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Socio-Economic Factors that Influence Coffee Production and Demand for Seedlings: Case Study of Mzuzu Smallholder Coffee Planters Cooperative Union in Malawi

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Abstract

Coffee (*Coffea*) is a fourth cash crop in Malawi, however, cherry yield productivity is low. The study assessed socio-economic factors affecting smallholder farmers' coffee production and also estimated demand for seedlings. It was implemented in five coffee growers' cooperatives. 372 coffee farming households' representatives were randomly selected and interviewed using a structured questionnaire. Data were analysed using SPSS and Mean Derived Scores (MDS) were calculated in Microsoft excel. 94.9% of farmers accessed information on coffee production practices from cooperative managers. 72% of respondents bought seed at MK3, 000.00/kg from private traders which was relatively higher than MK2, 500.00 offered by the government. 96.8% of respondents sold coffee to their Union, however, farmers complained of price fluctuations and late payments. Farmers cultivated Catimor 129 (MDS = 5.2) because it is high yielding and of good cup quality. Annual parchment production per household ranged from 101kgs to 500kgs according to 34.4% of respondents, and they earned MK40, 001.00 to MK200, 000.00. Total demand for coffee seedlings was 600,341. Government should provide credit facilities to farmers, set up coffee certification standards, employ agricultural extension agents, and regulate the coffee market in order to attract more investors.

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Coffee, parchment, yield, production, demand, farmer.

Introduction

Coffee is a perennial crop that belongs to the genus *Coffea*, and comprise of more than 103 species (Carvalho *et al.*, 1996). *Coffea arabica* and *Coffea canephora* are the most cultivated species in more than 70 countries (ICO, 2019). Latin America is the highest coffee producing continent, followed by Asia and Africa, whose relative production is constantly decreasing (Bertrand, 2022). Global production of Arabica is at 65% but constantly decreasing as compared to Robusta (35%)

(Bertrand, 2022; World Coffee Research, 2017). Climate change is probably contributing to the decrease in world coffee productivity especially coffee production under smallholder farmers because of inadequate inputs in production.

Other challenges for smallholder coffee production include inadequate technical extension services, pests, diseases and low use of organic and inorganic fertilizers. Smallholder coffee production contribute 80% of world coffee supply, yet 44% of the world's small coffee

farmers live in poverty, and 22% live in extreme poverty (Bertrand, 2022). Coffee production is source of livelihood for more than 12 million households, and mostly in lower income countries (Sanger, 2022). Ethiopia is the only country in Africa that is among the top ten producing countries.

World consumption of coffee has been growing steadily over the last 50 years with an estimated annual average of 1.8 to 2% in volume and this is consistent with the curve of world human population increase (Bertrand, 2022; Celi, 2022). Coffee industry is valued at over USD 200 billion per year (Samper *et al.*, 2017).

So the importance of coffee cannot be overemphasized. Coffee is the fourth forex exchange earner in Malawi, and contribute to the national development for the country (Natural Resource Institute, 2006). A 1% increase in the price of coffee is associated with a 3% increase in rural employment rate (ICO, 2019).

ICO (2019) further indicated that revenues from coffee exports are also associated with more rural employment, higher contribution of agriculture to gross domestic product, lower levels of poverty and income inequality, increased food security, and higher political stability. Coffee is mostly produced by the smallholder farmers in the Northern and Central regions of Malawi.

A few commercial estates in the Southern region produce coffee. However, total coffee production by the commercial estates is far more than total coffee production by the smallholder farmers. Smallholder farmer coffee cherry yield productivity is usually below 500 kg/ha annually in Malawi, compared to potential yield of above 2500 kgs/ha.

Therefore, annual coffee cherry yield productivity of less than 500 kg/ha translate to low revenues. There are socio-economic factors that influence smallholder farmers' decisions and determine the status quo of coffee production. ICO (2019) indicated that coffee production practices, profitability of coffee production and household welfare are closely linked. Information on smallholder farmers' socio-economic factors that influence coffee production and demand for coffee seedlings in Malawi is scarce.

Therefore, this study aimed at assessing socio-economic factors that determine smallholder farmers' coffee productivity and estimate demand for coffee seedlings. The findings of this study will inform policy makers and

development partners on appropriate interventions that can contribute towards development of sustainable coffee industry in Malawi.

Materials and Methods

Study area

The study was implemented in five smallholder coffee growers' cooperatives under Mzuzu Coffee Planters Cooperative Union (MzCPCU) (<https://www.mzuzucoffee.org/>). The five coffee growers' cooperatives are Misuku in Chitipa district, Viphya North in Rumphi district, Nkhatabay North cooperative in Nkhatabay district, Mzimba Southeast in Mzimba district, and Ntchisi East cooperative in Ntchisi district (Table 1 & Figure 1).

Each cooperative under MzCPCU is demarcated into coffee growers' business zones. MzCPCU is the largest coffee producing, processing and exporting smallholder farmers' organisation in Malawi.

Sampling Procedure

The study used multi-stage sampling to select coffee farmer's cooperatives and respondent households. The first stage was purposive selection of MzCPCU which was selected because it is the largest farmers' organization in Malawi with registered coffee farming households.

The second stage was random selection of coffee farming households from all the business zones of five coffee growers' cooperatives. A total of 372 households (27.6%) were selected as summarised in Table 2.

Data Collection and Analysis

Focus Group Discussion

A Focus Group Discussion (FGD) was done in Chigwere business zone under Nkhatabay coffee growers' cooperative in May 2022. Participants in the FGD comprised of 7 male and 5 female household representatives. Household representatives provided information following a checklist questionnaire that was administered. Information collected during the FGD was used to generate a study questionnaire. The study questionnaire was discussed during training of enumerators and proper adjustments were made to the draft questionnaire.

Pilot testing

Enumerators were trained on data collection using the study questionnaire before pilot testing. After training of enumerators, pilot testing was done in Nchenachena coffee growers' cooperative. Pilot testing was done in three coffee growers' business zones, and five household representatives were interviewed.

The aim of pilot study was to test suitability of the draft questionnaire to gather appropriate information. Following the pilot study, proper adjustments were made to the draft questionnaire before administering it to a larger sample size.

Study area and Data Collection

A baseline survey was conducted in five cooperatives under MzCPCU. The study collected both primary and secondary data. Primary data were collected from 372 household representatives using a structured study questionnaire. Key informants such as managers for business zones and cooperative were also interviewed.

The survey was implemented in June 2022. Secondary data were collected from records and literature reviews. Data were collected on Socio-economic factors that determine smallholder farmers' coffee cultivation and production practices, and demand for coffee seedlings in five coffee growers' cooperatives. Topographical data were also collected and used to generate a map showing study areas in Figure 1.

Data analysis

Qualitative data were analysed using Statistical Package for Social Sciences (SPSS) version 16. Frequency distribution and percentage were used to analyse the data. Mean Derived Scores (MDS) were also calculated in Microsoft excel.

MDS were derived by combining rankings from different cooperatives into a derived score according to [De Groot et al., \(2002\)](#). MDS is an indicator of overall importance of factors.

The score represent number of times a factor ranks highly. For each cooperative, a factor received a value inversely related to its rank as follows: a factor ranked first received a derived score of 5, when it was ranked second it received a score of 4, when ranked 3 it had a

score of 3, when ranked fourth it had a score of 2, and when it was ranked fifth it received a derived score of 1.

Results and Discussion

Socio-economic factors that affect smallholder coffee production

Farmers' access, source and type of information on coffee production practices

The study revealed that 94.9% of farmers in the five cooperatives, accessed information on coffee crop husbandry practices (Table 3). Only 5% did not access information on good coffee husbandry practices. During focus group discussion, farmers indicated that they accessed information on coffee crop husbandry practices through various platforms such as television and radio programs, cooperative managers, government and non-governmental agricultural extension agents. According to 53.2% of respondents, information on coffee husbandry practices was accessed from their cooperative managers, and a higher proportion of respondents were in Misuku (24.7%), Viphya (12.1%) and Mzimba (9.1%), while in Ntchisi (15.6%) and Nkhatabay (8.1%) accessed information on coffee husbandry practices from multiple sources such as the government extension agents and cooperative managers. In Mzimba South East cooperative, 3.5% of farmers did not access agricultural extension services from both the government and cooperative managers, probably due to inadequate agricultural extension agents. There are inadequate government extension workers compared to established posts in the Ministry of Agriculture in Malawi.

Recruitment of agricultural extension agent would supplement available extension services and enhance effective and efficient delivery of agricultural technical advisory services. However, available extension agents can reach out to more farmers using modern technologies and platforms such as mobile cell phone applications. [ICO \(2019\)](#) agrees that adoption of digital innovations has the potential to achieve transformative outcomes through transparency, learning and continuous improvement. [Celi \(2022\)](#) observed that scaling up delivery of technical services to farmers can increase use of available technologies and ultimately increase farm profitability. [Sette \(2012\)](#) argued that very little to none investment in agriculture research, innovations and technology dissemination has affected global coffee production.

The findings of this study indicated that 86% of farmers accessed different types of extension services such as coffee production practices, including postharvest handling, pest and disease management. Misuku had a higher proportion of farmers (40.6%) that accessed different forms of agricultural extension services. Access to agricultural extension services on good coffee husbandry practices is evidenced by good quality coffee that is produced, processed, packaged and exported by Mzuzu Coffee Planters Cooperative Union. Good service delivery models are a key to improved farm performance and income diversification. According to Celi (2022), little technical assistance and access to finance are available for small-holder coffee producers. Sanger (2022) suggest that facilitating smallholder farmers' access to finance, inputs, skills, certification standards and markets can enhance development of the coffee industry. Sette (2012) agrees that smallholder coffee farmers are facing various challenges mostly due to poor government policy environment in terms of low levels of public investment in agriculture extension services, disengagement of the state in production and marketing activities, and weak institutional framework in many developing countries.

Farmers' access to free coffee seed and seedlings

Smallholder coffee growers (98.1%), had never accessed free seeds or seedlings in the five cooperatives (Table 4). Farmers indicated that they access coffee seeds or seedlings from Lunyangwa Agricultural Research Station, MZCPCU and fellow farmers at a cost.

Consequently, farmers have been recycling coffee seeds among themselves for so many years. Recycling of coffee seeds has over time made some improved varieties such as Catimor 129 (Nyika) become more susceptible to pests and diseases. Lunyangwa Agricultural Research Station in Malawi is mandated to supply farmers with good quality seed and seedlings of pure coffee varieties. However, demand for coffee seed and seedlings is usually higher than the station is able to supply. Demand and supply of coffee seed and seedlings is usually affected by prices among other factors (Celi, 2022; Sette, 2012). In Malawi the coffee seed production system is not well organized. Bertrand (2022) observed that in most developing countries coffee seed systems are disorganized. In order to reduce the gap between demand and supply for coffee planting materials, Lunyangwa Agricultural Research Station embarked on rapid coffee seed multiplication techniques such as somatic embryogenesis using tissue culture techniques in a

laboratory. Through somatic embryogenesis, farmers will access adequate, genetically pure and disease free coffee tissue culture plantlets.

Variability in prices of coffee seed and seedlings

According to 72% of respondents, farmers were buying coffee seed at MK3000.00 per kilogram or more from private suppliers (Table 5). The cost of buying coffee seed from private suppliers was relatively higher than the price of MK2, 500.00 offered by Lunyangwa Agricultural Research Station. Lunyangwa Agricultural Research Station offers minimum farm gate prices that are set by the government. Celi (2022) observed that prices for coffee products are increasing on global market due to increase in prices for farm inputs such as fertilizers among other factors. Respondents (73.4%) further indicated that price of a coffee seedling was at MK100.00 in all the five cooperatives. The price of K100.00 was relatively lower than the price of MK150.00 per seedling offered by Lunyangwa Agricultural Research Station. Considering availability of high demand for coffee seed and seedlings, commercial coffee seed and seedlings production is a viable business venture for smallholder farmers. If seed companies and farmers venture into commercial seed and seedlings production, there would be adequate supply of coffee planting materials. However, there is need for government to establish standards for seed quality control, and regulate seed and seedlings production. Sound government policies and an effective regulatory framework contribute to a healthy coffee sector (ICO, 2019). Regulating prices of coffee seed, seedlings and the coffee industry can attract commercial seed companies into coffee seed business. Bertrand (2022) and Sette (2012) observed that there are big commercial seed companies for other crops unlike for coffee.

Markets for selling coffee parchment

Coffee was sold to Mzuzu Coffee Planters Cooperative Union (MzCPCU) in the five cooperatives according to 96.8% of respondents (Table 6). Farmers under MzCPCU are registered members, as such, they sell coffee parchment to the organization which is a reliable and readily available market. However, farmers complained of late payment by the organization which affect timely preparation for the next cycle of managing the coffee crop. Similarly, coffee growers complained of late payment as one of the market challenges for selling coffee in India (Chandran & Prabitha, 2020). Key informants explained that some farmers sell their

produce to vendors at a higher price in order to get more revenue, while others sell to vendors in order to sort out immediate needs for their households. Chandran and Prabitha (2020) agrees that some growers preferred selling coffee to private traders in search for higher prices in India. According to Sette (2012), most smallholder farmers have poor access to markets and long supply chain that affect farm-gate prices of coffee. This is usually the case in most developing countries where the coffee market is not regulated and liberalised. Removing barriers to trade through regulatory framework is an effective way of generating more market opportunities for coffee growers. ICO (2019) argues that the impact of price volatility is less in countries where the market for coffee is regulated. A regulated coffee market just like tobacco market in Malawi could attract more investors in coffee industry.

Variability in prices of coffee parchment

Coffee parchment was sold at the price range of MK1, 600.00 to MK2, 000.00 per kilogram as indicated by 47.3% of respondents mostly in Ntchisi (n = 59), Mzimba (n = 51) and lastly in Misuku (n = 20) (Figure 2). Only in Misuku (n = 130) farmers sold coffee parchment at a price greater than MK2, 000.00 per kilogram. Coffee parchment from Misuku was sold at a higher price probably because coffee from Misuku is known to be of higher cup quality compared to other regions. Considering recent escalating prices of farm inputs such as fertilizers, MzCPCU may consider increasing the price of buying parchment from farmers. ICO (2019) agrees that within a decade, cost of production in local currency has nearly doubled if not tripled in major coffee producing regions. Increasing the buying price of parchment will increase competitiveness of MzCPCU on the market, retain registered members and also attract other growers to register with the cooperatives. According to Bertrand (2022); Sanger (2022) and Chandran and Prabitha (2020), unpredictable nature of coffee prices is a global phenomenon that makes it difficult for growers to make decisions related to crop production. ICO (2019) agrees that volatility of coffee prices is similar to other tropical commodities that leave farmers with risky production and livelihood choices.

Setting of price of coffee parchment

According to 45.7% of coffee growers prices for parchment were set by the buyer, while 21% of farmers in Mzimba indicated that prices were determined by the

seller (Figure 3). In Nkhatabay, 13.7% of respondents indicated that prices for selling parchment were determined by both the buyer and seller. Clearly, there are different perceptions of farmers on who set prices for coffee parchment. Prices for coffee are not regulated in Malawi consequently farmers are exploited on liberalised market. Key informants from MzCPCU indicated that farmers were represented during board meetings where prices for buying parchment were discussed and agreed. Therefore, it is pertinent that MzCPCU should engage in an awareness campaign in order to inform farmers on how prices are determined. Such an initiative would retain farmers' trust and membership to MzCPCU. According to ICO (2019), market power on the buyer side contribute to unfavourable contract terms on the price of buying coffee from farmers and this may result in price volatility. Excessive volatility in coffee prices can pose a risk to market participants, in particular to coffee farmers who tend to have limited access to price risk management strategies (World Bank, 2015).

Estimated annual revenues from coffee parchment sales

Respondents (34.4%) indicated that farmers earned MK40, 001.00 to MK200, 000.00 from sales of coffee parchment annually, followed by 24.7% farmers that earned above MK400, 000.00 from sales of coffee parchment, and most of them were in Misuku (n = 65). Thirdly, 21.2% coffee farming households earned MK200, 001.00 to MK400, 000.00 annually from sales of coffee parchment. Farmers were able to buy some farm inputs, food and other household essentials with annual revenue from coffee sales. However, coffee is harvested once annually, therefore, price variations and prolonged periods of scarce profitability have put smallholder coffee producers out of business, caused their migration to produce other crops or kept them on traditional farming (Bertrand, 2022; Celi, 2022). Chandran and Prabitha (2020) argues that price volatility of coffee is distressful to most farming communities in India. Coffee is considered a fourth cash crop for Malawi, and it has the potential of being the main forex exchange earner for the country. Farmers, as well as other stakeholders along the coffee value chain can earn more revenue from coffee sales if the market for coffee is regulated. Sette (2012) agrees that poor access to high-value markets, market liberalisation and dis-engagement of the state in regulating market services impact on revenue from coffee sales more especially for smallholder farmers. Sanger (2022) explained that globally revenues from coffee sales are low especially

for smallholder farmers due to lower value addition, and consequently low household income.

Smallholder coffee cultivation and production

Experience of farmers in coffee cultivation

Table 8 shows that 36.3% of respondents had 11-20 years' experience in cultivating coffee, followed by 34.7% with more than 20 years' experience. The findings are consistent with an average of 17 years' experience in coffee production in other part of Ethiopia (Degaga *et al.*, 2017). 55.7% of growers in Misuku (n = 68) had 1 to 10 years' experience in coffee production. The findings for Misuku agree with what was reported by Tadesse *et al.*, (2020) that farmers had about 3 to 14 years' experience of cultivating improved coffee in some districts in Ethiopia. Coffee is a perennial crop and therefore, it is a sustainable source of income for smallholder coffee farming households. Reliable information was obtained during this study considering that households had considerable experience in producing coffee. Similarly, Chandran and Prabitha (2020) reported that majority of coffee growers had more than twenty years' experience producing coffee in Wayanad district in India.

Farmers' preferred coffee varieties

Farmers preferred most Catimor 129 (locally known as Nyika) (MDS = 5.2), followed by Geisha (MDS = 4.6) varieties, while the least preferred genotype was 15069 with MDS of 2.7 (Table 9). Catimor 129 is preferred because of high yield and good cup quality. Lunyangwa Agricultural Research Station as well as commercial seed and seedlings multipliers should focus on multiplying preferred coffee varieties in order to sell more and make profits. Coffee genotypes that are grown in Malawi are Arabica, unlike in India where most growers prefer to grow coffee Robusta (Chandran & Prabitha, 2020). According to Bertrand *et al.*, (2021) choice of coffee genotype or variety determines cup quality, keeping other factors constant, and that old varieties such as Geisha are being earmarked on the market for the highest cup quality specialty coffees. Unfortunately, coffee varieties that produce the best cup quality also relatively produce low yields or are very susceptible to major coffee pests and diseases, and this compromise revenues for farmers (McCook & Vandermeer, 2015). Bertrand (2022) indicated that coffee industry has a very limited supply of varieties due to insufficient investment in research efforts with unclear breeding strategies and

goals. World Coffee Research is a relatively new organization that is establishing global coffee breeding programmes that will develop improved coffee varieties.

Area allocated for coffee production at household level

According to 41.1% of respondents, coffee households allocated less than one acre of land for coffee production. The study revealed that most coffee growers had small land holding sizes under coffee cultivation. Similarly, Sanger (2022) and Chandran and Prabitha (2020) reported that majority of growers had small land holding sizes under coffee cultivation in Ethiopia and India. Contrary to the findings of this study, smallholder coffee producing households had coffee fields of one hectare on average in Uganda, Colombia and Tanzania (Sanger, 2022).

Available potential land for cultivating coffee

The findings revealed that 52.4% of coffee growing households had less than 1 acre land for possible extension of existing coffee fields and majority were from Misuku (n = 84) (Table 11). Coffee growing households had less than 1 acre land for possible extension probably because Misuku in Chitipa district is traditionally a coffee growing area, and most of the farmers must have utilized almost all of the household's virgin land. Only 0.3% had no extra land for extending coffee field. The study revealed that most coffee growing households had extra land for extending existing coffee fields. The findings suggest presence of demand for coffee seed and seedlings that farmers would need to either extend existing coffee fields or establish new fields. Chandran and Prabitha (2020) argues that sometimes farmers tend to allocate part of their land to food crops or other cash crops that fetches more revenue than coffee.

Estimated number of coffee plants owned by a household

Table 12 shows that 43.3 % of households owned equal or less than 1,320 coffee plants. The results in Table 12 agree with the results in Table 10 above where 37.9% of respondents indicated that coffee growing households had one coffee field and of less than one acre.

Table 12 also shows that only 5.1% of households had more than 6,600 trees per household except in Ntchisi. Ntchisi East plant growers' cooperative was recently

established under Mzuzu Coffee Planters Cooperative Union and farmers are still planting more coffee plants. The numbers of coffee trees per household in this study are higher than the range of 150 to 612 trees per household in Ethiopia according to [Tadesse et al., \(2020\)](#) and [Degaga et al., \(2017\)](#). In Malawi, there are so many areas for potential coffee growing across the country

which are not being put to good use (Figure 1). Mzuzu Coffee Planters Cooperative intends to expand coffee production and establish coffee growers' cooperatives to other areas where traditionally farmers do not grow coffee. Extending coffee production to potential areas will contribute towards increased coffee production and export revenues for the country.

Table.1 Altitude and coordinates of study areas

Cooperatives	District	Altitude (masl)	Coordinates
Mzimba South East	Mzimba	1,300-1,600	12 ⁰ 25'52.81''S, 33 ⁰ 47'42.76''E.
Misuku	Chitipa	1,200-1,800	09 ⁰ 44'04.99''S, 33 ⁰ 31'36.13''E
Ntchenachena (Phoka)	Rumphi	1,250-1,700	10 ⁰ 45'23.94''S, 34 ⁰ 01'55.07''E
Ntchisi East	Ntchisi	1,200-1,500	13 ⁰ 25'59.13''S, 33 ⁰ 57'39.29''E
Nkhata-bay Highlands	Nkhatabay	1,100-1,600	11 ⁰ 23'51.66''S, 34 ⁰ 10'14.14''E

Key: masl = Meters above sea level; UTM = Universal Transverse Mercator; L = Longitude; E = East.

Table.2 Number of business zones, households and respondents in five cooperatives

Cooperatives	Business zones	Households	Respondents
Mzimba South East	6	105	59
Misuku	16	596	152
Viphya North	7	116	45
Ntchisi	8	319	59
Nkhatabay	7	213	57
Total	44	1,349	372
Percentage	-	-	27.6

Table.3 Farmers' access, source and type of information on coffee husbandry practices in five cooperatives

Information		COOPERATIVE					Frequency	Percent
		Mzimba	Misuku	Viphya	Ntchisi	Nkhatabay		
Access to information	Yes	43	151	45	58	56	353	94.9
	No	16	1	0	1	1	19	5
Source of information	Government	1	0	0	0	1	2	0.5
	Cooperative	34	92	45	1	26	198	53.2
	Multiple sources	11	60	0	58	30	159	42.7
	None	13	0	0	0	0	13	3.5
Type of information	Production	3	1	5	2	24	35	9.4
	P&D	0	0	3	0	1	4	1.1
	Post-Harvest handling	0	0	1	0	0	1	0.3
	Different types of information	44	151	36	57	32	320	86
	None	12	0		0	0	12	3.2

Key: P&D = Pests and Diseases.

Table.4 Farmers’ access to free coffee seed and seedlings in five cooperatives

Cooperative	Free access	
	No	Yes
Mzimba	57	2
Misuku	152	0
Viphya	43	2
Ntchisi	59	0
Nkhatabay	54	3
Frequency	365	7
Percent	98.1	1.9

Table.5 Distribution of prices of coffee seed and seedling in five cooperatives

Cooperative	Price of coffee seed/kg (MK)				Price of coffee seedling (MK)				
	1,000	1,500	2,500	≥ 3,000	100	150	180	200	≥250
Mzimba	1	1	2	55	44	11	0	4	0
Misuku	0	0	3	149	127	22	1	1	1
Viphya	0	0	0	45	24	16	0	2	3
Ntchisi	0	0	59	0	59	0	0	0	0
Nkhatabay	19	10	9	19	19	19	1	18	0
Frequency	20	11	73	268	273	68	2	25	4
Percent	5.4	3.0	19.6	72.0	73.4	18.3	0.5	6.7	1.1

Key: Kg = Kilogram; MK = Malawi Kwacha.

Table.6 Market for selling coffee parchment in five cooperatives

Markets	Cooperatives					Frequency	Percent
	Mzimba	Misuku	Viphya	Ntchisi	Nkhatabay		
MzCPCU	58	143	45	59	55	360	96.8
Vendors	0	9	0	0	1	10	2.7
Both	1	0	0	0	1	2	0.5

Key: MzCPCU = Mzuzu Coffee Planters Cooperative Union.

Table.7 Distribution of annual income from sales of coffee parchment per household in five cooperatives

Income from sales of parchment (Mk)	Cooperatives					Frequency	Percent
	Mzimba	Misuku	Viphya	Ntchisi	Nkhatabay		
≤ 20,000	8	1	1	9	9	28	7.5
21,000 - 40,000	4	6	10	10	15	45	12.1
40,001 - 200,000	22	51	14	24	17	128	34.4
200,001 – 400,000	15	29	20	8	7	79	21.2
> 400,000	10	65	0	8	9	92	24.7

Key: MK =Malawi Kwacha

Table.8 Distribution of years of cultivating coffee in five cooperatives

Cooperatives	Experience in cultivating coffee (Years)		
	1-10	11-20	>20
Mzimba	12	8	39
Misuku	68	52	32
Viphya	10	25	10
Ntchisi	0	23	36
Nkhatabay	18	27	12
Frequency	108	135	129
Percent	29.0	36.3	34.7

Table.9 Preferred coffee varieties ranked in order of importance

Varieties	Rank in five cooperatives					
	Mzimba	Misuku	Viphya	Ntchisi	Nkhatabay	MDS
Nyika	4	1	2	1	1	5.2
Geisha	1	2	3	2	3	4.6
Pop3	2	3	1	3	2	4.6
Others	-	4	4	2	-	3.7
Agaro	5	-	-	4	4	3.0
15069	5	5	-	-	3	2.7

Key: Rank = First rank was given a score of 6, second rank was scored 5, third rank was scored 4, fourth rank was scored 3, and fifth rank was scored 2, and sixth rank was scored 1; MDS = Mean Derived Scores; - = Not ranked.

Table.10 Distribution of estimated area under coffee cultivation per household in five cooperatives

Cooperative	Estimated area (acres) under coffee cultivation per household				
	≤ 1	1.1 – 2	2.1 – 2.5	2.6 – 8	> 8
Mzimba	26	28	4	1	0
Misuku	46	56	35	10	5
Viphya	12	20	7	6	0
Ntchisi	33	21	2	3	0
Nkhatabay	36	12	5	3	1
Frequency	153	137	53	23	6
Percent	41.1	36.8	14.2	6.2	1.6

Table.11 Distribution of estimated area for extension of coffee fields in five cooperatives

Cooperative	Estimated area (acres) for extension of coffee fields					None
	≤ 1	1.1 - 2	2.1 - 2.5	2.6 - 8	> 8	
Mzimba	13	26	9	5	5	1
Misuku	84	39	19	7	3	0
Viphya	7	18	8	8	4	0
Ntchisi	52	5	2	0	0	0
Nkhatabay	39	15	2	1	0	0
Frequency	195	103	40	21	12	1
Percent	52.4	27.7	10.8	5.6	3.2	0.3

Table.12 Distribution of number of coffee plants owned per household in five cooperatives

Cooperatives	Number of coffee plants owned per household				
	≤ 1320	1321 - 2640	2641 - 3300	3301 - 6600	> 6600
Mzimba	32	10	12	1	4
Misuku	38	44	28	32	10
Viphya	10	16	6	11	2
Ntchisi	48	6	3	2	0
Nkhatabay	33	9	8	4	3
Frequency	161	85	57	50	19
Percent	43.3	22.8	15.3	13.4	5.1

Figure.1 Map of Malawi showing coffee growers cooperatives

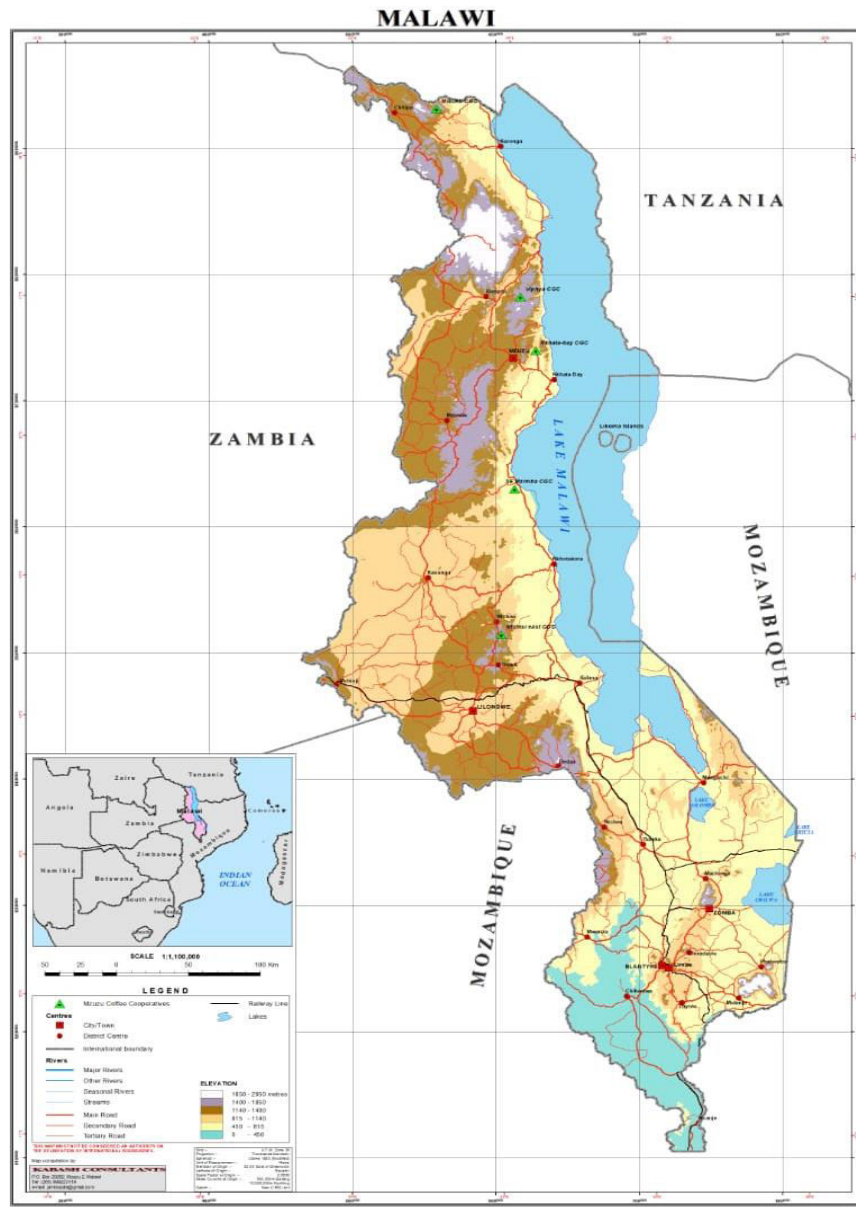


Table.13 Distribution of estimated annual production of coffee parchment (kg) per household in five cooperatives

Parchment (Kg)	Cooperative					Frequency	Percent
	Mzimba	Misuku	Viphya	Ntchisi	Nkhatabay		
≤ 50	7	16	4	29	17	73	19.6
51 - 100	9	23	7	12	17	68	18.3
101 – 500	20	52	22	17	17	128	34.4
501 - 1000	14	18	11	1	4	48	12.9
> 1000	9	43	1	0	2	55	14.8

Key: Kg = Kilogram

Table.14 Estimated demand for coffee seedlings to replace diseased and old plants, establish new fields and extend existing fields.

Cooperative	Demand for coffee seedlings to replace diseased plants					
	Minimum	Maximum	No. of seedlings	% of Total	Mean	STD
Mzimba	30	5,000	17,980	31.9	946	1203
Misuku	80	2,500	20,680	36.8	530	518
Viphya	150	1,000	13,450	23.9	498	284
Ntchisi	50	2,000	3,450	6.1	493	677
Nkhatabay	20	1,800	646	1.2	11620	481
Total	-	-	56,206		-	-
	Demand for coffee seedlings to replace old plants					
Mzimba	-	-	-	-	-	-
Misuku	50	2,500	39,870	76.6	546	486
Viphya	100	1,500	3,800	7.3	633	528
Ntchisi	200	500	1,200	2.3	400	173
Nkhatabay	125	2,000	7,175	13.7	652	538
Total	-	-	52,045		-	-
	Demand for coffee seedlings to establish new fields					
Mzimba	50	40,000	87,850	25.1	3993	8445
Misuku	100	12,000	184,800	52.7	1515	1495
Viphya	100	3,000	38,400	10.9	1477	958
Ntchisi	100	2,000	16,650	4.7	520	478
Nkhatabay	500	4,000	22,700	6.5	1513	1064
Total	-	-	350,400		-	-
	Demand for coffee seedlings to extend existing fields					
Mzimba	40	6,000	39,240	27.7	1453	1588
Misuku	100	2,800	26,550	18.7	664	502
Viphya	1000	5,000	15,000	10.6	2143	1345
Ntchisi	100	1,800	7,000	4.9	389	409
Nkhatabay	200	10,000	53,900	38.0	1382	1677
Total	-	-	141,690		-	-

Key: STD = Standard Deviation

Figure.2 Prices of coffee parchment in five cooperatives

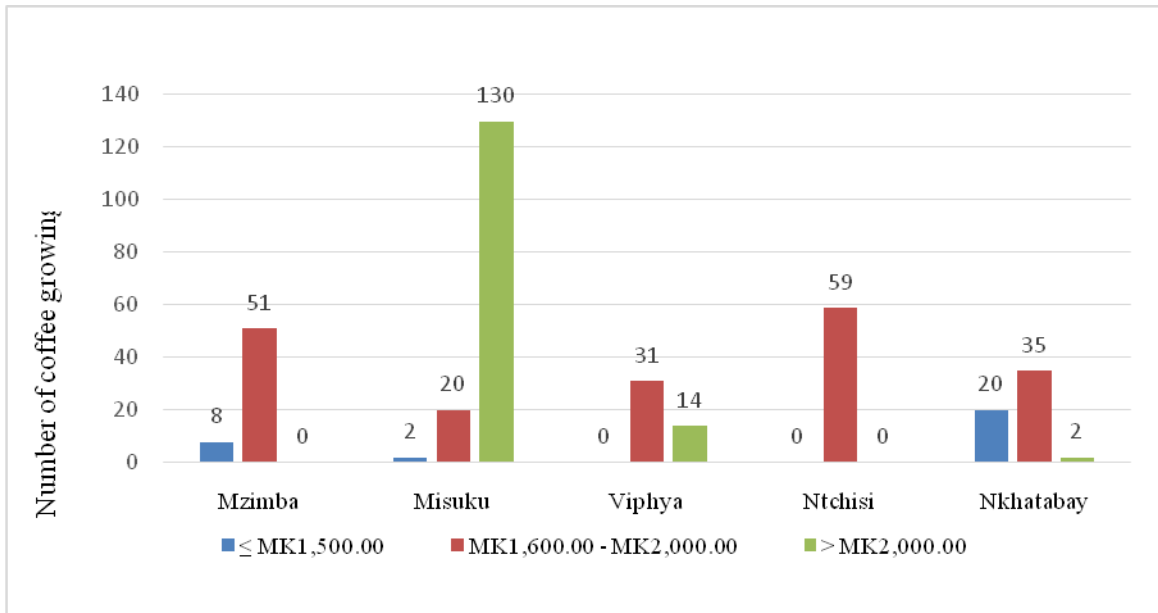


Figure.3 Farmers' perceptions on who set prices for parchment in five cooperatives

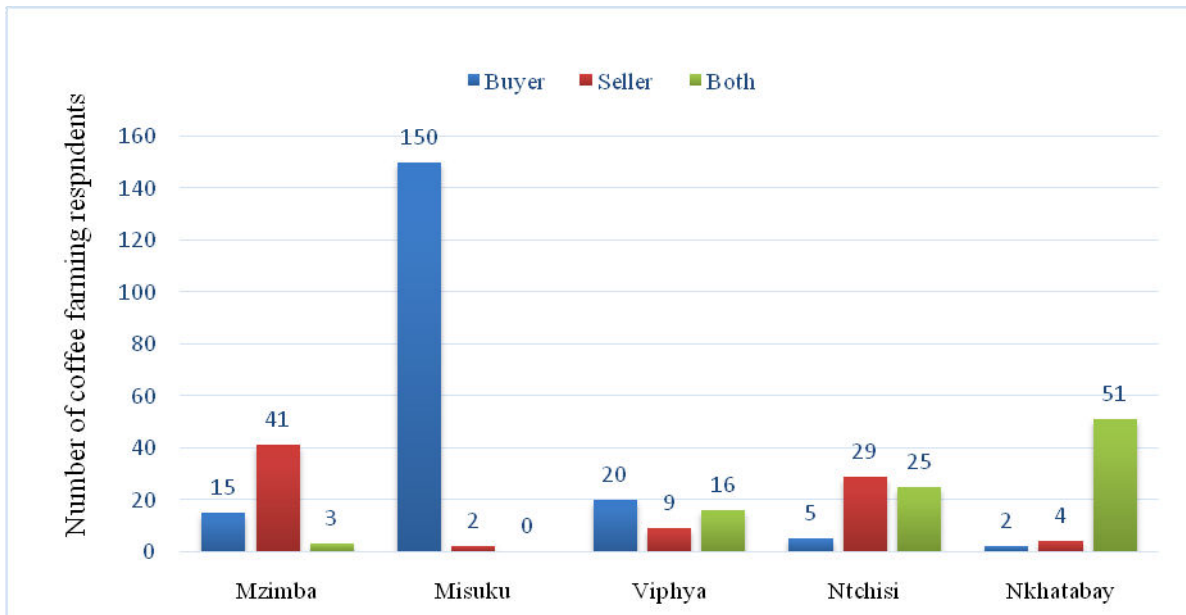
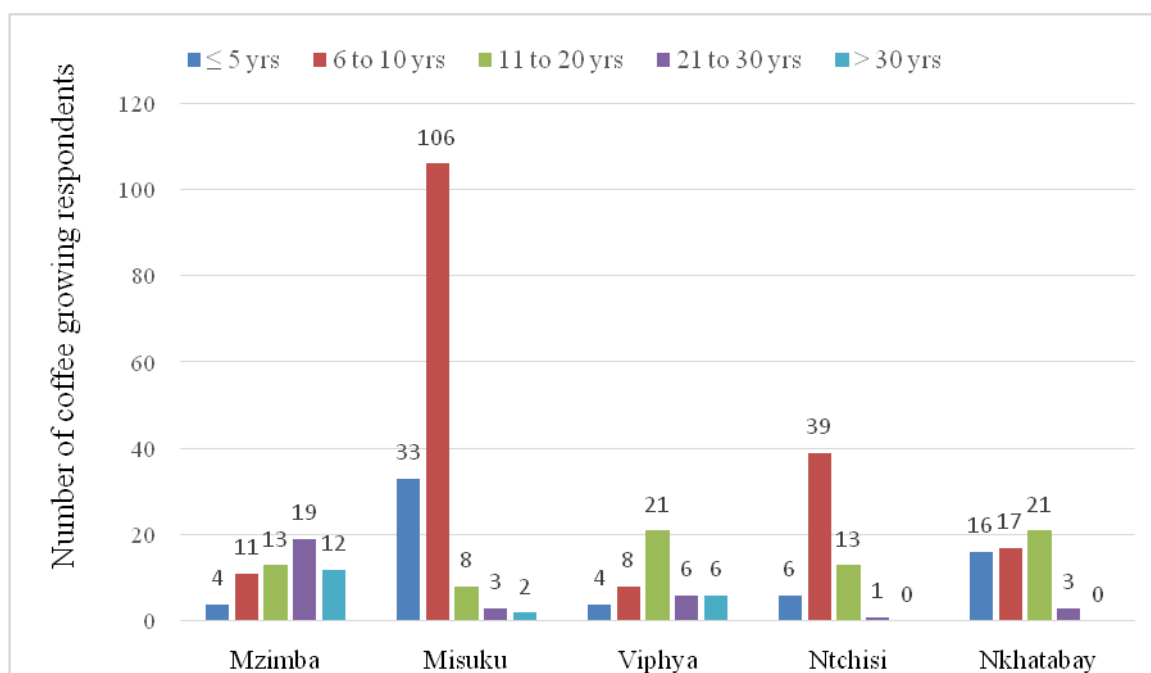


Figure.4 Estimated mean age of coffee plants owned by a household in five cooperatives

Estimated average age of coffee plants owned by a household

Majority of coffee farming households in Misuku ($n = 106$) and Ntchisi ($n = 39$) had 6-10 years old coffee trees, while in Viphya ($n = 21$) and Nkhatabay ($n = 21$) had 11-20 years old coffee plants (Figure 4). Only in Mzimba South East farmers ($n = 19$) indicated that coffee trees were 21-30 years old. Generally most of coffee trees in Misuku, Ntchisi, Viphya and Nkhatabay were not too old. Key informants explained that due to unstable selling prices of coffee and late payments, farmers tend to drop out of coffee farming and resume cultivating coffee when farm-gate prices increase. Chandran and Prabitha (2020) agrees that fluctuations in the price of coffee forced many farmers to curtail or even to give up agricultural activities in India, as a result, large numbers of workers are deprived of employment. As earlier alluded to, government should consider regulating farm gate selling prices of coffee cherry and parchment. A regulated market for coffee would motivate more farmers to start growing coffee, consequently total coffee production and exports for the country would increase.

Estimated annual production of coffee parchment

Coffee parchment produced per household field ranged from 101 kgs to 500 kgs per year as indicated by 34.4% of respondents (Table 13). Majority of respondents in 51-

100 kgs category were in Misuku ($n = 52$), Viphya ($n = 22$), Mzimba ($n = 20$) and Nkhatabay ($n = 17$). Misuku had the highest number of households ($n = 43$) producing parchment in excess of 1000 kgs, while the lowest annual coffee parchment production was equal or less than 50 kgs in Ntchisi ($n = 29$). Misuku was able to produce parchment in excess of 1000 kgs per household because according to the results in Figure 4 above, 33% of households had coffee plants more than 30 years old. Low coffee parchment production in Ntchisi was probably because coffee is relatively a new crop in the area, and the plants are still young (Figure 4). Smallholder coffee yield productivity is still low in Malawi probably due to use of recycled seed, mixed varieties, low application of farm inputs such as organic and inorganic fertilizers. Inadequate application of inorganic fertilisers in coffee has been exacerbated by the recent hike in prices of fertilizers. Although smallholder coffee yield productivity is low, smallholder coffee production contribute about 70 to 80% of global coffee supply (Bertrand, 2022; Celi, 2022). If smallholder farmers are supplied with subsidized farm inputs and credit facilities, coffee productivity and production can increase and consequently revenue. Celi (2022) agrees that besides exceptions, generally there is little or no technical assistance and access to finance for increased smallholder coffee productivity and production. Celi (2022) further suggest that planting of first filial generation (F_1) of coffee hybrids can increase

coffee yields in a short term for a period of 10 to 30 years. However, F₁ hybrids cannot be propagated using the seeds due to genetic segregation that is expected in later generations and consequently decline in productivity.

Demand for coffee seedlings in five cooperatives

Estimated demand for coffee seedlings to replace diseased and old plants, establish new fields and extend existing fields in five cooperatives

Table 14 shows that demand for coffee seedlings to replace diseased plants is highest in Misuku (36.8%) and lowest in Nkhatabay (1.2%). This is so probably because Misuku cooperative falls at a very high altitude and has hot spots for fungal diseases like coffee leaf rust and coffee berry, unlike Nkhatabay cooperative which experience relatively warm climate and prevalence of fungal diseases is low. Farmers should be trained on good crop management practices after replacing diseased coffee plants such as regular pruning to reduce infection of fungal diseases. Good crop husbandry practices increase plant health and enhance tolerance to diseases (Bertrand, 2022).

The demand for coffee seedlings to replace old plants was highest in Misuku (76.6%) and lowest in Ntchisi (2.3%) (Table 14). The highest demand for coffee seedlings to replace old plants in Misuku is consistent with the results in Figure 4 where the highest number of respondents (n = 33) indicated that Misuku had coffee trees that were greater than 30 years old. Misuku hills area has long history of cultivating coffee. The demand for coffee seedlings to establish new fields was also highest in Misuku (52.7%) and lowest in Ntchisi (4.7%). Misuku hills in Chitipa district receives adequate rainfall, has favourable temperature, and fertile soils for growing coffee. Similarly, Gemechu *et al.*, (2002) observed high demand for coffee seedlings to replace old and diseased coffee plantations in Ethiopia. Replacing old coffee plants with new plants increased coffee yields from 1.5 tons of green beans per hectare to 2.5 tons per hectare in Vietnam (Le *et al.*, 2020).

Nkhatabay cooperative had highest demand (38%) for coffee seedlings to extend existing coffee fields, while Ntchisi had lowest demand (4.9%) (Table 14). Demand for coffee seedlings to extend existing coffee fields was highest in Nkhatabay probably because the cooperative is close to Mzuzu city, and farmers would like to increase coffee production considering that coffee is a cash crop.

Demand for coffee seedlings to extend existing coffee fields was lowest in Ntchisi probably because coffee is relatively a new crop in the district, and farmers' interest to grow coffee is increasing gradually. Generally there is high demand for coffee seedlings in all the study areas and the findings agree with Bertrand (2022) who indicated that global demand for coffee seedlings is increasing and estimated to be at 550,000,000 per year. However, Bertrand (2022) suggest increasing crop productivity per unit area in order to avoid extending existing fields or establishment of new fields to the detriment of unused land including forest and natural grasslands.

Conclusion

Farmers accessed information on coffee husbandry practices, postharvest handling, pests and disease management mostly from cooperative managers. The cost of buying coffee seed and seedlings from fellow farmers was relatively higher than the price offered by Lunyangwa Agricultural Research Station. Farmers sell coffee parchment to Mzuzu Coffee Planters Cooperative Union (MzCPCU) because they are members and the organization is reliable and readily available market. However, farmers complained of late payment sometimes and that affect timely preparations for the next cycle of managing the crop. The price of selling coffee parchment to MzCPCU is low considering recent escalating prices of farm inputs such as fertilizers, and this is a disincentive to many farmers to venture into commercial coffee production. Annual revenues from coffee sales ranged from MK40, 000.00 to MK400, 000.00, and this is consistent with acreage (≤ 1 acre), number of coffee trees owned per household (≤ 1320), and annual coffee parchment yields in the range of 101 kgs to 500 kgs. Farmers are able to buy farm inputs, food and other household essentials with revenues from coffee sales.

However, some famers drop out of coffee production due to price variations and uncertainty, hence, the crop was relatively young in some cooperatives. The most preferred cultivated variety was Catimor 129. Generally, there is overwhelming high demand for coffee seedlings to replace old plants, diseased plants and establish new coffee fields in Misuku cooperative, while demand to extend existing coffee fields was highest in Nkhatabay highlands cooperative. The government should consider setting up coffee seed system, certification standards, employ supplementary agricultural extension agents, and regulate the market for coffee in order to attract more

investors in coffee industry. Coffee farmers should be provided with credit facilities in order to boost coffee productivity, production and revenues from sales.

Conflict of interests

The authors have not declared any conflict of interests.

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References

- Bertrand, B. 2022. Sustainability Challenges in Coffee culture. Proceedings of “Ernesto Illy Colloquia” Addressing Key Challenges in Coffee Growing Worldwide Workshop, 27th – 29th September 2022. Trieste, Italy.
- Bertrand, B., Hincapie, A. M. V., Marie, L. and Breidler, J. C. 2021. Breeding for the Main Agricultural Farming of Arabica Coffee. *Frontiers in Sustainable Food Systems*, 5(709901). <https://doi.org/10.3389/fsufs.2021.709901>.
- Carvalho A., Ferwerda F.P., Frahm-Leliveld J.A., Medina D.M., Mendes A.J. and Monaco L.C. 1996. Coffee. In F.P. Ferwerda&F.Wit (Eds.), *Outline of Perennial Crop Breeding in the Tropics*. Miscellaneous Papers 4 (pp. 189-235). Wageningen. Netherlands.
- Celi, G. 2022. Coffee production towards 2030 and 2050. Proceedings of “Ernesto Illy Colloquia” Addressing Key Challenges in Coffee Growing Worldwide Workshop, 27th – 29th September 2022. Trieste, Italy.
- Chandran, N. and Prabitha, P. B. 2020. A Study on the Challenges Faced by Coffee Growers of Kaniyambetta Panchayat of Wayanad District. *International Journal of Advances in Agricultural Science and Technology*, 7(11): 145-156. <https://doi.org/10.47856/IJAASST.2020.v07i11.018>
- De Groote, H., Siambi, M., Friesen, D. & Diallo, A. 2002. Identifying farmers’ preferences for new maize varieties in Eastern Africa. In: Bellon, M. R. & Reeves, J. (Eds.) *Quantitative analysis of data from participatory methods in plant breeding*. CIMMYT, Mexico, DF.
- Degaga, J., Melka, T., Angasu, B., Alemu, G., Zewdu, A. and Amin, M. 2017. Constraints and Opportunities of Coffee Production in Arsi Zone: The Case of Chole and Gololcha Districts. *European Journal of Business and Management*, 9 (10): 2222-2839.
- Gemechu, K., Yohannes, G., Kiflu, B., Chilot, Y., & Asgelil, D. (Eds). 2002. Towards farmers’ participatory research: Attempts and achievements in the Central High lands of Ethiopia (pp. 41-47). Proceedings of Client-Oriented Research Evaluation Workshop, 16-18 October 2001. Holleta Agricultural Research Center, Holleta, Ethiopia.
- ICO. 2019. Coffee Development Report 2019. International Coffee Organization.
- Le, Q. V., Jovanovic, G., Le, D. T. and Sanya Cowal, S. 2020. Understanding the Perceptions of Sustainable Coffee Production: A Case Study of the K’Ho Ethnic Minority in a Small Village in LâmĐông Province of Vietnam. *Sustainability* 2020, 12, 1010. <https://doi.org/10.3390/su12031010>.
- McCook, S. and Vandermeer, J. 2015. The big rust and the red queen: long-term perspectives on coffee rust research. *Phytopathology* 105, 1164–1173. <https://doi.org/10.1094/PHYTO-04-15-0085-RVW>
- Natural Resource Institute. 2006. *The Potential for Diversification in Coffee Exporting Countries*. (vol. 1 and 2). UK. University of Greenwich.
- Samper, L., Giovannucci, D., Marques-Vieira, L. 2017. The Powerful Role of Intangibles in the Coffee Value Chain. WIPO Economic Research Working Paper No. 39. Geneva: WIPO.
- Sanger, C. 2022. Coffee – Economic and Social Sustainability. Proceedings of “Ernesto Illy Colloquia” Addressing Key Challenges in Coffee Growing Worldwide Workshop, 27th - 29th September 2022. Trieste, Italy.
- Sette, J, D. 2012. Ethiopian Coffee: Challenges and Opportunities. Proceedings of the Ethiopian

- Coffee Export Conference 8th - 9th November 2012. Addis Ababa, Ethiopia.
- Tadesse, T., Tesfaye, B. and Abera, G. 2020. Coffee production constraints and opportunities at major growing districts of southern Ethiopia. *Cogent Food & Agriculture* (2020), 6: 1741982. <https://doi.org/10.1080/23311932.2020.1741982>
- World Bank. 2015. "Risk and finance in the coffee sector: a compendium of case studies related to improving risk management and access to finance in the coffee sector". Parizat, R., Van Hilten, H. J., Tressler, E. G., Wheeler, M., Nsibirwa, R. W., Morahan, R., Modelo Ruiz, J. M., De Smet, J. and Pineda Pinto, D. F. (Eds). Agriculture global practice discussion paper; no. 2. Washington, D.C.: World Bank Group.
- World Coffee Research. 2017. *Coffee Varieties of Mesoamerican and the Caribbean*. World Coffee Research 5728 John Kimbrough Blvd., Suite 201, College Station, TX 77843-2477. Available at worldcoffeeresearch.org.

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