# Analysis of Market Chains of Forest Coffee in Southwest Ethiopia

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**Abstract:** This study was initiated with the objective of assessing the existing market structure, conduct and Performance of forest coffee; examine its cost and profitability and point out determinants of its Supply and problems in their market chain. Structure-Conduct-performance model and regression analysis were used to analyze the data. The result of the investigation of the market structure indicated that producers, assemblers and wholesalers are the major actors involved in the market chain of coffee. The local coffee Wholesalers' concentration index (40% for Gera and 29.64% for shebe) revealed that there is a threat of Oligopoly in the market structure of coffee especially in Gera area. The market conduct analysis revealed that price setting mechanism is largely determined by the benevolence of buyers and the existing market force in the producers and exporters market respectively. The margin analysis indicated that exporters take the largest profit margin (50.98%) in the coffee market chain. The ordinary least square regression analysis with $R^2=0.57$ also pointed out that price, educational level of households, transportation cost and level of production were found to have a significant impact on the supply of the coffee in the study area.

**Key words:** Market structure · Market conduct · Market performance · Market concentration · Marketing Margin

## INTRODUCTION

**Background and Justification:** Arabica coffee (*Coffea arabica* L., Rubiaceae) has its centre of origin in Southwestern and Southeastern Ethiopia, where it occurs naturally in the undergrowth of Afromontane rainforests between 1,000 and 2,000 m above sea level (asl). Wild coffee is defined as coffee that grows and regenerates spontaneously in its natural habitat and is genetically different from known cultivars and landraces [1]. The gene pool of these wild coffee populations is of national and international importance. Because it has high potential for the breeding of new coffee varieties [2]. In addition, the original forest habitat of wild coffee is part of the Eastern Afromontane Biodiversity Hotspot, which is internationally recognized for its plant diversity, including large numbers of endemic species and high threat of habitat destruction [3]. Indigenous communities have been utilizing wild coffee for centuries and the art of preparing coffee is a central element of the Ethiopian culture. Furthermore, coffee is Ethiopia's most important export crop contributing 41 % of the country's foreign currency income [4]. Modern type plantations only constitute 6 % of the total coffee production area in Ethiopia, while the majority of the production area consists of montane rainforest with wild coffee [5]. Local farmers simply pick wild coffee fruits inside these forests, or manage wild coffee stands by removing competing undergrowth vegetation and some canopy trees. Coffee is their main source of cash income.

In the past three decades, however, large parts of the Ethiopian rainforests with wild Coffee have been modified or destroyed by conversion to agricultural land, new settlements and timber extraction [6]. This therefore calls for designing strategies which could possibly reduce the destruction of these forests through creation of appropriate market linkage through which the primary producers of forest coffee and other important actors in the market chain can be benefited. However, such an endeavor can be facilitated with knowledge of the existing market chain and profitability of forest coffee production in the marketing system. But no study has been made in the past to deal with this issue and this study therefore intends to fill this gap with the following objectives.

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**Objective**

**General Objective:** The general objective of this study was to study the marketing system of forest coffee in southwestern Ethiopia.

**Specific Objective:**

- To characterize the existing market structure, conduct and performance of the forest coffee
- To assess the cost and profitability of forest coffee production and marketing by the actors in the chain
- To identify the determinants of supply of forest coffee
- To identify problems associated with the existing market chain of forest coffee

**Methodology**

**Description of the Study Area:** This study has been undertaken between January 2009 and September 2010 in Gera and Shebe weredas of southwestern Ethiopia where the belt of Belete-Gera forest extends

**Gera Wereda:** Gera is one of the weredas of Jima zone which is covered by the belt of Belete-Gera forest. The wereda has an area of 144,340ha with topography of mountainous (30%), flat land (5%) and Hilly areas (65%).It has an altitude that ranges between 1500-3000 meter above sea level. The daily annual temperature ranges between 14 and $25^0$c and the daily rainfall ranges between 1800 and 2080. 56% of the land is covered by forests, 50% with shrubs and 4.64% with grass and the rest with other vegetations.

The total no. of households in the wereda is estimated to be 21200 out of which 20473 are male headed and 727 are female headed. The average family size in these households is 6.Maize, teff; sorghum, wheat and barley are the major crops growing in the area whereas cattle rearing are the major livestock activity in the area. Honey trading and cattle fattening are the important off-farm activities of the households in the area.

**Shebe Wereda:** The wereda has a total population of about 96899.The area is characterized by a mid-land, mixed agriculture, moderately productive, food sufficient area. Crops include teff, maize, sorghum, coffee, chat, pepper. Coffee, chat and pepper are produced by the wealthier groups. Livestock sales (cattle and shoats) supplement crop income. Poorer groups grow enset and get some income from labor (agricultural and construction).

**Type of Data:** Both cross-sectional and time-series data were used from primary and secondary sources.

**Method of Data Collection:** Informal survey has been undertaken to have first hand information about the area. In this survey, zonal and wereda beauro have been consulted for secondary information about the area and PRA tools (group discussion and transect walk) have been employed to gather basic information from the people that can serve as an input for designing questionnaire for the subsequent (formal) survey.

Formal survey was then undertaken in which six Pas from the two weredas and a total of 168 producers from all the Pas were purposively selected and interviewed by using a structured questionnaire. In addition middlemen (wholesalers, assemblers and retailers) involved in the marketing of forest coffee have been consulted by using a structured questionnaire.

Finally, survey of the terminal market (Addis Ababa market) has been undertaken to contact the traders of forest coffee in that market.

**Method of Data Analysis:** Descriptive statistics such as mean and frequency have been employed to describe the existing socio-demographic characteristic of producers and production of forest coffee in the study areas.

Structure-conduct-Performance model was employed to assess the nature of the existing market in the overall chain. The market structure was analyzed in terms of identifying the market channel, explaining the type, function and volume of sale of each actor in the chain and analysis of the market concentration index for the major actors in the chain..A suggestion that four enterprise concentration ratio of 50% or more is the indicative of a strongly oligopolistic industry, of 25-50 percent a weak oligopoly and less than that, an unconcentrated industry is used as a rule of thumb for evaluating the concentration ratio [7]. The greater the degree of concentration, the greater will be the possibility of non-competitive behavior such as collusion in the market. The concentration index was calculated by using the following formula.

$$S_i = \frac{V_i}{\Sigma v_i}$$

Where $S_i$=market share of buyer i, $V_i$=amount of product handled by buyer I and $?V_i$=total

**Product Handled:**

$$C = \Sigma Si$$

where C= concentration ratios=percentage share of the i$^{th}$ firm and r=number of the largest firms for which the ratio is going to be calculated.

- The market conduct was explained in terms of the price setting behavior/mechanism of actors in the market chain.
- the performance of the market was evaluated by the use of margin analysis which measure the percentage share of price that each actor could take from the final price paid by consumers.
- in addition, a regression analysis was employed to identify the determinants of supply of forest coffee in the area. The multiple regression model was specified as Y (amount of supply)=f(price, level of production, cost of transportation, educational level, experience in production, age of the household head,sex of the household head and access to market information). The econometric model specification of supply functions in matrix notation was estimated by

$$Y = Bx + U$$

Where Y= Forest coffee supplied to the market
        B= a vector of estimated coefficient of the explanatory variables
        X= a vector of explanatory variables
        U= disturbance term

**Definition of Variables:** Depending on the information obtained from the survey, the following variables were identified as dependent and independent variables for the above econometric model

**Dependent Variable**
**Quantity Supplied:** The amount of coffee and honey actually supplied by households to the market is considered as dependent variable.

**Independent Variables**
**Price of the NTFPs:** this variable was hypothesized to be the influencing (independent) variable and is assumed to have a positive and significant impact on the supply of forest coffee

**Educational Status of the Household:** This variable is also assumed to to have a positive and significant impact on the supply of forest coffee

**Level of Production:** The average amount of production by households is assumed to have a positive and significant impact on the supply of forest coffee

**Cost of Transportation:** This variable was hypothesized to have a negative and significant impact on the supply of forest coffee

**Access to Market Information:** This variable is assumed to have a positive and significant impact on the amount of supply of forest coffee

**Experience in Production:** This variable is also assumed to have a positive and significant impact on the amount of supply

**Age of the Households:** Since this variable has a direct relation with experience in production, it was assumed that it will have a positive and significant influence on the supply of forest coffee

**Sex of the Household:** This is a dummy variable that takes the value of one if the household head is male and zero otherwise. Both male and female participate in the supply of forest coffee. But males have a better tendency to supply more than females due to different discriminating socioeconomic factors in the society.

## RESULT AND DISCUSSION

This section presents the results of the descriptive and econometric analysis. The descriptive analysis describes the general characteristics of the sample households and the market chain of forest coffee. The econometric analysis is used to identify factors that influence the supply of forest coffee in the study areas and the overall findings of the study are presented as follows

**Sociodemographic Characteristic of Sample Households:** The overall profile of the sample respondents with regard to their socio-demographic situation is presented by the following table 1.

Table 1: Socio demographic characteristics of households

| | Gera | | Shebe | |
|---|---|---|---|---|
| Characteristics | N | Mean | N | Mean |
| Age of household head | 71 | 45 | 70 | 40 |
| Experience in the production of NTFP | 76 | 17 | 76 | 18 |
| | N | Frequency (%) | N | Frequency (%) |
| Sex of household head | | | | |
| -male | 79 | 94.5 | 77 | 90 |
| -female | | 5.5 | | 10 |
| Religion | | | | |
| -Muslim | 79 | 79.7 | 79 | 92.3 |
| -Orthodox | | 17.7 | | 7.7 |
| -Other | | 2.5 | | |
| Educational status | | | | |
| -illiterate | 77 | 36.4 | 76 | 34 |
| -Read and write | | 15.6 | | 14 |
| -elementary (1-6) | | 39 | | 34 |
| -Junior (7-8) | | 7.8 | | 12 |
| - H i g h   school (9-12) | | 1.3 | | 6 |

Source;-Survey resuly,2009/10

Table 2: Volume of production of NTFPs by a single producer in one production season

| | Gera | | Shebe | |
|---|---|---|---|---|
| Characteristics | N | mean | N | mean |
| No. of forest coffee tress owned | 69 | 9784 | 70 | 4721 |
| Amount of coffee harvested at the time of good harvest (Kg/ha) | 79 | 1504 | 78 | 1360 |
| Amount of coffee harvested at the time of poor harvest (Kg/ha) | 79 | 595 | 78 | 340 |
| Average production (kg/ha) | 79 | 1091 | 78 | 850 |

Source;-Survey result, 2009/10

According to the result shown in table 1, almost all of the household respondents are male and fall in a relatively similar age group in the two weredas. There is also an indication that a large proportion of forest coffee producers (39% in Gera) and (34% in Shebe) have completed their education up to the elementary level and hence are in a better position to easily uptake technologies and technical advices in their production.

The result also indicated that there is a long experience of production of forest coffee (an average of 17 and 18 Years) in the surveyed areas with farming being a major supplementary economic activity.

**Production of Forest Coffee:** The level of production of forest coffee in the study area can be described by the following table 2.

The findings of the study in table 2 indicates that the average number of forest coffee tree owned by a single producer in Gera is larger as compared with that of Shebe.This may be associated with the fact that Gera has a wider forest coverage which can provide a favorable environment for forest coffee as compared with that of Shebe. In addition, the average productivity of forest coffee (1091kg/ha) in Gera is greater as compared with the productivity in Shebe area. This can again be associated with the more favorable environment of Gera with a wider forest and diversified vegetation cover as compared with that of shebe.Furthermore, the existence of coffee research centre in the nearby area of forest coffee producers in Gera has contributed a lot for the increment of the productivity through the provision of appropriate technologies and technical advices in the production process.  These average yield figures of coffee producers

in the study areas were found to be similar with that of producers in Thailand and east Timor. The average coffee production per hectare in the north and southern part of the country were 544 and 1206kg/ha respectively and this figure in the overall kingdom was 1193kg/ha [8].Similarly, the average coffee yield of coffee by a single producer in east Timor was found to be 1000kg/ha [9].

**Market Structure, Conduct and Performance:** Efficient production of commodities demands efficient marketing system. The efficiency could be in the speed with which the produce reaches the ultimate consumers, the prices and qualities of the product. For a critical understanding and identification of inefficiencies in the market chain of forest coffee, the following section is spent for some investigation on the prevailing marketing system.

**Market Structure:** A significant amount of forest coffee is produced and brought to market for sale by the producers. However this large volume of business transaction doesn't end at the nearby village or town market where producers sell their product. Rather, it goes through a number of chains until it reaches to the final destination (consumers).Therefore the market structure in the subsequent section is described in terms of identifying the existing market channel, type and function of actors in the chain, volume and value of forest coffee handled and marketed by each participant and on the degree of market concentration.

Accordingly, a market channel analysis was made with the intention of providing a systematic knowledge of the flow of forest coffee from their origin (producers) to the final destination (consumers) and the following market channel was identified as a route for forest coffee.

However the government has made an intervention and established a new market system called ECX (Ethiopian Commodity Exchange market) after September 2009 through which only local wholesalers are made to buy coffee from the producers and sell it to the exporters through this market. This intervention was made for improving the traceability of the area specific coffee and maintains their quality through minimizing the handlings by the different actors.

As can be seen in Figure 1, there are assemblers, wholesalers and retailers which perform a linking function between producers and consumers. Therefore, in order to have a better insight about the market structure in the overall chain, it is better to have an investigation on each of the actors' market and is presented as follows

**Market Participants**

**Producers Market:** In any market chain analysis, characterizing and analysis of producers' market usually occupies a paramount importance since the possible problems and potentials that may arise from this market largely influence the efficiency of the overall market chain. So producers' market analysis for forest coffee production and the general situations in this marketing system are illustrated by the following table 3.

As can be seen in table 3, the average value of sale of forest coffee (22,453.6 br) in Gera is much larger as compared with the average value of sale of coffee (12,086.25 br) in Shebe. In addition to the difference on the volume of production, the larger difference in the value of sale of forest coffee in the two weredas was largely attributed to the differences in the producers' price of the products. Producers in Gera sell their products with a relatively better price as compared with producers in Shebe and this price difference in the two areas can further be associated with the difference in access to market information. According to the results of the investigation, 96.1% of coffee producers in Gera reported that they have access to price information whereas only 52 % of them in Shebe have access to market (price)
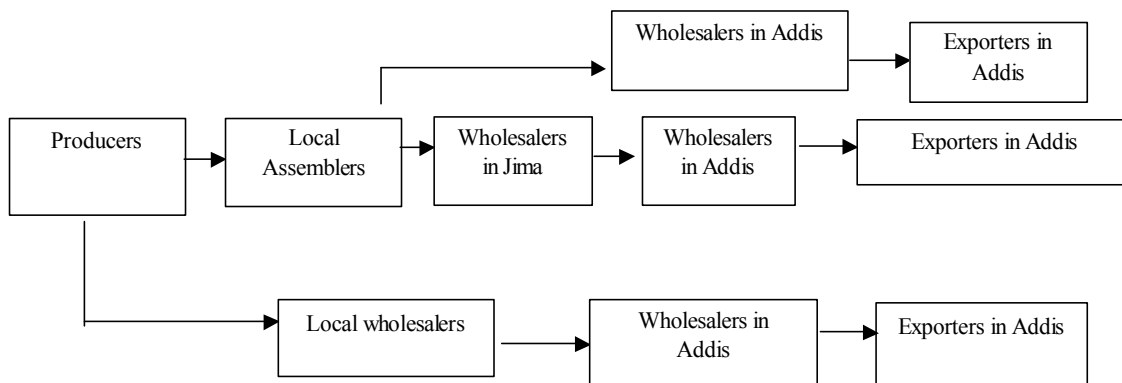


Fig. 1: Market Chain of coffee before September 2009

Table 3: Average Volume and Value of sale of forest coffee by a single producer in one production season

| | Coffee | | | |
|---|---|---|---|---|
| | Gera | | Shebe | |
| Characteristics | N | Mean | N | Mean |
| Amount provided for sale at the time of good harvest (in kg) | 78 | 3,655 | 78 | 2125 |
| Amount provided for sale at the time of poor harvest (in Kg) | 78 | 1,105 | 78 | 59 |
| Average amount for sale (in kg) | 78 | 2,210 | 78 | 1360 |
| Value of sale at the time of good harvest (in birr) | 78 | 37,134 | 78 | 13812.5 |
| Value of sale at the time of poor harvest (in birr) | 78 | 11,226.8 | 78 | 3867.5 |
| Average Value of sale (in birr) | 78 | 22,453.6 | 78 | 8840 |

Source;-Survey result, 2009/10

information. So improving the access to price information for producers in Shebe is very much vital to increase the possible benefit that can be obtained from the sale of forest coffee in the area.

The result of the study also revealed that producers sell the dry cherry of coffee without value addition since the existing market system doesn't provide any price premium for quality products provided to the market

**Assemblers Market:** Assemblers are the main actors in the coffee market chain who receive coffee from the producers in the two surveyed weredas. According to the investigation made, a single assembler collects up to 150-250 Q of Coffee in Gera and transfer the product to wholesalers in Addis Ababa. A single assembler in Shebe also collects 120-180Q of coffee from producers and sells either to the wholesalers in Jimma or Local (nearby) wholesalers in their town with a price ranging between 140 br-270 br/ 17kg. So from this transaction, a single coffee assembler could get a gross income of 323,080br and 196,800 br in Gera and shebe respectively from the sale of coffee in one production season. There is also a value addition (processing activity) performed by the assemblers. This involves grinding the dry coffee cherry bought from the producers to produce the clean bean.

**Wholesalers' Market:** Like the assemblers, wholesalers also play a significant role in the coffee market chain. According to the result obtained, the wholesalers in Gera wereda collect coffee from both local assemblers and producers. They directly collect coffee from the producers by their agent (commission men) and then transfer this product to the exporter in Addis and Ethiopian commodity exchange (ECX) market. The amount of washed coffee provided to the Jimma ECX by a single wholesaler extends upto 1000 kesha at the time of

good harvest (1kesha = 60kg) with a price ranging between 250 to 400 br/feresula where as the amount of washed coffee provided directly to exporters in Addis Ababa market by a single wholesaler extends up to 3000 kesha (20 car each carrying 150 kesha or 9000 kg) and 1200 kesha (8 car each carrying 150 kesha or 9000 kg) at the time of good and poor sale respectively with an average price of 400 birr. Wholesalers in Shebe also provide a huge amount of coffee (2000Qt and 1000 Q at the time of good and poor harvest respectively) with a price ranging between 255 to 398 br/ feresula. Washing and cleaning of coffee is the main processing/value addition activity performed by the local wholesalers before they sell their coffee to their clients.

The wholesalers in Jima also have a great role in transferring coffee to the terminal market. These wholesalers buy coffee from the local collectors and sell it directly to wholesalers in and around the periphery of Addis Ababa. The volume of sale by a single wholesaler in Jima ranges between 250,000 and 750,000kg with an average price of 400br/feresula (1 feresula=17kg). So this makes the jima wholesalers to get a gross income that ranges between 5,882,353 and 17,647,058.8 br at the time of poor and good sale respectively.

Coffee wholesalers in Addis Ababa receive coffee from the local wholesalers and wholesalers in Jima and transfer it to the exporters in Addis. An individual wholesaler in Addis resell an average volume of 3,000,000kg with an average price of 29.4br/kg and this makes the wholesalers in Addis to get an average gross income of 88,200,000br

**Exporters Market in Addis:** According to the investigation made on the coffee export market, exporters purchase their coffee from Jima wholesalers in the ECX market. ECX is a government established commodity

Table 4: Amount of Coffee provided by the local wholesalers in the study areas

| Wholesalers in Gera | Amount purchased in Kg | Wholesalers in Shebe | Amount provided (in Kg) |
|---|---|---|---|
| 1 | 250,150 | 1 | 144,620 |
| 1 | 150,020 | 1 | 120,302 |
| 1 | 137,950 | 1 | 100,363 |
| 1 | 90,200 | 1 | 80,500 |
| 1 | 80,303 | 1 | 78,400 |
| 1 | 72,500 | 1 | 66,700 |
| 1 | 65,500 | 1 | 60,320 |
| 1 | 64,400 | 1 | 58,130 |
| 1 | 59,250 | 1 | 56,600 |
| 1 | 56,350 | 1 | 55,500 |
| 1 | 54,540 | 1 | 53,440 |
| 1 | 49,197 | 1 | 52,800 |
| 1 | 45,300 | 1 | 51,655 |
| 1 | 44,120 | 1 | 50,700 |
| 1 | 41,400 | 1 | 49,150 |
| 1 | 39,550 | 1 | 48,750 |
| 1 | 36,160 | 1 | 47,600 |
| 1 | 34,500 | 1 | 46,900 |
| 1 | 34,000 | 1 | 43,320 |
| 1 | 32,750 | 1 | 42,850 |
| 1 | 31,500 | 1 | 41,500 |
| 1 | 30,000 | 1 | 40,700 |
| 1 | 29,150 | 1 | 38,450 |
| 1 | 27,500 | 1 | 37,100 |
| 1 | 27,000 | 1 | 36,670 |
| Total | 1,583,290 | Total | 1,503,020 |

Source;-Survey result,2009/10

exchange market which brings the clients (wholesalers and exporters in this case) together for undertaking effective marketing mainly for coffee and other exportable crop products. So exporters and coffee wholesalers of Jima meet at this exchange market centre for undertaking the marketing of coffee. The result of the investigation of this market also depicted that an individual exporter can sell a maximum of 14000 and a minimum of 7000 metric tons of coffee at the time of good and poor sale respectively to the European, Asian, African, American and middle east market with a price ranging between 80 and 220 Us cents/lb

**Measure of Market Concentration:** The concentration ratio is expressed in terms of CRx which stands for the percentage of the market sector controlled by the biggest X traders. Four traders (CR4) concentration ratio is the most typical concentration ratio for judging the market

structure. A $CR_4$ of over 50% is generally considered as a tight oligopoly.CR4 between 25% and 50% is generally considered as a lose oligopoly and a CR 4 of fewer than 25% signifies no oligopoly at all.

In this case since all the other traders were found to have similar capacity, the analysis of degree of market concentration ratio was carried out for the local coffee wholesalers and is illustrated by the following table 4.

From the above information on table 4, the market concentration index was calculated by considering the ratio of the volume of supply by the first four suppliers to the total volume of supply by the overall wholesalers. Accordingly the concentration index for the two study areas is given as follows

$$\text{Concentration Index for wholesalers in Gera} = \frac{628,320}{1,583,290} \times 100 = 40.85\%$$

$$\text{Concentration index for wholesalers in Shebe} = \frac{445,785}{1,503,020} \times 100 = 29.65\%$$

Therefore from the above calculation, Even if there is a threat of oligopoly in both areas, the probability of its prevalence was observed to be high in Gera (40.85%) as compared with Shebe.

**Market Conduct:** The Conduct of the market was analyzed by the pricing behavior and buying and selling practice analysis across the chain. According to the investigation made, the price setting mechanism in the producers market is largely determined by the benevolence of buyers. Producers have a low bargaining power to influence price due to their limited capital and access to market (price) information. However a different finding in coffee pricing was observed on a study made in Thailand. Accordingly, a guiding price is set every year by government agencies which normally serve as a floor price so as to protect the farmers from underpayment caused by not knowing what their product is worth [8]. Such practice is now being assessed by the Ethiopian Government for implementation in the coffee and other important crop market to safeguard the producers.

In the assemblers and wholesalers market, the existing demand and supply situations are the major factors considered in setting the selling price. When the wholesalers sell their coffee to the exporters through the Ethiopian commodity exchanges, the exchange auction normally provide the coffee for tender after it has set standards (Grades) for the product that it has received from the wholesaler. There are commission men involved

in providing the market /price information, make negotiation on behalf of the wholesalers and finally sell the product to the respective clients, Those commission men who negotiate to sell coffee to the ECX on behalf of a wholesalers are paid 1% of the total sale value of the product and those who negotiate with exporter in Addis on behalf of their clients (wholesale in Gera) receive 3000 birr /car as a commission.

In the coffee export market, the selling prices of the exporters are largely determined by the international market price (New York Price) and are easily accessed by the exporters from the internet and other published sources. There are intermediaries/agents in this market whose main task is to find buyers and make them create linkage with the exporters.

**Market Performance:** The market performance in the overall chain of forest coffee is largely determined by the market structure and conduct and was explained in terms of the marketing /profit margin that each actor is taking from the final price paid by the consumers. So in order to calculate the marketing margins for each actor in the chain, it is essential to separately identify the chains of the product and the following chains were identified for this purpose.

Channel 1: -Producers_____Local Assemblers _____Wholesalers in Addis _____Exporters

Channel 2: -Producers____Local assemblers ___Wholesalers in Jima__Wholesalers in Addis__Exporters

Channel 3: -Producers___Local Wholesalers ___Wholesalers in Addis____Exporters

So as can be seen from the above, coffee has three major routes through which it can be delivered to the final market. The major market participants, their selling price and gross marketing margins are presented Table 5.

As can be seen from the above margin analysis in table 5, producers are not benefiting from the final price paid by the consumers as compared with the intermediaries. Exporters are taking the largest gross margin in all the cases followed by the wholesalers in Addis and in the local areas. So there should be establishment of a novel market chain which makes the producers to benefit more from the market.

**Cost and Profit Analysis of Actors in Coffee Market Chain:** In addition to the gross marketing margin analysis, net benefit analysis was also undertaken for the actors in the chain to examine/evaluate the performance of the market of forest coffee. The net benefit analysis for these actors in the coffee market chain is shown by the following table 6.

As can be seen from table 6, the larger average net profit is obtained by the intermediaries than the producers and like the margin analysis, this analysis also revealed that producers are less beneficiaries in the chain than the other actors.

**Determinants of Market Supply of Forest Coffee:** Forest coffee is the most important cash commodities for South west Ethiopia. According to the information obtained from the survey, more than 90% of the coffee produced is supplied to the market. Eight explanatory variables were hypothesized to determine the market supply by sampled coffee producing farmers. These include age of the household head, sex of the household, educational status of the household head,

Table 5: Gross marketing margin of actors in the coffee market chain

| Actors in the coffee market chain | Average selling price (in br/kg) | Values of Gross marketing margins of actors | | |
|---|---|---|---|---|
| | | Channel 1 | Channel 2 | Channel 3 |
| Producers | 8.5 | 14.18% | 14.21% | 13.32% |
| Local assemblers | 17 | 14.16% | 14.16% | - |
| Local wholesalers | 21 | - | - | 21.7% |
| Wholesalers in Jima | 22 | - | 8.3% | - |
| Wholesalers in Addis | 29.41 | 20.68% | 12.35% | 14% |
| Exporters | 60 | 50.98% | 50.98% | 50.98% |

Source;-Calculated from survey Result, 2009/10

Table 6: Average net profit of actors in one production season in coffee market chain

| Items | Producers | | Assemblers | | Local wholesalers | |
|---|---|---|---|---|---|---|
| | Gera | Shebe | Gera | Shebe | Gera | Shebe |
| Gross value of sale (in br) | 22,453 | 9,520 | 323,080 | 196,800 | 2,823,529 | 1,710,000 |
| Cost | | | | | | |
| -Value of purchase (in br) | - | - | 170,000 | 89,250 | 1,700,000 | 892,500 |
| -Processing Cost (in br) | - | - | 3600 | 3000 | 60,000 | 58,500 |
| Packing cost (in br) | - | - | 4200 | 3900 | 42,000 | 36,000 |
| Loading cost (in br) | - | - | 400 | 300 | 8,000 | 6,000 |
| Transportation cost (in br) | 520 | 160 | 11,666.67 | 625 | 103,433 | 45,000 |
| Cost for commission men (in br) | - | - | - | - | 24,498 | - |
| Total cost (in br) | 520 | 160 | 189,866.67 | 97,075 | 1,938,231.5 | 1,038,000 |
| Net profit (in br) | 21,933 | 9,360 | 133,309.80 | 99725 | 885,297 | 672,000 |

Source;-Calculated from Survey Result, 2009/10

Table 8: OLS results of determinants of supply of forest coffee

| Variable | Beta coefficient | t-ratio | Sig |
|---|---|---|---|
| Constant | - | -0.216 | 0.830 |
| Age of HH | 0.096 | -0.831 | 0.409 |
| Sex of HH | 0.050 | 0.591 | 0.556 |
| Educational status | 0.281 | 3.005 | 0.004*** |
| Experience in NTFP production | 0.344 | 2.697 | 0.009*** |
| Price | 0.632 | 6.804 | 0.000*** |
| Level of production | 0.641 | 6.904 | 0.000*** |
| Cost of transportation | -0.717 | -6.558 | 0.000*** |
| Access to market information | -0.410 | -3.909 | 0.000*** |
| R-square | 0.573 | | |
| Adjusted R square | 0.519 | | |
| N | 71 | | |

Source;-Regression result from the survey data. 2009/10,

Note;-** and *** signifies significance at 5% and 1% level respectively.

experience in production, price of the coffee, level of production, cost of transportation and access to market information. The OLS results of the determinants of supply of NTFP are presented by the table 8.

According to the result obtained from the regression analysis in table 8, the following hypothesized variables were found to be significant in influencing the supply of forest coffee

**Educational Status of the Household:** This variable was found to have a positive and significant impact on the supply of coffee. According to the OLS result in table 8, for each additional level of formal education, the supply of coffee was found to increase by 0.281. This finding goes in line with the general principle that as people are becoming more educated, there is a great chance to easily uptake the improved technologies of production and increase the amount of market supply.

**Price of the NTFPs:** This variable was also found to have a positive and significant influence on the supply of this product. According to the OLS estimates in table 8, when there is a one unit increment in price, the supply of coffee increases by 0.632 and this estimate was found to be significant at 1% level of significance. This finding goes in line with the theory of supply which states that as price of output increase, the supply level of those outputs will also increase.

**Cost of Transportation:** this variable was also found to be one of the most significant variables which influence the supply of coffee. According to the result of the OLS estimate in table 8, a one unit increment in the cost of transportation has resulted in the decline of supply of coffee by 0.717. So this finding goes in line with the general principle that as transportation and other marketing costs increase, the level of supply of commodities decreases.

**Level of Production:** The level of production was also found to have a direct and significant impact on the supply of forest coffee. The result of the OLS estimate in table 8 indicates that as the level of production increases by one unit, the amount of coffee to be supplied to the market increases by 0.641 and this finding goes in line with the general principle that as the amount produced increases, the amount provided for market also increases especially for commercial products like coffee.

Experience in production and access to market information were found to be significant influencing factors for the supply of coffee. According to the result of the OLS estimate, as an experience in production increases by one year, the level of supply of coffee increases by 0.344kg and as the access to market information increases by one unit, the level of supply of coffee decreases by 0.410.The positive relation between experience in production and quantity supplied emanates from the fact that as producers get more experienced with the production, they acquire a great skill and knowledge on how to increase production and supply of products to the market so as to increase their level of income. However the inverse relation between access to market information and amount supplied can be attributed to the fact that as producers are getting information about the low market price before going to the market, they may refrain to bring their product to the market and prefer to store so as to sell it when the price is higher.

**Problems in the Market Chain of the NTFPs:** The major market problems which are endangering the benefit of the market participants and the overall efficiency of the coffee market system in the study areas during the survey year are the following

**Transportation Problem:** All producers in almost all of the surveyed areas pointed out transportation as a key factor which is adversely influencing the marketing of coffee. According to the investigation made, due to the absence of road for a vehicle, producers were forced to go a large distance by using back animal for transporting their product to the market and this in turn made them incur a large amount of cost. Even if this problem was persisting in most of the surveyed areas, it was found to be largely prevalent in Gurafalo and Gerenaso Kebeles of Gera wereda.

Transportation problem is also largely prevalent in the export market for coffee. There is no sufficient transportation system to carry coffee to the Port. Because transporters do not want to carry coffee due to its lengthy clearance process within the country and at the port of Djibouti.

**Low Coffee Price:** Even if some improvements are now being observed on the producers' price as a result of the establishment of coffee unions and introduction of new commodity exchange system by the government, coffee producers have been critically suffering from the low and fluctuating price for many years. This problem was partly associated with the time-lag in production. That is, since coffee needs a longer period for being harvested, producers couldn't provide the coffee supply immediately when there is a sudden rise in the price of coffee and this made the production to be supply inelastic. Even if such problems can be alleviated by using a storage system, most of the producers sell their coffee immediately after harvest since they should finance all their household expenditure from the sale of coffee which is considered to be the major cash crop used as a great source of income by almost all the households in the study area. In addition, the low bargaining power of farmers in selling their product to their clients also contributed for the low price of coffee in the producers' market. According to the investigation made, other than the limited access to price information, the relatively low volume of supply by the individual producers made them not to look for other clients/customer who can provide them with a better price since such effort may make them incur additional transaction cost which could sometimes be greater than the total value of sale of the product.

**Absence of Price Premium for Quality Products:** According to the information generated, producers are paid the same amount of price irrespective of the quality of coffee that they provide to the market. Such practices make farmers to be reluctant about the quality issues. A similar result was also obtained from the study on coffee in Tanzania. Accordingly, despite their high quality coffee, over 90% of the Tanzanian smallholder coffee growers sell their produce into the undifferentiated commodity market [10].

**International Market:** Due to the undulating nature of the international coffee market, it is difficult to predict the possible prices and demand of the product. In addition there is a problem of default from the international buyers

especially from the Arab world. The same result was also obtained by a study made in Ethiopia. Accordingly, a high market volatility and global coffee crisis practically induced producers and traders to shift to the production and sale of other commodities. In addition, the market problem has even caused a larger insolvency to a state owned coffee plantations like Limu coffee plantation in Ethiopia [11]

**Problem of Packing Material:** There is a shortage of supply of packing materials (Jute bag) since only two factories/firms are involved in the production and supply of this material.

**Price Risk:** Even if exporters set their purchase price on the basis of their selling price at the international market, due to the time lag between the purchase and sale of coffee and volatile nature of the price, there could be a sudden decline in the price which could make exporters to lose.

## CONCLUSION

This study was initiated with the general objective of analyzing the market chain of forest coffee for the case of Belete-Gera forest in south western Ethiopia.. According to the information obtained, an average of 9784 and 4721 coffee trees are owned by a single producer in Gera and shebe respectively. The yield figure also indicated that an average of 1091 and 850 kg/ha of coffee are produced by a single producer in one production season in Gera and Shebe respectively.

The result of the assessment of the market structure indicated that producers, assemblers, wholesalers and retailers are the major actors involved in the market chain of coffee. The local coffee wholesalers' concentration index (40.85% for Gera and 29.64% in shebe) revealed that there is a threat of oligopoly in the market structure of coffee especially in Gera area. The result of the assessment of the market conduct revealed that price setting mechanism in the producers market is largely determined by the benevolence of buyers whereas the existing market demand and supply are the major determinants of price setting mechanism in the other actors' market and in evaluating the market performance, the margin analysis indicated that exporters (50.98%) take the largest profit margin in the coffee market chain. The ordinary least square regression analysis also pointed out

that price; educational level of households, transportation cost and level of production were found to have a significant impact on the supply of coffee in the study area. High cost of transportation, absence of price premium for quality products, low bargaining power of producers, absence of organized action of producers, absence of documented market research and the undulating nature of the international market were the major problems encountered by actors in the market chain of coffee.

**Recommendation:** On the basis of results of investigation on the market chain of forest coffee, the following interventions are necessary to improve the efficiency and performance of the existing marketing system.

**Establishment of an Improved Transportation System:** Since transportation was mentioned to be the major problem by all participants in the market chain, it is mandatory to have a well constructed road especially for the producers market and help improve the existing transportation system

**Establishment of Producers' Cooperative:** In order to improve the bargaining power of producers, establishment and strengthening of market cooperatives is very essential.

**Establishing of Price Premium System for Quality Product:** In order to encourage producers to produce quality products, it is essential to pay a certain extra amount for quality products and hence the establishment of that system should be given a due attention.

**A Strong and Participatory Forest Management Strategy:** As a result of the production and sale of forest coffee, people are getting a greater benefit with a relatively minimum cost of production and management. Hence in order to assure the sustainability of the benefit, there should be awareness creation among the users on the need to efficiently utilize and maintain the existing forest coffee. Since forests are serving as a shade for coffee in the area, there should also be a room for awaring the local leaders and administrators on the long run benefit of maintaining the forest in terms of generating income and safeguarding environmental degradation so as to prevent the rapid conversion of the forest land into the agricultural land.

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