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SUGARCANE FARMERS' SATISFACTION WITH CONTRACT FARMING SERVICE QUALITY UNDER THE CO-OPERATIVE MODEL IN KILOMBERO VALLEY, TANZANIA

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ABSTRACT
Farmers' associations in Kilombero Valley have been providing services to sugarcane contract farmers and helping them with their farming activities since the 1990s. However, there have been elements of dissatisfaction with the service quality provided by the associations for many years. To address the issue, farmers in Kilombero Valley switched from using the farmers' association model to Agricultural Marketing Co-operative Societies (AMCOS) in 2017. It has not been determined whether there is a positive change as a result of the shift. This article assessed service quality under Agricultural Marketing Co-operative Societies in Kilombero Valley. The aim is to determine farmers' satisfaction level with the services. The study employed a cross-sectional design. Both simple random and purposive sampling techniques with proportionate stratified sampling methods were used. The SERVQUAL model's five dimensions were used to collect data from 361 smallholder sugarcane contract farmers via a questionnaire-based survey and key informant interviews. Descriptive statistics and structural equation modelling based on the partial least square were used in analysing quantitative data. The study found a relationship between service quality dimensions and smallholder farmer satisfaction, with empathy, assurance, and tangibles being statistically significant. Despite switching from using the farmers' association model to AMCOS, smallholder sugarcane farmers had a negative perception on the contract farming service quality provided by AMCOS. It is recommended that service quality should be improved to meet the needs of smallholder farmers and reduce complaints, particularly regarding delays in supply of farming inputs. Also, AMCOS leaders and staff should improve their customer service and service efficiency to meet farmers' needs.

Keywords: Smallholder farmers, Contract farming, Service quality, Satisfaction, Sugarcane.
Paper type: Research paper
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1. Introduction

Contract farming (CF) has existed for decades and gained popularity worldwide (Dsouza et al., 2018). It has been considered to be a means of improving farmers' welfare and meeting their requirements due to

the services offered (Meemken et al., 2020). In Africa, CF is viewed as an institutional arrangement that can benefit both large-scale and smallholder farmers (Poku et al., 2018). The emergence of CF has been necessitated by global economic integration and market liberalisation. Farmers, particularly sugarcane smallholder farmers, have proactively shown interest to engage in CF as a result of impressive services offered, such as farming inputs, credit facilitations, technology transfer, and market of the produce (Louhaichi et al., 2018; Mishra et al., 2018; Bellemare, 2018).

Moreover, CF has been proven to be a useful tool in creating a formal market for farmers' products and has improved farmers' satisfaction level, trust, and commitment (Dlamini et al., 2019). However, to some extent, it has caused dissatisfaction among some farmers during its operationalization (Machimu et al., 2019; Sulle, 2017). Satisfaction is a psychological factor that designates feelings when desires and needs are fulfilled (Bencsik et al., 2018). This has been a global concern, and its evaluation is significant. For CF contexts, satisfaction is measured based on attributes such as registration procedures, transparency, contract implementation, and quality of services (Sugiarto et al., 2019). The intention of evaluating the practicality of the attributes is to get feedback on how CF operates. In most countries, for example in South Africa, CF as a model has worked parallel with other business models like cooperatives, farmers' organisations, companies and individuals.

Sugarcane CF in Tanzania began in Kilombero Valley in 1991 when two farmers' associations, the Ruhembe Cane Growers Association and the Kilombero Cane Growers Association, co-ordinated the operations of CF (Schemes, 2016). Since then, the associations have been in operation, and the number of associations grew from two (2) to 17 as of 2014 (Machimu, 2020). Among other things, the growth was fuelled by smallholder farmers' dissatisfaction with the quality of services. Farmers' associations reported low revenues as production input costs increased, payment delays occurred, and the milling company/buyer failed to meet its contractual obligations (Machimu et al., 2019; Sulle, 2017). To address the dissatisfaction, in 2017, the Tanzania Co-operative Development Commission (TCDC) facilitated the transformation of farmers' associations into Agricultural Marketing Cooperatives Societies (AMCOS) as a new strategy to improve CF services (URT, 2020; TCDC 2020).

The transformation of farmers' associations aimed at increasing AMCOS' potential for making smallholder sugarcane farming more competitive as well as providing more relevant and fair services to members (URT, 2020; Landesa, 2017). It is argued that AMCOS are preferable because they are dedicated to rebalancing power between farmers and buyers and negotiating on behalf of their members to obtain a competitive advantage (Parwez, 2017). TCDC managed to encourage smallholder farmers to join AMCOS in 2017 as a mitigation measure for farmers' dissatisfaction with the services quality of their associations (TCDC, 2020). Thus, it was critical to determine whether the cooperative model well addressed the dissatisfaction with service quality previously expressed by smallholder sugarcane farmers in Kilombero Valley.

Service quality is a comparison of perceived service expectations with perceived performance, and it stems from the expectancy minus the disconfirmation paradigm (Afthanorhan et al., 2019; Satapathy et al., 2017). The quality of CF services is argued to be potential in maintaining smallholder farmers' participation in CF and AMCOS membership. Moreover, it has been suggested by Afthanorhan et al. (2019) that the extent to which smallholder contract farmers are satisfied with the service quality determines their inflow to join and practise CF. The quality of CF services provided to smallholder farmers necessitates the buying firms to commit provision of the agreed-upon services (Gersch, 2018) and cooperative societies' oversight of the contractual agreements (Kasiri et al., 2017; Cramb, 2020). It is, therefore, significant to consider various important variables of service quality that describe smallholder farmers' expectations and satisfaction with the contracts. For this study, the dimensions of service quality that were proposed by Parasuraman et al. (1985) as measures of satisfaction with CF service quality were adopted; including empathy, effectiveness, assurance, reliability, and tangibles (Satapathy et al., 2017).

A study by Danso-Abeam et al. (2024). suggests that, to satisfy a contract partner, the service quality should be well-measured by paying attention to service quality dimensions. Smallholder farmers in Kilombero Valley have been receiving contractual services including farming inputs supply, credit, extension services, and technical support to assist them in their sugarcane farming activities through AMCOS as a strategy to improve CF service quality since the farmers' associations were dissolved in 2017 (TCDC, 2020). Following the transformation of farmers' associations into AMCOS, it was necessary to assess the extent to which the co-operative model addressed prior dissatisfaction with CF service quality. In light of that phenomenon, the study sought to (i) analyse the CF services offered to smallholder farmers by AMCOS, (ii) examine the quality of services received by smallholder farmers through AMCOS, and (iii) determine causal-effect relationships between perceived service quality offered by AMCOS and smallholder farmers' satisfaction.

2. Theoretical Review

2.1 Expectancy disconfirmation theory

The Expectancy Disconfirmation Theory (EDT), which was founded by Oliver (1980), states that customers' satisfaction is formed by comparing their expectations with their perceptions. The theory assumes that satisfaction or dissatisfaction of the customers is the difference between expectations on the delivered service and their perceptions. The theory was used in this study to examine the relationship between the service quality delivered by AMCOS to the smallholder sugarcane farmers and their satisfaction. According to the theory, disconfirmation can be positive, negative, or neutral. The positive disconfirmation is when perceptions exceed expectations; negative disconfirmation is when expectations exceed perceptions; and neutral disconfirmation is when perceptions are equal to expectations. According to Sinha et al. (2020) the disconfirmation partially mediates the relationship between expectations and satisfaction of the customers. They are of the view that customer satisfaction is influenced by disconfirmation between expectations prior to service delivery and the actual service. Moreover, Harrison et al. (2022) and Qureshi et al. (2022), from their studies, add that there is a positive relationship between service quality and customer satisfaction. Therefore, to enhance smallholder sugarcane farmers' satisfaction with offered services, the AMCOS should strive to meet or exceed the expectations of the smallholder sugarcane contract farmers. The theory focuses on overall satisfaction of the customer, and this serves as a weakness of this theory regarding the study. Therefore, the SERVQUAL model was used to complement the EDT which helped to assess the gap that exists between the expectations and perceptions of the customers regarding the provided services by using five dimensions of service quality.

2.2 SERVQUAL model

The SERVQUAL model, which was founded by Parasuraman et al. (1991), defines quality as an act of meeting customer needs and requirements and also how the delivered services are perceived by the customers. The aim was to measure the customer perceptions regarding the offered services. By the model, it is assumed that the provision of the required services leads to customers' satisfaction. The service quality model also signifies the gap that exists between the expected services and actual services offered to the customers, and the perceptions of customers on the provided services (Parasuraman et al., 1991). Additionally, Sugiarto et al. (2019) contend that, to maintain customers, service quality is a critical factor and should be well measured to satisfy the contract partner by paying more attention to dimensions such as reliability, assurance, responsiveness, empathy, and tangibles. The SERVIQUAL model focuses on the expectations and perceptions of individuals regarding the services offered. Therefore, the model was used in this study to measure the relationship between service quality dimensions (responsiveness, assurance, reliability, tangibles, and empathy) and satisfaction of smallholder sugarcane farmers in Kilombero Valley.

Quality is subjective, and its dimensions have been proposed by people according to their perceptions; this serves as one of the weaknesses of the model. Despite the weakness, the model fitted the study because the perception of services offered to smallholder sugarcane contract farmers differed from one farmer to another. Yet, Machimu (2020) argues that the services offered by the principal and agent in CF should be skewed to benefit both parties. Kariuki and Loy (2016) and Tgeee al. (2020) add that the

services offered to smallholder farmers depend on the quality, level of control and trust among contracting partners. According to the SERVQUAL model, customers are the judges of the quality of service provided and giving out their perceptions. For instance, in Kilombero Valley, the smallholder sugarcane contract farmers had a chance to judge the services offered to them through AMCOS. From their arguments, for this study, it was hypothesised that:

H1: Responsiveness has a positive relationship with smallholder sugarcane farmers' satisfaction.
H2: Reliability has a positive relationship with smallholder sugarcane farmers' satisfaction.
H3: Tangibles have a positive relationship with smallholder sugarcane farmers' satisfaction.
H4: Empathy has a positive relationship with smallholder sugarcane farmers' satisfaction.
H5: Assurance has a positive relationship with smallholder sugarcane farmers' satisfaction.

3. Methodology

The study used cross-sectional survey research design because it allows the use of various analytical techniques and mixed methods for data collection, and that data on the variables were collected and examined at one point in time. This study was conducted in Morogoro Region, specifically in Kilombero Valley because it is the largest sugar producing area in Tanzania with 5887 registered smallholder sugarcane farmers (SBT, 2019). Likewise, it is the first sugar plantation area which practises CF through the AMCOS model. Moreover, it is the largest sugar-producing area in Tanzania which contributes about 45% of the total sugar produced in Tanzania (SBT, 2019; Schemes, 2016).

The population of the study constituted 5887 registered smallholder sugarcane contract farmers as per SBT (2020). Therefore, the unit of analysis was a smallholder sugarcane contract farmer who owned a farm between 0.9 hectares and 3.0 hectares (Anderson et al., 2016). From each AMCOS which was involved in the study, a list of smallholder sugarcane contract farmers was established, and proportionate stratified sampling was used to determine a sub-sample from each AMCOS because the numbers of members varied from one AMCOS to another. Then, smallholder sugarcane contract farmers were randomly selected from each AMCOS by using the lottery method. Besides the respondents, three key informants were selected purposely, based on their knowledge of service quality and the positions they held. The sample size consisted of 361 smallholder sugarcane farmers from 19 AMCOS in Kilosa and Kilombero Districts who received CF services through AMCOS. They were sampled as indicated in Table 1.

Table 1: Sample size distribution

S/No	AMCOS	n
1	Miwa AMCOS	20
2	Bonye AMCOS	27
3	Ruhembe Cane Growers AMCOS	40
4	Mkula AMCOS	10
5	Msolwa Station Nyange AMCOS	12
6	Mang'ula AMCOS	9
7	Harambee AMCOS	12
8	Hope AMCOS	20
9	Kidatu Ikela AMCOS	17
10	Sanje AMCOS	11
11	Kitete Msindazi AMCOS	10
12	Muungano AMCOS	29
13	Msowero AMCOS	13
14	Kidodi AMCOS	39
15	Miwangani Mtendezi Lukonga AMCOS	9
16	Msindazi AMCOS	39
17	Msolwa Ujamaa AMCOS	7
18	Chauamiho AMCOS	13
19	Kilombero Cane Growers AMCOS	24
	TOTAL	**361**

The formula for finite populations by Cochran (1977) was used to estimate the sample size for sugarcane contract farmers, as seen below, because the number of registered smallholder sugarcane contract farmers in Kilombero Valley was known, which made the formula appropriate for this study. Therefore, the sample size, n, was estimated as follows:

$$n = \frac{no}{1 + ((\frac{no-1}{N}))} = \frac{384}{(1 + ((\frac{384-1}{5887}))} = 361$$

Where:
no = Cochran's sample size recommendation
N = Population size
n = New sample size

Qualitative data were collected using a key informant interview guide whereby three (3) interviews with key AMCOS leaders were conducted. The selection of key informants was based on their knowledge regarding the quality of service offered through AMCOS, satisfaction, and the positions held in AMCOS. Quantitative data on service quality offered to smallholder farmers through AMCOS were collected using a survey questionnaire with open-ended and closed-ended questions.

In examining the service quality, the perceptions of the smallholder sugarcane contract farmers of the services offered by AMCOS and their satisfaction with the services were assessed. Eighteen (18) statements of service quality about sugarcane CF were tested by using a 5-point Likert scale as suggested by Parasuraman et al. (1991) because it allows the comparison of the results without overwhelming the respondents with too many choices. For each statement, the farmers were required to indicate their perceptions and expectations from sugarcane CF services. The quality gap, which refers to the discrepancy between perceptions and expectations, was calculated. When the service quality gap is 0 (Perceptions – Expectations = 0), the quality is satisfactory; if it is greater than 0 (Perceptions – Expectations > 0), the quality is acceptable; and if the quality gap is less than 0 (Perceptions – Expectations < 0), the quality is unacceptable (Parasuraman et al., 1991). Furthermore, satisfaction was assessed using 12 statements with 3 alternative answers (0 = not satisfied, 1 = somehow satisfied, 2 = satisfied).

Content analysis was used to analyse qualitative data whereby the recorded data were transcribed, categorized, coded, and grouped into themes and concepts. The interviews were transcribed into a word document whereby themes and concepts related to CF service quality were identified from the transcriptions. This was done to organize the information into common themes that emerged in response to dealing with specific items. Themes were organized into coherent categories which summarized the key findings. Qualitative information was then integrated with findings from quantitative information to provide meaningful conclusions.

Descriptive and PLS-SEM were used to analyse the quantitative data that were collected on the assessment of service quality offered to smallholder sugarcane farmers and their perceptions regarding the services. Two procedures were followed to assess the perceptions of the smallholder farmers regarding the services offered. The perceptions of smallholder sugarcane farmers about the quality of services offered by AMCOS were calculated by using six steps. First, 18 SERVQUAL statements for smallholder sugarcane farmers' expectations and perceptions were obtained. Second, the quality gap score was calculated (Gap score = Perception – Expectation) for each item. Third, the average gap score for each dimension of service quality was obtained by assessing the gap scores for each of the statements that constituted the dimension and dividing the sum by the number of statements making up the dimension. Fourth, the average SERVQUAL score was calculated, which served as an unweighted dimension of service quality offered to smallholder sugarcane contract farmers through AMCOS. In addition, the calculated average score for each of the five SERVQUAL dimensions was added up, and the result was divided by five (the total number of the SERVQUAL dimensions). Fifth, the scores were then converted into percentages (100 points) to determine the relative importance of each dimension. Lastly, the averages

determined in step three were multiplied by the weighted scores determined in step five, yielding the weighted average SERVQUAL score for each of the five service quality dimensions.

Furthermore, the hypotheses stated above were tested by using structural equation modelling (SEM), based on partial least squares (PLS). The PLS-SEM is appropriate to carry on Confirmatory Factor Analysis (CFA) because it is the best approach to examine the reliability and validity of constructs (Afthanorhan et al., 2019). The PLS-SEM is a multivariate data analysis technique that combines component analysis and allows evaluation of complex connections. It is also flexible and free from the model fit; it estimates formative and reflective constructs and ignores assumptions, hence removing error measurement problems (Hair et al., 2016). Eliminating measurement errors tackles the issue and produces a solid relationship estimation (Benitez et al., 2020).

4. Findings and Discussions

4.1 Services received by smallholder farmers through AMCOS

In this article, the quality of service offered by AMCOS to smallholder sugarcane contract farmers in Kilombero Valley was assessed. The findings revealed that the services offered were farm inputs supply, credit facilitation, sugarcane price negotiation, extension services, sugarcane harvest arrangements, sugarcane transportation arrangements, sugarcane payment follow-up, legal service, training, technology transfer, dispute resolution, and improvement of infrastructures. The findings are presented in Table 2.

Table 2: Services offered to farmers through AMCOS (n=361)

Services	Frequency	Per cent
Improvement of infrastructures	348	96.00
Sugarcane price negotiation	345	95.57
Dispute resolution	345	95.02
Sugarcane harvest arrangements	342	94.74
Legal services	337	93.35
Credit facilitation	335	92.80
Farm inputs facilitation	323	89.47
Sugarcane transport arrangements	323	89.47
Technology transfer	319	88.36
Training	309	85.59
Extension services	308	85.31
Sugarcane payment follow-up	272	75.84

The study findings revealed that smallholder sugarcane farmers were contributing TZS 500 per ton for infrastructure improvements. The stated amount was deducted from the sugarcane sales of every AMCOS member to maintain roads to improve the transportation of canes from the farms to the processing mills. Despite the efforts, farmers (96%) were not satisfied with the infrastructure, especially during the rainy season. Farmers were disappointed as they thought that the money deducted from their sales for road maintenance would eliminate the challenges faced by transporters during the rainy season, something which proved otherwise.

Sugarcane price negotiations were done by appointed negotiation teams, and 95.57% of the smallholder sugarcane farmers revealed that they were represented by their AMCOS leaders. They thought the intervention of AMCOS could improve the service, and all AMCOS members would participate in the process. The sugarcane negotiation team included SBT, AMCOS leaders, TCDC representatives, and KSCL. The findings imply that sugarcane price settings were based on sugarcane world market prices and the sugarcane sucrose content. Therefore, the smallholder farmers accepted the offered prices because they had no alternative market for their cane sales. The findings contradict findings by Tuyen et al. (2022) and Muarubwa et al. (2018) who reported that the prices offered by the buyers based on market prices also influence farmers to decide on their market channels. This means that if the smallholder sugarcane

farmers in Kilombero Valley had an alternative market for their canes, they would have more power to negotiate better prices for their canes.

Operational boards were established in every AMCOS, and one of their functions was to deal with complaints and resolve disputes. About 95.02% of the respondents were satisfied with the service because their complaints were resolved on time. The operational board comprised a maximum of 10 members, five (5) of whom were representatives appointed by KSCL and the other five (5) were appointed based on the AMCOS policy. The appointment of the representatives was done at the beginning of each year. The findings imply that the establishment of operational boards was helpful because complaints were resolved at the lower level without incurring any dispute resolution cost. Similarly, Kot et al. (2020) argue that trust and mutual responsibilities among parties in CF may result in solving disputes amicably. As a result, the contract should be well understood by each party to avoid wasting time on complaints handling.

AMCOS had the harvest arrangement plan which had been approved by the members to ensure fairness in implementation of the plan. More than 94.74% of the farmers reported that the harvest plan had been approved by the AMCOS members who were supplying 60% of the required canes for sugar production; the remaining 40% was from KSCL farms. One of the key informants argued that "the harvest plan has been proposed and approved by members, but it is not realistic because all farmers want their canes to be harvested in each farming season while they are producing a large amount of sugarcane, contrary to what is required by KSCL" (KI 1, Ruhembe, 25th of February 2021). The findings imply that, despite the harvest plan in place, sugarcane factories were not capable of processing all grown canes, which led to some challenges in the implementation of the harvest arrangement plan.

Legal services were provided to smallholder farmers by legal officers who went through the proposed contract between AMCOS on behalf of the smallholder farmers and KSCL before the implementation. The legal officers vetted the proposed contract and clarified to farmers to ensure they understood what was written in the contracts. The contracts were written in English, and 53% of the smallholder farmers were satisfied with the contract clarifications given by legal officers from TCDC and the government. In addition, farmers wanted the contracts to be written in Kiswahili so that every member of AMCOS could understand them. The findings were supported by a key informant who maintained that "legal officers are helping us to understand what is written in the contracts, but if Kiswahili were to be used in the contracts, it would be more helpful" (KI 2, 26th of February 2021). The findings imply that legal officers provided contract clarifications to smallholder sugarcane farmers especially on the contents and clauses of the contracts.

Smallholder sugarcane contract farmers accessed credit (92.8%) from different financial institutions with facilitation from AMCOS. The findings revealed that not all AMCOS members were getting the requested amount of loan; for instance, smallholder farmers were getting a minimum of TZS 1,500,000 while the majority needed more than TZS 2,000,000. Smallholder sugarcane contract farmers argued that the loan interest rates were high (14%-17%). Therefore, they thought the transformation of the farmers' association to AMCOS could help them to get loans at a lower interest rate (10% and below). A study by Abate (2018) revealed that most of the smallholder farmers faced financial problems, thus farmers' organisations facilitated them to get financial support from financial institutions. This indicates that most of the smallholder farmers cannot adequately finance their farming activities. As a result, they depend on financial support from financial institutions.

The findings revealed that smallholder farmers were receiving farm inputs (89.47%), among the services offered by AMCOS. It was noted that all AMCOS members were eligible for receiving inputs such as fertilizers, pesticides, and seedlings either in cash or on credit, but the prices of farming inputs were not affordable. Furthermore, the farming inputs provided to farmers were not meeting their requirements because the demand exceeded the supply. The results imply that AMCOS members needed the service to be improved and inputs to be provided to them as incentives and not being sold as the common practice

was. Despite the contribution made through the provision of farming inputs, still there were some reported challenges such as untimely supply of inputs. The findings are supported by Gersch (2018) and Orsi et al. (2017) who reported that farmers were supplied with farming inputs (such as pesticides, fertilizers, and seeds) on credit, and payments were deducted from their sales.

Similarly, AMCOS leaders, in collaboration with AMCOS employees, were looking for transport service providers. The proposed service providers were approved by members during the meeting at the beginning of each farming season. About 89.47% of the farmers reported that they were getting transportation services. However, they complained that the transportation charges were very high as they were charged per ton, the charges being based on the distance from the farms to the mills. For example, farmers whose farms were located within 10 kilometres (km) were charged TZS 6 500 per ton; for farms within 20 km the charge was TZS 8 500 per ton; while for farms located from 30 km and above the charge was TZS 10 000 per ton.

Smallholder farmers were trained on issues concerning sugarcane farming, and 85.9% of them declared that the training conducted was effective. The training was on soil fertility, sugarcane diseases and pests, application of fertilisers and pesticides as well as appropriate seeds to be used. The training provided was among the co-operative principles observed. The training was initiated by the AMCOS, SBT, TCDC and KSCL whereby the training costs were covered by the sugarcane buyer. Furthermore, technology transfer was among the services received by smallholder sugarcane farmers from AMCOS. About 85.84% of the farmers revealed that agricultural equipment was available to be used in farming and harvesting activities such as tractors, ploughs and cane loaders. The equipment was borrowed by the smallholder sugarcane farmers at lower costs, compared to other lenders. These findings are supported by Dsouza et al. (2018) and Tuyen et al. (2022) who argue that smallholder farmers access new technologies, for example, agricultural equipment such as drones and harvesting machines at lower costs. Therefore, the type of modern equipment used facilitated farming and harvesting activities, compared to manual tools.

Extension services offered through AMCOS had improved, and 85.31% of the respondents were satisfied with the services. The availability of extension officers in their field areas had helped farmers increase their production by 44% through AMCOS. Smallholder farmers were producing 25 tons of sugarcane per hectare before AMCOS but after joining AMCOS their production per hectare increased up to 45 tons. Despite the availability of the extension officers and increment of the smallholder farmers' sugarcane production, the farmers argued that there were only 21 extension officers in Kilombero Valley who were not enough to provide services to all registered (5887) smallholder sugarcane farmers. The findings are supported by Tray et al. (2021) who argue that extension services are production and market-oriented, which leads to farmers' production increase. One of the key informants reported that "we are harvesting up to 45 tons per hectare while KSCL is harvesting about 70 tons per hectare. This is due to too few extension officers available in our area to provide advice from land preparation to harvest to farmers which help in farming activities" (KI 3, Chauamiho, 26th of February 2021). This implies that the availability of enough extension officers is important to meet the sugarcane farmers' extension service needs.

More than three-quarters (75.84%) of the smallholder farmers claimed that payment follow-up was necessary, and delayed payments were not experienced. The sugarcane buyer was paying as per agreements after delivery of the canes to the sugar mills. Ninety per cent (90%) of the payments were made within 15 days after delivery, and the remaining 10% was paid at the end of the farming season. The findings imply that, while signing the contract, smallholder farmers and the sugarcane buyer agreed on payment terms and conditions, and every party met its obligations. The findings differ from ones by Tuyen et al. (2022) who reported that smallholder farmers are paid 50% of the total amount before harvesting and the remaining 50% is paid within 5 days after delivery.

4.2 Perceptions on services offered by AMCOS to smallholder farmers

Sugarcane smallholder farmers' perceptions of the quality of services offered by AMCOS were examined to get their views. The service quality dimensions such as responsiveness, reliability, assurance, empathy, and tangibles used to assess the perception of the smallholder sugarcane farmers' satisfaction with the quality of services offered by AMCOS. The findings in Table 3 show that reliability was the dimension with the highest gap score (-902), followed by responsiveness (-825), assurance (-814), empathy (-809), and tangibles with the least gap score (-785). Therefore, the findings imply that reliability was the most deficient dimension, and the smallholder farmers were least satisfied when evaluating the level of services provided by AMCOS.

Table 3: Quality gap score and un-weighted average SERVQUAL score (n = 361)

Dimensions	Statements	Perceptions score	Expectations score	Quality gap (P - E)	Mean for Dimension
Responsiveness	The willingness of AMCOS personnel to assist smallholder farmers	872	1698	-826	
	Readiness of AMCOS personnel to provide contractual service as per agreement	847	1684	-837	
	The willingness of AMCOS personnel to inform smallholder farmers accordingly	872	1684	-812	-825
Reliability	Information sharing with farmers	820	1698	-878	
	Dependability of service provision	804	1693	-889	
	Providing contractual service at the agreed time	756	1694	-938	-902
Tangible	Adequacy of AMCOS service equipment	842	1341	-499	
	Adequacy of farming inputs	830	1698	-868	
	Communication service at AMCOS offices	807	1696	-889	
	Visibility of resources necessary to provide services to smallholder farmers	810	1694	-884	-785
Empathy	AMCOS worker's customer care to the smallholder farmers	840	1681	-841	
	AMCOS workers understand the needs of smallholder farmers	878	1679	-801	
	The ability of the AMCOS personnel to show friendly behaviour to smallholder farmers	886	1670	-784	-809
Assurance	Consistency of AMCOS leaders on contractual service delivery	743	1327	-584	
	AMCOS leaders' confidence	775	1691	-916	
	Knowledge of AMCOS leaders in the provision of services	805	1690	-885	
	Making smallholder farmers feel safe during contractual service delivery	767	1691	-924	
	Keeping smallholder farmers informed in their native language	922	1685	-763	-814
Un-weighted average SERVQUAL score					-827

In addition, to perform triangulation and determine the relative importance of the weights that smallholder sugarcane farmers assigned to each of the five dimensions, the point allocations technique was employed for the five dimensions. The results showed that the highest weighted dimension was assurance (27%), followed by tangibles (22%), empathy (18%), responsiveness (17%), and reliability (16%). The results are shown in Table 4.

Table 4: Percentage point allocations for each dimension (n = 361)

Dimension	Average Points (% Weight)
Responsiveness	17
Reliability	16
Tangibles	22
Empathy	18
Assurance	27
Total	100

The weighted SERVQUAL score for each dimension described the satisfaction and dissatisfaction with the services received by smallholder sugarcane farmers through AMCOS. Therefore, the score gap was calculated by multiplying the mean score in Table 3 by the corresponding weights in Table 4. The findings showed that the responsiveness dimension (-140.25) had more weighted scores towards the quality of services received by smallholder farmers, compared to other dimensions. The other dimensions were reliability (-144.27), followed by empathy (-145.56); both tangibles (-172.70) and assurance (-219.89) had deficient SERVQUAL weighted scores. The results are presented in Table 5.

Table 5: Distributions of weighted average SERVQUAL score and gap score (n = 361)

Dimensions	Average scores	Weights	Weighted score
Responsiveness	-825.0	0.17	-140.25
Reliability	-901.7	0.16	-144.27
Tangibles	-785.0	0.22	-172.70
Empathy	-808.7	0.18	-145.56
Assurance	-814.4	0.27	-219.89
Weighted SERVQUAL score			-822.66

The overall weighted SERVQUAL score for all service quality dimensions was -822.66. The findings imply that most smallholder sugarcane farmers were not satisfied with the services provided by AMCOS because they were experiencing delays in the supply of farming inputs. Similarly, Machimu (2020) argues that the contractual services offered to smallholder sugarcane farmers in Kilombero Valley through their farmers' association are of unacceptable quality due to challenges that the farmers experience such as rising farming input costs, favouritism, and delays of supply of farming inputs. Therefore, it can be argued that smallholder sugarcane farmers were not satisfied with the services offered by AMCOS due to high expectations during the transformation of the farmers' association to AMCOS.

4.3 Relationship between perceived service quality dimensions and smallholder farmers' satisfaction

Confirmatory factor analysis (CFA) was used to assess the constructs' reliability and validity. The content, convergent, and discriminant validity of the measurement model were also examined. The Cronbach's Alpha, which is widely used to measure reliability in social studies, was significant as it was above the 0.7 cut-off thresholds. Composite Reliability (CR) was used to measure construct validity whereby the CR was above the 0.8 acceptable threshold (Fornell & Larcker, 1981). Thereafter, convergent validity was measured by using Average Variance Extracted (AVE); the AVE was greater than the 0.5 threshold for all variables as recommended by Tabachnick et al. (2007). The results are shown in Table 6.

Table 6: Cronbach's Alpha, Composite Reliability and Average Variance Extracted

Dimension	Item	Factor loadings	Cronbach's alpha	CR	AVE
Responsiveness	Res_1	0.945	0.94	0.96	0.89
	Res_2	0.944			
	Res_3	0.931			
Reliability	Rel_1	0.888	0.91	0.94	0.85
	Rel_2	0.942			
	Rel_3	0.928			
Tangible	Tan_1	0.894	0.93	0.95	0.83
	Tan_2	0.924			
	Tan_3	0.920			
	Tan_4	0.894			
Empathy	Emp_1	0.941	0.92	0.95	0.86
	Emp_2	0.922			
	Emp_3	0.925			
Assurance	Asr_1	0.919	0.91	0.94	0.74
	Asr_2	0.910			
	Asr_3	0.916			
	Asr_4	0.884			
	Asr_5	0.700			
Farmer's Satisfactions	Sat_1	0.746	0.92	0.93	0.54
	Sat_2	0.738			
	Sat_3	0.725			
	Sat_4	0.709			
	Sat_5	0.714			
	Sat_6	0.795			
	Sat_7	0.765			
	Sat_8	0.754			
	Sat_9	0.700			
	Sat_10	0.706			
	Sat_11	0.724			
	Sat_12	0.820			

AVE=Average Variance Extracted >0.5, CR=Composite Reliability>0.8, Cronbach's alpha>0.7

The discriminant validity was evaluated by matching the association between the correlation among variables and the square root of the AVE of the variables (Fornell & Larcker, 1981). The results demonstrate that the square roots of AVE were above the correlation among constructs, hence showing satisfactory discriminant validity. The findings are shown in Table 7.

Table 7: Discriminant Validity

Dimensions	1	2	3	4	5	6
Responsiveness	0.942					
Reliability	0.590	0.920				
Tangible	0.708	0.687	0.908			
Empathy	0.844	0.541	0.741	0.929		
Assurance	0.558	0.819	0.748	0.595	0.863	
Farmers satisfaction	0.367	0.273	0.403	0.436	0.345	0.733

Multicollinearity was tested by checking correlations between the independent variables of the study. The findings show that the Variance Inflation Factor (VIF) was less than 5. This implies that there were low correlations between independent variables and other independent variables of the study.

Table 8: Sample Adequacy and Multicollinearity Test

Indicators	Eigenvalues (%)	VIF	KMO	Bartlett's test
Responsiveness	2.66 (88.7)	3.97	0.765	0.000
Reliability	2.54 (84.6)	3.42	0.740	0.000
Tangible	3.30 (82.5)	3.44	0.820	0.000
Empathy	2.59 (86.4)	4.22	0.760	0.000
Assurance	3.73 (74.5)	3.92	0.842	0.000
Farmers satisfaction	6.48 (53.9)	-	0.914	0.000

Furthermore, to examine the relationship between service quality offered by AMCOS and farmers' satisfaction, a structural equation modelling based on partial least squares (PLS-SEM) was employed for statistical investigation and testing of the study hypotheses. The analysis of the relationship between variables and hypotheses was done, based on the examination of standardised paths after establishing acceptable reliability and validity in the measurement model. PLS-SEM was used to calculate the path significance of proposed relations using the bootstrap resampling technique (Benitez et al., 2020; Henseler et al., 2009), with 5000 iterations of resampling. Hence, as shown in Figure 1, 21.1% of the smallholder sugarcane farmers were satisfied with the services provided by AMCOS and their quality service dimensions perceptions.

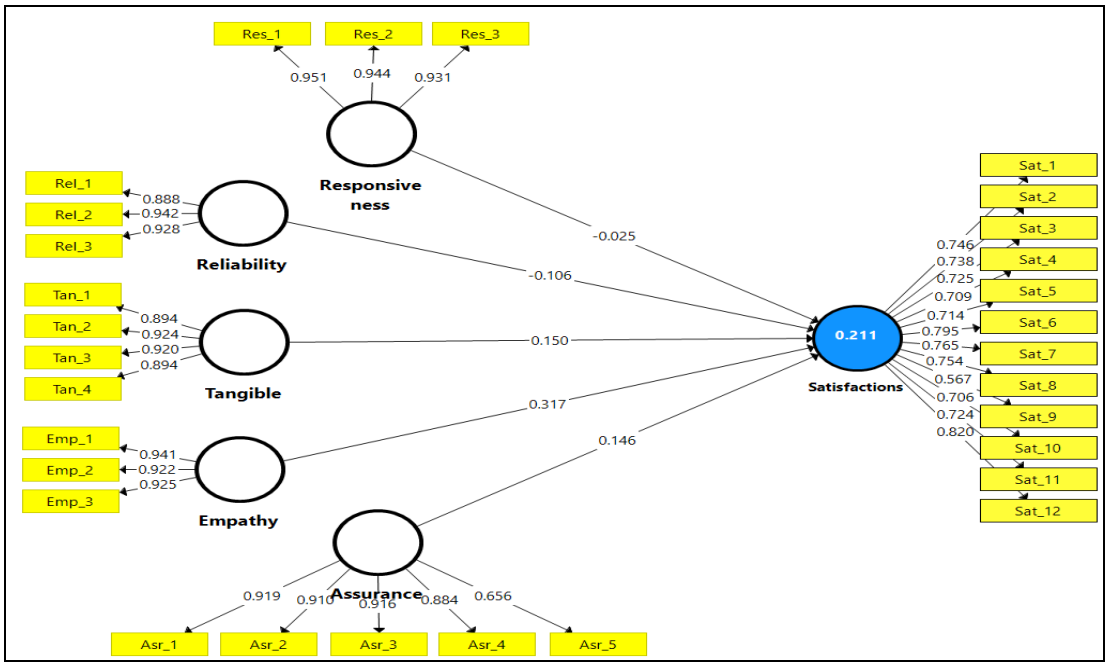

Figure 1: Path diagram

Similarly, the findings in Table 9 show that, out of the five hypotheses tested, three were statistically significant: tangibles ($\beta = 0.15$, $p < 0.05$), empathy ($\beta = 0.32$, $p < 0.001$), and assurance ($\beta = 0.15$, $p < 0.05$), and they had a relationship with smallholder farmers' satisfaction. Only the responsiveness and reliability dimensions failed to support the alternative hypotheses. This implies that AMCOS personnel were ready to provide services to the smallholder sugarcane farmers on time; although farming inputs were not supplied on time, which made the farmers dissatisfied. The results are in line with Oh et al. (2017) and Twum et al. (2020) who maintain that satisfaction is predicted by the perceived value.

Table 9: PLS-SEM estimated result

Dimensions	Path coefficient	t-statistics	p-value	Remark
Responsiveness	-0.03	0.29	0.771	Not supportive
Reliability	-0.11	1.45	0.149	Not supportive
Tangibles	0.15	2.25	0.025**	Supportive
Empathy	0.32	3.37	0.001***	Supportive
Assurance	0.15	1.98	0.048**	Supportive

Key: *** at 0.01, ** at 0.05 and * at 0.1 significant levels.

The findings revealed that the tangibles, empathy, and assurance dimensions were the key determinants of the level of farmers' satisfaction with the services offered by AMCOS. Nevertheless, a unit increase in the tangibles dimension led to an increase in smallholder farmers' satisfaction by 15%. This implies that AMCOS provided farming inputs to farmers. Similarly, the availability of physical types of equipment such as tractors, cane loaders, ploughs, and trucks facilitated farming, harvesting, and transportation activities. A unit increase in the empathy dimension led to an increase in smallholder farmers' satisfaction by 32%. The implication here is that the AMCOS personnel understood the needs of the smallholder farmers despite the challenges reported on the provision of the required services. A unit increase in the assurance dimension led to an increase in smallholder farmers' satisfaction by 15%. Thus, the findings imply that farmers were getting assistance which reduced marketing and production risks. This is in line with Kant and Mishra (2017) and Karim (2019) who reported that smallholder farmers are satisfied with the services provided to them because they are guaranteed business success due to assurance of marketing, farming inputs, and availability of various equipment which reduce business failure and production difficulties.

4.4 Theoretical implication of the findings

The findings were in line with the SERVQUAL model. The model assumes that the provision of the required service leads to customer satisfaction. The findings, therefore, showed that the service quality dimensions which are tangibles, empathy, and assurance had a positive relationship with smallholder sugarcane farmers' satisfaction. The study focused on five dimensions of responsiveness, reliability, tangibles, empathy, and assurance. The smallholder farmers were not satisfied with the service offered by AMCOS because they had high expectations of the delivered services. This shows that the perception of the services delivered differed from one farmer to another because quality is subjective and is based on an individual's feelings. Despite farmers' dissatisfaction with the delivered services, AMCOS personnel understood the needs of the farmers and had confidence during the provision of services to the smallholder farmers.

5. Conclusions and Recommendations

5.1 Conclusions

This study provides empirical evidence that farmers were receiving service quality from AMCOS to support their farming activities in Kilombero Valley. Based on the findings, it is concluded that smallholder sugarcane farmers were somehow satisfied with the quality of services received. Furthermore, it is concluded that service quality based on the dimensions such as assurance, empathy, and tangible have a positive statistically significant relationship with smallholder sugarcane farmers' satisfaction. Therefore, the hypotheses that tangibles have a positive relationship with smallholder sugarcane farmers' satisfaction; empathy has a positive relationship with smallholder sugarcane farmers' satisfaction, and assurance has a positive relationship with smallholder sugarcane farmers' satisfaction were accepted. The implication here is that AMCOS personnel understood the needs of smallholder farmers, and customer service improved as a result of their friendly behaviour in providing services. Likewise, AMCOS had adequate service provision equipment like cane loaders, ploughs, and tractors which smoothed service provision, for example, harvesting of the cane. Farming inputs such as fertilizers, pesticides, and seeds were adequate, which led the farmers to get the required inputs at reasonable prices, although they experienced some delays.

5.2 Recommendations

The study recommends that AMCOS leaders and personnel should ensure that services such as farm inputs are provided on time to smallholder sugarcane farmers as per agreement. Moreover, the AMCOS leaders should ensure consistency in the provision of services to smallholder farmers to increase their satisfaction. In addition, the government, in collaboration with the sugarcane buyer, should increase the number of extension officers by at least two officers in each zone to help the smallholder farmers increase their production. Moreover, the TCDC, government should conduct regular training for AMCOS personnel and AMCOS leaders to ensure reliability and responsiveness during the provision of services to smallholder farmers.

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