Original Research Article

Effect of coffee price fluctuations on sustainability of agricultural marketing co-operatives in Tanzania: The case of Kilimanjaro Native Co-Operative Union

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The main objective of this study was to establish the effects of coffee price fluctuations on sustainability of agricultural marketing co-operatives in Rombo, Tanzania using the quantitative approach with a convenient sample of 135. The study employed the descriptive and correlational research designs and established that coffee price changed from time to time and the change did not favor the farmers. Experience did not influence the perception of respondents regarding marketing sustainability but level of education did. There is no significant relationship between coffee price fluctuation and sustainability of agricultural marketing. The study recommends empowerment of women for them to equally participate in coffee production initiative just like men. There is need to regulate coffee price in order to avoid frequent changes which are not beneficial to farmers who are the most important stakeholders in coffee production and marketing. The cooperative union needs to search for new markets and build long-lasting relationship with customers. Finally, there is need for farmers to continue learning in order to increase their critical thinking which may help them in making important decision regarding farming activities. Regardless of the existing price fluctuation, cooperative union still have roles to play in order to make the marketing strategies sustainable.

Keywords: Coffee, price, fluctuation, co-operative, sustainability

INTRODUCTION

Coffee farming sustainability of agricultural marketing co-operative is the issue that touches the development of farmers and hence the national development. When coffee price is lower, it results into farmers invest less in coffee farming and in so doing the agricultural marketing co-operative fail to earn enough income to provide her members adequate extension and technical services (Hung et al., 2019). The failure to offer best market coffee price and inability to offer credit to farmers resulted into agricultural marketing co-operative such as Kilimanjaro Native Co-operative Union (KNCU) to remain highly indebted, and hence the ability to generate income to

sustain its operations becomes adversely affected. The situation cause depletion at household level by limiting income collections which are used to provide essential services to members such as extension, credit, input provision, processing and marketing. As a result, members are not realizing the benefits from collective participation in the coffee value chain from household level the thing which impact negatively on incomes of AMCOS and small-scale coffee farmers (Sambuo and Mbwaga, 2017).

Though coffee is one of the most popular cash crops grown in Tanzania that accounts for about 5% of total exports (generating export earnings averaging US\$ 100

million per annum) and provide employment to more than 400,000 farmers (Otieno et al. 2019), price volatility is a major concern for stakeholders characterized by considerable instability, with a large crop one year followed by a smaller crop the next. In exporting countries, price volatility leads to instability in producer incomes and uncertainty of export earnings and tax revenues (ICO, 2014, as cited in Krishnan, 2017). The crucial contribution of coffee in the economy of other countries is agreed by Samper and Quiñones-Ruiz (2017) who argued that as one of the world's most traded agricultural commodities, coffee constitutes a significant part of the overall economy and a major source of foreign revenue for many developing countries. Coffee also touches a large portion of the world's population in the South, where it is mainly produced, and in the North, where it is primarily consumed. As a product frequently purchased by a significant share of worldwide consumers on a daily basis in social occasions, the coffee industry has earned a high profile that also attracts the interest of non-governmental organizations, governments, multilateral organizations and development specialists.

A study conducted in Brazil by Almeida and Zylbersztajn (2017) found that there were some challenges in coffee production which related to the management and price fluctuation. The study identified some crucial factors, suggesting the need for more coordinated management between the agents in the coffee chain. Issues such as marketing, mechanization, succession, and sustainability are the main challenges for the development and competitiveness of the coffee sector within and outside the country. The same as the study done in Colombia, coffee output was strong in the first three months of 2019/20, due to high prices at the time as well as replanted trees coming into production. However, falling prices and adverse weather caused a decline in harvest over the next four months, which was further compounded by covid-19. Peru's production in crop year 2019/20 declined by 8.5% to 3.9 million bags. Adverse weather impacted the yield as well as quality of the coffee. Further, low international coffee prices have led farmers to turn to other crops with better returns.

Hung et al. (2019) study in Vietnam found that price fluctuation and market was among the major challenges facing coffee small scale farmers. It was evidenced by farmers' decisions that farmers to participate in sustainable coffee farming were mainly driven by economic benefits. Sustainable farming is more cost-effective and profitable than conventional farming, despite the insignificant difference in production efficiency. In context of Africa such as Ethiopia, a study by Tadesse et al. (2020) found that there have been many complaints among the small-scale farmers. Price instability of their products is one of the complaints reported. It also confirms that coffee production constraints and opportunities at major growing districts of Southern Ethiopia only pointed the major production constraints as poor management practices, low soil fertility and poor pricing. The study did not discuss the sustainability of marketing co-operatives. In Rwanda,

Ngango and Kim (2019) found that the mean technical efficiency among small-scale coffee farmers is 82%, implying a potential to increase coffee production by 18% with the current level of resources and technology. This means that coffee markers have not achieved the indented outcomes as some co-operative unions had declined.

In Tanzania researchers have studied small-scale coffee farming. For instance, Otieno et al. (2019) conducted a study on coffee production challenges and opportunities in Tanzania. The study indicated that among the challenges facing small-scale coffee farmers in Mbeya Region was the use of old methods of farming. Anania and Rwekaza (2016) in their study on the determinants of success in agricultural marketing co-operatives in Tanzania conducted in Moshi district found that the most dominant risks facing coffee co-operatives are drought and little rainfall, coffee diseases and price fluctuations in the world coffee markets. These factors have to some extent affected the coffee output from members' farms for years and fewer efforts are done to overcome such dominant risks. On the other hand, Mhando (2019) examined the unlocking institutional constraints to increasing coffee production in Tanzania. It was found that coffee production and marketing in Tanzania face many challenges; price and weather variability, limited access to agricultural inputs, poor extension services, lack of irrigation, lack of credit facilities and land shortage which have decreased the capacity of small-scale farmers to consistently meet the supply of quality and required quantity.

Another study was conducted by Rwekaza et al. (2019) on determining members' views on factors influencing AMCOS sustainability. The study revealed that membership has decreased over the previous ten years (prior to 2015). On the other hand, the democratic governance was assessed and the extent of prevalence of good governance and democratic practice was found to be low (With a mean score of 4.09 that had 18.56 percentage score). The study concluded that primary AMCOS need a continuity of democratic practices by engaging in multiple crops (as opposed to coffee only which is seasonal) to bring sustainable democracy which will not be seasonal.

Marcis et al. (2019) argued that the sustainability of AMCOS is determined by the percentage of market share, return on assets (ROA), return on equity (ROE), return on investment (ROE), debt ratio, maintaining control of cash flow, and liquidity. However, all those aspects depends with the stability of price production trend and marketing. If production is not stable due to price volatility then AMCOS sustainability can be at jeopardy due to low sales revenue and profitability. For example Kimaro et al. (2020) in the study on coffee production trends and their implications on livelihood capability among small-scale farmers in Hai and Arumeru districts revealed that coffee production in Hai District, Kilimanjaro Region, for the past 20 years from 1998/99 to 2018/19 indicates that the highest coffee production in Hai District took place in the 1999/00 crop season with a total of 3020 tons while the lowest production occurred in the 2009/10 with 943 tons

followed by 2015/2016 agricultural season when 949 tons of coffee were harvested. Regarding income obtained, the highest income was recorded in the 1998/99 crop season when \$3 980 thousands were obtained followed by 2007/08 crop season with \$3 102 thousands obtained and the lowest income obtained in 2000/01 when \$96 thousands was obtained. In this scenario, the highest price offered was \$2 114 per 1 ton of coffee in the 2011/12 crop season followed \$2 051 in 2012/13 crop season. The lowest price was marked in 2001/02 where \$334 offered per 1 ton of coffee followed by 2000/01 when \$581 offered for 1 ton of coffee. This study sought to investigate on the effect of coffee price fluctuations on sustainability of agricultural marketing co-operatives in Tanzania, the case of Kilimanjaro Native Co-operative Union. The study was guided by the following research questions;

1. What is the rate of coffee price fluctuation as perceived by stakeholders in Kilimanjaro Region?
2. What is the perception of respondents on the sustainability of Agricultural marketing?
3. Is there significant difference in perception sustainability of Agricultural marketing by stakeholders categorized according to (a) experience in coffee production and (b) educational level?
4. Is there significant relationship between coffee price fluctuation and sustainability of agricultural marketing?

Literature review

Coffee price fluctuations – Global and Africa review

Coffee price fluctuation refers to an increase or decrease of coffee prices in both domestic and international coffee markets. The market forces of demand and supply in the market is the key factor behind fluctuation in coffee bean prices. Prices can increase due to increased demand or reduced supply (Caldarelli et al., 2019). In Indonesia for example Darmi and Ayu (2020) in the study Price transmission of Arabica coffee (*Coffea Arabica*) between Sumatera Utara and major export destination countries in Asia and Australia found that increasing global coffee consumption is driving the increasing need for world coffee.

Fitriani et al. (2021) found that coffee price is an important indicator that stimulates farmers to advance their welfare. Unfortunately, coffee crisis makes the farm gate price uncertain and volatile. Results revealed that Indonesian coffee export performed progressively in the last decade. Export destination countries for Indonesian coffee also developed broadly. There was market integration on the Indonesian coffee market and global price in the London terminal. Although not fully, the shock in the international price was somehow felt in the Indonesian coffee market. There were sufficient shreds of evidence to conclude that the Indonesian coffee market is well integrated with the international market in the long run. The changing coffee price in Indonesia and the

International market adjusted in the next three years. In short term, Indonesian coffee price was 76% influenced by international price changes, but not vice versa.

On Global perspective, Chander (2017) in the study Global Coffee Commodity Chain revealed that the volatility of the global coffee market has forced small-scale coffee farmers in Costa Rica to react. Some farmers support their coffee earnings with supplemental income they receive from other activities beyond agriculture; others diversify their fields with other crops they hope to sell in the market; and yet others, afraid that their impoverished condition will outlast them, are making great sacrifices in sending their children away to school so they themselves switch professions, away from their parents' coffee plots.

Jácome and Garrido (2017) found that coffee market is distinguished for being volatile and uncertain in terms of domestic and international prices. Arabica and Robusta coffee are produced in 23 provinces of Ecuador. A decade-long decline of coffee production prompted the Ecuadorian government to launch a public program for replanting coffee trees towards the end of 2011. A grower's decision to enter, remain in or exit the coffee sector is based on fluctuating profits from each year's harvest sale. It was revealed that high and low coffee prices encourage growers to leave the sector. High and low prices resulted from high variable cost due to increasing wages for farm workers. To sustain the coffee production and marketing the Ecuadorian government is developing a policy to help growers make production more efficient, encouraging them to remain in the sector in the long run.

Degaga (2020) in Ethiopia argued that Ethiopia's largest export crop is the backbone of the Ethiopian economy. However, Ethiopia has not yet fully exploited its position as the producer of some of the best coffees in the world. Hence, a little information has been gathered on different aspects of the coffee with the objectives of reviewing coffee production and marketing in Ethiopia, and marketing actors and margin distribution of coffee in Ethiopia.

Clay and Bizoza (2018) conducted a study on Rwanda's Coffee Sector and noted that recent in-depth analysis of current trends in Rwanda's coffee sector and revealed that many farmers report that losses in coffee have driven them to abandon their coffee trees and increasingly to uproot them in favor of other, more profitable crops.

The study of Ruben et al. (2018) in Tanzania found that before 1990 all coffee marketing (including input provision, transportation, and processing) was handled by the state coffee board and the cooperative unions. With modest reforms implemented in 1990, it affected inputs, price announcements, and retention of dollar export earnings. The study further inform that more comprehensive reforms were introduced beginning in 1994/95, allowing private traders to purchase coffee directly from growers and process it in their own factories for the first time in more than 30 years.

According to Kangile et al. (2021), Tanzania has continued producing coffee and it is now among the top five coffee-producing countries in Africa. Africa makes up about 11%

of the total global coffee production with Ethiopia, Uganda, Côte d'Ivoire, Madagascar, and Tanzania being the top five coffee producers. These five countries produce about 76% of the total coffee produced in Africa Tanzania contributes about 1.7% to the total share of coffee production in the world. Coffee production in Tanzania is dominated by small-scale farmers (90%).

Sustainability of Agricultural Marketing Co-Operatives

According to Kabeta (2021), the primary Co-operatives for example in Ethiopia are important participants in the coffee value chain of the country. They produce and harvest the coffee and some of them even perform some processing activities like washing pulping, sorting and finally sell it to their respective unions. The unions process the coffee or further processing. Finally further processed are packed, transported to their warehouse and make ready for export market. In Ethiopia further, Srinivasan and Sundaram (2020) in the study *The Performance of Agricultural Co-operatives to Endorse Socio-Economic Development in Ethiopia* noted that Co-operatives in Ethiopia provide assistance mainly agricultural farmers' input and marketing for their produces. Hence, Co-operatives are receiving due attention because of their immense contribution to address the challenge of the people with regard to low level of income, unemployment, poor market for agricultural product etc. It is not surprising that the Co-operatives have a great role in generating income, providing goods and services at reasonable price to their members goes down to the rural areas and provide employment opportunity to the citizen also. Consequently, Co-operatives have a considerable contribution in poverty reduction thereby developing the national economy.

Otieno et al. (2019) agreed that sustainability of agricultural marketing co-operatives refers to the ability of co-operatives to provide services to small-scale farmers such as obtain inputs, adopt new agricultural technologies and access frequent agricultural extension technical assistance. Co-operatives also should be able to provide credit services to member farmers to reduce production challenges.

On Global perspective, Kalogiannidis (2020) found that cooperation and in addition the creation of Co-operatives and cooperative companies in the agricultural sector influence the effort of small farmers to survive in conditions of increased competition. Farmers are in many cases considered "small" entrepreneurs compared to their counterparts in other sectors of the economy. Therefore, the need for survival leads most of the farmers to unite in order to gain bargaining power. Agricultural Co-operatives were and remain the only mechanism for gaining bargaining power of small and weak producers, which is the main reason for creating Co-operatives. Due to their historical process, we can understand their role in the development of the Greek economy. Finally, the study of their problems in last year's presents the need for the planning of a modernized cooperative model, based on

the most important principles of social economy.

Additionally, among the indicators of sustainability of an agricultural market cooperative is the ability to offer technical and financial service to farmer members which eventually help members to earn profits from selling of their agricultural produce. Wang et al (2019) has it that recent research has highlighted the importance of agricultural Co-operatives on farm production. Although the consensus from the literature suggests that participating in these organizations significantly affects farm production, there is inconclusive evidence on whether this effect is positive or negative. Moreover, previous studies solely focus on the magnitude of this effect and fail to explain the mechanism behind it. Their study contributes to this knowledge gap by estimating the impact of agricultural Co-operatives on farm profits. To do this, they applied the causal mediation analysis to explain the potential mechanism behind this relationship. Using a nationally representative survey of farm households from Taiwan in 2013, they found that participating in Co-operatives increases farm profits.

On Africa review, one of agricultural marketing co-operative sustainability is the ability to generate income and low financial dependency from host state government. Mushonga et al. (2019) in their study the Co-operative Movement in South Africa revealed that the co-operative movement in South Africa came a long way, but the results of such a long revolution are yet to be seen despite an enabling legislative environment and government incentives which increased their formation from 4,000 in 2004 to 132,000 in 2016. The sustainability of these Co-operatives outside government grants is very doubtful, with most of them just appearing on paper without any meaningful economic activity happening on the ground. The study further explain that for Co-operatives to be sustainable, they need to work toward full implementation of the cooperative movement principles and values through the bottom-up approach to cooperative formation by reducing their overdependence on the state.

The leading factors on coffee price fluctuations and sustainability of AMCOS

Price fluctuation is one of the challenges for small scale farmers all over the world and more specifically in developing countries including Tanzania. The study by Sambuo and Mbwaga (2017) found out that unfavorable coffee prices, access to extension services, pests and coffee diseases, unreliable coffee markets, shortage and untimely accessibility of farm inputs, are the main challenges of change in price of coffee as well as sustainability of AMCOS. It further revealed three effects of coffee price fluctuations to farmers that includes declined coffee productivity, reduced household income level, and farmers' inability to meet household's needs. Hung et al. (2019) found that the loans from commercial bank helps AMCOS to provide farm inputs in term of loans and extension services to farmers. The side-selling of coffee by farmers pose a risk of financial

burden and operational healthier and hence jeopardize AMCOS sustainability. The study revealed that none of AMCOS members are knowledgeable to price setting and fluctuations nor are they involved in price setting. Although TCB is responsible with coffee price set up, the set up only reflect the price changes in New York coffee market and London coffee Market. This price changes phenomenon is agreed by Bargawi and Newman (2017) in the study From futures markets to the farm gate: A study of price formation along Tanzania's coffee commodity chain which examined the nature of price formation and transmission in the Tanzanian coffee price chain. The study found that the world price of coffee has become increasingly volatile as a result of the behavior of international coffee traders and broader shifts in the character of global capital accumulation.

Furthermore, Anania et al. (2020) sought to assess the role of AMCOS in socio-economic development and challenges they face in Moshi district Council. The study intended to document the socio-economic benefits brought by AMCOS to their members and reveals some challenges they face in such efforts to meet members needs and expectations. The study viewed AMCOS in the context of members and at organizational level. The specific reference was drawn from selected AMCOS in Moshi District Council to provide picture on the benefits they bring to members and expose prevailing challenges. The study found that AMCOS have enabled members to improve capacity to access to social services. From the 80 respondents, 65 of them (81 %) revealed this from the fact that improved income from coffee sales had other trickle-down effects to members. The income helped them to access services such as paying for health services, water and electricity bills and educational expenses for their children and other dependents in schools, colleges and vocational training centers.

The mechanism used by AMCOS to challenge coffee price fluctuations for AMCOS sustainability

Mrema (2017) in the study Co-operative members' decisions on coffee marketing channels and factors influencing their choices in Rombo district, Tanzania found that although Agricultural Marketing Co-operative Societies (AMCOS) play a major role in coffee marketing, not all members seem to use them effectively since some of them are using private traders as their coffee marketing channel. The question now is what influences their choices on which channel to use on coffee marketing. The main objective of the study was to analyze co-operative members' decisions on coffee marketing channels and factors influencing their choices in Rombo district. Specifically, the study aimed at describing the coffee marketing system and evaluates the existing potentials of AMCOS, assessing the factors that influence co-operative member's choice of coffee marketing channel and comparing the transaction costs incurred by the user and non-user of AMCOS in coffee marketing.

Two-stage sampling procedure was followed to select

four AMCOS and a total of 200 sample respondents who were the co-operatives members. Both primary and secondary data were collected. The study noted that, only 16.5% of the members trade with private buyers. By using SWOT analysis the study found that co-operatives are internally strong, while the external analysis shows the co-operatives current strategies do not respond well on the use of the external opportunities. Logistic regression analysis indicated that only four variables that is, access to inputs, payment system, access to market information and trust were significant at 0.05 probability level, this means the aforementioned factors are the ones which influence co-operative member's choice of coffee marketing channel. From the independent sample test it was noted that, AMCOS as a marketing channel has higher transaction costs than private traders. The study concluded that, co-operatives do not perform well in coffee marketing compared to private traders although members have more faith to co-operatives than to private traders. Therefore the study recommends that, there is a need to strengthen organizational and institutional capacity of AMCOS.

Rwekaza et al. (2018) in the study coffee production trends and their implications on livelihood capability among small-scale farmers in Hai and Arumeru districts, Tanzania, assessed the extent to which democratic practices reflect member ownership in different decision-making processes. The study objective was to examine external interferences limiting co-operative sustainability in the primary AMCOS in Bukoba and Moshi districts. A cross-sectional design was used whereby 400 members were selected from ten primary AMCOS of Bukoba and Moshi districts. The study used primary data using household survey and interviews, focus group discussions and key informant interviews. Documentary review was done to collect secondary information. The findings on the external sustainability influence results shows government roles were more identified as to tax members' produce than regulation and creating enabling environment for co-operative business; a total of 47 deduction and tax items were found to effect member produce on Farm Gate Price. Also, the decline of coffee price was the leading factor affecting the co-operative business. The study recommended that ordinary members, board and managers of the Primary AMCOS should prepare strategies that will expand the capital base of their firm in order to have a sustainable capital system. Also, the role of the Government should be creating enabling environment to co-operative rather than taxing co-operative members.

METHODOLOGY

Research Design

This study employed the descriptive- correlational research designs because it described the views of respondents and determined the relationship between price change and sustainability of coffee market. Descriptive design is a

Table 1. Reliability Test

SN	VARIABLE	CRONBACH ALPHA	RESULTS
1	Coffee Price Fluctuation	.713	Reliable
2	Sustainability Of Agricultural Marketing	.724	Reliable

Table 2. Demographic Characteristics of Respondents

VARIABLE	Frequency	Percent
Gender of respondents		
Male	106	78.5
Female	29	21,5
Total	135	100
Experience in coffee production		
5years and below	6	4.4
6 to 10	34	25.2
11 and above	95	70.4
Total	135	100
Education level of respondents		
None	4	3
Primary	74	54.8
Secondary	50	37.0
Tertiary	7	5.2
Total	135	100

design that describes the situation, characteristics or behavior of the phenomena (Salkind, 2010). This design includes the use of percentages, mean scores and standard deviation (Boslaugh, 2008). On the other hand, correlation aspect was used to measure the relationship and differences variables under investigation. Correlation design refers to the design that measures the relationship between variables (Newman, 2006) which was the case in this study.

Population and Sampling

The study was conducted at KNCU and Olele and Tarakea AMCOS in Rombo District, Kilimanjaro Region, Tanzania. The study population is made up of KNCU project staff, and staff in Olele and Tarakea primary AMCOS. This is because KNCU coordinate coffee farming and marketing through primary AMCOS in all Kilimanjaro districts. Due to the scattered nature of respondents' distribution, the study used convenience sampling techniques for ease access to about 150 respondents. The study ended up with 135 respondents which is 90% of the intended sample.

Validity and Reliability

In ensuring the data to be collected will be valid, the questionnaires were shared to the research supervisor for reviewing and reshaping the items in order to ensure that the instruments includes all the items that are essential and eliminates undesirable items so that their content is made more valid. The study further ensured reliability of research instruments by calculating the Cronbach's Alpha

through the Statistical package for Social Sciences as indicated in Table 1.

The questionnaire instrument was pretested for reliability before data analysis took place Afterwards the data was entered and analyzed using SPSS. Since all the reliability results were above 0.7 Cronbach's Alpha, the questionnaire was reliable for data collection.

Ethical Consideration

In maintaining the research ethics, the researcher requested data collection permit from the Institute of Accountancy Arusha. KNCU provided a permission for data collection and offered two staff the Technical Manager and Field Officer to assist the researcher. After permission being granted, the researcher proceeded with data collection in Olele and Tarakea AMCOS. The researcher ensured that all respondents voluntarily participate in the study where no pressure was applied to any participant to respond, and the information collected was kept confidentially and is used for the purpose of study only.

ANALYSIS AND DISCUSSION

Demographic Characteristics

The analysis of data started with presentation of demographic characteristics of respondents as indicated in Table 2. The demographics included gender of respondents, experience in coffee production and educational level of respondents. Male respondents were 106 (78.5%) while

Table 3. Interpretation Scale

Mean score	Response
3.50-4.00	Strongly Agree
2.50-3.49	Agree
1.50-2.49	Disagree
1.00-1.49	Strongly Disagree

Table 4. Coffee Price Fluctuation

SN	Online Marketing	Mean	Std. Dev	Interpretation
1	Coffee price changes from time to time	3.1667	.59472	Agree
2	Coffee price changed for the past two years	3.0455	.53665	Agree
3	The change of coffee price favors the farmer	1.9407	.85312	Disagree
4	Coffee price encourages the farmer to continue farming	1.3481	.60246	Strongly Disagree
5	Coffee price is fair as compared to price of other agricultural products	1.3333	.48868	Strongly Disagree
6	Coffee price change can be predictable	1.3111	.48046	Strongly Disagree
7	The coffee price in the market is what farmers would expect	1.3037	.46157	Strongly Disagree
8	I am happy with the current coffee price	1.2463	.43245	Strongly Disagree
9	The coffee price I expect is what I find in the market	1.2222	.41729	Strongly Disagree

females were 29 (21.5%). Therefore, majority of respondents were males. This suggests that majority of those who engaged in coffee production were males and therefore there was gender imbalance.

Those with 5 years or below experience in coffee production were 6 (4.4%). Those with 6 to 10 years were 34 (25.2%) while those with over 10 years of experience in coffee production were 95 (70.4%). Therefore, majority of respondents were those with 10 years and above. The table indicates that those with no formal education were 4 (3%), those with primary education were 74 (54.8%), those with secondary education were 50 (37%) while those with tertiary education were 7 (5.2%). Therefore, the majority of respondents possessed primary education while the least had no formal education.

Analysis of Research Questions

The analysis of research questions was done through descriptive statistics in terms of mean scores and standard deviations as well as through ANOVA and Pearson Correlations. The interpretation of mean scores was according to the criteria in Table 3 whereby 3.50 to 4.00 denoted strong agreement, 2.50 to 3.49 denoted agreements, 1.50 to 2.49 denoted disagreements and 1.00 to 1.49 denoted strong disagreements.

Research Question 1: What is the rate of coffee price fluctuation as perceived by stakeholders in Kilimanjaro Region?

While price fluctuation could be dangerous to the sustainability of agricultural products, this research question sought to establish how respondents viewed the fluctuation of price in the region under investigation. The

fluctuation was measured by 9 items in the questionnaire as seen in Table 4 whereby respondents had to indicate their agreement or disagreement. Table 1 indicates that the mean scores for the first two items were between 2.50 and 3.49 which mean that they agreed that coffee price changes from time to time and that coffee price changed for the past two years. This suggests that change of coffee price takes place from time to time. The mean score for the next item was between 1.50 and 2.49 which means respondents disagreed that the change of coffee price favors the farmers. This suggests the farmers are not satisfied with the current price of the coffee they produced.

The mean scores for the rest of items in Table 1 were between 1.00 and 1.49 which indicates strong disagreement. Particularly, they strongly disagreed that coffee price encourages the farmer to continue farming and that coffee price is fair as compared to price of other agricultural products.

They also strongly disagreed that coffee price change can be predictable. This means that farmers have no idea on the price of coffee they can find on market tomorrow. Finally, they strongly disagreed that coffee price in the market is what farmers would expect, that they are happy with the current coffee price and that coffee price they expect is what they find in the market. This suggests that farmers are not satisfied with the current price of coffee. The finding is similar to that of Huka et al. (2014) who investigated Price Fluctuation of Agricultural Products and its Impact on Small Scale Farmers Development: Case Analysis from Kilimanjaro Tanzania and established that price fluctuation of agricultural product is a challenge towards achievement of small scale farmer's development which results to loss of capital and farmers shifting to other production activities. The researchers concluded that price fluctuation is a multifaceted problem attributed by various factors which,

Table 5. Sustainability of Agricultural Marketing

SN	Online Marketing	Mean	Std. Dev	Interpretation
1	Co-operatives can supply coffee to buyers at any time	2.0299	.73516	Disagree
2	Co-operatives search for new markets for coffee continuously	1.9852	.61067	Disagree
3	Co-operatives build long-lasting relationship with customers	1.9852	.61067	Disagree
4	Co-operatives store coffee in quality stores to preserve the quality	1.9179	.83214	Disagree
5	Co-operatives pack the coffee in quality packages	1.8963	.73580	Disagree
6	Co-operatives have marketing expertise to market the coffee	1.8593	.60053	Disagree
7	Co-operatives use resource efficiently and effectively for marketing	1.8370	.69333	Disagree
8	Co-operatives delivers sustainable value to customers	1.7037	.64731	Disagree
9	Co-operatives train farmers to produce exceptional quality	1.5185	.78085	Disagree
10	Co-operatives serve the needs of farmers to strengthen value chain	1.4074	.60219	Strongly Disagree

Table 6. Sustainability of Agricultural Marketing Years of Experience

				95% Confidence Interval for Mean			
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum Maximum
5 years or below	6	1.9667	.32660	.13333	1.6239	2.3094	1.70 2.60
6 to 10 years	34	1.9559	.36696	.06293	1.8278	2.0839	1.30 2.80
Above 10 years	95	1.7529	.48974	.05025	1.6531	1.8526	1.00 3.00
Total	135	1.8135	.46281	.03983	1.7347	1.8923	1.00 3.00

when combined, culminate in dangerous consequences for the most vulnerable. There is therefore a need for the appropriate authorities to ensure that price does not change from time to time and that the price favors the farmers who are the key stakeholders for sustainable production of coffee.

Research Question 2: What is the perception of respondents on the sustainability of Agricultural marketing?

This research question sought to determine the perception of respondents on the sustainability of Agricultural marketing. This was prompted by the fact that market sustainability is a key factor for sustainability of farming activities. As seen in Table 5 the mean score for the first nine items were between 1.50 and 2.49 which means respondents disagreed that Co-operatives supply coffee to buyers at any time, that Co-operatives search for new markets for coffee continuously, that Co-operatives build long-lasting relationship with customers and that Co-operatives store coffee in quality stores to preserve the quality.

They also disagreed that Co-operatives pack the coffee in quality packages, that Co-operatives have marketing expertise to market the coffee, that Co-operatives use resource efficiently and effectively for marketing, that Co-operatives delivers sustainable value to customers and that Co-operatives train farmers to produce exceptional quality raw materials. The fact that respondents disagreed with all these items regarding marketing strategies suggest that the marketing strategies by the Kilimanjaro Native Co-

operative Union are inadequate and therefore an urgent need for transformation in order to attain sustainable marketing for coffee products. This is in harmony with what Amano (2014) recommended in his study about Coffee Production and Marketing in Ethiopia that it is also important to increase coffee production, productivity, sales value and marketing strategies which are beneficial to the cooperative unions and the farmers as well.

Research Question 3: Is there significant difference in perception of sustainability of Agricultural marketing by stakeholders categorized according to (a) experience in coffee production and (b) educational level?

This research question sought to establish whether experience in farming and educational level would contribute to the perception of the respondents on the marketability of coffee products. The research question called for testing a null hypothesis which stated: there is no significant difference in perception of sustainability of Agricultural marketing by stakeholders categorized according to (a) experience in coffee production and (b) educational level. The null hypothesis was tested through the Analysis of Variance (ANOVA) as reflected in Table 4, 5, 6 and

Marketing Sustainability and Experience

As seen in Table 6, the mean score of respondents in all three groups for experience in coffee production was between 1.50 and 2.49 which still means that respondents

Table 7. Analysis of Variance by Experience

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.179	2	.590	2.828	.063
Within Groups	27.523	132	.209		
Total	28.702	134			

Table 8. Sustainability of Agricultural Marketing Years of Education

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Primary	74	1.7189	.40601	.04720	1.6249	1.8130	1.00	2.80
Secondary	50	1.8729	.48109	.06804	1.7362	2.0096	1.00	3.00
Tertiary	7	1.9683	.53888	.20368	1.4699	2.4666	1.40	3.00
None	4	2.5500	.36968	.18484	1.9617	3.1383	2.00	2.80
Total	135	1.8135	.46281	.03983	1.7347	1.8923	1.00	3.00

Table 9. Analysis of Variance by Education

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.176	3	1.059	5.432	.001
Within Groups	25.527	131	.195		
Total	28.702	134			

Table 10. Correlations between Price Fluctuation and Marketing Sustainability

		Price Fluctuation	Marketing Sustainability
Price Fluctuation	Pearson Correlation	1	.135
	Sig. (2-tailed)		.119
	N	135	135
Marketing Sustainability	Pearson Correlation	.135	1
	Sig. (2-tailed)	.119	
	N	135	135

regardless of their years of experience in producing coffee disagreed that the coffee marketing strategies are sustainable. Therefore, experience did not influence the perception of respondents regarding marketing sustainability.

The sig of .063 in Table 7 further indicates that the mean difference among the three groups is not statistically significant. This leads to accepting the null hypothesis maintaining that there is no significant difference in perceiving sustainability of Agricultural marketing by stakeholders categorized according to experience in coffee production.

Marketing Sustainability and Educational Level

As seen in Table 8, the mean score of respondents with no formal education was 2.5000 which means they agreed that the marketing strategies were sustainable. On the contrary, the mean scores for respondents with formal education (primary, secondary and tertiary) were between 1.50 and 2.49) which means disagreement that the marketing

strategies were sustainable.

The Sig of .001 in Table 9 indicates that the mean score difference is statistically different. This means that respondents with formal education were more critical thinking about sustainability of agricultural marketing. Therefore the null hypothesis that there is no significant difference in perception sustainability of Agricultural marketing by stakeholders categorized according to educational level is rejected. Therefore, there is need for farmers to continue learning in order for them to increase their critical thinking power which may help them in making important decision regarding their farming and marketing activities.

Research Question 5: Is there significant relationship between coffee price fluctuation and sustainability of agricultural marketing?

This research question sought to establish the effect of coffee price fluctuation on sustainability of agricultural marketing. The research question called for testing of a null

hypothesis which stated: there is no significant relationship between coffee price fluctuations and sustainability of agricultural marketing co-operatives in Tanzania. The null hypothesis was tested through Pearson Correlation.

The nature of possible correlations would be either positive or negative and its interpretation based on the Cohen's formula as follows: $\geq .70$ = strong relationship; $\geq .50$ = moderate relationship and $\leq .50$ = weak relationship. As seen in Table 10, the Sig of .119 is greater than the critical value and therefore, the null hypothesis is accepted. In that matter, there is no significant relationship between coffee price fluctuation and sustainability of agricultural marketing. This implies that price fluctuation does not affect the sustainability of marketing strategies. It also suggests that regardless of the existing price fluctuation, cooperative union have roles to play in order to make the marketing strategies sustainable.

Conclusions of the Study

Based on the findings of the study, the researcher came up with the following conclusions regarding price fluctuation and sustainability of coffee marketing strategies:

1. Majority of those who engaged in coffee production were males and therefore there was gender imbalance. This was contributed by customary laws and culture that limited women ownership to land and control of wealth (including coffee).
2. Coffee price changed from time and the most recent change took place in the past two years. The change of coffee price did not favors the farmers who in turn were not satisfied with the current price of the coffee they produced.
3. Regarding sustainability of agricultural marketing, it is concluded that the cooperative union did not search for new markets for coffee and did not build long-lasting relationship with customers. Hence, negative perception regarding the marketing sustainability.
4. Experience did not influence the perception of respondents regarding marketing sustainability but level of education did as respondents with formal education were more critical thinking about sustainability of agricultural marketing. This necessitates a need for farmers to continue learning in order for them to increase their critical thinking power which may help them in making important decision regarding their farming activities.
5. There is no significant relationship between coffee price fluctuation and sustainability of agricultural marketing. This implies that price fluctuation did not affect the sustainability of marketing strategies. Regardless of the existing price fluctuation, cooperative union still have roles to play in order to make the marketing strategies sustainable.

Recommendations of the Study

Based on the conclusions above, the study came up with the following recommendations regarding price fluctuation and

sustainability of coffee marketing strategies:

1. There is need to empower women for them to equally participate in coffee production initiative just like men. This will increase the level of coffee production and benefit both the individuals and the country at large.
2. The cooperative union needs to search for new markets and build long-lasting relationship with customers. This will enhance the positive attitude toward coffee production and therefore increase the production level.
3. There is a need for farmers to continue learning in order for them to increase their critical thinking power which may help them in making important decision regarding their farming activities.
4. Regardless of the existing price fluctuation, cooperative union still have roles to play in order to make the marketing strategies sustainable.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of the paper.

REFERENCE

- Amano AA (2014). Coffee Production and Marketing in Ethiopia. *European Journal of Business and Management* 6(37):109-120.
- Anania P, Rwekaza GC (2016). The determinants of success in agricultural marketing co-operatives in Tanzania: the experience from Mweka Sungu, Mruwia and Uru north Njari agricultural marketing co-operatives in Moshi district. *Euro. J. Res. Soc. Sci.*, 4(3):62-75.
- Anania P, Rwekaza GC, Bamanyisa JM (2020). Socio-economic benefits of agricultural marketing co-operatives and their challenges: Evidence from Selected Cases in Moshi District Council (Tanzania). *Comité editorial/editorial board*, p.97
- Almeida LF, Zylbersztajn D (2017). Key success factors in the Brazilian coffee agrichain: Present and future challenges. *Int. J. Food System Dynamics*, 8(1):45-53.
- Amrouk EM (2018). Depressed international coffee prices: insights into the nature of the price decline. *FAO Food Outlook*, (November), pp.25-28.
- Bargawi HK, Newman SA (2017). From futures markets to the farm gate: A study of price formation along Tanzania's coffee commodity chain. *Economic geography*, 93(2):162-184.
- Boslaugh S (2008) *Encyclopedia of Epidemiology*. Retrieved from:doi:10.4135/9781412953948
- Bryman A, Bell E (2011). *Business Research Methods*. 3rd Edition. India: Oxford University Press.
- Caldarelli CE, Gilio L, Zilberman D (2019). The Coffee Market in Brazil: challenges and policy guidelines. *Revista de Economia*, 39(69)
- Chander KP (2017). The global coffee commodity chain: coffee farmers in Costa Rica, and its 'ups and downs'. *J. Globalization Studies*, 8(2):92-107.

- Clay DC, Bizoza A (2018). The Challenge to Sustainable Growth in Rwanda's Coffee Sector (No. 1879-2018-5039).
- Darmi A, Ayu SF (2020), February. Price transmission of Arabica coffee (*Coffea Arabica*) between Sumatera Utara and major export destination countries in Asia and Australia. In IOP Conference Series: Earth and Environ. Sci. (Vol. 454, No. 1, p. 012025). IOP Publishing.
- Degaga J (2020). Review on Coffee Production and Marketing in Ethiopia. *J. Mark. Consum. Res.*, 67:7-15.
- Fitriani F, Arifin B, Ismono H (2021). Indonesian coffee exports and its relation to global market integration. *J. Socioeconomics and Develop.*, 4(1):120-133.
- Global Agricultural Information Network. Tanzania Annual Coffee Production Report (2017). USDA Foreign Agricultural Services.
- Huka H, Ruoja C, Mchopa A (2014). Price Fluctuation of Agricultural Products and its Impact on Small Scale Farmers Development: Case Analysis from Kilimanjaro Tanzania. *European J. Bus. Manag.* 6(36):155-160.
- Hung Anh N, Bokelmann W, Do Nga T, Van Minh N (2019). Toward sustainability or efficiency: The case of smallholder coffee farmers in Vietnam. *Economies*, 7(3), p.66.
- Mhando DG (2019). Unlocking institutional constraints to increasing coffee production in Tanzania. <https://www.repoa.or.tz/wp-content/uploads/2020/07/SD4-Paper-Day-2-David-Gongwe-Mhando.pdf>
- Jácome AR, Garrido A (2017). A Real Option Analysis applied to the production of Arabica and Robusta Coffee in Ecuador. *Spanish Journal of Agricultural Research*, 15(1), p.e0104.
- Kabeta T (2021). Review of coffee value chain in Ethiopia on the course crop value chain management. *American Journal of Supply Chain Management*, 6(1):60-78.
- Kalogiannidis S (2020). Economic Cooperative Models: Agricultural Co-operatives in Greece and the Need to Modernize their Operation for the Sustainable Development of Local Societies. *International J. Acad. Res. Bus. Soc. Sci.*, 10(11):452-468.
- Kangile JR, Kadigi RM, Mgeni CP, Munishi BP, Kashaigili J, Munishi PK (2021). Dynamics of Coffee Certifications in Producer Countries: Re-Examining the Tanzanian Status, Challenges and Impacts on Livelihoods and Environmental Conservation. *Agriculture*, 11(10), p.931.
- Kimaro PJ, Bee FK, Towo EN (2020) Coffee Production Trends And Their Implications On Livelihood Capability Among Small-Scale Farmers In Hai And Arumeru Districts, Tanzania. *Analysis Of Influence Of Livelihood Capabilities On Coffee Production Among Small-Scale Coffee Farmers In Hai And Arumeru Districts, Tanzania*, P.35.
- Krishnan S (2017). Sustainable coffee production. In *Oxford Research Encyclopedia of Environ. Sci.*
- Kweka GJ (2018). Welfare effect of eliminating commodity price volatility: Evidence from Tanzania coffee farmers. *Afr. J. Agric. Res.*, 13(35):1837-1851.
- Marcis J, de Lima EP, da Costa, SEG (2019). Model for assessing sustainability performance of agricultural Co-operatives'. *J. Cleaner Production*, 234:933-948.
- Maundu RM (2018). The Impact of Neo-Colonialism on Coffee Trading Activities in Kenya (Doctoral dissertation, United States International University-Africa).
- Mhagama JK, Mmasa JJ, Ismail IJ (2021). Marketing Services For Choice Of market Channels Among Sesame Smallholder Farmers In Tanzania: The Moderating Effect Of Agricultural Marketing Co-Operative Societies. *East African Journal Of Social And Applied Sciences (Eaj-Sas)*, 3(1).
- Mrema MJ (2017). Co-operative members' decisions on coffee marketing channels and factors influencing their choices in Rombo district, Tanzania (Doctoral dissertation, Sokoine University of Agriculture).
- Mushonga M, Arun TG, Marwa NW (2019). The cooperative movement in South Africa: Can financial Co-operatives become sustainable enterprises?. *Strategic Change*, 28(4):259-271.
- Newman LW (2006) *Social Research Methods, Qualitative and Quantitative Approaches*, 6th Edition, Pearson: Boston.
- Ngango J, Kim SG (2019). Assessment of technical efficiency and its potential determinants among small-scale coffee farmers in Rwanda. *Agriculture*, 9(7), p.161.
- Otieno MO, Alwenge BA, Okumu OO (2019). Coffee Production Challenges and Opportunities in Tanzania: The Case Study of Coffee Farmers in Iwindi, Msia and Lwati Villages in Mbeya Region. *Asian Journal of Agricultural and Horticultural Research* 3(2): 1-14
- Ruben R, Allen C, Boureima F, Mhando DG, Dijkshoorn Y (2018). Coffee value chain analysis in the southern highlands of Tanzania. *Wageningen University & Research*
- Rwekaza GC, Kayunze KA, Kimario LP (2018). An analysis of external interfaces limiting co-operative sustainability in the primary agricultural marketing co-operative societies (amcos) in Tanzania, evidence from selected coffee primary amcos of Bukoba and Moshi districts. *European J. Res. And Reflection Manag. Sci.* Vol, 6(2).
- Rwekaza GC, Kayunze KA, Kimario LP (2019). Members' views On Ownership and Democratic Sustainability In Primary Agricultural Marketing Co-Operatives In Tanzania; Evidence From Bukoba And Moshi Districts. *East African J. Soc. Appl. Sci. (Eaj-SAS)*, 1(2).
- Salkind N (2010) *Encyclopedia of Research Design*. Retrieved from: doi:10.4135/978129612888
- Sambuo D, Mbwaga A (2017). Challenges of Coffee Price Fluctuations and Sustainability of Agricultural Marketing Co-Operatives in Tanzania: Experience from Mbozi and Rombo Districts. *Noble Int. J. Econ. Financ. Res.*, 2:140-151.
- Samper LF, Quiñones-Ruiz XF (2017). Towards a balanced sustainability vision for the coffee industry. *Resources*, 6(2), p.17.
- Tadesse T, Tesfaye B, Abera G (2020). Coffee production

constraints and opportunities at major growing districts of southern Ethiopia. *Cogent Food & Agriculture*, 6(1), p.1741982. Tanzania Coffee Board. 2020. Tanzania Coffee Industry Profile. Available from: https://www.coffeeboard.or.tz/tzcoffee_%20profile.php [16 December 2020].

Wang B, Cheng PY, Lee B, Sun LC, Chang HH (2019). Does participation in agricultural Co-operatives affect farm sustainability? Empirical evidence from Taiwan. *Sustainability*, 11(18):4987.