Teff Commodity Value Chain Analysis in Addis Ababa: Customers’ Willingness to pay Approach to Maximum Retail Pricing System

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Abstract
The Teff value chain has not reached its full potential because of systematic bottlenecks at each phase of the value chain with average yield per 8 years data per hectare was 10.81 quintal. Besides, the practices in every sector (manufacturing, agriculture, construction, service, etc) of Ethiopia, has arms length relationship and have rivalry relationship and compete among each other instead of cooperation. Regardless of ample literature on the teff value chain analysis in Ethiopia, almost all of the studies failed to show a value of teff from the consumers’ point of view as value emanates from the customers in the backward direction towards the farm as opposed to the supply chain flow in the forward direction from source to end. Besides, the existing market structure of teff from farm gate of teff production to consumer market via multiple market intermediaries failed to show the existence of chain that created value for the customers beyond self motivated profit maximization at the expense of the final consumers of the teff product. Therefore, this study fills the research gap in the teff value chain analysis that run from customer to farm in the backward direction, based on customers’ willingness to pay for teff at retail price. The study used a descriptive survey method based on a sample respondent of 233 from Addis Ababa retail market (teff mill houses) where the customers buy teff based on the four different grades off teff based on its color. Based on the analysis from both primary and secondary data sources, the study found that cost led pricing approach of teff from farmer to consumer in the Addis Ababa market through teff supply chain analysis revealed, maximum retail price of teff should be 1638 Birr, even though the current actual retail price of teff in the Addis Ababa market is higher than the MRP, which is 1900 Birr. On the other hand, teff value chain analysis at Addis Ababa market from the consumers’ point of what teff finally worth to them revealed a maximum retail price of 1400 Birr which is much less than the teff supply chain analysis of 1638 Birr. Based on the findings of the study, it was recommended that, effective value chain analysis of all essential agricultural commodities like teff, maize; wheat, etc are need at every echelon of the agricultural value chain structure. And finally, tagging price at each stage of the value chain to the point of retail shop using maximum retail price setting and allowing commodity tracking at every stage of agricultural commodity movement from farmer/supplier to consumer via wholesalers and retailers is needed to enhance transparency, quality and integration among all supply chain members.

Key words, Teff, supply chain, value chain, maximum retail price.

1.1. Background of the study
The Value Chain concept was developed and popularized in 1985 by Michael Porter, in “Competitive Advantage,” -a seminal work on the implementation of competitive strategy to achieve superior business performance. Porter defined value as the amount buyers are willing to pay for what a firm provides, and he conceived the “value chain” as the combination of nine generic value added activities operating within a firm – activities that work together to provide value to customers. Porter linked up the value chains between firms to form what he called a Value System; however, in the present era of greater outsourcing and collaboration the linkage between multiple firms’ value creating processes has more commonly become called the “value chain.”[1]. The primary focus in value chains is on the benefits that accrue to customers, the interdependent processes that generate value and the resulting demand and funds flows that are created. Effective value chains generate profits [2].

Most corporate initiatives are really about developing appreciation and awareness of customer needs and values, and then organizing the firm’s activities around efficiently providing for those needs –
quickly, accurately, and at minimum cost. This is because value occurs when customer needs are satisfied through an exchange of products and/or services for some form of payment [3]. Value is an experience, and it flows from the person (or institution) that is the recipient of resources – it flows from the customer. This is a key difference between a value chain and a supply chain – they flow in opposite directions [4].

The need for managing supply chain and adopting supply chain management practice through integration with partners is inevitable for Ethiopian firms, because it is not only a source of competitive advantage for these firms but also to survive even as followers as the firms are already in the global market competing with global companies[5].

Teff is the single most important staple in urban areas of Ethiopia, accounting for 30% per capita caloric intake in 2001/07 and is grown mainly as a cash crop by most farmers where teff value chain is long and involves too many small operators [6]. The marketing channels of teff show how commodity of teff passes through eight complicated routes of intermediaries on the way from point of origin (producers) to reach ultimate users (consumers). [7].

Teff productivity depends on good weather condition and use of appropriate technologies (fertilizer, improved seed, and herbicide) with the recommended rate and time. On-farm experiment conducted indicated that average yield obtained per hectare with the use of appropriate improved practice was 14.2 quintal while it was 12.90 quintal with farmers practice in the year 2001 and 2002 production year [8].

Row planting and transplanting technologies produced especially high yields of teff, on average increasing yields by 70% from the national average of 12.6 quintals/ha to 20.9 quintals/ha. In Amhara and Oromia regions transplanting produced the highest yields followed by row planting and broadcasting. Transplanting in these two regions produced the highest regionally averaged yields of any technology with 23 quintals/ha. In SNNP and Tigray regions row planting produced the highest average yields of 22 and 21 quintals/ha respectively [9].

Teff, wheat and rice are becoming important market oriented crops in Ethiopia. The important market places for producers of these commodities are the district town markets and markets located at the peasant associations within the district. Wholesalers and retailers are the most important buyers from producers. Average distance to market places for these commodities is about two walking hours [10].

Teff value chain is comprised of six key components: research and breeding; seeds and inputs; production practices; harvest and processing; trade and marketing; and value addition and export. [11]. The Teff value chain has not reached its full potential because of systematic bottlenecks at each phase of the value chain with average yield per 8 years data per hectare was 10.81. The strategic vision proposed for Teff is “to make sufficient high quality Teff available to the Ethiopian population at an affordable price and improve farmers’ income in the next five years.” However, in order to achieve this vision, there are six systematic bottlenecks that need to be addressed: (1) very limited resources for Teff research and breeding, (2) low improved seed adoption and expensive fertilizer, (3) inefficient agronomic practices, (4) high post harvest handling loss rates, (5) a fragmented value chain that involves many players and (6) limited value addition opportunities [12].

1.2. Problem Statement
The practices in every sector (manufacturing, agriculture, construction, service, etc) of Ethiopia, has arms length relationship and have rivalry relationship and compete among each other instead of cooperation. As a result market is distorted and price is unreasonably sky rocketed, even if other factors were attributed to the cause. The increase in the price of goods and services in the market is because of lack of cooperation among players in the market and motivation of some players in the market (especially, importers, wholesalers, distributors, retailers and commission agents to speculate on the future prices of goods and hoard and hold goods by creating artificial shortage in the market.) Because of information asymmetry by some players the bullwhip effect has been created - the distortion in information with regard to goods availability (stock out/shortage) in the market which is
magnified as one goes from market (buyer side-the downstream) to supplier (upstream side). This forced the government to set price cap on commodities and some imported goods before two years ago. In effect, it seems the action taken by the government worked especially in the short run and at least from the buyers’ point of view. The price cap solution approach to price increase in essential commodities, including teff in Ethiopia was not effective solution. Because, the government failed to recognize the unintended consequence of the price cap on the whole supply chain from source to end which actually brought general price increase, non availability of certain essential items like oil, sugar, hoarding of some items by traders, shortage of imported goods in the market, etc are among the problems encountered as a result of price cap action taken by the government as a long term effect.

After reasonable period of time the problem was exacerbated and forced the government to lift the price cap on certain items and maintain price cap on essential items. This action again brought a chain effect of going for re registration by the traders for trade license and the logistics part of essential goods be delivered via government agencies and the like. As a result stock out/non availability of goods is common in the market of Addis Ababa and even severe in the regional towns of Ethiopia. These raise the question of the effectiveness of price capping strategy taken by government in Ethiopia and under what conditions such strategy works.

Major problems identified from value chain perspective in teff commodity development are low productivity (8 qt/ha), poor access to improved seed and poor agronomic practices, inferior seed quality due to poor threshing practices, inadequate and untimely supply of inputs and absence of collective marketing. However, intervention on improved seeds to supply to farmers resulted in a yield of 12qt/hectare [13]. Estimates of farm-level costs of Tef production in the Adaa area is (land preparation (man-days) ,seeding ate (kg) ,fertilizer (DAP in qts) ,fertilizer (Urea in qts) , weeding (person-days) , herbicide (lts) ,harvesting (person-days) , gathering and piling (person-days) .Total cost of Birr 5,557 , Becho area total teff production cost is Birr 4,335.9, Shashemene area teff production cost is Birr 4,771 and Dejen area teff production cost is Birr 5,333[14]. Based on these data from four known teff production areas, average teff production cost at Ethiopia level can be recalculated as an average of Birr around 5000 per hectare. On the other hand, price of teff at Adaa, Becho, Shashemene and Dejen are Birr10, 771, Birr 5999, Birr 5666 and Birr 5707 Birr respectively with average price of 7035 per hectare .i.e average profit margin of 28.9%. But it was also reported in literature that farmers earn average profit margin up to 67% during out of stock season for teff product. Therefore, farmers’ average profit margin per hectare for the production of teff per year is 2035 Birr, which may show variation depending on the location of the farm of teff from the main market for teff, Addis Ababa.

It is better to change the measurement of teff from hectare to one quintal (100kilo gram of teff) for value chain analysis as customers frequently buy one quintal or less (like 50 KG, 25 KG, 10 KG, etc of teff) for consumption. Therefore based on the average improved yield of teff per hectare be 12 quintals and average of 5000 Birr production cost per hectare, the cost of teff per quintal at far gate is5000/12 is about 416.67 Birr and selling price at farm gate per quintal is 7035/12 is 586.25 Birr. However, current (2014 harvest season of teff production) farm gate price of teff, for example, in Adaa( 45 kilometer teff farm area from the capital city of Ethiopia-Addis Ababa) popular area of teff production is 1300Birr( a significant farm gate price difference of in the past three years.), and 1900Birr at retail price at mill house (house price of teff commodity with estimated 600 pieces of ‘injera’ per quintal at a retail price of 4 Birr per injera( a value added commodity of teff ready for consumption) totaling 2400 Birr per quintal.

Most farmers sell teff produce right after harvest (more than 80% of the produce) due to liquidity constraints. [15]. In the teff production cycle time, 20-25% pre harvest and late harvest losses, and poor handling result in 20% losses of teff product. [16]. The proposed vision for the future Teff sector is that there should be sufficient high quality teff that is available to the Ethiopian population at an affordable price and provides a good income to farmers [17].
Regardless of ample literature on the teff value chain analysis in Ethiopia, almost all of the studies failed to show a value of teff from the consumers’ point of view as value emanates from the customer in the backward direction towards the farm as opposed to the supply chain flow in the forward direction from source to end. Besides, the existing market structure of teff from farm gate of teff production to consumer market via multiple market intermediaries failed to show the existence of chain that created value for the customers beyond self motivated profit maximization at the expense of the final consumers of the teff product. Therefore, this study fills the research gap in the teff value chain analysis that run from customer to farm in the backward direction, based on customers’ willingness to pay for teff at retail price.

1.3. Research Question
The central question to the research problem is, what is the value of teff produce per quintal from the customers’ willingness to pay point of view at Addis Ababa retail market?

1.4. Objective of the study
The study analyzes teff value chain from customers’ willingness to pay at Addis Ababa retail market.

2. Research Design and Methodology

2.1. Research Design
The study used a descriptive survey method based on a sample respondent from Addis Ababa retail market (mill houses) where the customers buy teff based on the four different grades of teff based on its color.

2.2. Methods of Data Collection and Sample design
Primary data source using interview on the retail price of teff was collected from mill owner in Addis Ababa in the month of November 2014 on the four different grades of teff categorized mainly based on the color of teff. Besides, wholesale price of teff at Mesalemia Addis Ababa market was obtained from ‘Reporter’ news paper published on November 29, 2014.

The first grade of teff (magna which is 100% white color) is 1900 Birr per quintal, based on the data obtained from retail mill house on 2/11/2014. second grade teff, which is dominantly white with few portion of red color, is 1700 Birr per quintal, third grade teff (equal proportion of white and red color) is 1650 Birr, and fourth grade teff (purely red) is 1400 Birr/ quintal.

On the other hand, questionnaire (see the detail in appendix A) was distributed to randomly selected customers of Addis Ababa who arrived to the teff mill house for purchase with a designed sample size of 385 for a large population size, but the study was able to capture data utilizable for analysis only from 233 respondents, which was collected during the month of November 2-15/2014. The questionnaire items include respondents’ economic background, based on their monthly income category, their preference among different grades of teff and their willingness to pay (what the teff product worth to them for the grade selected different from the actual price?)

2.3. Data Analysis
Descriptive statistics on the cost and pricing of teff in addition to frequencies and percentages used to analyze questionnaire survey data. The results of the findings were interpreted in line with the existing value chain theory.

3. Findings and Discussions of the Study

Figure 1. Adaa area Teff Crop, in Ethiopia, 2014.
As portrayed in figure 1, teff crop is mainly cultivated in Western and Central parts of Ethiopia with average production cycle time of 5 months.

3.1. Supply Chain Analysis of Teff Commodity (Cost Led Pricing Approach)

A supply Chain Analysis is can be run from farm gate price to retail shop at teff millhouse via wholesaler with a three echelon of supply chain as presented below:

In the month of December, 2014: Farm gate teff price is Birr1300 at Adaa, wholesale price is Birr 1600 at ‘Mesalemia’ (Addis Ababa market) and retail price at Addis Ababa is 1900 Ethiopian Birr.

Based on the 2011 teff cost of production data and in the absence of current cost of teff production, it can be estimated that price of teff minus profit margin will give cost of teff. That is 1008.53Birr per quintal.

Based on the cost led pricing approach of teff, maintaining a profit margin of 28.9% based on historical data of 2011, wholesale price of grade one teff will be Birr 1675.7 and retail price of teff at mill house will be 2160 Birr at Addis Ababa market.

However, as cycle time of teff production takes 5 months on average for turnover. On the other hand, for wholesalers and retailers in addition to consolidation of teff products from various locations for economies of scale for transportation and daily turnover, profit markup per quintal must be significantly less and should even be lesser at retail price.

However, wholesalers in Addis Ababa market earn near the same(23%) gross profit margin as of the farmers who produce teff as the current wholesale price of teff at Addis Ababa market is Birr 1600. Retailers’ current gross profit margin who sale for the consumers at Addis Ababa is 18.75%, which is less than wholesale profit margin.

Considering the value creation in the supply chain if it took farmers to create teff produce five month of cash to cash cycle time assuming 20 working days a month (5x20days=100days), farmers should earn more profit margin from teff considering time, risk factor and the whole effort exerted in the value creation of teff. On the other hand, wholesalers should earn a mass lesser profit margin(for example in soft-drinks supply chain in Ethiopia earn in the range of 3-5% gross profit margin as opposed to 23% profit margin for teff). Since the role of wholesalers in the supply chain of teff at ‘Mesalemia’ market (‘Ehil berenda’) is limited, like distribution to different retailers in Addis Ababa and regional states, and their turnover time on cash to cash cycle time is on daily basis, and often sale teff on spot without unloading from the truck that avoids warehouse rent, and cost of transport per quintal is 40 Birr and unloading cost per quintal is 5Birr, their gross profit margin should have been less than five percent of the price of teff they pay for the farmers.

Considering a maximum of 5% gross profit margin for wholesalers and 20% gross profit margin for retailers at Addis Ababa market, based on the cost led pricing approach, the highest cost of teff goes to production at farmers which is well above 1000 Ethiopian Birr and the maximum retail price be calculated as follows:

Farm gate price @Adaa=Birr 1300Birr, wholesale price=0.05x1300= 1365 and Maximum Retail Price (MRP) =0.2x1365=1638Birr. However the current retail price of teff is 1900Birr, with a price difference of 262 Birr from the Maximum Retail price.

From this cost led pricing of teff analysis, maximum retail price of teff should be Birr 1638. On the other hand, wholesalers/brokers are unnecessarily maximizing their profit beyond the value creation. Besides, in the absence of maximum retail price setting, retailers may continue to raise the price of teff beyond the current price without justified value addition.

The optimal approach to reduce price of retail teff in the teff supply chain is to improve teff supply chain efficiency by taking measures that improve productivity of teff in terms of yield at farm gate level to reduce cost of production per quintal, reduce maximum gross margin of wholesalers /agents at ‘Mesalemia’ and set maximum retail price of teff.

As cost led pricing approach to teff ignores customers (ultimate consumers) in the value determination of teff to set maximum retail price of teff, it is better to rely on the theory of value chain and consider the customers’ vie of teff value to help us sett maximum retail price of teff at Addis Ababa.
3.2. Value Chain Analysis of Teff (Price Led Costing Approach)

The following analysis is based on the data collected from 233 residents of Addis Ababa who bought teff from retail mill house based on questionnaire survey.

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<th>Table 1. Income Group</th>
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</tr>
<tr>
<td>less than 1000 Birr</td>
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<tr>
<td>1001-5000 Birr</td>
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<td>5001-10,000 Birr</td>
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<td>greater than 20,000 Birr</td>
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<td>Total</td>
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</table>

Source: Questionnaire Survey, 2014

As portrayed in table 1, majority of the respondents (51.9%) are in the income category of less than five thousand Ethiopian Birr per month, significant number of respondents (30.5%) are in the income category of 5001-10,000 Birr per month, 9.4% of the respondents are in the income category of 10, 000 to 15,000 Birr and the remaining 8.2% of the respondents are in the income category of greater than 15,000 Birr.

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<tr>
<th>Table 2. Grade Type of Teff Purchase By Consumers</th>
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<td>Total</td>
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Source: Questionnaire Survey, 2014

Table 2 depicts different grade levels of teff product purchase by consumers in Addis Ababa and responded as follows: 21.9% replied grade one teff, (51.5%(majority)) of the respondents replied that they purchase grade 2 teff which is dominantly white with red color slightly mixed and significant portion(about 25%) were also users of grade three teff product, where as small portion of the respondents( around 2%) are also users of grade 4(pure red teff). From the data presented, it implies that most of the residents (73.4%) of Addis Ababa use grade two and grade one teff.

<table>
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<th>Table 3: Value of Teff from Customers’ point of View</th>
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<td>Total</td>
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Source: Questionnaire Survey, 2014
As portrayed in Table 3, teff consumers’ were asked “what a grade one teff (magna teff with 100% white) worth to them at retail price in Addis Ababa and replied as follows: 41.2% replied grade one teff worth in the range of 1000-1200 Birr for the customer, 38.2% replied grade one teff worth in the range of 1201-1400, and the remaining 20.2% customers replied grade one teff worth in the range of 1401-1600 Ethiopian Birr. From the data presented, most of the teff consumers of Addis Ababa (79.8%) valued grade one teff to a maximum retail price of 1400 Birr.

From the value chain point of view, consumers of the teff product are an integral part of supply chain and value flows from the customer to the produce in the backward direction. What customers say on what teff finally worth to them must derive all players in the teff value creation. That starts from teff farmers, wholesalers/agents, transporters and retailers to make the teff supply chain efficient to meet the expectation of teff consumers in Addis Ababa, which is a maximum retail price of 1400 Birr. A price-led costing approach demands to take the input for pricing of a product from customers and all upstream supply chain members to make teff value chain analysis to increase its function by reducing cost of production and distribution to the consumer market which in turn maximize value(benefit) to the teff customers.

4. Conclusions and Recommendations

A cost led pricing approach of teff from farmer to consumer in the Addis Ababa market through teff supply chain analysis revealed that maximum retail price of teff should be 1638 Birr, even though the current actual retail price of teff in the Addis Ababa market is higher than the MRP, which is 1900 Birr. Therefore, it can be concluded that teff supply chain operation from source to end is inefficient. Wholesale/agent gross profit margin at Addis Ababa market is 23%, which is greater than the value addition they make and can be concluded as abnormal profit.

Teff value chain analysis at Addis Ababa market from the consumers’ point of view revealed a maximum retail price of 1400 Birr which is much less than the teff supply chain analysis of 1638 Birr. Therefore, it can be inferred that based on the customers’ willingness to pay for grade one teff in Addis Ababa market should not be greater than 1400 Birr and this can be taken as the upper threshold for the retailers of teff to compete by offering less than MRP of teff. Therefore, the optimal way to maximize value of teff to customers is through cost reduction at farm site by improving teff supply chain efficiency and removing non value adding members in the teff chain.

Besides, the effective strategy of maximum retail price of teff (MRP) works only by looking in to the market structure in the flow of teff from source to end (suppliers’ of suppliers to customers’ of customers)-the essence of value chain analysis. Furthermore, effective value chain analysis of all essential agricultural commodities like teff, maize, wheat, etc are need at every echelon of the agricultural value chain structure. And finally, tagging price at each stage of the value chain to the point of retail shop using maximum retail price setting and allowing commodity tracking at every stage of agricultural commodity movement from farmer/supplier to consumer via wholesalers and retailers is needed to enhance transparency, quality and integration among all supply chain members.

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