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UTILIZATION OF GOOD AGRICULTURAL PRACTICES TECHNOLOGIES AMONG TOMATO FARMERS IN OYO STATE, NIGERIA

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Abstract

The study assessed the utilization of Good Agricultural Practices (GAPs among tomato farmers in Oyo State, Nigeria. Using three stage sampling technique, (240) registered tomato farmers were selected sample size for the study. Interview schedule was utilized to elicit relevant information and data were analysed using descriptive and inferential statistics. Results show that most (65.0%) of the respondents were males, married (50.0%) with mean age, household size and years of formal education of 35±10.5 years, 2 ± 0.6 persons and 13.0±3.9 years, respectively. Most (56.3%) of the respondents were primarily engaged in farming with mean annual income of ₦703,075.00 ±210,922.5 while few (42.5%) belong to social organisation. The most frequently aware of all the practices by the respondents were to look for pest and disease resistance varieties (93.8%) while inadequate knowledge of GAPs (1.46) and high cost of technology (1.29) were the main constraints to utilization of GAPs among tomato farmers in the study area. Positive relationship was found between age (r = 0.531, p≤0.05), years of formal education (r = 0.460, p≤0.05) and utilization of GAPs. The study concluded that GAPs were moderately utilized among the respondents and recommended that government should provide special incentives for the tomato farmers in order to encourage them as well as others who are yet to engaged in GAPs.

Key words**:** *Good Agricultural Practices, tomato farmers, utilization*

INTRODUCTION

Tomato (*Lycopersicon esculentum)* belongs to the genus *Lycopersicon* and *Solanaceae* family. Tomato is one of the most important solanaceous vegetable crops grown worldwide under outdoor and indoor conditions. It has become an important commercial crop so far as the area, production, industrial values and its contribution to human nutrition is concerned [8]. Tomato is one of the most highly consumed vegetable due to its status as a basic ingredient in a large variety of raw, cooked or processed foods. It belongs to the family Solanaceae, which includes several other commercially important species. Tomato is grown worldwide for local use or as an export crop. Although the crops are believed to have been originated from South America and its many varieties are now widely grown, often in green houses in cooler climate. As it is relatively short duration crop and gives a high yield, it is economically attractive. According to [7], Nigeria is said to have the largest area harvested for fresh tomato in Africa with 541,800Ha followed by Egypt with 214,016Ha. Tomato contribute to a healthy, well balance diet as they are rich in minerals, vitamins, essential amino acids, sugars, dietary fibres, vitamin B and C, iron and phosphorus. Compared to rice, tomato production could generate double economic efficiency [13] which helps to create more job opportunities for farmers. Tomato is the world's largest vegetable crop after sweet potato but it tops the list of canned vegetables [11]. Lycopene is a carotenoid that is present

in tomatoes, processed tomato products and other fruits. It is one of the most potent anti-oxidants among dietary carotenoids. Dietary intake of tomatoes and tomato products containing lycopene has shown to be associated with a decreased of chronic disease, such as cancer and cardiovascular disease [4]. It can be processed into different product including tomato juice, tomato ketchup, tomato paste, tomato soup (condensed), raw tomato and spaghetti sauce. Northern part of Nigeria commonly grown tomatoes but largely consumed in the South Western in which Oyo State is one of them. Tomato fruit exhibits amongst the highest postharvest losses in the fruit and vegetable supply chains of Sub Saharan Africa [2]. However, Nigeria is not included in the list of countries exporting tomatoes, and huge amount of money is spent on tomato importation annually. Significant parts of annual production are lost to post-harvest spoilage due to poor handling, microbial deterioration, absence of storage facilities and processing industries [6]. Most farmers engage in vegetable cultivation for income generation improve livelihoods [1]. However, they often face poor yields and low income due to poor farm management and lack of adoption of cost-effective agricultural technologies [3] Introduction of GAPs was one of the ways to increase net income and improve produce quality through modest prevention and /or control of some pest and diseases.

Tomato traders were not interested in the low produced quality due to pest and diseases and damage during transportation. Food and Agricultural Organization of the United Nation (FAO) define Good Agricultural Practices (GAP), as collection of principles to apply for on – farm production and post-production processes, resulting in safe and healthy food and non – food agricultural product, while taking into account economic, social and environmental sustainability. GAP relies on four principles, which are; economically and efficiency produce sufficient (food security), safe (food safety) and nutritious food (food quality), sustain and enhance natural resources and maintain viable farming enterprises and contribute to sustainable livelihood. Guidelines for GAP can cover all aspects of farms production. Whether in the field, in a green house or in barn including crop and seed choice, watering and fertilization, pest and disease control, disposing of manure, harvesting, and handling after harvesting, in food processing and in retail setting. Based on a rapid appraisal survey, farmers who adopted GAP Technologies at various level of location seem to be aware and knowledgeable of improved production technologies, had a better bargaining power in the sale of their produce due to improved produce yield, and perhaps better produce quality.

Unfortunately, farmers in Oyo state still experiences deficiency in critical input, lack of improved technology, low yield and productivity, high post-harvest losses and lack of processing and marketing infrastructure. Bad practices of tomatoes production such as over fertilizing, fertilizer can build up in the soil and cause problems, not watering properly which can lead to multiple problems to tomatoes, including blossom end rot. Planting tomatoes too closely not only stunt their growth and causes a drop in fruit production, but it also makes it too difficult for sun to reach through the plants. Not prune makes it overcrowding which makes it easier for plant disease to spread. Given the needs to address the utilization of good agricultural practices technologies among tomato farmers, it is expedient to describe the socio-economic characteristics of the tomato farmers, determine awareness of respondents on use of GAP technologies utilized by the tomato farmers, identify the GAP technologies utilized by the tomato farmers as well as the constraints faced by tomato farmers in the use of GAP Technologies.

Hypothesis of the study

There is no significant relationship between the socio-economic characteristics of the respondents and the utilization of GAPs Technologies.

MATERIALS AND METHODS

The study was carried out in Oyo state. Agriculture is the major occupation and source of income for a larger portion of the people of Oyo State engaging in over 70% of the state's workforce. Oyo State has a population of 415,030 farm families (2007 Crop enumeration Exercise). This is attributable to the fact that the state is endowed with varied but favorable climatic and ecological conditions, vast agricultural land mass estimated at about 28,000 square kilometers as well as soil structures that support the production of a range of fruits, vegetables, arable and tree crops. The state has untapped and available arable land suitable for large-scale farming with a cultivable size of about 2,710,793 Hectares [12]. The list of registered tomato farmers was extracted from All Farmers Association of Nigeria (AFAN) list in 5 local governments (15%) purposively selected for the study which were Surulere (from Ogbomoso Agricultural zone); Iseyin and Saki West (Saki Agricultural zone); Ido (Ibadan/Ibarapa Agricultural zone) and Atiba (Oyo Agricultural zone) The list has 450 tomato farmers. 53.3% of the respondents were randomly selected to give sample size of 240 tomato farmers. Structured interview schedule was used to collect data. The study contains both dependent and independent variables. The dependent variable of the study is utilization of Good Agricultural Practices Technologies among tomato farmers. This was measured by asking the respondents to indicate the GAP technologies utilized in the study area, and the frequency of utilization of each of the technologies was scored on 4-point rating scale of: Always utilized =3, Occasionally utilized =2, Utilized before but discontinued =1, Not utilized =0. Independent variables were: Age measured in years at ratio level; Education qualification measured as years spent in formal schooling; Household measured as actual number of people living together and eating from same pot; Annual income from tomatoes production measured as actual amount in Naira obtained from sale of tomatoes per year. Frequency counts and percentages were used to describe the data while Pearson correlation was used to establish the relationship between selected variables.

RESULTS AND DISCUSSIONS

Socio-economic characteristics of respondents

The results of socioeconomic characteristics of the respondents as shown in Table 1 indicated that (23.7%) of the respondents are within the age bracket of 41 to 50 years with a mean age of 35 years. This implies that most of the respondents have the ability to engage in productive activities that will enhance their investment and improved technology utilization and hence innovativeness. This finding is in agreement with [10] who reported that farmers within the age range of 41 to 50 years are active, more receptive to innovation and could withstand the stress and strain involved in crop production. The results also showed that majority (65%) of the respondents were males. This corroborates the findings of [9] that the crop production terrain in Nigeria is dominated by the male gender. About (66.67%) of the them were married which shows that most of them had responsibilities and so will be ready to adopt the use of Good Agricultural Practices. Majority (75.0%) of the respondents were literate and this is an advantage for adoption of farm innovation as education has been shown to be a factor in the adoption of high yielding modern farm practices. In other words, the high level of education among the respondents would likely make them more responsive to many agricultural extension programmes and policies. The result further indicated that more than half (56.3%) of the respondents are engaged in farming activities as means of livelihood, while only 43.7% of the respondents are engaged in non-farming activities. This finding is in line with that of [5] who observed that agriculture is the main source of livelihood of rural communities in the south-eastern Nigeria. Furthermore, majority (80.0%) of the respondents have

household size of less than 5 persons with a mean size of 2 persons. The result also indicated that majority (71.2%) of the respondents earn annual income of between N501,000 to N1,000,0000 with mean annual income of N 703,750.00. This implies that most of them still earn a very good income annually despite engaging in farming as their primary occupation.

Table 1. Distribution of respondents according to their socio-economic characteristics

Socio-economic characteristics	Freq	%	Mean
Age(years)			
≤30	120	50.0	
31-40	45	18.7	35±10.5
41-50	57	23.7	
51-60	15	6.3	
61 and above	3	1.3	
Sex			
Male	156	65.0	
Female	84	35.0	
Marital status			
Single	117	47.5	
Married	120	2.5	
Widow	6	2.5	
Education (Years spent in school)			
<6	36	15.0	
7-10	24	10.0	
13 and above	180	75.0	
Religion			
Muslim	102	42.5	
Christian	138	57.5	
Household size (persons)			
≤5	192	80.0	**2**±0.6 persons
6 and above	48	20.0	
Primary occupation			
Farming	135	56.3	
Civil servant	9	3.8	
Trading	42	17.5	
Artisan	51	21.3	
Students	3	1.3	
Annual income (000)			
<500	63	26.3	
501-1,000	171	71.2	
1,001-and above	6	2.6	
Social organization			
Yes	103	42.5	
No	138	52.5	

Source: Field Survey, 2021.

Awareness level on GAP technologies by the respondents

Table 2 indicate the awareness level of different GAPs technologies in the study area. (75.0%) indicate indigenous soil testing, (60.0%) claimed modern soil testing, (77.5%) claimed avoid use of refuse dumping site for cropping, (72.5%) claimed to purchased seed from trusted seller, (93.8%) claimed looking for varieties which are pest and disease resistance, (82.5%) claimed healthy seedling are selected for transplanting, (63.7%) claimed preference for organic fertilizer against inorganic, (77.5%) ensured site free from toxic element, (72.5%) claimed water source is not contaminated, (77.5%) claimed appropriate use of chemical, (78.8%) claimed container for harvesting tomato are clean, (83.8%) claimed storage area are clean.

Table 2. Distribution of respondent according to their awareness in Good Agriculture practices (GAP) technologies

GAP technologies Awareness*	Freq	%	Rank
Look for varieties which are pest and disease resistant	225	93.8	1st
Ensure storage area kept clean	201	83.8	2nd
Ensure storage area protected from insect and rodents	201	83.8	3rd
Healthy seedlings are selected for transplanting	198	82.5	4th
Ensure accident and emergency procedure exist	195	81.3	5th
Ensure worker equipped with suitable protective clothes	189	78.8	6th
Ensure containers for harvesting tomato are clean	189	78.8	7th
Ensure site free from toxic element	186	77.5	8th
Ensure appropriate use of chemicals	186	77.5	9th
Avoid use of refuse dump site for cropping	186	77.5	10th
Soil testing (indigenous)	180	75.0	11th
Purchase seed from trusted seller	174	72.5	12th
Ensure water source is not contaminated	174	72.5	13th
Preference for organic fertilizer against inorganic	153	63.7	14th
Soil testing (modern)	144	60.0	15th

Source: Field survey, 2021.

Also, 83.8% claimed storage area protected from insect and rodents, 78.8% claimed worker equipped with suitable protective clothes and 81.3% ensured accident and emergency procedure exist.

This implies that looking for varieties which are pest and disease resistance is the most aware GAP technologies by the respondents.

Level of utilization on GAPs technologies by the respondents

Table 3 shows the level of utilization on GAPs technologies by the respondent. It indicated that look for varieties which are pest and disease resistance is most utilized GAP technologies with a weighted mean score (WMS) of 2.30 and was ranked 1st ,followed by avoid use of refuse dumping site for cropping with (WMS) of 2.21 and was ranked 2nd ,ensure storage area kept clean with (WMS) of 1.96 and was ranked 3rd ,healthy seedling are selected for transplanting with (WMS) of 1.86 was ranked 4th ,ensure site free from toxic element with (WMS) 0f 1.85 was ranked 5th, ensure storage area protected from insect and rodents with (WMS) of 1.85 was ranked 6th, purchase seed from trusted seller with (WMS) of 1.78 was ranked 7th., ensure appropriate use of chemical with (WMS) of 1.77 was ranked 8th, ensure container for harvesting tomato are clean with (WMS) of 1.66 was ranked 9th, ensure water source is not contaminated with (WMS) of 1.64 was ranked 10th, ensure worker equipped with suitable protective clothes with (WMS) of 1.58 was ranked 11th, indigenous soil testing with (WMS) of 1.54 was ranked 12th, ensure accident and emergency procedure exist with (WMS) of 1.32 was ranked 13th.

Table 3. Distribution of respondents according to their level of utilization in GAP technologies

GAP technologies	Always	Occasionally	Utilized before discontinued	Not Utilized	WMS	Rank
Look for varieties which are pest and disease resistance	150(62.5)	36(15.0)	30(12.5)	24(10.0)	2.30	1st
Avoid use of refuse dumping site for cropping	87(36.3)	75(31.3)	21(8.8)	54(22.5)	2.21	2nd
Ensure storage area kept clean	90(37.5)	90(37.5)	21(8.8)	39(16.3)	1.96	3rd
Healthy seedlings are selected for transplanting	99(41.3)	60(25.0)	30(12.5)	51(21.3)	1.86	4th
Ensure site free from toxic element	96(40.0)	63(26.3)	30(12.5)	51(21.3)	1.85	5th
Ensure storage area protected from insect and rodents	87(36.3)	72(30.0)	39(16.3)	42(17.5)	1.85	6th
Purchase seed from trusted seller	111(46.3)	39(16.3)	15(6.3)	75(31.3)	1.78	7th
Ensure appropriate use of chemicals	96(40.0)	51(21.3)	36(15.0)	57(23.8)	1.77	8th
Ensure that the containers for harvesting tomato are clean	63(26.3)	90(37.5)	30(12.5)	57(23.8)	1.66	9th
Ensure water source is not contaminated	81(33.8)	60(25.0)	30(12.5)	69(28.7)	1.63	10th
Ensure worker equipped with suitable protective clothes	48(20.0)	93(38.8)	48(20.0)	51(21.3)	1.58	11th
Soil testing (indigenous)	63(26.3)	72(30.0)	36(15.0)	69(28.9)	1.54	12th
Ensure accident and emergency procedure exist	36(15.0)	78(32.5)	54(22.5)	72(30.0)	1.32	13th
Soil testing (modern)	60(25.0)	45(18.8)	24(10.0)	111(40.3)	1.22	14th
Preference for organic fertilizer against inorganic	36(15.0) 36(15.0) 72(30.0)	72(30.0)	39(16.3)	93(38.8)	1.21	15th

Source: Field Survey, 2021. *Multiple response.

Also, modern soil testing with (WMS) of 1.22 was ranked 14th and preference for organic fertilizer against inorganic with (WMS) of 1.21 was ranked 15th.

This implies that look for varieties which are pest and disease resistance is most utilize.

Hypothesis testing

Pearson Product Moment Correlation analysis of the relationship between the socio-economic characteristics of the respondents and level of utilization of technologies in GAPs.

The result in Table 4 shows that two of the selected socio-economic characteristics were significant which were age (r=0.531; P=0.003), education qualification (r=0.460; P=0.020) and level of utilization of GAPs technologies. This implies that increase in their age, leads to increase in their level of utilization of GAPs technologies. Also,

increase in education qualification leads to increase in their level of utilization of GAP technologies. The null hypothesis which stated that there is no significant relationship between the selected socio-economic characteristics of the respondent and level of utilization in Good Agricultural Practices technologies is thereby rejected and alternative hypothesis is hereby accepted.

Table 4. Pearson Product Moment Correlation analysis of the relationship between the socio-economic characteristics of the respondents and level of utilization of technologies in GAPs.

Socio-economic characteristics	Correlation coefficient (r)	p-value	Remark
Age	0.531**	0.003	Sig
Education	0.460*	0.020	Sig
Household size	0.193	0.087	Non-sig.
Annual income	0.141	0.211	Non-sig.

Source: Field survey, 2020.
**correlation is significant at the 0.01 level (2-tailed).
*correlation is significant at the 0.05 level (2-tailed).

CONCLUSIONS

Based on the findings, farmers gathered their information mostly from relatives and co-farmers. Tomato farmers in the study area were faced with various challenges on the use of GAPs technologies in the study area ranges from inadequate knowledge of GAPs, high cost of technology, lack of awareness about technology and lack of credit facility. Study further concluded that most GAPs technologies adopted by the farmers are to look for varieties which are pest and disease resistance and avoid use of dumping site for cropping. It is therefore recommended that extension agents should extend training of tomato farmers in Oyo state to other non-participating local governments to ensure others benefitted from GAPs technologies.

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