviation
Age of respondent	80	27.85	13.025
Family size	80	5.02	1.800
Experience	80	14.8	8.678
Distance to the nearest mkt	80	1.06	0.476

As it is indicated in the Table 2 above, those respondents who lack access of credit which accounts 64(80%) dominate those farmers that have good access to credit which accounts 16(20%); i.e., the overwhelming majority of the respondents 64 (80.0%) have no access to credit and the remaining have access which accounts for 16 (20.0%) of total respondents; it implies that the opportunity to get input will decrease and simultaneously it also decreases the productivity of an individual.   Regarding to extension service the majority of farmers 51 (63.8%) were given extension service, while the remaining which accounts 29 (36.2%) were not accessible for this. Therefore, the majority of the farmer respondents have access of extension service.

As there is more access to extension service it leads to improved method of production and supply of banana in the study area also increased and improved production of the households.

Table.3: Access to services of respondents

		Frequency	Percent
Access to credit	Yes	16	20
	No	64	80
	Total	80	100
Availability of extension service	Yes	51	63.8
	No	29	36.2
	Total	80	100
Access of market	Yes	42	52.5
	No	38	47.5
information	Total	8o	100

With respect to market information the result in table 4.1 revealed that about 42(52.5%) of the respondents have access to market information and about 38(47.5%) of the respondents have no access to market information. This helps to make good market decision this increase the supply of banana and leads to improve individual capital. Ethiopian agricultural markets are characterized by inadequate market information system (Mulat et al., 2005). It is indicated that Lack of market information limit producers' participation in marketing (Giuliano et al., 2005; Gibbon et al., 2008).

3.3. Value Chain Mapping of Banana in Mizan-Aman Town

The value chain mapping for banana producer in Mizan Aman town is depicted as:
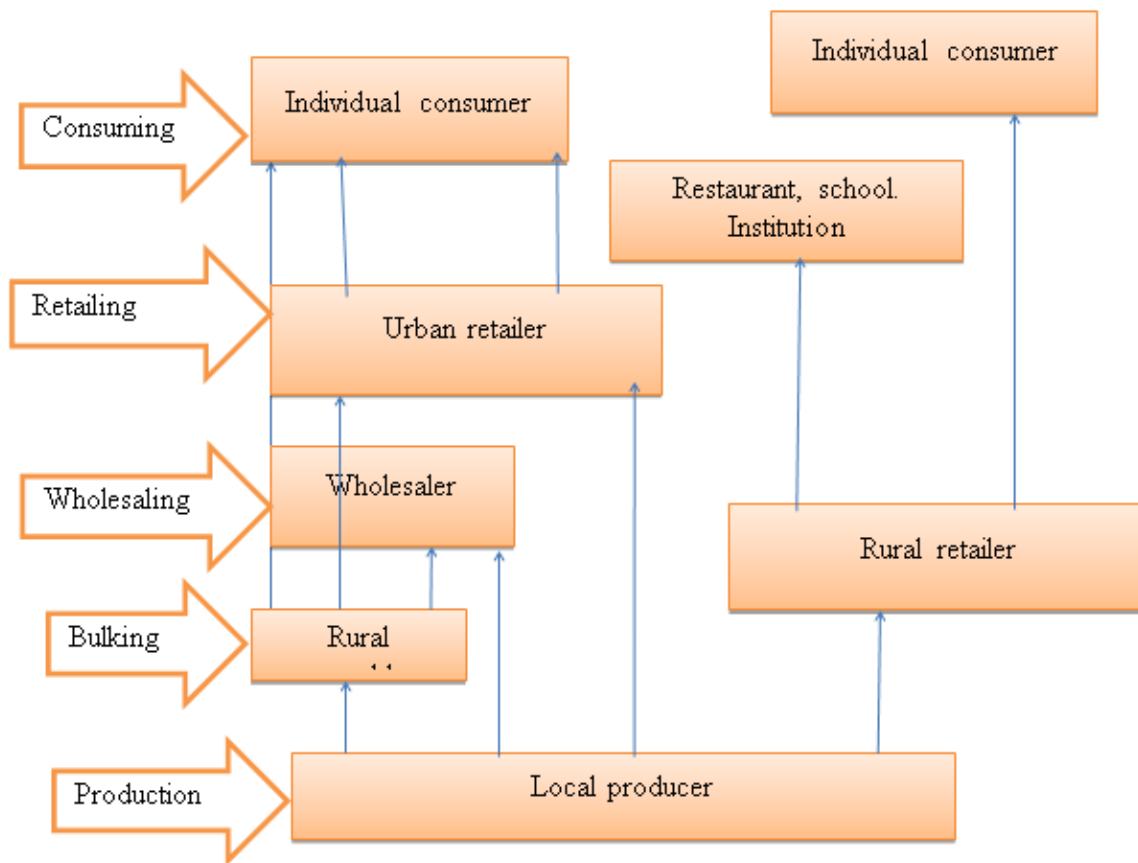

Fig.1: value chain mapping of banana producer

3.3.1. Value chain actors and Their Roles

In this study, different banana value chain actors were identified in the exchange functions between farmer and final consumer. Market participants in the study areas include: producer, local collectors, wholesalers, retailers and final consumers of the product. Even though, each participant was involved in different activities (wholesale,

retail, assembly etc.), based on major activities undertaken, value chain actors were categorized into different categories.

Producers: they were primary or first link actors who cultivate and supply banana to the market. The land for the aforementioned produces was on its own plot to produce the already stated crops. Since the commodities are very

perishable in nature, producers sell their produce right after harvest either at Woreda market and/or other market. The role of small-scale farmers is by and large limited to production and they have no much control over the price that they receive from their produce.

Local collectors: they were farmers or part time traders in assembly markets who collect Banana from producers in village markets for the purpose of reselling it to wholesalers or retailers in Jimma market. They have direct contact with farmers and spent majority of their time in searching of fruits. They used their financial resources and their local knowledge to bulk banana from the surrounding area. They played significant role and they do know areas of surplus well. They often receive cash from wholesalers after or before sell.

Wholesalers: These were well-known for purchase of bulky commodities with better financial and information capability. They purchased banana either directly from farmer or Local collectors. They bought and consign large amount of banana to the Jimma market.

Retailers: known for their limited capacity of procuring and handling produces with low financial and information capability. In addition, they were the final actors in the market chain that buy and deliver banana to consumers.

Consumers: consumers think that if the chain becomes shorter and shorter the price will be reduced. Consumers for this specific study mean those family units who bought and consume banana. They were individual family unit; they bought the products for their own consumption.

3.3.2. Market Channel for Banana
Banana is an important fruit crop in Ethiopia and goes through the hands of several supply chain actors. Based on

the direction of flow, 5 different banana market channels were identified in this study. As illustrated in the chain map, the product flow begins from the farmer and ends with the consumer. Market channel alternatives for banana marketing in the town were illustrated as:

Channel I: Producers →Local collector→Wholesaler→Retailer→ Consumer

Channel II: Producers→ Local collector→ Retailer→ Consumer

Channel III: Producers →Wholesaler →Retailer → Consumer

Channel VI: Producers→Retailer→Consumer

Channel V: Producers → Consumer

Figure 2. Market channel of respondents

3.4. Factors Affecting Banana Market Supply
3.4.1. Econometric Results of OLS Model
For this study ten explanatory variables are hypothesized to determine factors affect household level marketable supply of banana to market. The hypothesized variables were; Sex of the household, age of the household, education level of household, extension access, credit access, distance to the nearest market, family size and market information. Based on OLS analysis five variables are found that significantly affect the marketable supply of banana at household level. Education level of the household head, market information, distance to the market, and extension service are variable that significantly influence the marketable supply of banana by household. The remaining 6 variables were found have no significant effect on banana market supply. The summery table of the variables with their level of significance was presented on table below.

Table.4: OLS estimation of factor affecting supply of banana

Dependent Variable: supply of banana

N=80,R-squared = 0.334,Adj R-squared = 0.238

Variables	Coefficients	T	Sig.
Constant	0.537		
Sex of respondent	0.202	1.818	0.073**
Education level	0.185	1.742	0.086**
Marital status	0.130	0.957	0.342
Credit access	0.113	0.869	0.388
Extension service	0.117	1.057	0.294
Age of respondent	-0.009	-1.726	0.089**
Family size	0.007	0.195	0.846
Experience	-0.019	-2.217	0.008*
Distance to the nearest market	-0.396	-3.638	0.001*
Market information	0.195	1.851	0.068**

Source: own computation, 2018.

* Significant at 1 percent, ** Significant at 10 percent

Education level of house hold head: Education has shown positive effect on banana quantity sold with significance level at 10%. On average, if banana producer gets educated, the amount of banana supplied to the market increases by 0. 185quintal.The result further indicated that, education has improved the producing household ability to acquire new idea in relation to market information and improved production which in turn enhanced productivity and thereby increased marketable supply of banana. This result is in line with Ayelech (2011)who explained if avocado producer get educated, the amount of avocado supplied to the market increases which suggests that education improves level of sales that affects the marketable surplus and also Astewel (2010) who illustrate if rice producer gets educated, the amount of rice supplied to the market increases which suggests that education improves level of sales that affects the marketable surplus.

Market information: Market information has shown positive effect on fruit quantity supplied with significance level at 10%. On average, if banana producer gets market information, the amount of banana supplied to the market increases by 0.195Quintal. This is similar with the finding Adugna (2009) who illustrate if papaya and tomato producer gets information, the amount of papaya and tomato supplied to the market increases. This finding is in line with the study of (Agete, 2014).

Distance to market: Distance to market was expected to adversely affect the volume of total sales. As hypothesized, this variable is negatively related to marketable surplus of banana. The result shows that distance to the market significantly and negatively affected marketable surplus at 1% confidence level. This implies that, an increase in one kilometer indicates a decrease in the quantity supplied by 0. 396quintals.This result also in line with Wolday (1994) and Ayelech (2011) who indicated that distance to market caused marketsurplus of food grain, poultry and avocado to decline. A study conducted in Kenya on factors influencing smallholder farmers' market participation revealed that distance to the market significantly reduces the percentage of sales volume for milk (Omiti et al., 2009). Orientation due to its effect of reducing marketing costs. Accordingly, households further away from market places have lower market participation. A finding by Efa et al (2016) also revealed that as the distance from the nearest market increases, variable transport costs increase and this discourages smallholder farmers from selling high volumes of teff.

Age of the respondent: age of the respondents affects negatively the marketed supply at 10% of significant. On average, if banana farmers get older and older, the amount of banana supplied to the market decreases by 0.009 quintals. This implies that household's tendency to participate in banana marketing decreases as he/she gets older and older. Thus, those households who are younger have higher tendencies to be engaged in commercial level of banana production as they would be more active in accessing market information through the use of mobile phone and other devices (Getahun et al., 2017). This result is in line with the finding of Getahun et al (2017), Barret (2007), Samuel and Sharp (2008), In contrary to our finding, a finding by Christopher et al(2014) revealed that farmer's age had a positive and significant impact on the decision to participate in the market.

Experience: experience affects negatively the market supply at 1% of significant. On average, if banana farmer have long period experience his age become high and decrease the market supply by 0.019quintals.A farmer with longer period of experience in production was assumed to have a better knowledge than who has a lower experience in agriculture because through time producers acquire skill about marketing and supply better than those who are less experienced. It was also assumed that as age increases the production capacity will decrease and amount produced and marketed supply decrease. Hence, both inverse and direct relation was assumed to the amount supplied.

Sex of the household head: on this study the sex of respondent affects the market supply positively at 10% of significant. This indicates that on average, when the numbers of male respondent increase by one the market supply of banana also increase by 0.202quintals.Contrary to the finding the gender of the household head had a significant but negative effect on farmers' decision to participate in the red bean market.

3.5. Major Constraints of banana marketing

Marketing constraints have been identified from the producers' perspectives. The producers' explained marketing constraints have been identified and presented in (Table, 4.3). The results shows about 56.25% associated with low prices of the products, 68.75% said lack of market, 62.5% is perish-ability and 87.5% reported lack of cooperative were the major constraints in the marketing system. While, lack of transportation and lack of market information are the less marketing constraints as compared the other constraints.

Table.5: Marketing constraints for producers

Alternatives	Yes		No	
Constraints	Frequency	Percentage	Frequency	Percentage
Low price	45	56.25	35	43.75
Lack of transportation	25	31.25	55	68.75
Lack of information	14	17.5	66	82.5
Perishability	50	62.5	30	37.5
Lack of cooperative	70	87.5	10	12.5
Lack of market	55	68.75	25	31.25

Source: own survey, 2018

IV. CONCLUSION

A number of factors may have affected the amount of marketable supply of banana at farm level in the country. In the case of Mizan-Aman town to identify factors affecting farm level marketable supply of fruit, OLS regression analysis was employed. About 10 variables were hypothesized to affect farm level marketable supply of fruit in the study area. Six variables were found to be significant variables in affecting farm level marketable supply of banana. Age of respondent, experience, family size, education level of the household head, market information (positively) and distance to the market (negatively) by household as predictable. Therefore it was recommended that Improving infrastructure, strengthening the linkage/interaction among value chain actors, supporting by extension service, market information and access to credit is paramount for improving banana production and market supply in the study area.

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