

Full Length Research Paper

Prevalence of some coffee quality problems in Gomma Woreda, Jimma Zone

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Despite the favorable climatic condition and long history of coffee production in Gomma Woreda, quality of coffee is declining due to poor pre and post harvest practices. Therefore; a study was conducted to assess the prevalence of some pre-identified coffee quality problems in the Woreda in 2013. For quantitative analysis respondents were drawn and data were collected from 150 households. The result indicated that majority of the respondents were headed by males (83%) with large family size (73%). In addition to that, most of the respondents (83.33%) owned old coffee trees (>20 years). The analysis on the pruning practice, harvesting stage, coffee storage method also showed that 93.3% of the respondents practice pruning and 100% of the respondents harvest coffee at full maturity stage but 80% of the respondents mix differently harvested coffee during storage and selling. From this finding we can conclude that institutional factors like age and educational status are found to be the major problems whereas, family size and household head has average effects on coffee quality. Moreover; pre and post harvest practices like age of coffee, disease and weed, compost application and mixing differently harvested coffee had significant effect on quality of coffee in the study area.

Key words: Coffee, prevalence, pre-harvest, coffee quality, cup quality and post harvest.

INTRODUCTION

Coffee (*Coffea arabica* L.) is the world's favorite drink, the most important commercial crop-plant, and the second most valuable international commodity after oil. Worldwide there are about 20 million coffee farming families and around 100 million people depend on coffee for their livelihoods. Its export value alone is immense (US \$ 15.4 billion in 2009/10) and as such it plays a crucial role in the economies of several tropical countries (Davis et al., 2011). Coffee is made from the roasted seeds of the genus *Coffea*, and is brought from plant to cup via a complex process (Davis et al., 2011).

Arabica Coffee is believed to originate in humid high rain forests of south and south western Ethiopia. Coffee ranked as the fifth most important trade commodity after wheat, cotton, maize, and rice (FAO, 2008). Ethiopia is a major source of genetic resources for origin and diversity

of *Coffea arabica*. It is cultivated in most parts of tropics, accounting for 80 percent of the world coffee market. The crop plays an important role in income and employment in developing countries like Africa, Asia and Latin America (Behilu et al., 2007). Coffee is the major sources of foreign currency income for Ethiopia and contributes more than 35 percent of total export earnings (Fayera, 2008). Ethiopia is well known not only for being the home of Arabica coffee, but also for its very fine quality coffee acclaimed for its aroma and flavor characteristics. The coffee that is distinguished for such unique characteristics include Sidamo, Yirgachafe, Harar, Gimbi, Jimma and Limmu coffee types (Anwar, 2010).

However, Workafes and Kebede (2000) stated that coffee produced in some parts of Ethiopia, especially from Harar and Yirgachafe are always sold at a premium prices both at domestic and international coffee markets because of its distinctive fine quality and appropriate processing approach. However; though there is suitable climatic condition in Jimma Zone, Gomma Woreda, generally coffee quality exported to abroad or local consum-

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ption is not satisfactory as it has to be. In view of the present situation, making effort to overcome challenges and threat slowly through expansion of production does not seem visible for the country. Thus, it has been repeatedly mentioned at various forum that providing good quality coffee is the only way out and viable option to get into world market and to remain help producers to hedge their marketing risks (Behailu et al., 2008).

Jimma Zone is one of coffee growing zones in the Oromia Regional State, which has a total area of 1,093,268 hectares of land (JZARDO, 2008). Currently, the total area of land covered by coffee in the zone is about 105,140 hectares, which includes small-scale farmers' holdings as well as both state and private owned plantations. Out of the 40–55 thousand tons of coffee annually produced in the Zone (JZARDO, 2008), about 28-35thousand tons is sent to the central market, while the remaining is locally consumed (Alemayehu et al., 2008). Nowadays, Jimma Zone covers a total of 21% of the export share of the country and 43% of the export share of the Oromia Region, of which Gomma Woreda takes the largest share of the region (JZARDO, 2008) as cited in Anwar (2010). Even though coffee has long history of production and favorable climatic conditions in Ethiopia, coffee quality is declining from time to time due to several improper pre and post harvest management practices. These are mainly associated with poor agronomic practices like lack of stumping, pruning and weeding (Tena, 2008).

Other factors like climate, genetic makeup of plants and institutional effects can also affect coffee production, productivity and finally coffee quality. Still there are gaps such as lack of profound assessment works to estimate the prevalence of coffee quality problems in Gomma Woreda and lack of adequate information on the effects of post harvest processing and pre-harvest handling techniques on coffee quality. Therefore, the study was designed to assess the prevalence of some pre-identified coffee quality problems in Jimma Zone, Gomma Woreda.

MATERIALS AND METHODS

Description of the Study Area

Gomma Woreda is one of the known coffee growing areas among 18 Woredas of Jimma Zone. It is located 397 km Southwest of Addis Ababa and about 50 km west of Jimma town (ORG, 2003). The annual rainfall of the area was between 800-2000 mm, while the mean minimum and maximum annual temperatures of the Woreda vary between 7oC-12oC and 25oC-30oC, respectively (ARDO, 2008). Altitudinal range of the Woreda is between 1387-2870 m above sea level (IPMS, 2007). Agro-ecologically, this Woreda is divided into 8% high land (Dega), 88 %, intermediate high land (Weyina Dega) and 4% low land (Kolla) (IPMS, 2007).

Sampling Technique and Methods of Data Collection

A survey was conducted on major coffee producing areas of Jimma Zone, Ethiopia during 2012. The south west part of Ethiopia that is Jimma zone, Gomma Woreda coffee growing areas were surveyed. The Woreda has 39 Kebeles, the smallest administrative unit of Ethiopia, of which only 4 Kebeles were selected randomly that is (Chedaro Suse, Guma, Beshasha and Bulbulo). One hundred fifty randomly selected farmers were interviewed to point out their views on coffee quality and its related problems. A semi-structured questioner with both close and open ended question was used to collect primary data. The survey was supplemented by experts' knowledge, views from national coffee researchers, coordinators of organic coffee farmers' cooperative unions, and some policy makers. The quantitative data analysis was carried out using SPSS soft ware. Percentage, mean and frequency distribution were also used to analyze the data. Problem ranking was calculated based on the frequency of respondents.

RESULTS AND DISCUSSIONS

Head of Household

The data in Table 1 showed that, from a total of 150 respondents the majority of household coffee farmers were males 125(83%) and the remaining 25(17%) of household coffee farmers were females. Many evidences showed that female households have less access to improved technologies, credit and extension service. For instance, the finding of Ellis (2005) showed that females have less access to any improved agricultural technologies and extension services, which contribute to lower adoption rates. According to the findings of (Negussie et al., 2008), only 26% of the female-headed households had access to improved coffee varieties as compared to 88% for the male-headed. Hence, this study showed that the area may produce a coffee with poor quality because of a very low rate of technology adoption and extension service.

Age

The studies indicated that majority of the household coffee farmers were elders (74%) and the remaining were younger's (26%) (Table 1). According to a recent report of (Yussefi and Willer 2003), those households headed by farmers with longer farming experience are believed to have better competence in assessing the characteristics and potential benefits of new technologies than younger farmers with shorter farming experience. Similarly 74% of the respondents are found to be illiterate whereas; 26% are literate of which majorities are primary schools completed.

Table 1. The social status of the respondents in the study area.

		Frequency	Percentage (%)
Sex of household head	Male	125	83
	Female	25	17
Age	<25 (young)	45	26
	>25 (elder)	105	74
Family size	Small (<5)	110	73
	Large (>5)	40	27
Educational status	Illiterate	110	73
	Literate	40	27

Table 2. Age of coffee tree owned by the respondents in the study area.

Age of coffee tree	Frequency	Percentage (%)
<20 years	10	6.67
>20 years	125	83.33
Both	15	10
Total	150	100

Family Size

As indicated in Table 1, majority of the respondents in the coffee farming household had large family size 110 (73%) and the remaining 40(27%) of household coffee farmers are small family size. Households with small family size suffer from labor shortage specially, during peak coffee harvesting time, because of shortage of labor to be hired in the area (Adriana et al., 2009). Household heads with large family size are more likely to improve coffee quality due to more labor during pre and post harvest management practices. Hence this study clearly indicated that the study Woreda has sufficient labor for different coffee management activities which in turn improve the quality of coffee dramatically.

Age of Coffee Tree

The survey result showed that majority of the respondents (83.33%) owned old coffee trees (>20 years), while 6.67 % of them owned coffee trees less than twenty years and 10% of them have a tree of both greater and less than 20 years (Table 2). This result implied that majority of the coffee plantations in the study areas are physiologically declining as their yield and

quality might decrease as reported by Clifford (1985). Yigzaw (2005) also reported that samples from young trees are likely to be mild and thin, but fine in flavor. Beans from old trees produced strong taste and a harsh characteristic brew. Medium aged trees, 15 to 20 years old, bear beans with good flavor as well as acidity and body. Therefore; this study proved that the study area has endowed with old aged coffee trees which indeed give low yield and quality upon harvesting.

Disease and weed prevention mechanisms

The weed is found to be a serious problem which reduces the productivity and quality of coffee in the study area. The study showed that majority of the coffee plantations in the study areas are infected by soft weed (53.33%), couch grass (40%) and a combination of soft weed and couch grass (6.66%) (Figure 1). Therefore, it is true that quality could decrease, because of the competition for nutrient, light and moisture with different types of weeds growing in coffee field. Similar findings were reported by (Adriana et al., 2009). To control this weed problem the study indicated that most of the respondents used slashing mechanisms 125(83.33%), whereas; 20(13.33%) of the respondents used chemicals

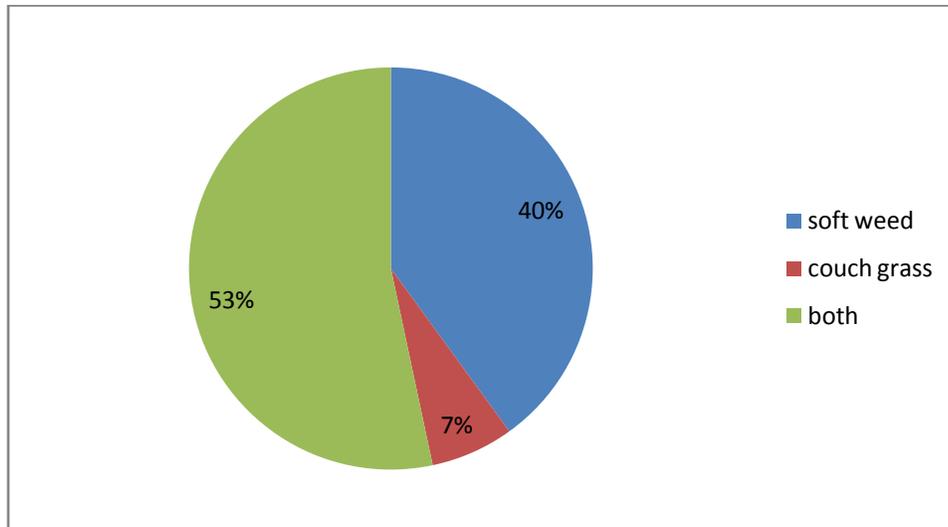


Figure 1. Types of weed prevalent in the coffee field.

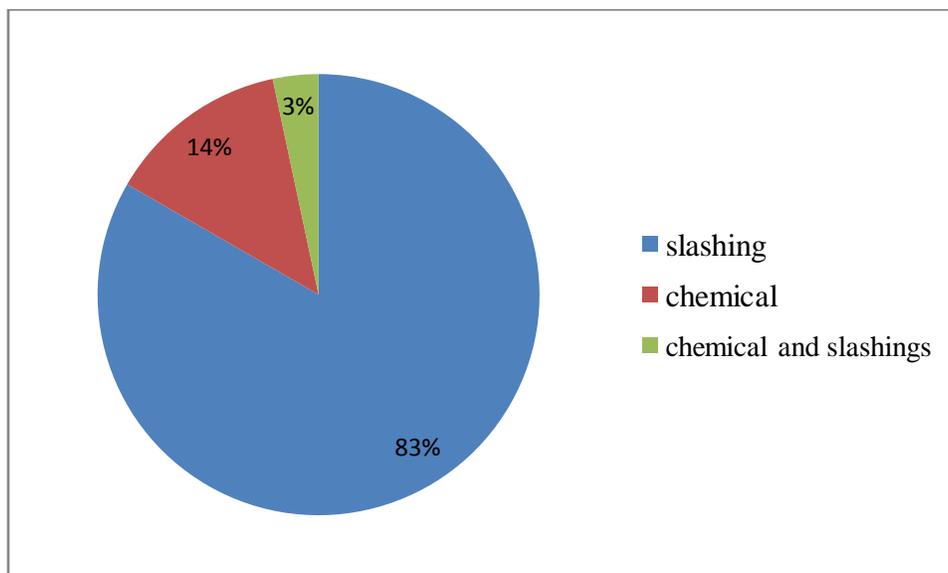


Figure 2. Mechanism used to prevent prevalent coffee weeds in the study area.

to control weed and the remaining 5(3.33%) of respondents used both chemical and slashing methods (Figure 2).

In addition to the prevalence of noxious weeds in the area, disease problem appeared as one of the major problem for decline of coffee productivity and quality. The result in Figure 3 showed that 36.67% of respondents use cultural practices to prevent coffee disease, whereas; 16.67% of respondent cannot use any mechanism to prevent coffee disease. However; disease occurrence can lead to poor quality coffee that gives off and disagreeable odor. Diseases attacks can affect the

cherries directly or cause them to deteriorate by debilitating the plants, which will then produce immature or damaged fruits that affect its quality (Wintgens, 2004). So that is based on the above finding it's advisable to create awareness among the coffee growers about coffee disease management as far as coffee quality and export standard are concerned.

Coffee Pruning and Composting

The survey result showed that 93.33% of the respondents practiced rehabilitation pruning and only 6.67%

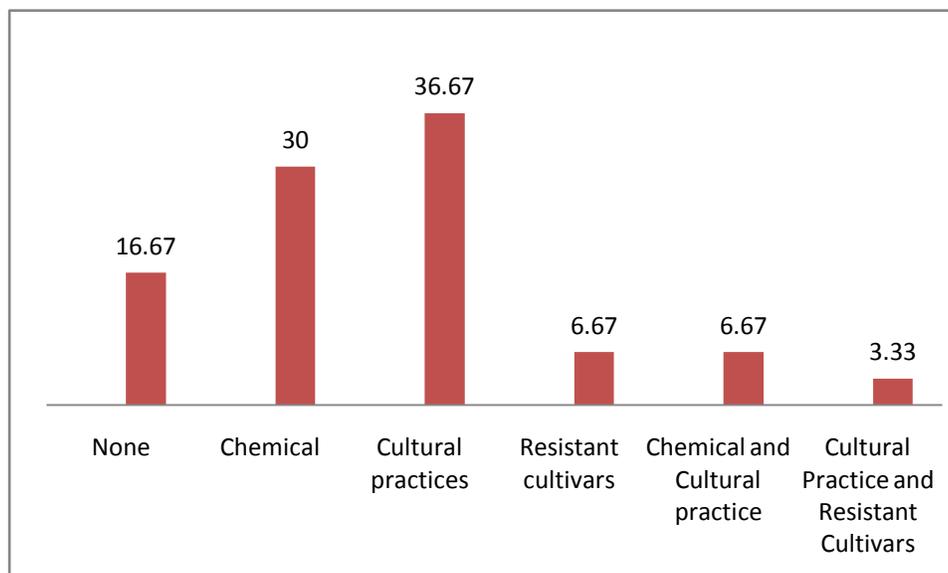


Figure 3. Prevention mechanism of coffee diseases in the study area in percentage

Table 3. Coffee tree pruning and compost application practices in the study area.

Coffee Tree Pruning		
Pruning practice	Frequency	Percentage (%)
No pruning	10	6.67
Pruning	140	93.33
Total	150	100
Compost Application		
Response	Frequency	Percentage (%)
Yes	75	50
No	75	50
Total	150	100

of respondents have no pruning practice in their coffee field (Table 3). Hence, majority of the coffee farmers in the study area are practicing coffee tree pruning. According to (Adriana et al., 2009) coffee tree pruning is an extremely important pre harvest activity for reducing incidences of diseases, modifying air movement within the plantation, which in turn reduces leaf drying time and helps maintaining the frame work of the plants in desired shape. In addition, the result showed that 50% of respondents applied compost to their coffee field and (50%) of respondents do not apply compost in their coffee field. This indicated that half of the farmers created a very good growth conditions which have a positive effect on bean size and flavor. According to (Wintgens, 2004), compost improves the activity of micro-organisms

and improves macro–and micro- nutrient availability. Compost acts as a good soil conditioner and improves the physical, chemical and biological properties of the soil.

Harvesting stage

From the result we found that, 150(100%) of the respondents harvest their coffee at full maturity stage (Table 4). This indicated that in the study area all coffee farmers harvest their coffee in the right time (full mature stage). According to Adriana et al., (2009) in order to maintain and protect the coffee beverage quality, aroma, thickness of the brew, taste and flavor as well as acidity in

Table 4. Method of harvesting, drying and storage mechanism of coffee in the study area.

Mixing differently harvested coffee		
Response	Frequency	Percentage (%)
Yes	120	80
No	30	20
Total	150	100
Drying Material of Coffee		
Material	Frequency	Percentage (%)
On wooden and bamboo made drying bed	150	100
Type of Bag Used for Coffee Packaging		
Material Used	Frequency	Percentage (%)
Jute bag	150	100
Duration of storage		
Duration	Frequency	Percentage (%)
<4 months	100	66.67
4-6 months	20	13.33
7-10 months	20	13.33
>10months	10	6.67
Total	150	100
Method of coffee harvesting		
Method	Frequency	Percentage (%)
Selective picking	150	100

the cup, the right kind of coffee fruits have to be harvested in the right time following certain suggested guidelines. If coffee is harvested before the beans are ripe or at immature stage, the end product will show color defect and will be cause of uneven roasts. So that this study indicated that harvesting at optimum maturity stage is not a problem among the growers. From our personnel observation we even concluded that the farmers have sufficient knowledge about the effect of harvesting stage on coffee quality. In addition, the study showed that selective picking (98%) is the most common method of coffee harvesting in the study area (Table 4).

Mixing Differently Harvested Coffee

From the total respondents, 120 (80%) of the respondents mix differently harvested coffee while selling and the remaining 30 (20%) of the respondents do not mix differently harvested coffee during selling (Table 4). This indicated that majority of the study area coffee farmers created inferior quality due to mixing of green, partly ripe, red and black cherries. However, red ripe

cherry should be selectively picked from the tree to maintain the quality of the green beans during harvesting and should be stored separately (Wintgens, 2004).

Coffee Storage House

The survey result indicated that only 6.67% of the respondents lacked storage facilities (Figure 4). Storage facilities should be clean, cool, shaded, dry and well ventilated. In conditions of high relative humidity and temperatures, coffee beans will absorb moisture and develop mold. They may be bleached out in color and lose some desirable flavor. In this regard, the farmers in the study area are using poor storage facilities which lead to changes in the inherent qualities and appearance of the green coffee as a result of potential development of molds.

Storage Period

The result in Table 4 indicated that about 66.67% of respondents stored their coffee for less than four months,

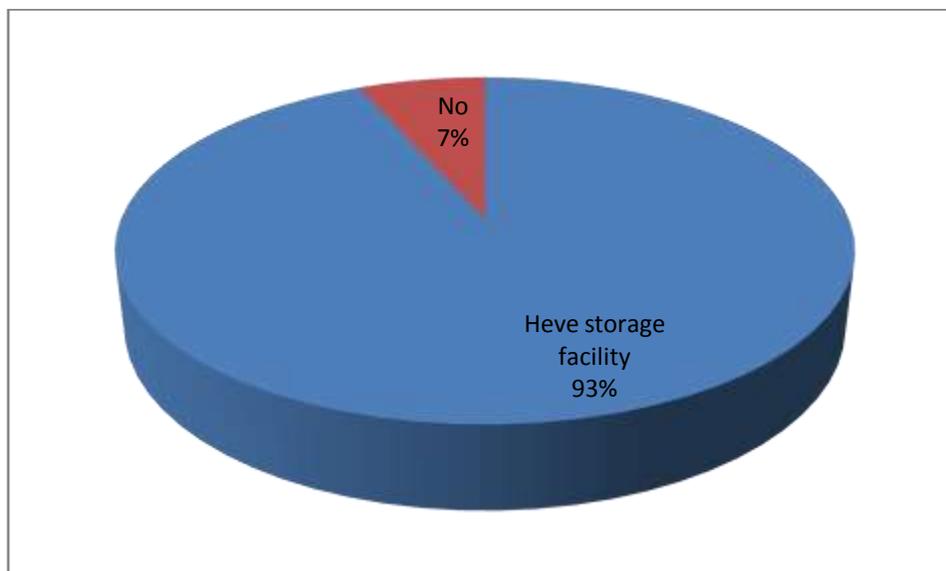


Figure 4. Availability of coffee storage facilities in the study area.

Table 5. List of factors affecting coffee quality in the study area in their order of importance.

Order	List of factors	Percentage (%)
1	Age of coffee tree	20
2	Mixing differently harvested coffee	19
3	Age of house hold head	18
4	Lack of Compost application	16
5	Lack of disease and weed prevention mechanisms	11
6	Head of house hold	6
7	Family size	4
8	Lack of good storage facility	2
9	Extended storage period	2
10	Lack of coffee pruning practices	2
11	Harvesting stage	0

whereas; 6.67% of respondents stored for over 10 months, which is considered as one of a coffee quality deteriorating factor. The finding of several studies further indicated that green coffees stored for a longer period described as 'aged' may suffer a loss of their acidity (Wintgens, 2004). Length and condition of bean storage also affect cup quality (Yigzaw, 2005). Moreover, long time storage under high relative humidity and warm conditions increase bean moisture content and consequently reduce quality in terms of raw and roasted appearance as well as liquor (Woelore, 1995). All the respondents (100%) in the area used Jute bag for coffee packaging and wooden and bamboo as a drying bed (Table 4).

Problem Ranking

As indicated in Table 5, the result of the survey showed that age of coffee tree (20%), mixing differently harvested coffee during storage and selling (19%), age of house hold head (18%) and lack of compost application (16%) are the four top problems in the study area as far as coffee quality is concerned whereas; harvesting stage at full maturity (null), lack of coffee pruning practice (2%), extended storage period (2%) and lack of storage facility (2%) are the list significant problems in the study area. Therefore, further training and awareness creation should focus on the prevention of disease and weed problems, application of compost, improving age of coffee tree and

mixing of differently harvested coffees during storage and selling. It is well recognized that, the area has endowed with a reach diversity of coffee genotypes but the management aspect still lacks strong scientific based agronomic practices which in turn have their own effect on the final cub quality. Therefore, to reduce this gap the farmers strongly needs the support of the government to capacitate their skill and local and international NGOs.

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