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Farmers' Satisfaction with the Use of AgriTecH in Disseminating Improved Oil Palm Production Technologies in Western Tanzania

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study assessed the level of farmers' satisfaction with the use of AgriTecH in disseminating improved oil palm production technologies in Tabora and Katavi regions in the Western parts of Tanzania. The study adopted a cross-sectional mixed-methods research design involving quantitative and qualitative methodologies. A semi-structured questionnaire was used to collect quantitative data from a sample of 120 respondents, while focus group discussions and key informant interviews were employed to obtain qualitative data.The collected quantitative data were analysed using a Statistical Package for Social Sciences (SPSS) to yield descriptive statistics while

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content analysis was used to analyse qualitative data. The study found that the majority of the farmers expressed high level of Satisfaction with the use of AgriTecH in dissemination of improved oil palm production technologies across all measurement indicators including responsiveness (93.3%), assurance (90.8%), reliability (89.2%), empathy (89.1%), timeliness (85.0%), access (65%) and tangibility (60.8%). Although farmers showed that they are satisfied with the AgriTecH in the dissemination of improved oil palm production technologies, the lower positive percentage scores in access (65%) and tangibility (60.8%) indicators implied that there is a need for improvements in the components of these indicators.
Based on the findings of the study, TARI should make some improvements in the physical component of the AgriTecH to ensure more efficiency in service delivery. Also, both TARI and the Local Government Authorities through the Division of Agriculture, Livestock and Fisheries should provide convenient ways to increase farmers' regular visits to the AgriTecH by either supporting their visits at least once per each cropping season or decentralizing the services to the grass root level where farmers are found by strengthening the linkages between the AgriTecH and the Ward Agricultural Resources Centres (WARCs)

Keywords: Farmers' satisfaction; oil palm production technologies; dissemination; AgriTecH.

1. INTRODUCTION

Agricultural Technology Transfer Hub (AgriTecH) is an organized facility that facilitates the dissemination of improved agricultural technologies to farmers, extension workers and other agricultural stakeholders (TARI, 2020). It is one among the pathways used by the Tanzania Agricultural Research Institute (TARI) for disseminating improved agricultural technologies developed by the Institute. TARI has established eight AgriTecHs in each Zonal Agricultural show grounds in Tanzania. They operate throughout the year, providing the opportunity to farmers and other agricultural stakeholders to learn various improved agricultural technologies. Improved agricultural technologies refer to all enhanced procedures and innovations which contribute to increasing agricultural productivity, resulting in significant increases in farm income and ensuring food security (Jain et al*.,* 2009; Challa & Tilahun, 2014). They include new crop varieties, soil and soil fertility management, pest management as well as irrigation and water management (Loevinsohn et al*.*, 2013).

The current study focuses on improved oil palm production technologies disseminated by the AgritecH, including improved oil palm seedlings (tenera), criteria for selecting oil palm fields, land preparation methods, nursery management practices, transplanting techniques, irrigation methods, pruning techniques, fertilizer application methods and pest control methods.

Fatuma Mwasa AgriTecH, which is the focus of this study, is located in the Fatuma Mwasa Agricultural showgrounds at Ipuli in Tabora Municipality. It is in charge of disseminating various improved agricultural technologies in the Western Zone of Tanzania (TARI, 2021). It operates under the supervision of the two TARI Centres, which are TARI Tumbi and TARI Kihinga. These two centres provide personnel, capacity development, and improved technologies, all of which are critical assets for AgriTecH's operations. In addition to the technologies from the centre's mandate areas, AgriTecH also provides technologies from other TARI centres. These technologies are disseminated through various extension methods, such as demonstration plots, Farmer Field Days, exhibitions, and mass media. AgriTecH also collaborates with different stakeholders, including private agricultural enterprises, academic institutions and local government authorities in disseminating improved technologies. An attempt was made in this study to assess the level of farmers' satisfaction with the use of AgriTecH in disseminating improved oil palm production technologies in Western Tanzania.

Satisfaction is the fulfilment of certain prior expectations related to a product or service Raboca, (2006). On the other hand, Dkhar et al*.* (2019) and Singh and Kalra (2019) defined satisfaction as the extent to which the farmers were satisfied with the various services provided. According to this study, the level of farmers' satisfaction with the use of AgriTeCH in disseminating improved oil palm production technologies is operationalized as the degree to which farmers are satisfied with the services and products provided by AgriTeCH concerning oil palm production. Assessing the degree of farmers' satisfaction with the use of AgriTecH in technology dissemination is essential to

comprehending the efficacy and influence of these hubs in advancing technologies for oil palm production; high satisfaction shows that the hubs successfully tackle farmers' problems and improve their agricultural output, whereas low satisfaction points to inadequacies in service provision or lack of alignment with farmers' requirements.

The level of farmer's satisfaction on the use of particular extension delivery approach in technology disseminating was measured differently by various scholars; Dutta et al. (2021) measured farmers' level of satisfaction on the use of Agricultural Technology Information Centre (ATIC) in provision of agricultural information and services by using frequency (f) and percentage (%) according to their satisfaction on the features/services of ATIC then Weighted Mean Score (WMS) was given on each feature/service to rank them accordingly. The overall satisfaction level of respondents was then calculated by the mean and standard deviation of the obtained scores. Singh and Karla (2019) measured level of satisfaction of farmers from the services provided by ATIC on a three-point continuum, namely satisfied, somewhat satisfied, not satisfied, using the scores of 2, 1 and 0, respectively. Dkhar et al*.* (2019) and Debnath (2016) measured clientele satisfaction on the extension services provided using a scale developed by Saravanan (2003) in four dimensions, which are relevancy, quality, usefulness and customer service. Ovharhe et al*.* (2020) measured farmers' satisfaction with agricultural extension services in Delta State, Nigeria using the Likert scale ranged from strongly agree, agree, disagree, and strongly disagree, which were coded as 4,3, 2 and 1, respectively. Similarly, Elias et al*.* (2015) measured farmers' satisfaction with agricultural extension services in Ethiopia using a Likert scale that ranged from strongly dissatisfied (1) to strongly satisfied (5). Furthermore, Khan et al*.* (2012) measured the level of farmers' satisfaction towards the services of ATIC on a five-point continuum, namely Most satisfied, Quite satisfied, Satisfied, Somewhat satisfied and Dissatisfied, with a weightage of 5, 4, 3, 2 and 1, respectively. The overall satisfaction score of a farmer was then calculated by summing the scores of all the services related to diagnostic services, supply of research products, information through publication and information through audio-visual aids.

While there are few studies (Dutta et al*.,* 2021; Singh and Kalra, 2019; Kumar et al*.,* 2020; Dkhar et al*.,* 2019; Khan et al*.,* 2012; Mukherjee et al*.*, 2011) on the level of farmers' satisfaction on the use of AgriTecH in disseminating improved agricultural technologies none of them evaluated the level of farmers' satisfaction on the use of AgriTecH in disseminating improved oil palm production technologies. Thus, this study attempts to fill this knowledge gap. It presents an assessment of the level of farmers' satisfaction on the use of AgriTecH as an approach for the dissemination of improved oil palm production technologies. The rest of the article is structured as follows: the next section describes the conceptual framework used in the study, followed by the methodology section. This is followed by the results and discussion. The final section is conclusions based on the findings.

2. CONCEPTUAL FRAMEWORK

This study used the seven indicators from the SERVQUAL Model as modified by Rana et al*.* (2013) to measure the level of farmers' satisfaction on the use of AgriTecH in the dissemination of improved oil palm production technologies. Indicators includes access, assurance, empathy, reliability, responsiveness, tangibility and timeliness. According to Tsiotsou (2006), measuring customer satisfaction is also a way of assessing the quality of the outputs delivered by the organisation, as higher satisfaction with its acquisition and use depends on the perceived quality of the product or service. On the other hand, Dutta et al*.* (2021) commented that satisfaction is a very important factor in determining the utilization, adoption and impact of a particular technology or information disseminated among the farmers. Therefore, the SERVQUAL model was useful in assessing the level of farmers' satisfaction on the use of AgriTecH in the dissemination of improved oil palm production technologies. According to this study, the operational definitions for the seven SERVQUAL indicators are presented as follows.

Accessibility refers to how simple it is for users to utilize the platform. Assurance is the confidence of farmers that AgriTecH has the required skills, expertise, resources and infrastructure to meet farmers' requirements. Empathy is the measure of the interest and concern of the AgriTecH in addressing the needs of individual farmers and within their context. Reliability is the ability to provide relevant and quality services accurately and cost-effectively. Responsiveness is the measure of concern and supportive service of the AgriTecH. Tangibility implies physical

facilities and materials for the benefit of farmers. Timeliness is the measure of timely provision of response and service.

3. METHODOLOGY

The study was carried out in the four districts in Western Tanzania, covering Tabora Municipality, Urambo and Kaliua districts in Tabora region and Tanganyika district in Katavi region. These regions were selected because they are ecologically suitable for oil palm production and are among the regions which are served by Fatuma Mwasa AgriTecH. Katavi and Tabora Regions have respective populations of 1,152,958 and 3,391,679, according to the 2022 National Census. Katavi Region lies between longitudes 30° and 33° east and latitudes 5° 15' and 7° 03' south. Each year, the area receives 700 -1,300 millimetres of precipitation. In contrast, the Tabora Region, which lies between latitudes 4° and 7° south of the Equator, experiences 1010 millimetres of precipitation on average every year.

A mixed-methods research strategy was used in the study, which combined qualitative and quantitative research techniques. Utilizing a mixed research approach makes triangulation easier, thus enhancing reliability and comprehensiveness of the findings. Oil palm producers were the target population for the study. To find out how gender contributed to oil palm productivity, the study included both male and female producers. Purposive sampling was used to select 30 oil palm producers from each district, making a total of 120 oil palm farmers. According to published research, socioeconomic studies in Tanzania and other sub-Saharan African nations can be conducted with a sample size of 80–120 respondents (Gbawoquiya, 2019; Iddi et al., 2022; Masanja et al., 2023).

The selection process concentrated on farmers who actively participate in AgriTecH activities, such as going to training sessions, seeking advice on oil palm cultivation, and using the technologies that have been disseminated. This tactic made sure that the sample contained people who understood the technologies being disseminated and who had relevant expertise that matched the goals of the study. AgriTecH Staff, Ward Agricultural Extension Officers (WAEO) and the District Agriculture, Livestock and Fisheries Officer (DALFO) were also chosen as Key Informants for this study because of their knowledge and experience in promoting the dissemination of improved agricultural technologies.

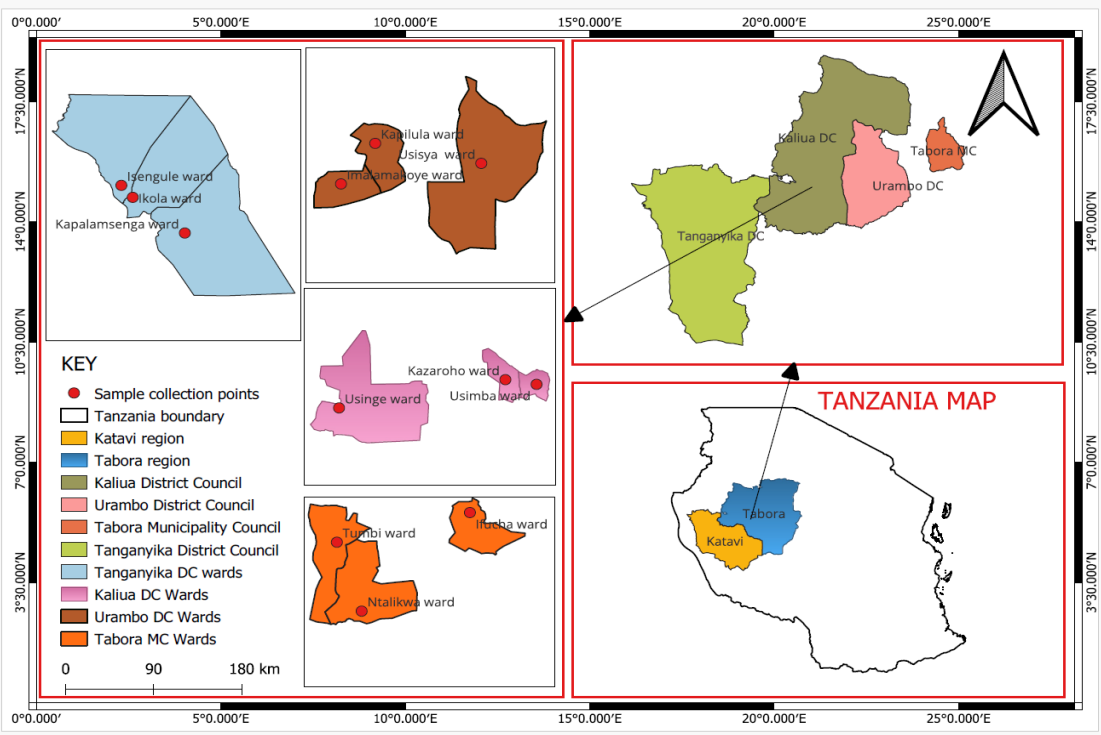

Fig. 1. Map showing the study area
Source: Adam et al. (2025)

Eight KIIs, two from each district, comprising the DALFO and the WAEO, and four Focus Group Discussions (FGDs) with the oil palm farmers were carried out. The selection of FGD members was predicated by their knowledge on AgriTecH dissemination initiatives and their involvement in oil palm farming. To gather a variety of perspectives, each focus group discussion (FGD) included six members, including men, women, young people, and the elderly. Oil palm farmers who did not participate in the survey were included in the FGDs to avoid survey overlap. To create a neutral and fruitful discussion atmosphere, FGDs were mediated by a qualified facilitator who was familiar with the objectives of the study.

A standardized checklist that addressed key topics, particularly the level of farmers' satisfaction with the use of AgriTecH in the dissemination of improved oil palm production technologies, assisted the discussions. Data were collected using a semi-structured questionnaire with KOBO Collect v2022.3.6 to gather information from 120 respondents. This software allows replies to be directly entered into a digital format, reducing human data entry errors, simplifying data management and ensuring data accuracy. The collected quantitative data were arranged, coded and cleaned in MS Excel and then imported into SPSS version 27 for further analysis.To assess the level of farmers' satisfaction with the use of AgriTecH in disseminating improved oil palm production technologies a five-point Likert scale covering seven SERVIQUAL indicators (access, assurance, reliability, empathy, responsiveness, tangibility, and timeliness) was used then the collected data were subjected to descriptive statistics such as frequency count and percentage.

Qualitative information from FGDs and KIIs was analysed using content analysis. The information was coded, and related trends were grouped to represent farmers' viewpoints and experiences. After that, an expert evaluation verified that the categories accurately represented the experiences and perspectives of farmers. Content analysis was utilized to delve into particular issues regarding the level of farmers' satisfaction on the use of AgriTecH in the dissemination of improved oil palm production technologies (Xu & Zammit, 2020).

4. RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of the Respondents

Results in Table 1 show that the majority (83.3%) of the respondents were men, a significant majority (95.8%) were married, and a significant proportion (59.2%) had only completed primary education. The vast majority (72.5%) of the respondents had more than 10 years of farming experience, and the majority (96.7%) were employed in the agricultural industry. While 91.7 per cent of the respondents still grow maize as their most common crop, a recent shift to oil palm production (68.3%) suggests diversification brought about by changes in the market and regulations.

4.2 Farmers' Satisfaction on the Use of AgriTecH in Dissemination of Improved Oil Palm Production Technologies

This section presents the assessment of the level of farmers' satisfaction on the use of AgriTecH in the dissemination of improved oil palm production technologies. Assessment of the level of farmers' satisfaction was done by using the seven indicators of SERVIQUAL model namely access, assurance, empathy, reliability, responsiveness, tangibility and timeliness as modified by Rana et al (2014). Every indicator was made up of different components, from which statements were made to find out how farmers were satisfied with the use of AgriTecH in a particular indicator. The use of these indicators in the evaluation process was significant since it provided a thorough grasp of their contentment with the use of AgriTecH in technology dissemination in various domains. The assessment revealed the following:

4.2.1 Access

The results in Table 2 show that the majority (65.0%) of the respondents were satisfied with the use of AgriTecH in the dissemination of improved oil palm production technologies in the access indicator. This suggests that farmers concurred that it is simple to get in touch with and speak with AgriTecH staff, to get AgriTecH information and to use the organization's prompt feedback system. As the farmers were able to contact the AgriTecH personnel at any time for advice, hence, they took appropriate decisions in time. However, 5.0 per cent of the respondents were dissatisfied with the AgriTecH accessibility.

This might be attributed to the distance from their homes to the AgriTecH, especially to those who live far from the centre. This discrepancy implies that farmers may not be able to make a full use of AgriTecH services due to regional constraints. According to research by Alemu (2021) and Saikia et al. (2024), farmers' visits to extension service delivery facilities are influenced by the distance between their homes and the facilities, as it requires more time, effort, and financial resources for them to travel there. Furthermore, a male oil palm farmer was quoted as saying,

> *"The distance between our home and the AgriTecH limits the frequency of our visits. We have to spend time and money traveling to the hub. We are requesting that TARI and the government find ways to bring these services closer to our residence…." (Male Oil palm farmer during FGD at Tumbi Ward on July 11, 2024)*

4.2.2 Responsiveness

The findings in Table 2 show that the majority (93.3%) of the respondents were satisfied with the use of AgriTecH in the dissemination of improved oil palm production technologies on the responsiveness indicator. The highest rating might be attributed to the genuine concern for farmers' well-being, personnel service-mindedness and their willingness to support the farmers. This finding aligns well with the findings in a study by Singh and Karla (2019), who reported that the majority (93.23%) of the farmers were satisfied with the interest of experts at ATIC in advising the farmers. The higher interest of the extension service provider in extension services delivery is crucial in the dissemination of improved agricultural technologies. However, the findings from this study were in contrast with findings in a study by Meja and Geta (2017), who reported poor concern of FTC experts for farmers' well-being.

Table 1. Socioeconomic characteristics of the respondents

Socioeconomic characteristics	Category	Frequency	Percent %
Sex	Female	20	16.7
	Male	100	83.3
Marital status	Single	5	4.2
	Married	115	95.8
Level of education	No formal education	2	1.7
	Primary Education	71	59.2
	Secondary education	25	20.8
	Tertiary/college education	22	18.3
Occupation	Government employee	14	11.7
	Farmer	116	96.7
	Local leader	6	5.0
	Business/trade	18	15.0
	Others (religious leader, plumber, carpenter)	4	3.3
How many years have you been engaged in agricultural activities?	Less than 3 years	10	8.3
	3 to 5 years	8	6.7
	6 to 10 years	15	12.5
	More than 10 years	87	72.5
For how long have you been growing oil palm?	Less than 3 years	82	68.3
	3 to 5 years	12	10.0
	6 to 10 years	5	4.2
	More than 10 years	21	17.5
Crops other than oil palm	Maize	110	91.7
	Tobacco	40	33.3
	Sweet potatoes	17	14.2
	Rice	64	53.3
	Others such as beans	55	45.8

Source: Adam et al. (2025)

Table 2. Satisfaction of farmers on the use of AgriTecH

Indicator	Most Satisfied	Satisfied	Neutral	Dissatisfied	Most Dissatisfied
Access	7 (5.8%)	71 (59.2%)	36 (30.0%)	4 (3.3%)	2 (1.7%)
Assurance	42 (35.0%)	67 (55.8%)	10 (8.3%)	1 (0.8%)	0 (0.0%
Empathy	34 (28.3%)	73 (60.8%)	6 (5.0%)	4 (3.3%)	3 (2.5%)
Reliability	39 (32.5%)	68 (56.7%)	9 (7.5%)	3 (2.5%)	1 (0.8%)
Responsiveness	48 (40.0%)	64 (53.3%)	7 (5.8%)	1 (0.8%)	0 (0.0%)
Tangibility	21 (17.5%)	52 (43.3%)	28 (23.3%)	15 (12.5%)	4 (3.3%)
Timeliness	39 (32.5%)	63 (52.5%)	14 (11.7%)	4 (3.3%)	0(0.0%)

4.2.3 Assurance

The data in Table 2 indicated that the majority (90.8%) of the farmers were satisfied with the AgriTecH use in the dissemination of improved oil palm production technologies on the assurance indicator. These results imply that farmers value the AgriTecH's expertise, capital resources and the usefulness of the extension services and products provided. A similar finding is reported by Singh and Karla (2019), who revealed that the majority of the farmers were satisfied with the availability and technical knowledge of the experts present at ATIC, which is operated by Punjab Agricultural University, by 80.73 and 93.75 per cent respectively. The findings, however, are in contrast with the findings in a study by Meja and Geta (2017), who reported skills and attitudinal problems among some of the FTC experts in Damote Gale District in Ethiopia. According to Liao (2020), competent and compassionate extension agents help foster confidence and boost the uptake of agricultural technologies. One female oil palm farmer commented;

> *"…TARI should increase financial and technical support to facilitate effective operations of the AgriTecH…." (Female Oil palm farmer at Kafisha village on July 11, 2024).*

4.2.4 Empathy

Results in Table 2 revealed that the majority (89.1%) of the respondents were satisfied with the use of AgriTecH in the dissemination of improved oil palm production technologies. This might be attributed to the AgriTecH localized solutions, regular interaction and personalized attention to farmers, which contributed to the creation of a friendly atmosphere for effective provision of extension services. Their crop problems were solved in time because of regular interaction with the AgriTecH personnel. Furthermore, the farmers perceived that the extension personnel were motivated to serve as they put proper attention to the farmers most of the time, but incentives or rewards or in-service training may be given to motivate them more and to improve the clientele accountability of the AgriTecH personnel for better job performance. This finding aligns well with the findings in a study by Wonde et al*.* (2022), who reported close supervision, special attention and follow-up of the farmers by FTC experts on attending FTC training programmes. However, the findings are in contrast with the findings in a study by Makundi (2017) who reported a poor engagement of researchers at the Agricultural Technology Demonstration Centre (ATDC) with key stakeholders in the rice sector in Dakawa and the lack of formal links between the centre and local institutions, including UWAWAKUDA and the village government. Such linkages are important for facilitating interactions with farmers and enhancing the centre's overall performance. Similarly, Sattari *et al*. reported lack of interaction with scientists/experts as a very serious constraint faced by the respondents during the Farmer Fair where they ranked as I with highest index value (IV) of 38.75. On the other hand, one male oil palm farmer suggested,

> *".AgriTecH staff should also be facilitated to visit us in our fields so that you can see how we practise the technologies learnt from the Hub. This will give them a room to make follow-up on the adherence to the provided recommendations, then they will be able to advice on improvement. (Male Oil palm farmer at Usimba village on July 11, 2024)*

4.2.5 Reliability

Data in Table 2 reveal that the majority (89.2%) of the respondents were satisfied with all aspects of the reliability indicator, including the accuracy

of provided information, quality, relevancy, suitability and cost-effectiveness of the services and products provided by the AgriTecH. The findings from this study conform with the findings in a study by Singh and Karla (2019) who reported that the majority of the farmers were satisfied with the quality of the planting materials (91.78%) and seeds (75%), as well as their prices (83.56%) and (87.96%), respectively. However, these findings are in contrast with the findings by Saikia *et al.* (2024) who reported that 5.42% and 1.67% of respondents who attended the Farmer Fair in India, were dissatisfied with the high cost of goods or seeds and the lack of desired quality seeds respectively. Similarly, Kumari *et al.* (2023) reported that the high price of products/seeds and non-availability of desire quality of seeds were perceived as constraints to Farmer Fair visitors in India by 17.5% and 10.0% respectively. Furthermore, Xu et al*.* (2016) reported that although the Chinese rice varieties disseminated by ATDC in Tanzania were technically very productive, some farmers perceived that the varieties' taste and aroma were inferior to those of the local varieties.

4.2.6 Timeliness

The results in Table 2 illustrate that the majority (85.0%) of the respondents were satisfied with the use of AgriTecH in the dissemination of improved oil palm production technologies with regard to the timeliness indicator. This high rating might be attributed to the AgriTecH's timely responses to farmers' inquiries and requests. Farmers' concerns like pest and disease attacks require immediate responses to avoid detrimental effects to the crops, which will in turn cause crop destruction and low crop productivity. The findings from this study are supported by the findings in a study by Singh and Karla (2019) who reported that the majority (92.19%) of the farmers were satisfied with the time taken by ATIC to solve the problem presented to them by farmers. However, these findings are in contrast with the findings by a study of Dkhar et al. (2019), who reported the low Clientele Satisfaction Index (CSI) of 47.00, indicating that farmers were not satisfied with the non-timely delivery of extension services of Meghalaya KVK in India.

4.2.7 Tangibility

The findings in Table 2 show that majority (60.8%) of the respondents were satisfied with the use of AgriTecH in the dissemination of improved oil palm production technologies with regard to tangibility indicator. Although the majority of the farmers were satisfied, tangibility indicator had the lowest satisfaction value (60.8%), the highest dissatisfaction value (15.5%) and the highest neutral value (23.3%) as compared to all other indicators. This implies that despite that farmers are satisfied with the aspects of this indicator; the findings indicate the need for improvement in the aspects of the tangibility indicator including physical facilities and communication materials in terms of acquisition and maintenance.

The results from this study conform with the findings in a study by Sajesh and Padaria (2019) who reported the highest score in the tangibility dimension for Krishi Vigyan Kendra (KVK) Farm Science Centre in Akola, India. Similarly, Dutta et al*.* (2021) reported the level of farmers' satisfaction with the infrastructure of ATIC by a Weighted Mean Score (WMS) of 3.82. The findings, however, contradict the findings in a study by Meja and Geta (2017) who reported unavailability of some physical facilities, including living houses for development agents and teaching materials in the Farmers' Training Centre (FTC) at Damote Gale District in Ethiopia. Furthermore, Saikia et al (2024) reported that 37.50% of the respondents mentioned lack of sanitary facility (which is one among the infrastructure components in the tangibility indicator) as the major constraint to farmers during their participation in the Farmer Fair organized in Dhemaji, India. Similarly, Sattari et al. (2021) claimed that infrastructural constraints were perceived highest by the farmers in transfer of technologies during farmers' fair with composite index value (CIV) of 38.28. On the other hand, Adam et al*.* (2025) reported on the need for improvement in the tangibility components of the Fatuma Mwasa AgriTecH. This observation was supported by the remarks by the Fatuma Mwasa AgriTecH Supervisor when quoted, saying;

> *"…We need some improvements in the training room so that it can accommodate a sufficient number of farmers at once. Also, some facilities like a living house for staff, offices, a bore hole, a fence and a storage facility are not in place. If these issues are addressed the working and learning environment for both AgriTecH Staffs and farmers will be improved…"*

(KII with Fatuma Mwasa, AgriTecH Supervisor, July 30, 2024)

5. CONCLUSION

The study attempted to assess the level of farmers' satisfaction with the use of AgriTecH in the dissemination of improved oil palm production technologies. It can be concluded that high majority of the farmers were satisfied with the use of AgriTecH in dissemination of these technologies across all seven SERVIQUAL indicators used including responsiveness (93.3%), assurance (90.8%), reliability (89.2%), empathy (89.1%), timeliness (85.0%), access (65%) and tangibility (60.8%). The highest ranking in responsiveness (93.3%) indicates that the majority of oil palm farmers were mostly satisfied with the AgriTecH staff genuine concern for farmers' well-being, personnel service mindedness and their willingness to support the farmers while the lower positive percentage score on tangibility (60.8%) and access (65.0%) indicators imply that improvement should be done in the components of these indicators for effective operations.

The improvement in tangibility aspect can be done by renovating the available physical infrastructures such as training room and constructing unavailable physical infrastructures including house for resident supervisor, shop for products, fencing, storage facilities as well as offices. This will improve the working and learning environment for both AgriTecH staffs and farmers respectively. Also, ensuring the availability and use of training materials both printed materials and audio-visual aids that can be utilized to disseminate improved agricultural technologies to farmers, extension staffs and other stakeholders. Furthermore, the AgriTecH's accessibility challenges can be addressed by finding more convenient ways to increase farmers' regular visits to the AgriTecH by either supporting their visits at least once per each cropping season or decentralizing the services to the grass root level where farmers are found by establishing and strengthening a linkages between the AgriTecH and the Ward Agricultural Resources Centres (WARCs).

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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