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Research Article

Assessment of coffee post-harvest handling in major growing areas of Ari and South Omo zone, South Ethiopia

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Abstract

The study was designed with the objective of assessing a post-harvest handling practices of coffee in Ari and South Omo Zone, South Ethiopia. Totally, 270 purposively selected household respondents were used from three Woredas for data collection. Finally, quantitative data was analyzed by employing SPSS (version 20). The results indicated that majority of the surveyed farmers were harvesting their coffee at full maturity stage (93.3%), use selective hand picking (49.4%) and drying on plastic sheets 45%, which maintain the inherent coffee quality. On the contrary, (30.6%) stripping on ground and collect in bulk, harvesting coffee by polyethylene bag (29.1), drying on bare land (36.5%), packaging in polyethylene bag (70.8%), store in residence home (94.5%), 42.8 % store their coffee more than three months and mold development (49.1%), which is considered as coffee quality deteriorating factor. So that, providing adequate trainings on a continuous basis to producers on pre-and post-harvest management practices are vital. These will further increase the quality; thereby increase the price because good quality coffee gets good grades that earn high price. Therefore, extension intervention could be the best possible approach to enhance awareness among coffee producers to keep the typical coffee quality profile in the area.

Keywords: *Coffee quality, Harvest, Post-harvest.*

BACKGROUND AND JUSTIFICATION

Ethiopia is renowned for exclusively producing Arabica coffee a species that originated in the southwestern highlands of the country. Arabica coffee, accounting for 60-70% of global coffee production, is the most widely cultivated coffee species and is considered the most popular beverage worldwide (Melese and Kolech, 2021). The coffee sector in Ethiopia is cornerstone of the economy, involving over 4 million smallholder farmers and employing approximately 15% of the population across various stages of the value chain (Degaga, J. (2020); Worku, M. (2023). Nearly 95% of Ethiopian coffee is produced by smallholder farmers who grow coffee on small plots of less than half a hectare. As the world's fifth-largest coffee producer, Ethiopia contributes 4% to global coffee production and leads Africa in coffee output, accounting for 40% of the continent's total (Kolech, S.A. (2021); Muhie, S.H. (2023). In addition to its cultural significance Arabica coffee generates 30-35% of Ethiopia's export revenue, with earnings of 1.43 billion USD in the 2023-2024 fiscal year alone (Africa.com.2023/2024). However, postharvest losses and quality deteriorations significantly reduce the economic potential of Ethiopia coffee.

Postharvest harvest handling which includes harvesting, processing, drying, storage and transportation plays a critical role in determining final cup quality and market value. Traditional methods, such as sun drying on bare ground and inconsistent fermentation, often leads to defects, mold growth, and mycotoxin contamination (Alemu *et al*., 2020). These issues result in down grading of coffee, reducing its value from specialty to commercial grade with estimated losses of 20-30% in potential revenue.

Small holder farmers, who produce 95% of Ethiopia's coffee, face multiple challenges, including: lack of access to modern processing technologies, poor storage facilities, inadequate training on best post-harvest practices and climate variability, where unexpected rain distrust drying and increases fungal risks (Wudneh, Mengistu & Tadesse, 2024).

Improving postharvest handling is essential for enhancing coffee quality, increasing farmers' incomes, and strengthening Ethiopia's competitiveness in global markets (Gashaye & Binganidzo, 2023).

The main coffee-producing regions in Ethiopia are the western, South-western, Southern and eastern parts of the country (Awoke & Tadesse, 2023). Also, coffee is one of the major cash crop in Ari and South Omo zone, which serves as a major means of cash income for the livelihood of coffee farming families. Though coffee is produced in the zones, information on post-harvest factors responsible for coffee quality problem is not well studied. Therefore, the present study was assessed harvest and post-harvest factors which could be responsible for coffee quality problem in the area.

MATERIALS AND METHODS

Study Area

This assessment work was conducted in Ari and South Omo zone, South Ethiopia in a year 2024-2025 at the three Woredas, namely; Debub Ari, Baka Dawula Ari and Mallee.

Sampling techniques

Three Woredas and five Kebeles from each Woreda were selected purposively based on level of production. Thirty key informants were drawn from all category, that is, middleman (traders‟ agents and traders) and extension workers (development agents [Das] and Woreda and zonal level experts). From the three Woredas, 240 household farmers were selected for interview following the sample size determination procedures of probability proportional to size technique to point out their views on coffee quality and how they handle their coffee after harvest. Totally, 270 respondents were used for the whole study.

Data collection

The assessment was conducted at farmers and trader level. It involved both quantitative and qualitative data. For primary data acquisition, questionnaire was prepared and administered to concerned stakeholders, namely, extension workers (front level DAs, experts at Woreda and zonal level) and middleman (traders‟ agents and traders). Farmers were interviewed to generate major coffee harvesting and post-harvest handling practices in the area and also key informant interview was held with farmers and DAs in three Woredas, to strengthen information gathered from interviewed farmers on harvest and post-harvest handling problems that contributes reduction in coffee quality in the area. Additionally, focus group discussion was held with farmers to strengthen and cross-check the data obtained from different stakeholders.

Data analysis

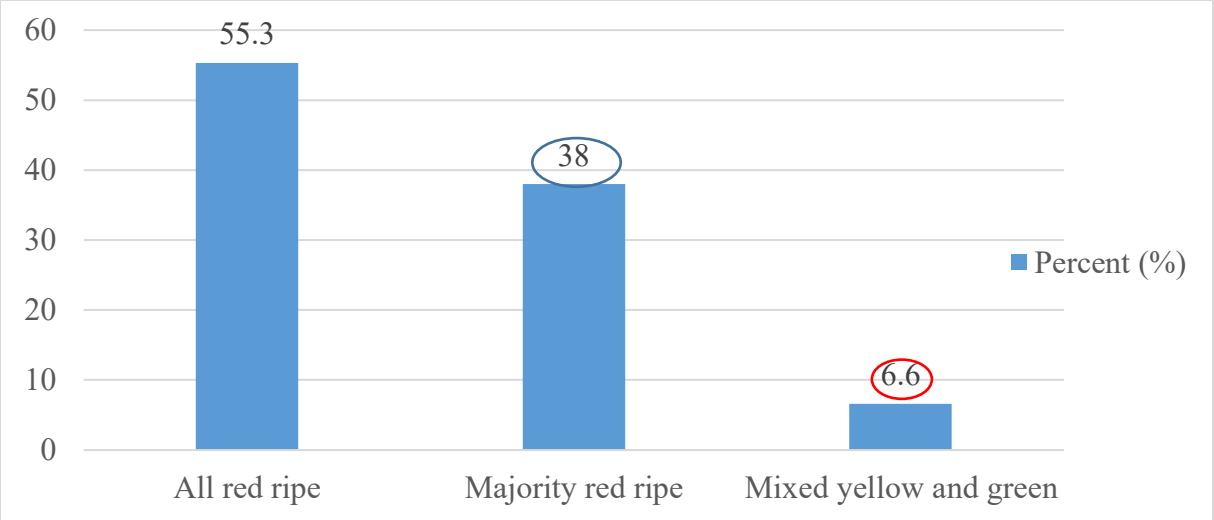
Quantitative data collected from different sources was analyzed using SPSS version 20 software. Qualitative data gathered from various sources was organized, triangulated, interpreted, discussed and narrated. Problem ranking was done to identify the magnitude of different factors which are affecting coffee quality in study the area.

RESULTS AND DISCUSSION

Coffee harvesting stages and methods used

The result indicated that most of the respondents harvest their coffee when all red ripe (55.3%) and majority red ripe stage (38%) (Figure 1). This implies that in the study area, majority of the farmers harvest their coffee at better stage to maintain coffee quality. A significant number (6.6%) of farming households harvest their coffee at mixed yellow and green stages.

Figure 1: Coffee harvesting stage in study area



Regarding to harvesting method, the survey result for shows that farmers commonly experienced three types of coffee harvesting methods (Table 1), that is selective hand picking (49.4%), strip on ground and collect in bulk (30.6%) and selective hand picking and collect dropped cherries from ground (15.5%). Similar research finding was reported by Gezehagn *et al*. (2016) for harvesting methods of coffee studied in Gamo Gofa Zone, Southern Ethiopia.

Table 1: Coffee harvesting methods in study area

Harvesting method	Frequency	Percent (%)
Selective handpicking	134	49.4
Stripping on ground and collect in bulk	83	30.6
Collect dropped cherries from ground	3	1.1
Selective handpicking and collect dropped cherries from ground	42	15.5
Total	270	100

Materials used for harvesting and method of coffee drying

From the survey, the major coffee harvesting material used in study area were polyethylene bag (29.1), plastic sheet (17.7) and Basket made of bamboo (12.2), respectively (Table 2). The result shows that the higher percentage of inappropriate harvesting material (32.4) is used in the area. They need to avoid using plastic/polyethylene sacks/ plastic container/ for harvesting since it has an opportunity to contaminate coffee quality especially when the container is used for transporting grains and/or chemicals including chemical fertilizer.

Table 2: Coffee Harvesting material used in study area

Harvesting material	Frequency	Percent (%)
Basket made of bamboo	33	12.2
Plastic sheet	48	17.7
Polyethylene bag	79	29.1
Plastic basket	14	5.2
Metal container	3	1.1
Animal leather	6	2.2
Total	270	100

With regard to coffee drying methods, about 45% dry their coffee on plastic sheet and 36.5% on bare land (Table 3). As the result confirmed, use of raised wire mesh beds for coffee drying is very small in the study area. These were used by the traders who collect non-dried and partially dried coffee from farmers and brokers and dry by their own efforts.

Table 3: Coffee Drying Methods in study Area

Drying methods	Frequency	Percent (%)
Both dry and wet	69	25.5
on bare land	99	36.5
on plastic sheet	122	45
mats made of bamboo	26	9.6
75-1m above ground drying bed	6	2.2
Plastic sheet and mats made of bamboo	18	6.6
Total	270	100

Constraints during coffee harvesting

Coffee harvesting in Ethiopia faces several constraints that impact productivity, quality, and sustainability. The result indicates that harvesting time (37%) and harvesting time and labor force (27.7%) were the major coffee constraints during coffee harvesting in the area (Table 4). During peak coffee harvesting stage, farmers in the area busy on weeding and other agronomic practices of other crops such as maize, sorghum, common bean etc. so that the coffee left overripe and dropped on the ground. Similarly, seasonal labor shortages occur, especially during peak coffee harvest periods, leading to delayed harvesting and overripe cherries.

Table 4. Constraints during harvesting coffee in study area

Constraints	Frequency	Percent	Rank
Harvesting time	102	37	1
Labor force	27	10	4
Money to pay for labor	22	8.1	5
Harvesting time and labor force	75	27.7	2
No constraints	41	15.1	3
Too much rain	4	1.5	6
Total	270	100	

Packaging and storage of coffee in study area

As indicated in Table 5, the major packaging material in the study area were polyethylene bag (70.8%) and plastic bags (28%). Such practices are in contrary to the proper packaging which uses high-barrier, hermetic, or multilayer packaging that enable maintaining the inherent quality of coffee.

Table 5. Packing and storage of coffee in study area

Variables	Item	Frequency	Percent (%)
Packaging material	Polyethylene bag	192	70.8
	Plastic bag	76	28
	Silo made of bamboo	3	1.1
Storage place	Residence home	256	94.5
	Warehouse	9	3.3
	No store	6	2.2
Storage period	Sale immediately after harvest	21	7.7
	1-3 months	120	44.3
	3-6 months	103	38.0
	Up to one year	13	4.8
	Wait until the price increases	14	5.2
Mold development	Yes	138	50.9
	No	133	49.1

The assessments result showed that 94.5% of the interviewed farmers stored the product in residence house which is susceptible for contamination as shown in Table 5. Among the respondents (Table 4), 82.3% of the respondent stored their coffee up to 6 months, but above one year storage duration practiced by 4.8% of respondents. Farmers in the study area (50.9%) sale their coffee after it had developed mold. However, 49.1% of farmers sold their coffee without mold development (Table 5).

Types of coffee sold in the study area

The result indicated that about 49.1% respondents sold dried cherries and 42.1 % sold both fresh and dried cherries. They sell their fresh cherries to processors who willing to dry on their own facilities (Table 6). Selling at dry stage by itself has no problem, but different faults are committed by farmers during drying processes that have negative effect on coffee quality.

Table 6. Types of coffee sold in study area

Coffee type	Frequency	Percent (%)
Fresh ripe cherries	3	1.1
Dried cherries	133	49.1
Green bean	3	1.1
Fresh and dried cherries	114	42.1
Dried cherries and green bean	5	1.8
All type	13	4.8
Total	270	100.0

Coffee post-harvest handling problems in study area

As indicated among harvest and post-harvest handling practices in the area, storage place (88.2%), harvesting method (69.7%), mixing differently harvested coffee (62.4%) and drying method (60.1%) are the top four factors significantly affecting coffee quality in study areas (Table 7).

Table 7. Major post-harvest factors affecting coffee quality in study are

Postharvest factor	Item	Frequency	Percent	Rank
Mixing differently harvested coffee	No	102	37.6	3
	Yes	169	62.4	
Harvesting method	No	82	30.3	2
	Yes	189	69.7	
Storage place	No	32	11.8	1
	Yes	239	88.2	
Packaging material	No	226	83.4	8
	Yes	45	16.6	
Determination of harvesting time	No	136	50.2	5
	Yes	135	49.8	
Extended storage period/time	No	193	71.2	7
	Yes	78	28.8	
Drying method	No	108	39.9	4
	Yes	163	60.1	
Transportation method	No	165	57.6	6
	Yes	115	42.4	

DISCUSSION

The results showed that most respondents harvest coffee either at the fully red ripe stage (55.3%) or when the majority of cherries are red ripe (38%) (Figure 1). This suggests that farmers in the study area largely follow appropriate harvesting practices that help preserve coffee quality. However, a notable proportion (6.6%) of households harvest at mixed yellow and green stages, which can reduce the overall quality. Optimal coffee quality—expressed through desirable attributes such as aroma, body, flavor, acidity, and cup balance—is achieved when cherries are harvested at peak ripeness (fully red), regardless of whether processing is carried out through the dry (natural) or wet (washed) method (Adriana et al., 2009). Recent studies further support this, demonstrating that fully ripe cherries contain higher concentrations of sugars, amino acids, and volatile precursors that enhance flavor and aroma complexity, whereas immature or overripe cherries are associated with undesirable traits such as bitterness, graininess, and musty notes (Bi et al., 2024; Cao et al., 2023; Król & Kurek, 2023).

Regarding harvesting methods, our survey revealed three common practices among farmers (Table 1): selective hand-picking (49.4%), strip harvesting onto the ground with bulk collection (30.6%), and a combination of selective hand-picking plus gathering fallen cherries (15.5%). These findings align with Gezehagn et al. (2016), who observed similar practices in the Gamo Gofa Zone of Southern Ethiopia. Similarly, the survey results indicate that polyethylene bags (29.1%), plastic sheets (17.7%), and bamboo baskets (12.2%) are the predominant materials used for coffee harvesting in the study area (Table 2). Notably, 32.4% of respondents utilize containers deemed inappropriate for harvesting. The use of plastic or polyethylene sacks and containers should be discouraged, as these materials can compromise coffee quality. Such containers, especially when previously used for transporting grains or chemicals like fertilizers, pose a risk of contamination. Studies have shown that improper storage materials can lead to flavor degradation and microbial growth in coffee beans (Girma, 2024; Viegas et al., 2022).

The finding also showed that use of inappropriate drying methods can be considered as one of the main problems contributing to low coffee quality in the study area. Similar research finding was reported by Gezehagn *et al*. (2016) for drying methods of coffee studied in Gamo Gofa Zone, South Ethiopia. In disagreement with present result, 90% dry on wooden and bamboo made bed in Gedeo, south Ethiopia (Kidist *et al*., 2019). Coffee drying using bare ground produced inferior coffee for all raw and cup quality attributes. Drying beds can be made of mesh wire, wood posts, or any suitable local material covered in a material like burlap or nylon netting (Alemseged and Yeabsira, 2014). As coffee is a hygroscopic commodity, it can easily absorb foreign materials from inappropriate post-harvest management areas. This result is in line with Getachew *et al*. (2015), who reported drying coffee on mesh wire and bamboo mats with thin layer thicknesses earned better raw quality attributes.

The choice of packaging material plays a crucial role in preserving coffee's sensory attributes, aroma, and freshness by protecting it from environmental factors such as oxygen, moisture, light, and loss of volatile compounds (Borém *et al*., 2019; Oliveira *et al*., 2023). As shown in the result the major packaging material in the study area were polyethylene bag. Storing coffee in polyethylene or plastic bags leads to moisture damage, oxidation, flavor loss and pest risks. For long term quality, high-barrier, hermetic, or multilayer packaging is essential (Rustia *et al*., 2022).

Storage is one of the most important and crucial stages in processing agricultural commodities, as it directly affects quality, nutritional value, and marketability—all central to food security and postharvest loss reduction (Bekele, D. 2021). The generally accepted time for green coffee storage under normal conditions is one year. Almost all respondent stores their coffee in residence home which is susceptible for contamination. Storage facilities should be clean, cool, shaded, dry, well ventilated and separated from other products. 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 (Belay *et al*., 2016). Also, above 80% the respondent stored their coffee up to 6 months. This storage duration would be better to maintain the quality of coffee in the study area. Length of coffee bean storage affects cup quality, with longer storage reducing desirable sensory traits and increasing negative flavors (Bicho *et al*., 2013). Similarly, extended storage of parchment coffee beyond six months can lead to development of undesirable flavours such as woody or stale notes due to biochemical changes and oxidation during storage (Bertrand *et al*., 2012). 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 (Worku *et al*., 2018).

In the study area, 50.9% of farmers sold their coffee after it had developed mold, likely due to improper drying practices. To ensure the preservation of coffee quality and prevent mold growth, it is essential to dry coffee beans to a moisture content of 10–12% (International Coffee Organization, 2017). At this moisture level, beans maintain their inherent quality, mold development is minimized, and the risk of breakage during processing is reduced (Ghosh, 2020).

In Ethiopian conditions, fresh red ripe cherry coffee was sold to a place where there is wet processing station, but still, it is great advantage on the coffee quality point of view if traders buy fresh red ripe cherries and dry it in their own facilities to minimize the contamination during post-harvest handling and poor storage at farmer‟s level. In study area farmers sell both dried and fresh cherries. Coffee quality would be better maintained if farmers sell red ripe cherries to processors, who will dry the coffee on their drying facilities to reduce contamination due to inappropriate drying by the farmers. With regard to processing methods, wet method better maintains inherent coffee quality than the other methods over different locations and genotype and resulted in better coffee cup quality (attributes like acidity, body and flavor) and bean physical quality (attributes like odor) as compared to the dry processing method (Banti and Atlaw, 2024).

The result from survey indicated that storage place, harvesting method, mixing differently harvested coffee and drying method are major coffee postharvest problems in study area. Poor warehouse conditions—such as high humidity and pest infestation—can lead to mold growth (including ochratoxin A) and significant quality loss in stored coffee beans (Legese, Girma & Sualeh, 2022; Maman et al., 2021; Georgise & Mindaye, 2020). Also, Tesfa (2019) found that 40% of defects in Ethiopian coffee are due to improper drying (leading to mold, sourness, and musty flavors).

CONCLUSION AND RECOMMENDATION

Conclusion

The study assessed postharvest handling practices of coffee in the Ari and South Omo zone of South Ethiopia, revealing both strengths and critical gaps. The Majority of the surveyed farmers were harvesting their coffee at full maturity stage (93.3%), use selective hand picking (49.4%) and drying on plastic sheets 45%, which maintain the inherent coffee quality. On the contrary, (30.6%) stripping on ground and collect in bulk, harvesting coffee by polyethylene bag (29.1), drying on bare land (36.5%), packaging in polyethylene bag (70.8%), store in residence home (94.5%), 42.8 % store their coffee more than three months and mold development (49.1 %), which is considered as coffee quality deteriorating factor. So that, providing adequate trainings on a continuous basis to producers on pre-and post-harvest management practices are vital. These will further increase the quality; thereby increase the price because good quality coffee gets good grades that earn high price. Therefore, extension intervention could be the best possible approach to enhance awareness among coffee producers to keep the typical coffee quality profile in the area.

Recommendation

To enhance coffee quality and farmer income, Training and capacity building should be conducted for all coffee producing areas: farmer training programs on

- ✓ **Selective hand picking** (to avoid striping/bulk collection).
- ✓ **Proper drying techniques** (raised mesh wire bed, moisture monitoring to 11 to 12%).
- ✓ **Hermetic storage** (replace polyethylene with GrainPro® bags).

- ✓ **Storage (**coffee should be stored in clean, cool, shaded, dry, well ventilated warehouse and separated from other products.

REFERENCE

1. Adriana, F. R., Rosa, S. D. V. F., Ferreira, R. A., & Siqueira, V. C. (2009). Influence of cherry maturity on coffee quality. *Acta Scientiarum. Agronomy, 31*(2), 225–229. https://doi.org/10.4025/actasciagron.v31i2.700
2. Adriana, F., Ashenafi, A., & Fekadu, B. (2009). Importance of harvesting red ripe coffee cherries to maintain beverage quality. *African Journal of Agricultural Research, 4*(14), 2160–2166. https://doi.org/10.5897/AJAR.9000154
3. Africa.com. Ethiopia earned record revenues from coffee exports in 2023/2024. https://www.africa.com/ethiopia-earned-record-revenues-from-coffee-exports-in-2023-24/
4. Alemseged A, Yeabsira Z (2014). Coffee export business in Ethiopia: Business start-up and operational manual. *Ethiopian Coffee Export Association*, Addis Ababa, Ethiopia.
5. Alemu, K., Adugna, G., Lemessa, F., & Muleta, D. (2020). Variation among Colletotrichum isolates associated with coffee berry disease in Ethiopia. *Cogent Biology*, *6*(1), 1740537.
6. Awoke, G., & Tadesse, M. (2023). *Coffee production and its socio-economic importance in Ethiopia. Ethiopian Journal of Agricultural Sciences*, 33(1), 45–60.
7. Ayele, A., Worku, M., & Demissew, S. (2021). *Production, productivity, quality and chemical composition of Ethiopian coffee. Cogent Food & Agriculture*, 9, 2196868. https://doi.org/10.1080/23311932.2023.2196868
8. Banti, M., & Atlaw, T. (2024). *Effect of processing methods on physicochemical and cup quality of coffee at Jimma, Ethiopia*. *Heliyon*, 10(9), e30480. https://doi.org/10.1016/j.heliyon.2024.e30480
9. Bekele, D. (2021). Role of postharvest management for food security: A review. In *Advances in Crop Science and Technology* (Vol. 9, Issue 7). https://doi.org/10.4172/2329-8863.1000475
10. Belay S, Mideksa D, Gebrezgiabher S, Seifu W (2016). Factors affect in coffee (*Coffea arabica* L.) in Ethiopia: a review. *Journal of Multidisciplinary Scientific Research* 4:22-28
11. Bertrand, B., Vaast, P., & Perriot, J. (2012). Post-harvest processing and storage effects on coffee quality: A review. *Food Science and Technology International*, *18*(2), 145–157. https://doi.org/10.1177/1082013211425092
12. Bi, Y., Wei, Q., Lin, Q., Wu, D., & Guo, M. (2024). Systematic study of flavor-active metabolites across multiple maturity stages of coffee cherries by UPLC–MS/MS-based metabolomics. *Molecules, 29*(3), 635. https://doi.org/10.3390/molecules29030635
13. Bicho, N. C., Leitão, A. E., Ramalho, J. C., & de Alvarenga, N. B. (2013). *Changes in sensory quality characteristics of coffee during storage. Food Science & Nutrition, 1*(6), 454–462. https://doi.org/10.1002/fsn3.335
14. Borém, F. M., Ribeiro, F. C., Figueiredo, L. P., Giomo, G. S., da Silva, V. C., & de Lima, R. R. (2019). Sensory analysis and chemical composition of specialty coffees stored in different packaging systems. *Journal of Food Science and Technology, 56*(1), 95–104. https://doi.org/10.1007/s13197-018-3461-4
15. Cao, L., Jin, Q., & Wang, X. (2023). Postharvest processing and its effects on coffee quality: A review. *International Journal of Food Science & Technology, 58*(3), 1077–1090. https://doi.org/10.1111/ijfs.16261
16. Degaga, J. (2020). Review on coffee production and marketing in Ethiopia. *Journal of Marketing and Consumer Research*, *67*, 7-15.
17. Garo, G., Shara, S., & Mare, Y. (2016). Assessment of harvest and post-harvest factors affecting quality of Arabica coffee in Gamo Gofa Zone, Southern Ethiopia. *African Journal of Agricultural Research*, *11*(24), 2157-2165.
18. Gashaye, N., & Binganidzo, M. (2023). Institutional actors and their impact on postharvest coffee value chain performance in Ethiopia. *Journal of Agribusiness and Rural Development, 70*(4), 445–456. https://doi.org/10.17306/J.JARD.2023.01780
19. Georgise, F. B., & Mindaye, A. T. (2020). *Technologies for storage & warehouse management of coffee beans in Ethiopia*. *Technology Reports of Kansai University*, 62(09), 5375–5393.
20. Getachew E, Berhanu T, Ali M, Tesfaye S, Yehenew G (2015). Influence of sun drying methods and layer thickness on quality of midland arabica coffee varieties at Gomma-II, Southe West Ethiopia. *Glob. J. Agric. Sci.* 3(2):203-212.
21. Ghosh, P. (2020). Processing and drying of coffee – A review. Sweet Maria's Library. Retrieved from https://library.sweetmarias.com/wp-content/uploads/2020/08/Processing-and-Drying-of-Coffee-%E2%80%93-A-Review.pdf
22. Girma, B. (2024). *The impact of packaging and storage on coffee quality*. *International Journal of Current Research and Academic Review*, 12(7), 43–49. Retrieved from https://www.ijcrar.com/12-7-2024/Bealu%20Girma.pdf
23. International Coffee Organization. (2017). Roaster guide: Why is green bean moisture content important? Perfect Daily Grind. Retrieved from https://perfectdailygrind.com/2017/08/roaster-guide-why-is-green-bean-moisture-content-important/
24. Król, K., & Kurek, M. A. (2023). Effect of ripening stage and processing method on coffee bean composition and quality: A review. *Foods, 12*(15), 2831. https://doi.org/10.3390/foods12152831

25. Legese, H., Girma, B., & Sualeh, A. (2022). Prevalence and importance of the mycotoxin and ochratoxin A (OTA) in coffee: A review. *Journal of Genetic and Environmental Resources Conservation, 10*(2), 88–100. https://doi.org/10.11648/j.gercj.2022.10.2.88
26. Maman, M., Sangchote, S., Piasai, O., Leesutthiphonchai, W., Sukorini, H., & Khewkhom, N. (2021). Storage fungi and ochratoxin A associated with Arabica coffee bean in postharvest processes in Northern Thailand. *Food Control, 130*, 108351. https://doi.org/10.1016/j.foodcont.2021.108351
27. Markos, M. U., Tola, Y. B., Kebede, B. T., & Ogah, O. (2023). *Metabolomics: A suitable foodomics approach to the geographical origin traceability of Ethiopian Arabica specialty coffees. Food Science & Nutrition, 11,* 4419–4431. https://doi.org/10.1002/fsn3.3434
28. Melese, Y. Y., & Kolech, S. A. (2021). Coffee (Coffea arabica L.): methods, objectives, and future strategies of breeding in Ethiopia. *Sustainability*, 13(19), 10814.
29. Moat, J., Williams, J., Baena, S., Wilkinson, T., Gole, T. W., Challa, Z. K., Demissew, S., & Davis, A. P. (2017). *Resilience potential of the Ethiopian coffee sector under climate change. Nature Plants, 3,* 17081. https://doi.org/10.1038/nplants.2017.81
30. Muhie, S. H. (2022). Strategies to improve the quantity and quality of export coffee in Ethiopia, a look at multiple opportunities. *Journal of Agriculture and Food Research*, *10*, 100372.
31. Oliveira, L. S., Oliveira, E. S., Franca, A. S., & Alves, R. C. (2023). Effect of storage conditions on the quality of green and roasted coffee beans: A review. *Food Chemistry*, 409, 135243. https://doi.org/10.1016/j.foodchem.2023.135243
32. Rustia, D., Pongpa-Adhmsri, A., & Wichienchot, S. (2022). Lipid oxidation changes of Arabica green coffee beans during accelerated storage with different packaging types. *Food Science & Nutrition*, *10*(8), 2540–2549. https://doi.org/10.1002/fsn3.2822
33. Teshome, K., Girma, Z., & Eshetu, B. (2019). Assessment of pre and post-harvest management practices on coffee (Coffea arabica L.) quality determining factors in Gedeo zone, Southern Ethiopia. *African Journal of Agricultural Research*, 14(28), 1216-1228.
34. Viegas, C., et al. (2022). Microbial contamination in the coffee industry. *Frontiers in Microbiology*. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC9602572/
35. Worku, M. (2023). Production, productivity, quality and chemical composition of Ethiopian coffee. *Cogent Food & Agriculture*, 9(1), 2196868.
36. Worku, M., Taye, T., & Asfaw, Z. (2018). Effect of storage conditions on quality and shelf life of coffee beans: A review. *International Journal of Food Science*, *2018*, Article ID 1342896. https://doi.org/10.1155/2018/1342896
37. Wudneh, A., Mengistu, S., & Tadesse, Y. (2024). Post-harvest challenges facing smallholder coffee farmers in Ethiopia: storage, processing, and climate variability impacts. *Journal of Agriculture and Food Research*, *18*, 101316. https://doi.org/10.1016/j.jafr.2024.101316

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