



Value Chain Analysis of Ethiopian Coffee (*Coffea arabica*)

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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ABSTRACT

Ethiopia is well-known as origin of Arabica coffee that produce largely in the country. Coffee plays crucial role in generating foreign currency to the country at large level. Ethiopia's coffee has its own peculiar quality that produced in the different parts of the country. It is produced in the country in different production system of forest, semi-forest, garden and plantation that made the country unique from other producing countries. Stakeholders like the value chain actors and supporters/facilitators were identified with their role in the chain. Data was collected from both primary and secondary sources from interview of experts and internets, published and unpublished documents respectively. Value chain analysis was undertaken from the collected data to identify the value chain affecting factors. Both qualitative and quantitative analysis tools like, PESTEC, SWOT, matrix, chain map, tables and problem tree were used to identify the possible constraints retarding the performance of the coffee value chain in the country. Factors which were responsible for quality deterioration include; Variety, environmental conditions, agronomical practices, diseases and pest, post-harvest factors and poor marketing infrastructure, crop replacement and adulteration of high quality coffee stated as main factors. To improve the existing coffee value

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chain performance in terms of quality, all stakeholders need to work in a team spirit with initiatives and supplement inputs and technologies for the producers. Moreover, active quality controlling mechanism by public private partnership should be encouraged by the government.

Keywords: Coffee; value chain; production; stakeholders.

1. INTRODUCTION

1.1 Description of Coffee Subsector in Ethiopia

Ethiopia geographically located at 3° and 14.8° latitude, 33° and 48° longitude in the eastern part of Africa. It is bounded by Northeast by Eritrea and Djibouti, on the east and southeast by Somalia, on the south by Kenya and on the west and Northwest by Sudan. The country has a land area of 432.310 sq Km with the population of 96,633,458, and the growth rate is 2.98% Since 1995, Ethiopia has been divided into 10 administrative regions based on ethnic lines. Those are Tigray, Afar, Amhara, Oromia, Somali, Benishangul, Southern Peoples' State, Gambella, Harar and Addis Ababa [1].

Among the listed regions, coffee production dominantly produced in Oromia and Southern Nation and Nationalities People regional states. Ethiopia remains the largest producer of coffee in Africa and is the fifth largest coffee producer in the world next to Brazil, Vietnam, Colombia, and Indonesia, contributing about 4.2 percent of total world coffee production. Ethiopia is the birthplace of Coffee Arabica and mostly produces this variety. Coffee has economic, environmental as well as social significance to the country. Ethiopia has suitable environmental conditions for coffee production which is the excellent opportunity for the producer farmers as well as traders [2].

Coffee production is vital to the Ethiopian economy with about one-fourth of the country's population directly or indirectly deriving their livelihoods from it. It is mainly produced in the southwestern and southeastern parts of the country [2].

1.2 Coffee Subsector

Ethiopia is known as the origin of Coffee Arabica. It has immense potential to produce and supply high-quality coffee with significant volume. In terms of coffee supply role in the coffee market chain Ethiopia is the leading from Africa and

ranked as fifth in the World [3]. The coffee subsector plays a crucial role in providing one-quarter of the entire population economic use for their living hood [4].

Coffee production in Ethiopia is inhibited by a lot of shortcomings such as lack of competitiveness, poor market access, less infrastructure, inadequate access to services, little value addition, and inadequate modern technology system and applied research [5]. Additionally, the constraints of coffee subsector in Ethiopia is limited in extension and research services [6]. This is a crucial constraint that exacerbates the influence of risks such as insect pest and diseases epidemic. Coffee plants exposed severely to vulnerable that outbreak by pests and diseases when there is less extension service that outcome from poor agricultural practices. Now a day, Khat (*Catha edulis*), a plant commonly chewed by humans for its stimulating effect, is competing for farmland with coffee [7]. Some smallholder coffee farmers lack the interest to produce khat instead of coffee as the income obtained from Khat is by far better than coffee. A large number of coffee produces mostly from the eastern part of the Ethiopia have changed from coffee to khat production. Khat is relative can withstand drought, diseases and pest and can be harvested three to four laps within a year and produces better revenue to the producers than other cash crops such as coffee.

Sustainable production and supply of fine specialty coffee types of the various quality type growing in different parts of the country as it is the origin of coffee. There are opportunities for coffee production in Ethiopia includes; high local and global demand for the coffee product, growing attention of private sector with high business capacity, better support from the regional and federal governments [8]. As the country endowed with suitable altitude, optimum temperature, low labor costs and fertile soil. The Ethiopian Coffee and Tea Development and Marketing Authority has been newly established as per the proclamation recognized by the House of Peoples' Representatives in 2015, with the purpose of enhancing the country's advantage from the coffee sector [9]. The Authority has

given with the mandates and responsibilities; to reinforce modern extension services to achieve higher production and productivity, to launch quality based effective and efficient marketing systems, and provide support and regulating of coffee, processing facilities.

1.3 Major Coffee Production Areas in Ethiopia

According to [10] report indicates the following particular area elaborated with its own unique characters and presented as follows;

Harar coffee: Sun-dried processed only and produced in the Eastern Highlands (Harar coffee has a trademark).

Yirgacheffe coffee: Washed only and this is the most famous washed Ethiopian coffee, especially in the United States (as a trademark).

Limmu coffee: Washed only and it is renowned for its excellent cup, sweet, spicy/winey flavour and balanced body and is therefore sought by many roasters, especially in Europe and United States.

Sidamo coffee: Washed and sun-dried processed producer in the Southern part of the country (as a trademark).

Gimbi/Lekempti coffee: Washed and sun-dried processed has a significant part of many roasters' blends.

Bebeka/Tepi coffee: Washed only and these coffees with less acidity, body and soft flavour.

Jimma coffee: Sun-dried processed only and the best known Ethiopian coffee. Industry, and represents the bulk of Ethiopian coffee exports.

1.4 Coffee Production System

There are different production systems in Ethiopia, according to [2] report there are four different ways of producing coffee in Ethiopia and these are (forest coffee, Semi-forest coffee, Garden coffee and Plantation coffee); here is the detail of each system:

- **Forest coffee** is a wild coffee grown under the shade of natural forest trees, with no defined owner. It is found in south and south-western Ethiopia. It is the center of

origin of Coffee Arabica. accounts for about 10% of Ethiopia's total coffee production.

- **Semi-forest coffee:** farming is a system where a farmer is living nearby a forest coffee do some thinning and pruning on the forest coffee to finally claim ownership of the forest coffee. accounts for about 35% of Ethiopia's total coffee production.
- **Garden coffee** is usually found near a farmer's residence. Farmers use organic fertilizers to produce *Garden coffee* and inter-crop it with other crops. accounts for about 45% of Ethiopia's total coffee production.
- **Plantation coffee** is commercial farms planted by the private investors for export purposes. accounts for about 10% of Ethiopia's total coffee production.

1.5 Importance of Coffee Production in Ethiopia

According to [11] report, coffee is a strategic commodity to Ethiopia that covers 24-26% of the total income of its earning and it is a source of income to a quarter of the population. According to [12] report, the export sector in Ethiopia has always been mainly comprised of agricultural products, of which mainly dominated by coffee.

Coffee still remains a valuable export commodity in Ethiopia as it is one of the top means of foreign exchange earnings sector for the country. According to [13], an average of 60% of the country's export earnings solely from coffee allowing contributes 12% of the total export earnings for Ethiopia. Around, in addition to the enormous developmental implications coffee has for Ethiopia, it also plays a significant role in the social and cultural heritage of the country [12].

1.6 Objective

The objective of the review was to;

Analysis the coffee value chain in Ethiopia to identify the opportunities and constraints within the chain. Identify the possible main problems suggest preliminary recommendations for further intervention.

2. METHODOLOGY

Mainly the strategy used for this paper was more of qualitative. Data gathered from secondary

sources and interview and use of personal experiences.

2.1 Data Collection

Data was collected from internet sources, published and unpublished reports sources. The interview was undertaken with coffee value chain case team leader at the national level about the recent evidence of coffee value chain aspects in the country.

2.2 Data Analysis

The collected data from both sources were analyzed by using value chain analysis approach. Value chain map was to depict the coffee value chain in Ethiopia explicitly. After collection of data from interview and desk study, the analysis is done by value chain analysis. Stakeholder matrix was used to show the role of chain supporters take part in the coffee value chain. Chain mapping is used to show the value chain of coffee in the country.

SWOT analysis and PESTEC was applied to elaborate the internal and external factors which stimulate and/or hindering the coffee value chain in the country. Problem tree was used to show the main identified problem in the subsector. Through this approach, the coffee value chain key problems were identified that contributed to affect the coffee value chain performance in the country profoundly.

3. EXPLANATION OF COFFEE VALUE CHAIN IN ETHIOPIA

3.1 Stakeholders Analysis

3.1.1 Actors lists

Input suppliers: Agro-input dealers; agricultural chemicals, seedlings from research centers. Large scale producers directly buy from international suppliers whereas the rest get from local agro-dealers.

Coffee producers: The sector segmented as small-scale coffee farmers and coffee farmers' service cooperatives (90%), medium-sized producers (5%), and large scale commercial private enterprises (5%) produce for local and global market depending on the graded standard of coffee quality inspection body. Picking and

drying are often the only operations undertaken by the grower.

Collectors: Buy coffee from smallholder farmers at their locality and supply to processors and have a crucial role in the coffee assembly and transfer the collected coffee to the processors.

Primary cooperative: Members' collect coffee together as well as purchase others coffee in village town as a group and supply to a cooperative union.

Processors: Both dry and wet processing are carried out at processing station by processors. It includes hulling and pulping of coffee and sorting, grading packing and weighing is carried out herein large scale producers & cooperatives all processing work is accomplished by the producers by their own processing plants.

Cooperative Union: Collect coffee from primary cooperative members in bulk, makes value addition practice such as hulling/processing, clearing, sorting and packaging and export directly to international buyers. In addition, Cooperative Union plays a significant role in the area of market linkages with international traders, collateral for cooperatives, and technical support to other cooperative and representing other cooperative members in the marketing process as well.

Wholesalers: There are private enterprises and individual that has got legal license to participate in a coffee transaction according to the regulation set by the country coffee transaction undertaken at ECX, and they buy processed coffee from collectors and sell the best quality to exporters and the rejected one for domestic retailer buyers that obtained from large any sources.

Exporters: Involved in the international transaction marketing operations buying the coffee from wholesalers at ECX and export the finished clean and standardized coffee bean.

Retailers: The retailers purchase coffee from the large scale producers, exporters and cooperative for the international market and the rejected and lower graded coffee supplied to the domestic market.

Consumers: Ultimate users of coffee that can be international or domestic users.

3.2 Supporter

According to [14] report, Coffee production for 2016/17 is forecast to remain almost unchanged from the previous year 390,900 metric tons. From the total yearly production 90% of the products produced by smallholder farmers and 10% produced by medium size and large scale farmers (5% each) produced. From the total production Ethiopia export 49% of Coffee and 51% used domestically.

It is estimated that only 40 percent of coffee producers are members of cooperatives [15]. Based on this assumption for overlays on the chain map calculated from 90% of smallholder farmers' producers considered for both members and nonmembers of cooperatives and 40% only are organized under cooperatives. Large scale commercial producers produce 70% of their produce for export market, and 30% is for domestic as noted from my previous practical experience.

Out of the total export of the coffee production 41% produced by primary cooperatives of smallholders, 52% through wholesalers collected from medium farmers and small producers outside the cooperative groups as well as 7% from large scale farmers which is the total export of 49% out of total production.

3.3 External Factors Affecting Coffee Value Chain

According to [16] finding, certification, which affects marketability and prices, Certification and traceability have become significant new requirements in the global food trade. Access to processing facility primary determinant in the smallholder producers chain.

3.4 Quantitative Analysis

It is used to show that amount of coffee values in terms of price and volume of the production that produced in the country as depicted in the chain map (Fig. 1).

Table 1. Supporters and their functions matrix

Supporter sectors	Functions/roles
Agriculture and natural resource offices	<ul style="list-style-type: none"> • Provide selected variety seedlings support for producers • Extension and technical advisory services such as production package, quality aspects, proper chemical use etc. • Provides production, sustainability and market information
University and Agricultural research institute	<ul style="list-style-type: none"> • Provision of selected high quality, high yield and disease resistant variety seedlings to producers • Giving Scientific and innovative training techniques
Non-Governmental Organizations(Techno serve, SNV, Oxfam)	<ul style="list-style-type: none"> • Provide training/facilitation and aid on market linkages, technical supports (e.g. women headed poor farmers' groups). • Train innovation, business development and capacity building.
Ethiopian Commodity Exchange(ECX)	<ul style="list-style-type: none"> • It is marketplace facilitate both export and domestic coffee trading by different actors
Financial Institutions Development Bank of Ethiopia, Cooperative Banks	<ul style="list-style-type: none"> • They provide loans or micro-credit to farmers' cooperatives, union, Wholesalers
Ethiopian Coffee Exporters Association (ECEA).	<ul style="list-style-type: none"> • Private support on promoting exports as one of the primary contacts with the world market. • It provides coffee trade information, lobbies on policies, and supplies technical support to its members.
Logistics/Transporters, Donkey, trucks, motorcycles.	<ul style="list-style-type: none"> • Provide transportation service to bringing product from field to market • Supply inputs to farmers.
Coffee quality certification and checking agent	<ul style="list-style-type: none"> • Performs quality checks on arrival at the export market and also grants export clearance.
Ethiopian Agricultural Commodities Warehousing Service Enterprise(EACWSE)	<ul style="list-style-type: none"> • Is established with the mandate of the two primary functions—warehousing service and quality certification

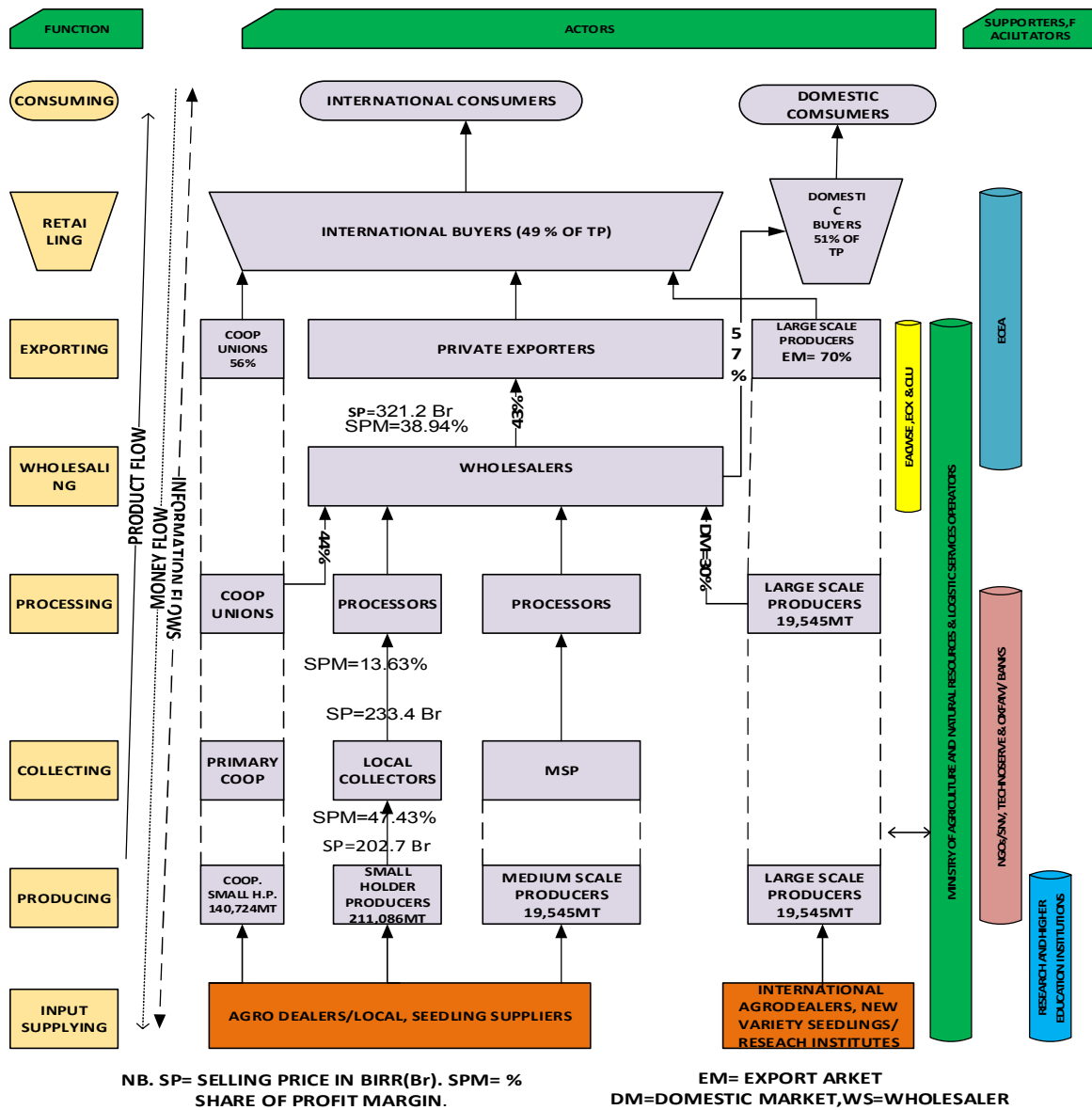


Fig. 1. Coffee value chain structure of Ethiopia

Table 2. External factors (PESTEC) analysis of Coffee value chain in Ethiopia

Factors	Description
Political	• Existence of Ethiopian Commodity Exchange Authority,
	• Reestablishment of coffee authority in the country
	• Existence of Ethiopian Coffee Board Authority
	• Government policy focused on coffee
	• Inefficient implementation strategies for the coffee sectors
Economic	• Inadequate institutional framework/no well-developed sector of quality infrastructure, inspection areas,
	• Limited credit or capital to invest in the subsector
	• Insecurity costs/high cost of production (inputs, chemicals, seeds)
	• Insecurity costs/high cost of production (inputs, chemicals, seeds)

	<ul style="list-style-type: none"> • lack of sufficient credit /loan accesses to commercial market systems. • Low selling price from marketing
Social	<ul style="list-style-type: none"> • High urbanization and population • Lack of training on quality standards • High domestic consumption of coffee • Low living standard of the coffee farmers • Low land and property right for females
Technical	<ul style="list-style-type: none"> • Limited skills in modern coffee production • Lack of processing plant nearby to the farmers • Absence of sufficient quality inspection and supervision centres • Limited communication infrastructure and logistics services
Environmental	<ul style="list-style-type: none"> • Erratic droughts • Prevalence of disease and pests • Environmental degradation and declining of soil fertility • Climate change • Gene pool erosion
Cultural	<ul style="list-style-type: none"> • Traditional farming system, harvesting, sorting, storage etc. • Khat production dominancy • Less recognition of women contribution to farming work

3.5 Qualitative Analysis

3.5.1 Chain coordination

Middle traders are the co-coordinators in the private and smallholder farmers' coffee value chain. Because they have an access to market information for prices and quality needed at the end market, unlikely producer farmers, don't access. Large scale producers have hierarchical chain governance structure in which the entire chain coordinated by them. In the cooperative organized farmers, the cooperative union has the chain coordination role, which is encourage able in Ethiopian coffee value chain aspects.

3.5.2 Actor chain relations

Establishment of co-operatives in most part of coffee producer areas represents a significant improvement in chain relations. The cooperatives and large scale commercial producers can utilize new markets opportunities directly through negotiation with end buyers, which can be from local or global. But the other traders who collected coffee from farmers need to pass through ECX auction market for any marketing function.

3.5.3 Power relations

Mostly the large-scale wholesalers play significant roles in market information control, the most considerable part of the coffee value chain

as they are involved in assembling at all levels of coffee markets and wholesaling at the international markets.

3.5.4 Vulnerable relations

The farmers/producers are the most vulnerable actors in the chain. They lack adequate market information so that traders take higher margin share than the farmers/producers. Producer farmers are the disadvantaged parts. As a result of the natural environment change contemporarily such as wilt coffee diseases and less production due to rainfall erratic distribution causes for loss of the productivity.

3.5.5 Gender aspects

In most part of Ethiopia where coffee processing is undertaken, the sorting, drying and most cleaning activities are done by females. Women play a significant role at family levels through taking care of the families as well take part in coffee field management works like; weeding, pruning, collecting, etc. They are not active in the decision making role on the product selling as this is dominated by a male in most part of the country even though there are some initiatives given by both government and NGOs to avoid the problem.

3.5.6 Sustainability Profile (PPP)

People standards: Basic needs of most smallholder's farming area, essential services

such as good health care, transportation and education facilities are not sufficiently available. The large scale enterprises relatively fulfilled basic standards at the better status than smallholder farmers.

Planet/environment standards: access to natural resources: As reported by [16] guaranteeing the product origin, fair prices to producers, ethical standards of production and processing, environmental sustainability in production, and safety and quality safeguards for a product, international buyers and consumers are often willing to pay extra for a product.

Profit standards: In the coffee sub-sector certification and traceability have become currently significant requirements in the global food trade and there are currently many certification schemes, like Fairtrade, Organic coffee, Bird –friendly, UTZ and Global Forest Alliance, share of certified coffee is increasing,

but is not significantly lower than in other countries [16].

3.5.7 Information flows

Inter-chain information

- ❖ The current system of coffee traders, individual collectors, and transporters interact continually and responds to market information.
- ❖ The market is particularly sensitive to prices on a daily basis such that any attempt to raise or lower coffee prices result in a corresponding change in supply to the market. Margins tend to be high partly due to the risks involved, leading to the relatively high cost of coffee by actors upstream in the chain.
- ❖ Processors and exporters are generally less affected by risks than farmers; the overall exposure remains however high.

Table 3. Estimated cost of production at smallholder level

No	Production inputs	Estimated cost of production (Birr/qt)
1	Causal Labor, for harvesting	58.4
2	Organic fertilizer, chemicals	20.6
3	Packing materials	13.4
4	Sub total	92.4
5	Interest (10%)	$(92.4/2) * (10/12) * 0.1 = 3.35$
6	Total variable cost/quintal	95.75
10	Output=yield/ha/qt	6qt/ha
11	Cost price=production cost/yield	$95.75 \text{ birr/qt} * 6\text{qt/ha} = 574.5 \text{ birr/ha}$

*N.B, 100 Kg =1 quintals 1ton=10quintals and 1Euro=24.34 birr
qt- stands for quintals which are equal to 100 kg*

Table 4. Cost and benefit shares of different actors in coffee value chain

No	Item (birr/qt)	Chain actors			Summation
		Producers	Collectors	Wholesalers	
1	Purchasing price	—	202.7	233.4	436.1
2	Production cost	95.75	—	-	95.75
3	Marketing cost				
4	Labor		6.5	5.3	11.8
5	Transport and comm. Cost	10	6.2	23	39
6	Overhead cost	--	4.5	13.45	17.95
7	Packing material	-	6.3	3.75	10.05
8	Tax	-	2.5	2.5	5
9	Total marketing cost	10	26	48	84
	Total cost	105.75	228.7	281.4	641.85
1	Ave.Selling price	202.7	233.4	321.2	757.3
2	Gross margin	106.95	30.7	87.8	225.45
	%share of margin	47.43	13.63	38.94	100
3	Profit margin	96.95	4.7	39.8	141.45
	%share of profit margin	68.54	3.36	28.1	100

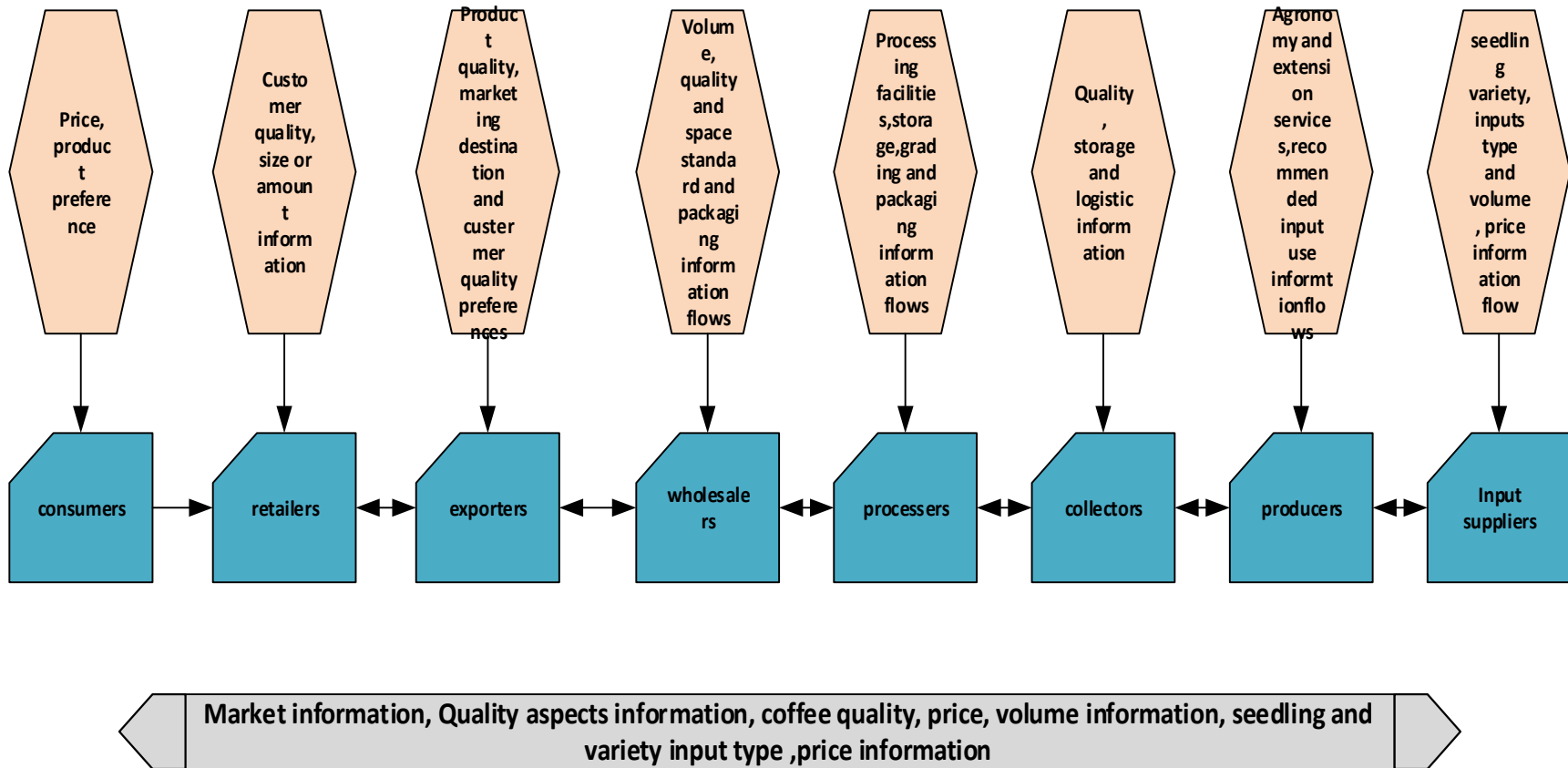


Fig. 2. Information flow chart

Product information

According to [17] stated that in product information, consumers are active drivers of the change towards high-quality products than the quantity of the products. In rural coffee producers'/farmers business persons need strong competitive skills and the capacity to innovate to compete in a rapidly changing global market systems. Attractiveness does not only mean intensifying farm production and increasing cost-effectiveness; it also involves considering non-price factors such as quality, reliability, organization and logistics.

Price information

- ❖ According to [18] reported that the introduction of ECX from the government aimed at price transparency and lower transaction costs in coffee trade which may lead to better price information for access to farmers
- ❖ The price is volatility lead by Ethiopian commodity exchange being transferred to farmers and further being accelerated as processors to ensure their margins by passing through their costs to farmers

All local actors are exposed to price risks as the institutional setting in Ethiopia uses market-based price discovery based on global futures and central pricing mechanism for international coffee trade.

3.5.8 Market institutions

Market institutions are values, rules, regulations, policies or services that form the way in which producers/farmers and traders collaborate. The association of the producers/farmers and traders reduced the costs of production, risks and support also trade activities. Market institutions include mechanisms for monitoring commercial arrangements, enforcing contracts, and establishing and punishing violations. It forms the corporate environment that surrounds the trading activities in the value chain [19]. As a modern market institution, the Ethiopian commodity exchange is established in 2008 that handles 90 percent of the exports of coffee marketing process in Ethiopia [20].

3.5.9 Quality management

A number of quality control measures are put in place at various levels in the chain to ensure

good quality coffee is supplied to the market. According to [16] coffee quality can be measured by several standards in the marketplace. They include a certification which affects marketability and price, but not necessarily the intrinsic quality of coffee, geographic origin, grades and washings. Quality will be one of the pillars of this chain, where all stakeholders need to understand and work tirelessly to meet or exceed consumer expectation [21].

Quality attributes from product aspect;

Intrinsic attributes

- **Safety** – perishable product and coffee require careful handling and transport.
- **Health** – coffee bean is good and physically good enough for consumers, roasters.
- **Shelf life** – proper handling, packing, storing and loading/ unloading.
- **Convenience** – coffee, in this case, is suitable for proper processing and can be packed according to customer preference.

Extrinsic attributes

Price– unstable price in the market. Production system characteristics- brand name, sustainability of production which consider the three Ps.

There are currently many certification schemes, like Fairtrade, Organic coffee, Bird –friendly, UTZ and Global Forest Alliance. In Ethiopia share of certified coffee is increasing, but is not significantly lower than in other countries [16].

In coffee Quality management; tracking and documentation are the cornerstones of quality Management they are also the bases of most certification programs [22].

Quality standard

Both physical and sensory assessment is used to determine the quality of the coffee. The grade is given ranges from 1-6 grade based on the result obtained from the total sum of raw physical and organoleptic quality testing from the sample and described in percentage [23].

Traceability

The ability to follow the movement of coffee through specified stage(s) of production,

Table 5. SWOT analysis of Coffee value chain in Ethiopia

Internal Analysis of Coffee value chain in Ethiopia	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Existence of Ethiopian Commodity Exchange Authority for modern marketing information • The existence of Ethiopian coffee export association for the support of the subsector in marketing, production etc. • Liqueured test practice and experienced staffs • Good experience in natural/forest coffee production • Large number of smallholder of coffee producers • Attention of Government due to export and foreign exchange purpose, • Well, experienced producer farmers, • Strong social communication skills at producer levels • Beneficial for environmental biodiversity conservation /sustainability 	<ul style="list-style-type: none"> • Less value addition to maintaining the quality of the product by processing. • Reduced production, quality and processing infrastructures and facilities across the chain • Inconsistency of the quality of the production in coffee value chain sector • Limited large scale farming practices • Underdeveloped market, market information and forecast • Inadequate improved seedlings of coffee to overcome drought, disease and pest constraints • Limited organized producer's groups, • Inadequate supporting institutions for cooperative work • Lack of active quality controlling strategy
External Analysis of Coffee value chain in Ethiopia	
Opportunities	Threats
<ul style="list-style-type: none"> • Having Suitable agroecology and soil conditions of coffee production area, • High demand for natural Ethiopian coffee in importing countries • Existence of coffee genetic diversities to resist different risks (Drought, disease, pest etc.) • Unexploited land and water resources with potential to produce more coffee • Use of by-products as husks and mulching trees 	<ul style="list-style-type: none"> • Climate problem and deforestation, soil erosion • Unpredictable weather • Fluctuation of international quality standards requirement • Pests and diseases outbreak • Fluctuating world coffee prices • Increased supply from large-volume/new emerging countries • Substitution coffee with other crops

processing and distribution. According to [23] the report presented at AFCA Conference & Exhibition, Traceability process flow in the Ethiopian coffee value chain. The diagram below gives high-level process flow of the traceability coffee business process.

4. FACTORS AFFECTING QUALITY OF COFFEE

According to [24] coffee quality is a complex characteristic which depends on a series of factors such as the species or variety (genetic factors), environmental conditions (ecological factors), agronomical practices (cultivation factors), processing systems (post-harvest factors), storage conditions, industrial

processing, grading, packing, transporting, all contribute either exaltation or deterioration of coffee. Mixing high-quality coffee one of the factors affecting the quality of coffee which may occur at post-harvest processing and handling practices levels. Limited government institution regulations to support [2].

4.1 Application of Analytical Tools

It is a qualitative tool to identify and describe the possible constraints existed in the coffee value chain.

4.2 Problem Tree Analysis

It is a tool to identify the potential causes of the focal problem and its effects.

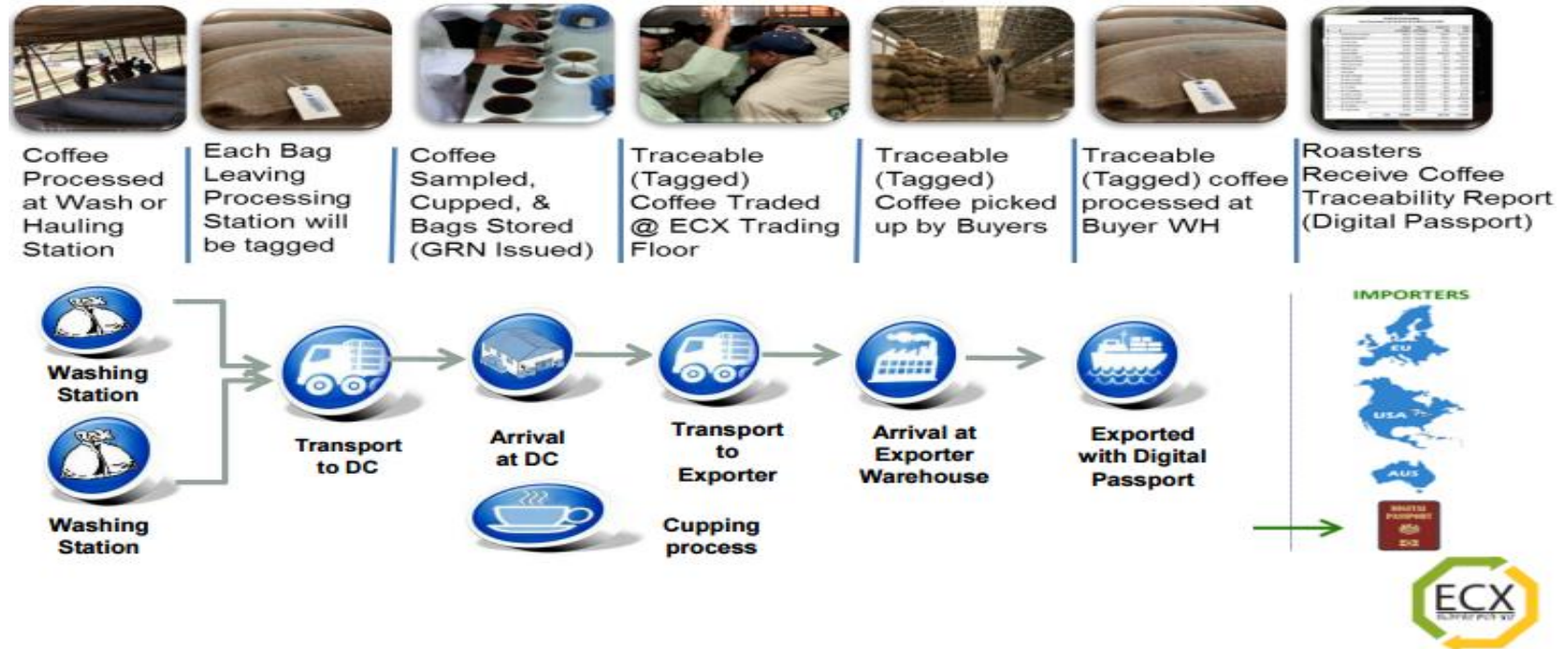


Fig. 3. Coffee traceability process
 Source: Ethiopian Commodity Exchange, 2016

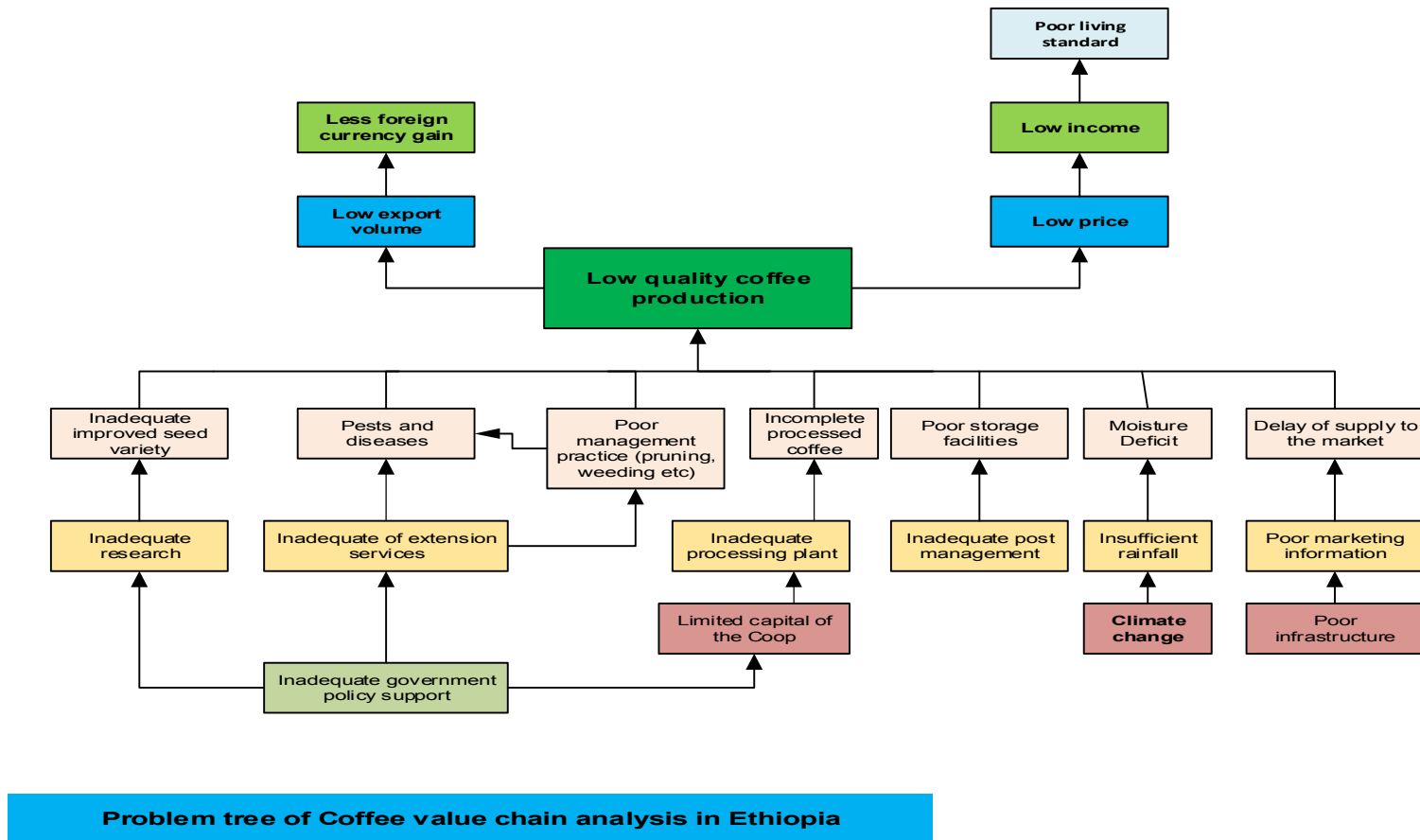


Fig. 4. Problem tree analysis

4.3 Main Opportunities and Constraints

The main opportunities for this subsector are:

- Availability of suitable agro ecology to produce high-quality coffee,
- High demand for natural Ethiopian coffee in importing countries,
- Existence of coffee genetic diversities in nature to resist different risks,
- Interest of the private investors in the sector,
- Unexploited land and water resources
- Government and NGOs intervention to promote the subsector.

4.4 Problem Definition

The main identified problem is low-quality coffee production. This results from composition of several constraints these are: inadequate improved seedlings varieties, problem of pests and diseases, poor management practices like pruning, stumping weeding, fertilizing, moisture deficit from climate change, poor storage and processing facilities for value addition and lack of infrastructure effects on time delivery of the products are the core causes for low coffee quality production that outcome for low living standards of the coffee dependent society.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

It is identified that the main problem that the country encountered is low-quality coffee production. This problem is due to several causes, that can be both man-made and naturally happened due to the above-stated causes and other factors that affect the quality of the coffee subsector is lack of integration and commitments of the chain actors, stakeholders, institutions are the identified constraints along the coffee value chain.

5.2 Preliminary Recommendation

To improve the coffee value chain in terms of production with quality wise, the subsector needs:

- The government and the stakeholders should create access to inputs for the producers from research institutes and extension service.

- Creating access to producers the get production technologies packages like pruning, weeding and safe harvesting and drying for right processing technologies as well as the promotion of product handling practices and value addition by processing.
- Promotion of producers through cooperatives organization to benefit from direct export opportunity from the market.
- There should be clear policy to support the sustainable coffee quality production through sustainable climate-smart farming and facilitate to meet with buyers' interest.
- The government should encourage increased private sector participation in the marketing of coffee through public-private sector partnership and shorten the complex coffee value chain of the export market.
- Promote active quality controlling system along the coffee value chain

COMPETING INTERESTS

Author has declared that no competing interests exist.

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