Challenges of supplying raw material to the locally established leather and leather products manufacturing industry

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ABSTRACT

Leather industries in countries with a large raw material base, such as Ethiopia, could contribute significantly to meeting future global demand for leather and leather goods. So far, Ethiopia's leather industry has begun producing leather shoes, jackets, and elegant gloves, which are sold in many developed countries through world-class branded distributors. However, shortage of raw materials has become a major constraint for the industry even if the volume of raw material production is greater than the design capacity of the industry. Therefore, the aim of this study was to investigate the complete process of raw material supply, i.e., starting from the point of production until it reaches the boundaries of tanneries and reveal how the process affects cost, quality, and availability of raw materials. Data were collected through surveys, observations, focus group discussions, and questionnaire. After modeling the existing raw material supplying process and conducting both qualitative and quantitate analysis, this study found that: (i) the existing process fails to collect about 45% of the total available raw material, (ii) the raw material price increases by five-fold when it reaches the tanneries, (iii) it takes 3 to 4 more steps than the standard of reaching raw material to the industry, and (iv) there is a lack of quality control throughout the entire process.. In conclusion, the existing process of raw material supply is a real challenge for the industry. Different interventions suggested by this study could improve the existing conditions.

Keywords*:* Process of raw material supply; Manufacturing industry; Leather industry; Developing country; Ethiopia.
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INTRODUCTION

Leather industry is one of the manufacturing industries that produce an incredible amount of goods like footwear, bags, garments, gloves, and other articles for millions of consumers around the world every day (Sivaram, 2019). The industry uses hides and skins, which are the by-products of meat processing as a main raw

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material (UNIDO, 2010; Teame, 2017). The industry has shifted to the global South since the 1970s (Mammo, 2000; Doble and Kruthiventi, 2007; UNIDO, 2010; Gereffi and Sturgeon, 2013; Bart *et al*., 2016). Because of this, over 60% of the global leather demand is produced by the tanneries located in developing countries (Doble and Kruthiventi, 2007). Moreover, countries like Ethiopia, Pakistan and Bangladesh, which were known for their quality raw material, have emerged as leather producing countries (UNIDO, 2010). The drastic change of the leather industry in Ethiopia dates back to the early 2000s (Sonobe and Otsuka, 2009; Altenburg, 2010; EEB, 2015; Deborah *et al*., 2018). Domestic tanneries that used to produce predominately minimally processed semi-products at the states of pickled pet, wet blue and crust, listed in order of value additions, have upgraded their facilities to the extent that enabled them to produce the next levels of products in the leather industry (Koleros and Attfiled, 2017). Moreover, the tanning process, which had been secured only for domestic firms, was opened for foreign firms in the early of 2000s (Grumiller and Raza, 2019). Some of the first arrivals like the Huajian Group and George Shoe have made significant expansion by building their own industrial parks in less than ten years (Tenaw *et al*., 2022). Furthermore, state of the art "plug and play" industrial parks, which are new experiences for Ethiopia, have attracted reputed firms in the leather industry from all over the world (Tenaw *et al*., 2022). Eventually, the progress made in the leather industry has enabled the medium and large-scale firms to export their products to the USA, European, Middle and Far East markets through world class branded distributors (Coppeaux, *et al*., 2017). Finished leather products are also supplied to the Africa's leather industry (ALLPI, 2015; EEB, 2015).

However, the leather industry development in Ethiopia has faced an unprecedented challenge (CSA, 2017; Koleros and Attfiled, 2017). Primarily, the industry has been deterred from utilizing its full capacity, which was created by enormous effort and investment cost (UNCTD, 2018). For instance, the leather processing and finishing facilities of the medium and large-scale tanneries in the country operate on average at 40% and 60% of their design capacity, respectively (Coppeaux *et al*., 2017). This limitation can also be transferred to the next level of value addition process, i.e., to the end product manufactures. The industry has also failed to generate the speculated revenue. The failure can be demonstrated by taking discrepancies between plans and actual performances. The industry was supposed to generate $1.7 billion by the end of 2015 as per the forecast set on 2010 (MoI, 2016). Yet, it has generated only US$ 472.2 million, which is translated to 73% negative variance (MoI, 2016). Moreover, the actual revenue has decreased to US$ 134.77 million by the end of 2017 (LIDI, 2018). Raw material is considered as one of the major limiting factors. According to the survey of the Central Statistical Agency of Ethiopia and evaluations made by international consultants, shortage of raw material is a critical problem for the industry (CSA, 2017; Koleros and Attfiled,

2017). In contrast, a study reveals that the annual volume of raw material production is greater than the design capacity of tanneries (Shimekt, 2018). Moreover, Ethiopia is one of the countries that ban or discourage export of raw material (Wegayehu and Kalaba, 2016; Grumiller and Raza, 2019). Thus, shortage of raw material seems to be controversial compared against the above evidences. Similarly, the cost of raw material is another critical issue for the leather industry in Ethiopia (CSA, 2017; Koleros and Attfiled, 2017). This is against the results of government's intervention. The reason why raw material for the leather industry isn't exported unlike other raw materials is for the purpose of making available the locally produced raw material with affordable price to the tanneries residing in Ethiopia. In practice, the locally available raw material is very expensive, although its price is very low at the point of production and shows a decline over time (Tegegne, 2009; Jura *et al*., 2015). Ultimately, quality of the raw material supplied to the tanneries is also poor. Out of the total raw material collected by the tanneries each year, only 10 to 15% qualifies the desired quality standards (Dereje *et al*., 2016; Feleke and Amistu, 2016; Alemnesh *et al*., 2018). A few years ago, up to 30-40% of the leather was top grade, i.e., Grade I and II raw material out of the total collection (UNIDO 1992; Rodriguez, 2010). The main research question is thus why raw material becomes a bottle neck in a place where there is excess raw material production?

Literature reveals that manufacturing firms cope up with the problems of material, information and other financial flows by managing supply chains (Kim, 2006; Lenny Koh *et al*., 2007). Commonly, the supply chain of manufacturing firms consists of six processes: plan, source, make/manufacture, deliver, return and enable (APICS, 2017). Particularly, sourcing is required in any supply chain to acquire raw materials that are used to produce products (Augs, 2017; DemandCaster, 2019). Empirical studies show that improving the performance of a supply chain, that is, its efficiency and effectiveness improves material management at a firm level (Sandhu *et al*., 2013). Hence, ranges of supply chain management practices such as supply chain integration, just-in-time capability, information sharing, supplier long-term relationship and involvement, outsourcing, process coordination, risk and award sharing have been widely implemented by manufacturing firms to improve and enhance supply chain performances (Chen and Paulraj, 2004; Khanuja and Jain, 2020; Phan *et al*., 2020). Firms also have reconsidered plant locations in the perspective of supply chain management (SCM) seeking to improve supply chain performance (Melo *et al*., 2009; Saldanha-da-Gama, 2022). Overall, improvement on supply chain performance can enable manufacturing firms to: acquire the right amount of material, at the right quality, at the right price, in the right time. The raw material problems noticed in the leather industry of Ethiopia could be related to SCM inefficiencies and also be alleviated by implementing SCMPs. This needs an in-depth understanding of the existing

supply chain, in particular, the sourcing/supplying process. However, very few studies (Mahmud, 2000; Mekonnen and Ayele, 2008; ICPALD, 2014; Tilahun, 2018) have attempted to highlight the marketing and trading system of the raw material. In their studies, the collection process and method are emphasized. Yet, these studies, fail to consider key factors. Firstly, no attempt is made to consider the nature of raw material production, which is seasonal in comparison to other countries (Coppeaux *et al*., 2017; Mohammed, 2019; Grumiller and Raza, 2019). Secondly, the experience of other countries show that plant location is a critical factor in leather industry. For instance, in USA tanneries are deliberately located near to the animal farms (UNIDO, 2010). Similarly, in the major leather and leather goods producer countries like Italy, China and India, tanneries are located in the raw material producer regions (GAIN, 2009; CLIA, 2015; Marco Bettega, 2021; CLE, 2022; Leather International, 2022). However, there is lack of literature that considers the effect of location of tanneries in Ethiopian to the collection and other related issues. Finally, the distance between raw material production spots and primary collection spots have not been considered in the collection process by the existing studies. Therefore, the purpose of this study was to investigate the sourcing/supplying process of raw material produced by households, which is estimated to 80% of the total annual production, to the leather industry in Ethiopia (Rodriguez, 2010), taking into account: the seasonal nature of raw production, location of tanneries, and collection spots. A process mapping method is used to model the process using primary and secondary data. After that qualitative and quantity analysis is carried out to reveal the effect of existing process on the availability, price and quality of the raw material. In the end, this study will have empirical contribution about material supply. This can also contribute to the body of knowledge in the supply chain management since case study is the best remedy to fill the gap of supply chain management theory.

RESEACH METHODOLOGY

Data and material

Survey, observation, Focus Group Discussion (FGD), and semi- structured questionnaire were used as a technique to collect arrays of primary and secondary data in the following way. The design and actual capacity of tanneries was first collected from the Ethiopia's Leather Industry Development Institute (LIDI) through semi-structured questionnaire. The location of the tanneries was collected though Google Map. The data compiled by these techniques has been compiled in Table 1. The total volume of raw material production of the year 2019, which is estimated to 2 million pieces, was taken from the report of the ministry of Industry of Ethiopia.

Secondly, FGD, one of the widely used techniques in research (Ochieng *et al*., 2018) was used. Commonly, this method is used to obtain data from a purposively selected group of individuals rather than from a statistically representative sample of a broader population (Ochieng *et al*., 2018).

Generally, it is perceived as a "cost-effective" method (Morgan, 1996). The method gives researchers an opportunity to obtain both qualitative and quantitative information. A single focus group is the most common type of focus group discussion (Morgan, 1996) that is used across different disciplines (Lunt and Livingstone, 1996). Single focus group discussion method was selected for this study. The specific objective of the FGD method in this study was to get quantitative information about the volume of raw material produced during the peak production seasons, its incidence, and the volume of raw material that is not collected each year. A group consisting of 8 experts discussed the matter, i.e., 3 from the Ministry of Industry of Ethiopia, 3 from the LIDI, and two from the Ethiopian Leather Industry Association (ELDI). The members of FGD have both theoretical and practical knowledge of the leather industry. The points discussed were the following, (i) What amount of raw material is produced during the peak production seasons (September, January, March/May), (ii) What are the most important incidences during the peak production for you and why, (iii) Are there any specific means to handle the surge of raw material production during peak seasons? If yes, what are the specifics, (iv) Is there a possibility to reduce the seasonal nature of raw material production? If yes, how, (v) What amount of raw material is not collected by the existing practice, (vi) What factors affect in order not to collect all the raw material produced by households, (vii) Is there a possibility to increase the volume of raw material collection - if yes, how?

Ultimately, Woreta, Dangila, Gonder and Bahir Dar, towns and cities located in the Amhara Regional State, the leading producer of raw material in the country, in particular, skin were purposively selected to collect primary data about the initial price of raw materials. The final price of a unit raw material that tanneries pay for it was taken from ten tanneries. Data were collected during holiday events in September, December and April/May in 2018/2019 because large volume of raw material produced in these months.

Table 1. The design and actual capacity of large and medium scale tanneries in Ethiopia and their locations.

Ser. No	Name of tannery	Location	Distance from Addis Ababa (km)	Installed (pcs/day)		Installed (pcs/260 days)		Capacity utilization	
				Hide	Skin	Hide	Skin	Hide	Skin
1	Addis Ababa Tannery	Addis Ababa		800	2,500	252,000	700,000	194,204	51,290
2	Bahir Dar Tannery	Bahir Dar	495	300	2,000	84,000	560,000	3,804	363,227
3	Bale Tannery	Addis Ababa		300	3,000	84,000	840,000	0	0
4	Batu Tannery	Addis Ababa		1,000	2,500	280,000	700,000	309,518	8,700
5	Blue Nile	Addis Ababa		0	4,000	0	1,120,000		
6.	Debre Birhan Tannery	Debre Birhan	124	0	6,000	0	1,680,000	0	279,682
7	China Africa Overseas Leather products S.C	Addis Ababa		400	12,000	112,000	3,360,000	89,000	1,321,197
8	Colba Tannery	Mojo	78.6	600	6,000	168,000	1,680,000	120,677	2,061,000
9	Dire Tannery	Addis Ababa		600	6,000	1680,000	1,680,000	0	815,770
10	DX Industrious	Mojo	74.5	0	8,000	0	2,240,000	0	374,423
11	East African Tannery	Mojo	77.3	0	8,000	0	2,240,000	0	374,423
12	ELICO	Addis Ababa		1,050	13,000	294,000	3,640,000	153,433	549,484
13	Ethiopian Tannery SC	Addis Ababa		1,200	12,000	336,000	3,360,000	308,897	1,433,160
14	Farida Tannery	Addis Ababa		0	7,000	0	1,960,000	8,199	524,249
15	Friendship Tannery	Mojo	73.8	1,000	10,000	280,000	2,800,000	0	3,437,045
16	Gelan Tannery	Addis Ababa		0	3,000	0	840,000	0	114,575
17	Habesha Tannery	Addis Ababa		0	4,000	0	1,120,000	0	421,604

18	Hafede Tannery	Alem Gena	19.2	250	6,000	70,000	1,680,000	7,969	71,938
19	Hora Tannery	Addis Ababa		0	3,200	0	896,000	0	261,874
20	Kombolcha Tannery	Kombolcha	376	0	6,000	0	1,680,000	0	197,756
21	Mersa Tannery	Mersa	486	300	6,000	84,000	560,000	0	0
22	Mojo Tannery	Mojo	78.6	500	8,000	140,000	2,240,000	66,723	1,389,150
23	New Wing Finishing	Addis Ababa		10	180	2,800	50,400	1,250	45,845
24	Sheba	Wikro	966	600	6,000	168,000	1,680,000	132,442	1,994,470
25	Sun Industrial Tannery	Vicinity of Addis Ababa		0	3,000	0	840,000	0	280,000
26	United Vasn Tannery	Addis Ababa		0	5,000	0	1,400,000	0	127,983
27	Walia Tannery	Addis Ababa		1,000	5,0000	280,000	1,400,000	35,000	408,750
28	Xiang Xin Xhange	Vicinity of Addis Ababa		500	5,000	140,000	1,400,000	293,000	120,000

Source: (Compiled from the LIDI report, 2019; Google Map)

Data Analysis

A process mapping technique is used to model systems in various disciplines (McClintock, 2017; Asana, 2021). The key elements and/or variables required to model the existing practice of the raw material supply are determined quantitatively and qualitatively from the primary and secondary data in the following ways.

Location of tanneries: Based on the calculation made from the secondary data, 97.3% of the 28 medium and large-scale tanneries, total number of operational tanneries in Ethiopia, are found in and around Addis Ababa within 130 km radius. The remaining 2.7% of the tanneries are located in the North and Northwest part of the country. These tanneries are not considered in this study because they have no significant effect on the general condition.

Number of raw material production spots: Each household is assumed as the source of raw material. This implies, the number of households ≈ the total number of production spots. Hence, the total number of raw material production points that contribute 80% of the raw material is determined by dividing the estimated population size by the average family size. The population of Ethiopia is estimated to be 110 million (UNDESA, 2019). According to the Ethiopian Central statistical Authority, the average family size is five (CSA, 2010). Accordingly, the total number of production spots = population size/average family size ≈ 22 million spots.

Types of collectors: The collectors which have different names in previous studies (Ahmed, 2000; Mekonnen and Gezahegn, 2008; ICAPLD, 2013; Tilahun, 2018:) are customized as primary, secondary, tertiary and final in the order of their size and role so as to make the model easy and understandable.

Collection spots: The place at which raw material is collected from the producers is determined in this way. The raw material produced by the rural community in 21,149 'kebeles'-the smallest administration units (Abdulahi, 2001) is collected from towns and cities which are accessible at a distance of 11 km on average from farmers. Whereas, the material produced by the urban community is collected from open markets or temporary stations along the road side (Mekonnen and Gezahegn, 2008). This implies the total number of towns and cities can be considered as the collection places. Hence, 968 towns (http://www.statsethiopia.gov.et) and 180 cities (http://www.ethiovisit.com) summed to 1062 is the total number of collection places.

The model developed to show the existing raw material supplying practice starting from the source of production to the boundaries of tanneries, using the process mapping technique is presented in the next section. After that, both qualitative and quantitative analysis is made to understand the effect of the existing supplying practice on the availability, quality and price of raw materials to the tanneries.

RESULTS AND DISCUSSIONS

This section presents the model that represents the existing practice used to reach the raw material produced by households, which is estimated to be 80% of the total raw material production. The remaining 20%, which is produced by meat factories and modern abattoirs, is not considered in this model since it is directly supplied to the tanneries with short steps.

As depicted above, it takes very lengthy steps to reach raw materials to the tanneries as compared to a one or two step supply, which is a common characteristic of other countries (UNIDO, 2010; Ruggero *et al.*, 2017). This is primarily because of the location of tanneries in reference to the raw material production spots. Based on the estimation of this study, raw material is produced at 22 million discrete spots scattered across the country (Figure 1). Whereas, the tanneries that process the raw materials are highly concentrated in specific geographical areas. As per this study, about 97.3% of the tanneries are located in and around the capital city at a radius of less than 130 km. Unfortunately, the location of the capital city is approximately at the center of the country at which the extreme edges are as far as 1,000 km.

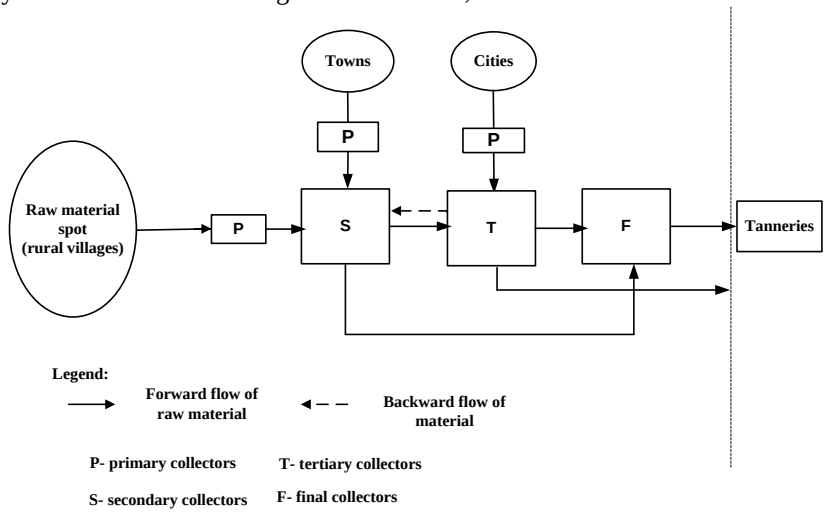

Figure 1. Model of raw material supplying practice to the leather industry in Ethiopia

This implies the raw material produced in the different regions of the country flows towards the center in stepwise through collectors whose storage facility increases as we move from the towns to the capital city. In the existing condition, the following collectors involve to reach the raw material from the point of production to the boundary of tanneries. The primary collectors have the role of collecting raw

materials from producers resided in 21,149 rural villages, 968 towns and 180 cities. The raw material that is produced by the rural villages is collected at towns after farmers travel 11 km on average on foot since villages are inaccessible by modern transportation systems. Whereas, the raw material produced by the urban community is collected by: (i) by door-to-door collectors, (ii) collectors make collection from temporary collection stations along the road sides or open markets of the stated towns and cities, and (iii) the warehouses of secondary and tertiary collectors. The secondary collectors have the role of accumulating raw material by receiving the smallest size of collections carried out by primary collectors. Similarly, the tertiary collectors play the role of accumulating raw material by receiving the collections carried out by secondary collector. In addition to this both secondary and tertiary collectors have the role of collecting raw materials from their vicinity through primary collectors. The final collectors, which play a role of supplier to the tanneries, do the fourth step of collection by receiving materials from the secondary and tertiary collectors.

This study also identifies that the seasonal nature of raw material production causes the raw material to flow in the reverse direction. According to expert estimates using the FGD method, approximately 30-40% of raw material is produced during specific events that may occur only three to four months per year. Unfortunately, this volume is greater than the purchasing and storage capacity of tanneries and collectors (secondary, tertiary and final) under normal condition. The incidence attracts entities that are not the regular members of the supplying process. These entities buy the excess raw material and hoard until price hike. In the worst case, the raw material can also escape from the hands of regular collectors (secondary and tertiary) and be in the hands of these illegal entities. This makes the raw material to flow back to the raw material production base instead of forwarded to the tanneries as depicted in the above model by a dotted arrow pointing to the left. This is not a common phenomenon in the supply chains of manufacturing industries. Back flow could happen only when material fails to meet quality requirements.

The cost of supply a unit raw material to the tanneries can also be estimated based on the primary data. Based on the first-hand data taken from 10 tanneries, they pay Birr 183.5 (USD 3.46) for a piece of raw material on average. When purchased from the producers, a piece of raw material costs Birr 30 (USD 0.57). Hence the cost of supply, i.e., how much it costs to reach a unit raw material from the point of production to the boundary of tanneries is estimated as:

Cost of supply = the final price of a unit raw material that tanneries pay for it - the initial price of a unit raw material fixed at the first step of collection.

Accordingly, the average cost of supply of a unit raw material = Birr 183.5 – Birr 30 = Birr 153.5. This means that the price of raw material increases by fivefold on average when it reaches to the tanneries. The storage, collection and transportation activities at each node or between the nodes contribute for such high cost. Some of these activities,

for instance, transportations are a bit different than transporting other materials. According to expert opinions obtained through the FGD method, it is difficult to obtain sufficient loads from each rural town. Hence, the transporters charge on the basis of full load irrespective of the amount of actual load. Otherwise, the vehicles will be loaded with other materials that affect the quality. In addition to this, the collection process demands large manpower since it is collected from all the towns and cities in the country. As a result, the activities end up swelling the cost of supplying the unit raw material from the point of production to the tannery's boundary.

Moreover, it is impossible to collect all the available raw material by the existing process. As per the estimations of senior experts of the ministry of industry, ELIA and LIDI through the FGD method, about 45% of the total available raw material production is not collected for different reasons. The amount in pieces that this system fails to collect is determined as follows. Based on the information of ministry of industry, the total annual production of raw material in the year 2019 was about 2 million. As we briefed in the background information, 80% of the raw material is produced by households. Thus, the total number of raw materials produced by households becomes (80% × 2 million) = 1.6 million pieces. Hence, the total volume of raw material that is not collected by the existing process is equal to (45% × 1.6 million) = 720,000 pieces for different reasons. If capability had been built to collect this amount of raw material, tanneries wouldn't have faced shortage of raw materials.

A number of factors attribute for this. Distance of collection spots from the production spots is one of the factors. Based a previous study (ICPALD, 2014), collection spots are on average 11 km far from the residents of rural community. This means that to reach the raw materials from the production spot, 11 km travel on foot is required. Travelling 11 km to sell a piece of raw material could not be an urgent issue by any means unless farmers have some other market. Hence, farmers avoid going only to sell the raw material and prefer to go to market whenever they have some other work. Until that time, they dry it by traditional method. Nevertheless, dried raw materials have lower prices than fresh ones. They have also low quality than dried by scientific methods. Such situation forces the producers to sell their products for cottage or traditional tanners that don't have much concern for quality, for instance, piercing or cut at any part of the raw materials since they use it to produce small items. The value of raw material from the perspective of producers is another factor that affects the amount of collection especially that is produced in big cities and towns. Normally, skins and hides being the by-products of meat processing, have low prices across the world (Tegegne, 2009; Juhar *et al*., 2015). However, the prices do not have relation to the amount to be collected if these raw materials are produced by mass production systems at meat factories and modern abattoirs. All that is produced can reach to the tanneries without any loss. However, when the raw material is produced at household level like what is happening in Ethiopia, it affects the volume of collection. Based on

the primary data, when the slaughtering/production happens at the household level, the price of a raw material, i.e., the skin, is only 0.375% of the price of a sheep or goat that is bought for meat consumption, which is the primary purpose. This value is meaningless in the perspective of the producers. This results in dumping the raw material as a waste in cities. Eventually, there is lack of incorporating quality control system, although there is a chance of spoilage and damage while the raw material is transported and stored in the lengthy sourcing/supplying process except minor inspection by the primary collectors. As per the existing studies (Mekonnen and Gezahegn, 2008; Coppeaux *et al*., 2016), primary collectors that make the first-hand collection carry out visual inspection while they buy the raw material from producers. Based on our observing on ten tanneries, there is no inspection system until it reaches to the boundary of tanneries once the primary collectors pass the quality level by their eyeballs. Because of this, the defects caused by transportation system, in the stores of secondary, tertiary and final collectors can easily reach to the tanneries. Moreover, the peak production events cause shortage of experienced collectors. This invites layman collectors and increases the collection of defective raw materials from the beginning. Overall, in the existing condition any malfunction cost caused by the lengthy process is easily transferred to the tanneries. If, the tanneries had been distributed across the regions, there would have been short steps of handing over, affordable raw material price, and sufficient raw material availability.

CONCLUSION

In this study, an attempt was made to investigate the existing sourcing/supplying process of raw material to the large and medium scale tanneries in the leather industry of Ethiopia seeking to understand how it affects the availability, price and quality of raw material. The complete sourcing process starting from the point of production until it reaches to the boundary of tanneries based on primary and secondly data was modeled. After conducting qualitative and quantitative analysis process, the following conclusions were made. (1) The seasonal nature of raw material production causes a backward flow of raw material. This is unprecedented phenomena in the arena of supply chain management. The incidence has a direct and an indirect effect on the price, availability and quality of raw material. (2) The reason that tanneries face shortage of raw material is not due to the shortage of raw material in the country. Rather, it is because of the existing supplying process. The existing process fails to collect approximately 45% of the raw material produced by households in each year. If there had been a capability of collecting this amount, estimated to 720,000 pieces per annum, shortage of raw tanneries wouldn't have been the problem of tanneries in Ethiopia. (3) In the existing condition, raw material is collected from approximately 22 million discrete production spots, which is equivalent to the number of households in Ethiopia, and supplied to the tanneries- located in and around the capital city at a radius of less than 130 km. In such a process, the price of a unit raw material raises by five folds when tanneries receive it. Hence, the cost of raw material price is related to

the existing raw material supplying process. (4) It takes three to four steps of handing over among different levels of collectors to reach the raw material to the industry. This is very length as compared to the process of supplying raw material produced by meat factories or modern abattoirs. In the latter case, the raw material can easily reach to the tanneries in one step or two steps. And (5) there is lack of quality inspection in the lengthy process except visual inspection by the primary collector during the first step of collection. As a result, any malfunction in the whole process is forwarded to the tanneries. In the existing condition, tanneries bear on any malfunction in the process since the process of supply is out of the control of tanneries.

In the end, the existing condition can be improved by multiple interventions. First, there shall be some means to manage the raw materials produced during the peak production seasons so that smooth and relatively stable supply of materials can be guaranteed to the tanneries. Warehouse upgrading and encouraging some of the tanneries to process the first stages of leather processing can be possible solutions. Second, it is important to consider the relocation of some of the tanneries to regions where the raw material production is high. Third, establishing appropriate collection spots that fit with the existing production spots could improve the amount of collection and shorten the process of supply.

Fourth, a study shall be made to incorporate quality control system in the supplying process so as to minimize the chance of receiving defective raw material.

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CONFLICT OF INTEREST

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