Turkish Journal of Agriculture - Food Science and Technology

Determinants of Tomato Farmers Participation in Agricultural Services and Training Centre (ASTC) Activities[#]

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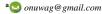[*]Corresponding author

ARTICLE INFO	ABSTRACT
	Agricultural production have remained rudimentary despite many years' of technology development and transfer; to reverse this declining trend, several agricultural policies and programmes aimed at ensuring sustainable production, improved income and farm expansion with added value output have become very germane. This study therefore analyzed tomato farmers' participation in ASTC activities in Jos-south local Government Area of Plateau state, Nigeria. This study adopted multi stage sampling techniques. Primary was data collected from 80 respondents, during the 2017/2018 farming season and were analyzed using descriptive statistics, participation index, weighted average index analysis and Binary Logit regression. The result of the study revealed that 73.8% were male; 88.75% had access to extension contact. The estimated mean for educational training, household size, farm income and farming experience were 6 years; 8 people; ₦108,500/ha and 12 years respectively. Also, most (68.7%) of the farmers have low participation index of ≤0.45; this trend is responsible for the existing low farm productivity of this crop in the area. Furthermore, the benefits derived from participating in ASTC activities among the respondents were significant as indicated by their weighted average index. In addition, the estimated coefficient of multiple determination (R^2) was 0.7602. Also, the coefficients of household size (0.421), education (0.559), experience (0.808), income (0.485) and extension contact (0.376) were statistically significant; implying that these factors in the regression model affected the likelihood of farmer's decision to participate in ASTC activities. Adequate labour supply; establishment of pilot farms; capacity training; access to agricultural credit, extension services, agro service centres, agricultural information, input supply and cooperative formation are strongly recommended.

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Introduction

Tomato is a versatile and widely grown vegetable throughout the world in nearly every home garden. Both wet and dry seasons cropping system contribute immensely to the national requirement, though bulk production is from the dry season cropping system grown yearly under irrigation. Nigeria is ranked the second largest producer of tomato in Africa and thirteenth largest producer in the World, producing 1.701 million tonnes of tomato annually at an average of 30 tonnes per ha (FAO, 2012). This crop does not only contribute to the share of agriculture in national economy but possess a great potential and comparative advantage to compete in the liberalized economy. Tomato has become an important cash and industrial crop in various parts of the world. It is not only important as protective food and highly beneficial for the maintenance of health and prevention of disease, but also a source of livelihood for small scale farmers, food security of the people as well as foreign exchange earner for the national economy. In Nigeria, areas of high production and concentration lie within the northern parts of the country. Vegetable production forms a substantial percentage of the major food crop cultivation in Nigeria. Tomato contributes to a healthy well-balanced diet. Tomato fruits are consumed fresh in salads or cooked in sauces and soups. They can be processed into purees, juice and ketchup, canned and dried products. Agricultural techniques have remained rudimentary despite many years of works on technology generation and transfer by the Federal and State governments; Nigeria is still a major importer of tomato because of low output in tomato production, while a significant proportion of the produce gets wasted during peak period of harvest. Also, difficulties to cultivate at

commercial level by many farmers can be attributable to vagaries of weather conditions, decline in soil fertility, lack of improved planting materials, inaccessibility to credit facilities, high cost of fertilizer, inappropriate application of modern agronomic practices, un-protective tomato faming systems, lack of capital, physiological decay, water loss, pest and disease outbreaks, inefficient transportation network or sometimes simply because there is a surplus or glut in the market; have resulted to spoilage of the harvested output (FAO, 2012). Besides, in developing countries like Nigeria, storage, packaging, transport and handling techniques are virtually non-existent. Tomato has a limited shelf life and high glut during its short production season and become very scarce and expensive during its off season, its short life and inadequate processing and preservation leads to revenue loss of the farmers. The need to reverse declining agricultural production trend has led the Federal Government of Nigeria and Plateau State government, to embark on several agricultural policies and programs some of which are defunct or abandoned, while others are still in place; hence the ASTC project aimed at ensuring farmers participation in different parts of the State to ensure all year-round tomato production, sustainable increase in income of the participants through the expansion of their farm holdings with added value output. The government of Plateau State in 2008 entered into a joint venture agreement with an Israeli SEC company specialized in agricultural development and thus initiated and implemented the Agricultural Activities and Training Centre (ASTC) intervention activity, as an alternative approach, with emphasis on tomato production. The vision is aimed at agrarian reform through the introduction of modern farming techniques referred to as protective farming system, which could make tomato production attractive, create employment opportunities for the youths, and to prove that agriculture could serve as the nation's dependable and sustainable alternative source of income /revenue generation. Some of the activities carried out by the center or agency includes provision of agricultural inputs, effective and efficient training of farmers on tomato production, modern agronomic practices on tomato production, use of net protective farming, provision of drip and other irrigation facilities, green house application style, efficient tractor hiring activities and effective marketing channels for the products (ASTC Bulletin, 2012). However, very few empirical studies have been available to confirm the intended impact in Plateau State (ASTC Bulletin 2012). This has constituted a gap in knowledge that needs to be filled making this study particularly imperative. Several literatures reveal that the reasons for failure of past development programs were poor data base used for policy formulation (Bonigwe and Micah, 2013). This study is expected to examine and provide valuable information on the impacts of ASTC technologies on the livelihoods of farmers. Also in many agricultural intervention programs, the actualization of its objectives is a measure of the extent to which it has made impact on the beneficiaries or participating farmers. In relation to participation and adoption there are various determinants that positively or negatively contribute to participation and adoption of technologies, it is therefore necessary to identify specific determinants or factors so as not to generalize one mode of participation and adoption within a particular socio - cultural context. It is in view of this irrevocable fact that makes it imperative that studies on farmers' participation and adoption under different conditions or settings be undertaken to ascertain its peculiar determinants and to add to the existing adoption theory. Recommendation from this study will also serve as blueprint for policy makers researchers, extension officers and organization involved in agricultural development. This study is therefore significant to highlight how far the goals and objectives of ASTC activity and its consequent impacts on the farmers' livelihood.

Problem Statement

Nigeria is currently facing serious food shortages to meet up the need of an increasing population. This has manifested in the declining per capita food production, decline of per capita income, growing food importation and accelerated ecological degradation. Vegetables in Plateau State have over the years been mainly produced during the dry season by irrigation farmers usually around low lying areas that are near water channels. Most of these vegetables however become scarce and expensive during the rainy season. Despite Nigeria's rank of 2nd to Egypt in Africa and 13th position in the world hierarchy of tomato production, the country is still lagging behind in tomato production compared to Egypt and USA. The yield of tomato in Nigeria is low, the average in guinea savannah zones of the country being only 20 tonnes per hectares (FAO, 2010). However, the yield of tomato in West Africa, particularly Nigeria, is still not encouraging especially when compared to developed countries. For instance, Nigeria production was estimated at 1,860,600 tonnes in 2010 while the United State of America has an estimate for the same year as 12,858,700 tonnes (FAO, 2010). Yield per hectare in Nigeria was estimated at 1/7th of that of the USA (FAO, 2010). Besides, within the Africa context the estimated annual average yield per hectare of tomato in Nigeria is at 7.1 tonnes per hectare comparable to 39.5 tonnes per hectare for Egypt (CBN, 2012). This short fall necessitated the importation of processed tomato worth N11.7 billion ($75.5million) yearly. This makes Nigeria one of the primary importers of tomato globally and a major consumer of tomato paste, with only between 20%-30% produced domestically, 25%-50% of the import of this domestic paste is from China (CBN, 2011). Without adequate evaluation, one cannot be sure whether the objectives of the activity were comprehensively achieved. It is in view of this that the study was conceived to answer the following research questions:

- What are the socioeconomic characteristics of the participants?
- What is the level of tomato farmer's participation in ASTC activities?
- What are the benefits of ASTC activities?
- What are the factors influencing participation in ASTC activities?

Objectives of the Study

The broad objective of the study was to analyze the level of participation of tomato farmers in activities of Agricultural Services and Training Centre (ASTC), while the specific objectives were to:

- describe the socioeconomic characteristics of the participants in the study area;
- examine the level of participation in ASTC activities;
- evaluate the benefits of ASTC activities; and
- determine the factors influencing participation in ASTC activities.

Materials and Methods

Study Area

The study was carried out in Jos-South local government area (LGA) of Plateau State, Nigeria (NBS, 2012).

Sampling Technique

Multi-stage sampling technique was used in selecting the respondents in the study area; with multistage sampling, 80 tomato farmers were selected randomly from Vwang district of Jos South LGA.

Methods of Data Collection

Primary data used for this study, was collected during the 2017/2018 farming season; from participating farmers, using structured questionnaires and Focused Group Discussion; with the assistance of local extension agents.

Analytical techniques

The analytical techniques used for this study include; Descriptive statistics (frequency distributions, percentages and mean); Adoption index; Weighted average index (WAI) analysis and Binary Logit regression analysis.

Model specification

Adoption Index

The level of participation of tomato farmers in ASTC activities was measured using the participation index. Adoption index were computed for individual farmers following Philip *et al.*, (2000); Wooldridge, (2002) whereby adoption index (Bi) is given by:

$$B_i = \sum (R_i/R_T) \tag{1}$$

Where:
B_i = the participation index in ASTC activities by i_{th} farmer;
R_i = ASTC activities the i_{th} farmer participated in;
R_T = Total number of ASTC activities available to the i_{th} farmer.
$i = (1 \ldots \ldots n)$

For this study, participation in ≤5 activities indicate a low participation index (≤0.45); while participation in ≥6 activities indicate a high participation index (≥0.54). The following are the activities of ASTC tomato program; Input supply, agronomic techniques, net houses, irrigation farming, capacity training, market linkages, group/cooperative formation, Tractor activities, agrochemical activities, fertilizer activities and storage activities.

Weighted average index (WAI)

Weighted average index (WAI) analysis is an Index ranking method that was used to evaluate the benefits of participating in ASTC activities. To determine the weight

of each scale, each item was calculated by multiplying the frequency of each response pattern with its appropriate nominal value and dividing the sum with the number of respondents to the items. Responses for the components in objective are rated by using a three-point scale with the scoring order. Given that; 1= indifferent (I), 2 = aware (A) and 3 = fully aware (FA). A weighted average index (WAI) analysis was then estimated as adapted from (Devkota et al., 2014); using the formula:

$$\sum f_i w_i \div N \tag{2}$$
$$WI \div N \tag{3}$$

Where:
$\sum$ = Summation;
F_i = frequency of '*i*' occurrence;
W_i = weight of each scale;
WI = weighted index; and
N = number of respondents

The benefits were therefore ranked using their average weight. This can be calculated as follows;

$$\text{Average weight (wa)} = \Sigma s /r \tag{4}$$

Where:
s = scoring order;
r = scale rating (3-point scale);
$\sum$ = Summation;
$\sum s$ = 1+2+3=6 =6÷3=2

Therefore any weighted average index ≥2 will be considered significant.

Binary Logit Regression Model

Logit regression analysis was used to determine the factors influencing tomato farmer's participation in the program. It specifies the relationship between the index of participation ASTC activities and the explanatory variables influencing this index (Greene, 2003). The implicit model is expressed as follows in equation (5):

$$Y= \beta_0 + \beta_1X_1+ \beta_2X_2+ \beta_3X_3+ \beta_4X_4+ \beta_5X_5+ \beta_6X_6+ e_i \tag{5}$$

Where;
Y_i = a dichotomous response variable such that;
Y = 1, if farmers have high participation index
Y = 0,

if farmers have low participation index;

$\beta_1 - \beta_6$ = Regression coefficients;
X_1 = Gender (1=Male, 0=Female);
X_2 = Household size (Number of persons in the household);
X_3 = Level of education (Years);
X_4 = Farming experience (Years);
X_5 = Farm income (₦);
X_6 = Extension contacts (Yes= 1, No=0)
e_i = Error term.

Results and Discussion

Socioeconomic Characteristics of the Respondents
Gender

Table 1 revealed that 73.8% of the activity participants are male, while 26.2% are female; implying that male headed households participated more in ASTC activities in the study area. This may be attributed to the land tenure system that prevails in the study area, which favours male members of the society to inherit and own land and also to the fact that women tend to engage more in off-farm activities of tomato marketing than production in the study area. This study is in line with the previous studies of Adesope et.al. (2012), who also reported similar gender population predominance in tomato production activities and programs.

Age

Table 2 revealed that 60% of the activity participants were within the age bracket of 30-49 years followed by ≤29 years 25% and ≥50 years 15%; implying that most (60%) of the respondents were within their economically active the age bracket of 30-49 years. This suggests that majority of the respondents were young, active and likely to be more productive, if given adequate levels of farming resources, the farmers have the potential to maximize their farm resources. This result is in conformity with Haruna et al. (2012) who also reported in their study that 40% respondents belong to the active population group of 36-40 years. The estimated mean age of the participants is 39 years.

Marital Status

The result from Table 3 reveals that majority (63.75%) of the participating farmers were married while 36.25% were single. The married respondents are likely to have access to more farm labour supply, through is family members for tomato production. This finding corroborates to the study of Edi et al. (2007) who observed in a similar study that majority of the farmers were married.

Educational Level

Table 4 revealed that majority (56.25%) of the participating farmer's attained basic or primary education in the study area. secondary and tertiary education accounted for 31.25% and 12.5% respectively. This suggests a high prevalence of literacy, which is an incentive for participation and adoption of improved farm practices thus translating to increased productivity among the farmers. The implication of this is that education provides a platform for participation and adoption of available innovations and easy access to information. This study is in line with the finding of Tologbonse et al. (2013) who reported that education has been found to be a catalyst in the participation and adoption of agricultural practices, the educated a farmer is more receptive to changes and has the ability to adopt improved agricultural practices. The estimated mean year of educational training for the participants is 6 years.

Household size of the respondents

Table 5 revealed that majority (61.25%) of the participating farmers have household size with a population of between 6-10 people; suggesting availability of labour supply from family member's for farming and domestic activities. This also helps to minimize expenditure on hired labour; hence, household size provides a repository of labour for production. This agrees with Haruna et al. 2012 who reported in their study that respondents with household size population of 6-10 and 1-5 people accounted for 46% and 32% respectively. The estimated mean household size population of the respondents is 8.

Farm Size

Table 6 revealed that majority (63.75%) of the participating farmers have farm holdings of ≤2.0ha, implying that the respondents were smallholders. This may be attributable to the prevalent tenure system of inheritance or communal land ownership in the study area which often results in fragmentation of farmlands. Ownership of land influences agricultural productivity. This result is in conformity with Tologbonse et.al. (2013), who also reported who reported similar results on smallholder farmers in their study. The estimated mean farm size of the respondents is 1.1ha.

Table 1. Distribution of the Respondents Based on their Gender

Gender	Frequency	%
Male	59	73.8
Female	21	26.2

Source: Field survey (2018).

Table 2. Distribution of the Respondents Based on their Age

Age Bracket	Frequency	%
≤29	20	25.00
30-49	48	60.00
≥50	12	15.00
Mean = 38.6		

Source: Field survey (2018).

Table 3. Distribution of Respondents Based on their Marital Status

Marital status	Frequency	%
Married	51	63.75
Single	29	36.25

Source: Field survey (2018).

Table 4. Distribution of the Respondents Based on their Level of Educational

Educational level	Frequency	%
Primary (≤6years)	45	56.25
Secondary (7-12 years)	25	31.25
Tertiary (≥13years)	10	12.50
Mean = 6.2 years		

Source: Field survey (2018).

Table 5. Distribution of the respondents based on their household size

Household size	Frequency	%
≤5	20	25.00
6-10	49	61.25
≥11	11	13.75
Mean = 7.8		

Source: Field survey (2018).

Table 6. Distribution of Respondents Based on their Farm Size

Farm size	Frequency	%
≤2.0ha	51	63.75
2.1-4.0ha	22	27.50
≥4.1ha	7	8.75
Mean = 1.1ha		

Source: Field survey (2018).

Membership of Cooperative Societies or Groups

Table 7 revealed that majority (77.5%) of the participating farmers belongs to cooperative societies or groups. This suggests that tomato farmer's participation in most of the ASTC activities was influenced by their membership of cooperatives or groups, thus creating an opportunity for the participating farmers to have access to and exchange information on tomato production problems, innovative solutions and practices. Non membership could lead to ineffective and inefficient use of resources consequently resulting to low farm output. This is in conformity with the study of Edi et al. (2007) who reported similar results on farmer's membership of cooperatives and groups.

Farm income of the respondents

Table 8 revealed that most (55%) of the participating farmers earned farm income of between ₦100,000-₦199,999/ha; this amount suggests a relatively fair remunerative farm income among the respondents in the study area. Farm income plays a critical role in participation and adoption of innovative practices and technology among farmers. This agrees with the study of Adesope et al. (2012) who also reported that increased farm income improved farmer's participation and adoption of agricultural technology. The estimated mean farm income for the farmer's was ₦108,500/ha.

Farming Experience

Table 9 revealed that most (47.5%) of the respondents have farming experience in tomato production of between 11-19 years; implying that the farmers in the study area had adequate years of experience in tomato production. Farming experience is an important factor in determining the level of farm productivity. This also agrees with the study of Montshwe (2006) who also reported that tomato production is dominated by experienced farmers in their productive and active age brackets. The estimated mean farming experience for the farmers is 12 years.

Extension Contact

Table 10 revealed that most (88.75%) of the participant farmers had contact with extension agents while 11.25% had no contact with extension agents. The participants had monthly, fortnightly or weekly extension contacts. The study reveals that extension contact is high among the participating farmers in the study area, which implied improved farmers access to innovative practices and technology in tomato production. This is in line with Montshwe (2006) who also reported that increased extension contact improved information sharing between different stake holders in tomato production.

Level of Participation in ASTC Activities

The result in Table 11 reveals that most (68.7%) of the farmers have low participation index of ≤0.45, while 25% have high adoption index of ≥0.54; hence for this study, this result indicates a low participation index (≤0.45), suggesting that the index of participation in ASTC activities among the respondents was low and not satisfactory. The respondents posited that this trend was also a factor responsible for the existing low farm productivity in the area. It is well known that in sub-Saharan Africa low agricultural productivity by small scale farmers have been attributed to poor adoption of improved agricultural technologies (Montshwe, 2006). Therefore, identification of factors hindering adoption/uptake of improved agricultural technologies has been an important

research agenda in the area (Agwu and Agbada, 2010). The following are the activities of ASTC activities in the study area; Input supply, agronomic techniques, net houses, irrigation farming, capacity training, market linkage, group/cooperative formation, Tractor activities, agrochemical activities, fertilizer activities and storage activities. Farmer's participation is considered necessary to get community support for agricultural development activities (Agwu and Agbada, 2010).

Benefits of Participation in ASTC Activities

From the result in Table 12, the different benefits of participating in ASTC activities among the respondents were very significant. This was indicated through trainings on tomato production (2.64), discount on ASTC activities (2.63), improved access to technology (2.53), improved extension contact (2.45), access to improved varieties (2.4), improved market linkage (2.35), training on net houses (2.3), improved access to credit (2.13) and fertilizer/agrochemical application (2.1) as reflected by their weighted average index. This result is in conformity with the study of Oruche *et al*. (2012); Ugwu and Kanu, 2012; Mustapha *et al*., 2010 who posited similar benefits of adoption of modern agricultural practices and programs.

Table 7. Distribution Based on their Membership of Cooperative Societies or Groups

Membership	Frequency	%
Yes	62	77.50
No	18	22.50

Source: Field survey (2018).

Table 8. Distribution of the respondents based on their farm income

Farm income (₦/ha)	Frequency	%
≤99,999	26	32.50
100,000-199,999	44	55.00
≥200,000	10	12.50
Mean = ₦108,500		

Source: Field survey (2018); Exchange rate at $1= ₦450

Table 9. Distribution of Respondents Based on their Farming Experience

Farming experience	Frequency	%
≤10 years	20	25.00
11-19 years	38	47.50
≥20 years	22	27.50
Mean = 12.4 years		

Source: Field survey (2018).

Table 10. Distribution of Respondents based on their Extension Contact

Extension contacts	Frequency	%
Yes	71	88.75
No	9	11.25

Source: Field survey (2018).

Table 11. Distribution Based on the Level of Participation in ASTC Activities

Participation index	Frequency	%
Low index	55	68.70
High index	25	31.30

Source: Field survey, 2018.

Table 12. Distribution Based on the Benefits of Participation in ASTC Activities

Benefits	FA	A	I	$\sum f_i w_i$	WI	Rank
Training on tomato production	58	15	7	211	2.64	1st
Discount on ASTC activities	55	20	5	210	2.63	2nd
Access to agric technology	50	21	10	202	2.53	3rd
Improved extension contact	49	18	13	196	2.45	4th
Access to improved varieties	49	16	10	189	2.4	5th
Improved market linkages	45	18	17	188	2.35	6th
Training on net houses	40	25	15	185	2.3	7th
Improved access to credit	40	10	30	170	2.13	8th
Fertilizer/agrochemical application training	37	15	28	169	2.1	9th

Source: Field survey (2018). FA= fully aware, A= aware I=indifferent

Table 13. Factors Influencing Participation in ASTC Activities

Variable	Coefficient	Standard error	T-ratio
Constant	0.694	0.262	2.648**
Gender (X_1)	0.287	0.219	1.31
Household(X_2)	0.421	0.157	2.681*
Education(X_3)	0.559	0.22	2.54*
Experience(X_4)	0.808	0.31	2.606*
Income (X_5)	0.485	0.126	3.849**
Extension (X_6)	0.376	0.101	3.722**
Prob<X^2	0.0045**		
Pseudo R^2	0.7602		

Source: Field survey (2018); **= significant at (P<0.01), *= significant at (P<0.05)

Determinants of Participation in ASTC Activities

The regression analysis presented in Table 13 revealed the factors influencing tomato famers Participation in ASTC Activities in the study area. The Likelihood ratio statistic (Prob<X^2) (P<0.0045) was significant at 5% (P<0.05); suggesting that the regression model has a strong explanatory power. Also, the result of the regression model reveals that the pseudo coefficient of multiple determination (R^2) was 0.7602; which implies that 76% of the variation in the decision to participate in ASTC activities among tomato farmers is taken into account by the variables in the regression model. The remaining 24%, which are not explained, may be due to omitted variables and the notion of stochastic error. The result of the study shows the cumulative contribution of independent variables to ASTC activity participation. This is in conformity with the study of Adesope et al. (2012) who reported similar results that socioeconomic variable significantly influenced participation in modern agricultural practices.

Household size (x_2): The coefficient of household size (0.421) was statistically significant at 5% (P<0.05) level of significance. This implies that household size increases the likelihood of participation in ASTC activity. This suggests that respondents with larger household sizes (61.25%) had more labour supply for participating in ASTC activities as well carrying out other farm and domestic operations. This is in conformity with the study of Adesope et al. (2012) who reported similar results that socioeconomic variable significantly influenced participation in modern agricultural practices.

Education (x_3): The coefficient of education (0.559) was statistically significant at 5% (P<0.05) level of significance; implying that the higher the level of education attained, the greater the likelihood that such a respondent will participate in ASTC activities; hence, the level of education attained facilitates understanding of agricultural information available and thus participation and adoption is most likely to improve. The level of education increases the probability of active participation in agricultural programs. This result is in conformity with the study of Edi et al. (2007) who reported similar results that socioeconomic variable significantly influenced participation in modern agricultural practices.

Experience (x_4): The coefficient of farming experience (0.808) was statistically significant at 5% (P<0.05) level of significance. This implies that the years of farming experience will enhance higher participation in ASTC activities and facilitate farmers' engagement in modern agricultural practices.

Income (x_5): The coefficient of income (0.485) was statistically significant at 1% (P<0.01) level of significance, which implies that as farm income improves the likelihood of participation in ASTC activities increases. Bismark and Agbeti (2012) observed that increased farm income is an important variable explaining farmers' participation in agricultural programs.

Extension contact (x_6): The coefficient of Extension contact (0.376) was statistically significant at 1% (P<0.01) level of significance; implying that improved access of extension services to farmers increases their likelihood of participating in more ASTC activities. Access to extension services is critical in promoting adoption of modern agricultural production technologies. Access to extensions services therefore creates the platform for acquisition of the relevant information that promotes technology adoption. Access to information through extension services reduces the uncertainty about a technology's performance over time thereby facilitating adoption. This result is in conformity with the study of Tologbonse et al. (2013) who reported similar results on that socioeconomic variable significantly influenced participation in modern agricultural practices.

Conclusion and Recommendations

This study revealed that tomato farmer's participation in ASTC activities was influenced by their socioeconomic factors. Also, a range of ASTC activities were available in the study area. However, the level of participation in ASTC activities among the respondents was generally low as indicated by their participation index. The farmers in the study area participated in a minimum of one ASTC activity, so as to improve their overall farm productivity and income. In addition, several benefits were attributable to tomato farmer's participation in ASTC activities as indicated by their weighted average index. Furthermore, there was a significant relationship between the socioeconomic characteristics of the farmers and their index of participation in ASTC activities; hence, the coefficient of multiple determination (R^2) was 0.7602, which implies that 76% variation in the decision to participate in ASTC activities among the respondents is taken into account by their socioeconomic factors in the regression model. This study therefore established that the level of participation in ASTC activities among the respondents was generally low, thus, there is a great need to ameliorate these trends. Based on the findings of this study, the following recommendations are made for policy actions to improve the level of tomato farmer's participation in ASTC activities in the study area;

- Farm activities should be properly scheduled to ensure adequate labour supply from farm households.
- Programmes that promote the frequency of capacity training to improve the knowledge and understanding on the potentials and uncertainties associated with ASTC activity should be provided for the tomato farmers.
- Establishment of pilot farms to educate and train tomato farmers on the various ASTC activities and operations.
- Formulation of policies to improve rural financial inclusion and tomato farmer's access to agricultural credit should be encouraged.
- Formulation of policies that will improve framer's access to extension services.
- Policies that will ease cooperative formation to aggregate tomato farmers' resources and increase their farm output through agricultural intensification should be formulated and implemented.
- Adoption of strategies that improves tomato farmer's access to agricultural information and input supply.

Acknowledgements

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