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Tomato Farmers Adoption Level of Postharvest Value Addition Technology and Its Constraints in Surulere Area of Oyo State, Nigeria

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ABSTRACT
The study examined tomato farmers' adoption level of postharvest value addition technology and its constraints in Surulere Area of Oyo state. 160 tomato farmers were randomly selected and interviewed through structured interview schedule. Data obtained were subjected to descriptive and inferential statistics. Results revealed prevalent causes of tomato postharvest losses to include; unreliable means of transportation, lack of adequate storage facilities, limited alternative uses of produce, diseases/pest infestation and non-accessibility to improved varieties and quality seeds. Furthermore, postharvest value addition technologies at adoption level indicated by majority were ranked as follows; sun drying and peeled tomato preserves (88.1%) ranked first, fresh refrigerated (67.5%) ranked third, pureed and sealed with oil in jars (50.6%) ranked fourth, boiled, sealed and packed sealed (50.0%) ranked fifth, cold water bath (46.9%) ranked sixth. Only (3.1%) evaluated pickling, 0.6% trialled irradiation, 2.5% trialled pulping. Constraints faced by majority include; inadequate technological knowledge about value addition, inadequate of electricity supply, lack of cold storage facilities and lack of awareness about value addition technologies. Regression analysis shows significant relation between preventive initiatives adopted by tomato farmers and their level of education, agricultural cooperative membership and availability of electricity and extension agents' visit. In the view of the findings, the study concludes that tomato farmers have adopted several preventive initiatives for tomato postharvest losses and were still with faced with challenges. It is therefore important improve educational knowledge of tomato farmers in the study area on improved skills to further minimise post-harvest losses.

Keywords: tomato, postharvest losses, value addition, constraints

INTRODUCTION
Tomato (*Lycopersicum esculentus*) is a staple fruit vegetable that is highly sensitive to frost. It thrives well in within a temperature range of 25 – 34 °C in Nigeria (Etebu et al., 2013). Tomato is an important vegetable grown universally because of its nutritional values. The production requires a high level of management, labour intensive and bulk of production is mostly supported by small family farm (Erdogan, 2007).

Despite its importance to human food, tomato is highly perishable resulting to poor quality and nutritional value of fresh tomato and consequently decreases in farmers' income. Sablani et al., (2006) have however stated that perishability of tomato is often affected by postharvest and storage practices.

Studies have further identified causes of tomato postharvest losses to include longer distant from farm to the market (Babalola et al., 2010), type and quality of labour used in harvesting (Mujib et al., 2007), rot and bruises causes by poor handing, diseases and pest attack (Aidoo et al., 2014). Adepeju (2014) concludes that total value of postharvest losses were found to

significantly affect the per-capita income and hence welfare of tomato farmers negatively. Afolami and Ayinde (2002) identified some problems militating against tomato production as high cost of fertilizer, pest and disease problems and inefficient transportation network resulting in spoilage of output and inadequate credit facilities.

An effort to reduce losses of tomato produce has made most farmers to add value to postharvest practices. The use of such value addition technologies is main focus of this study. Roger (2003) defined adoption as the implementation of transferred knowledge about a technological innovation. Adoption occurs when a person has decided to make full use of a new technological innovation as the best way to address a need. Adoption can thus be thought of as the final stage of the technology transfer process. Purcell and Anderson (1997) farmer is more inclined to accept a recommended practice if the practice is profitable, compatible with existing farming system, divisible, simple, to use, has relevance for his labour use, farm inputs, marketing, credit, community values and crop situation. Asiabaka et al., (2001) also adoption condition to include awareness of information, valid up-to-date information, technical assistance necessary to adopt the technology and applicability of the technology to their farming system.

The main objective of this study was to investigate tomato farmers' adoption level of postharvest value addition technologies and its constraints in Surulere Area of Oyo State Nigeria. Specifically, the study sought to (i) identify the causes of postharvest losses of tomato in the study area (ii) determine the adoption level of postharvest value addition initiatives in tomato production (iii) examine the major constraints militating against practising postharvest value addition technologies by tomato farmers in the study area.

METHODOLOGY

The study was conducted in Surulere Local Government of Oyo State. Surulere Local Government shared boundary with Ifelodun and Araolu Local Government of Osun Local Government, Asa Local Government in Kwara State. Surulere is located within longitude 4^0 and latitude 8^0, the local government lies with the tropical rain forest zone with its characteristics of west and dry seasons with the average of 250mm. The temperature ranges from 70^0- 90^0 F throughout the season. The area is blessed with vast arable land, shifting cultivation is still the main method of farming in Surulere Local government since the rural population comprising mainly of peasants farmers. Farming is the main occupation of the people but few others have diversified into petty trading, carpentry and others. The Local Government is divided into 10 wards namely: Gambari, Bayaoje, Iresaapa, Arolu, Iresaadu, Iregba, Iwofin, Oko, Illajue and Magin.

The study population comprised of all tomato farmers residing in Surulere Local Government of Oyo State. Two stage random sampling was used in the selection of respondents for the study. The first stage involved a simple purposive selection of ten (10) villages in the local government namely: Gambari, Bayaoje, Araolu, Iresaapa, Iresaasadu, Illajue,Mayin, Iwofin, Oko and Iregba. The large number of tomato farmers and marketers necessitated the choice of this area in Oyo State. The second stage involved the random selection of sixteen (16) tomato farmers from the list of registered tomato farmers' association from the selected villages. A total number of 160 farmers were used for the study.

Primary and Secondary data was used for the study. Primary data was gotten from the field survey through the administration of interview schedule. A structured interview schedule was

used to solicit information from the respondents on issues that bothers on the set objectives of the study. The secondary data was gathered from internet, journals and library.

To determine the adoption level of tomato postharvest value addition technologies, postharvest value addition practices were listed out and the respondents were asked to indicate their level of adoption using the five step adoption model such as: aware, interest, evaluation, trial and adoption.

To find out the constraints to the adoption of postharvest value addition technologies, five point likert-type scales were used. The response option and values assigned were; no extent = 1, little extent = 2, and great extent = 3. These values were added to get 6 and later divided by 3 to get a cut of point of 2. This means that variables with mean scores of 2 and above were regarded as major constraints while variables with mean scores below 2 were regarded as minor problems to the adoption of tomato value addition technologies for postharvest in the area.

The data collected were analysed using descriptive statistics such as frequency, percentage, mean, ranking to achieve objective 1, 2 and 3 while tobit regression analysis was used to test for hypothesis of the study.

RESULTS AND DISCUSSION

Causes of Post-Harvest Losses in Tomato Production

In table 1, the various causes of postharvest losses in the study area were identified and almost all tomato farmers attributed losses to more than one reasons. All (100%) the respondents attributed post-harvest losses to unreliable means of transportation, inadequate storage facilities, non-exposure to modern trend in tomato value addition, disease infestation, limited alternative uses and non-accessibility to improve and quality seed. The result corroborates the findings of Idah *et al.*, (2007) who stated that transportation resulting from vibration by undulation and irregularities on the road can enhance wastages in tomato. Table 1 also revealed that 86.1% of the respondents attributed post-harvest losses to lack of market venue, 75.3% attributed losses to bad road network, 29.7% of the respondents attributed losses to drought, 72.2% of the respondents attributed losses to heavy rainfall and 31.0% attributed post- harvest losses to shortage of labour.

Table 1: Causes of post- harvest loss in tomato production

Perceived causes of post- harvest losses	Frequency (*)	Percentage
Lack of market avenue	138	86.1
Unreliable means of transport to transfer produce to the market	160	100.0
Lack of adequate storage facilities	160	100.0
Bad road network	121	75.3
Non exposure to modern trends in tomato production	160	100.0
Lack of processing plants	120	75.0
Limited alternative uses of produce	160	100.0
Drought	48	29.7
Heavy rainfall	115	72.2
Diseases and pest infestation	160	100.0
Non accessibility to improved varieties and quality seeds	160	100.0

Shortage of labour	50	31.0

Source: *Field survey, 2013*
(*)=Multiple responses

Level of Adoption of Value Addition of postharvest technologies

As revealed in table 2, postharvest technologies mostly adopted were ranked as follows; Sun drying and peeled tomato preserves (88.1%) ranked first, fresh refrigerated (67.5%) ranked third, pureed and sealed with oil in jars (50.6%) ranked fourth, boiled, sealed and packed sealed (50.0%) ranked fifth, cold water bath (46.9%) ranked sixth.

Other postharvest technologies adopted by few of the respondent include; fresh frozen, processed into jam and processed into juice (0.6%) ranked seventh, grind and frozen (0.6%) ranked eighth. Only (3.1%) evaluated pickling, 0.6% trialled irradiation, 2.5% trialled pulping.

From indication, sun drying has the highest level of adoption while irradiation and pulping has the least level of adoption by the respondents in the study area.

Tale 2: Distribution of respondents according to their level of adoption of value addition initiatives.

VALUE ADDITION INITIATIVES	Aware		Interested		Trial		Evaluated		Adopted		Mean	Rank
	F	%	F	%	F	%	F	%	F	%		
Cold water bath	31	19.4	28	17.5	24	15.0			75	46.9	3.3	6
Sun dried into chips	3	1.9	-	-	-	-	16	10.0	141	88.1	4.8	1
Fresh frozen	89	55.6	14	8.8	49	30.6	7	4.4	1	0.6	1.8	7
Irradiation	85	53.1	6	3.8	1	0.6	-	-	-	-	0.6	10
Pureed and sealed with oil in jars	4	2.5	13	8.1	51	31.8	11	6.9	81	50.6	3.9	4
Boiled and sealed	5	3.1	11	6.9	56	35.0	7	4.4	80	50.0	3.8	5
Pulping	87	54.4	6	3.8	4	2.5	-	-	-	-	0.6	10
Pickling	93	58.1	18	11.3	22	13.8	5	3.1	-	-	1.3	9
Grind and frozen	96	60.0	23	14.4	24	15.0	4	2.5	1	0.6	1.5	8
Fresh refrigerated	6	3.8	4	2.5	21	13.1	21	13.1	108	67.5	4.4	3
Peeled tomato preserves	3	1.9	0	0.0	0	0.0	16	10	141	88.1	4.8	1
Processed into jams	87	54.4	19	11.9	31	19.4	9	5.6	6	3.8	1.8	7
Processed into juice	87	54.4	19	11.9	31	19.4	9	5.6	6	3.8	1.8	7

Source: *Field survey, 2013*

Constraints to Practicing postharvest Value Addition Technology

Results of data illustrated in table 3 shows that the major constraints to practicing postharvest tomato technologies include; inadequate technological knowledge about value addition (mean=2.9), inadequate electricity supply (mean =2.9), lack of cold storage facilities (mean= 2.8), lack of awareness about value addition technologies (mean =2.6), lack of contact with extension workers (mean=2.3) and lack of functional farmers association to encourage value addition (mean=2.2).

Other minor constraints with mean less than 2 were; lack of interest by farmers (mean=1.9), inadequate marketing facilities (1.8), inadequate and untimely transportation facilities (mean=1.8) and lack of capital (mean=1.8).

Table 3: Distribution of respondents according to the factors militating against practicing value addition initiatives

CONSTRAINTS	Great Extent		Little Extent		No Extent		Mean score
	F	**%**	**F**	**%**	**F**	**%**	
Inadequate technological knowledge about value addition	155	96.9	25	15.6	1	0.63	2.9*
Lack of capital	134	83.8	5	3.1	-	-	1.8
Lack of awareness about value addition technologies	102	63.8	53	33.1	5	3.1	2.6*
Lack of interest by farmers	21	13.1	107	66.9	32	20.0	1.9
Lack of cold storage facilities	126	78.8	34	21.3	-	-	2.8*
Inadequate electricity supply	147	91.9	8	5.0	5	3.1	2.9*
Inadequate marketing facilities	8	3.8	118	76.3	34	20.0	1.8
Inadequate and untimely transportation facilities	2	1.3	125	78.1	33	20.6	1.8
Lack of functional farmers association to encourage value addition	41	25.6	107	66.9	12	7.5	2.2*
Lack of contact with extension workers	80	50.0	60	37.5	20	12.5	2.3*
Lack of policy to encourage value addition to agricultural produce	1	0.6	67	41.9	92	57.5	1.4
Lack of market avenue	52	32.5	78	48.8	30	18.1	2.1*

Source: *Field survey, 2013*

Test of hypothesis

Null hypothesis: There is no significant relationship between selected socioeconomic characteristics of tomato farmers and the level of adoption of value addition initiatives in tomato production.

The relationship between selected socioeconomic characteristics and their level of adoption of tomato value addition initiatives is presented on table 4. Here, the level of education, membership to a cooperative society, extension contact and access to electricity have a significant relationship with the level of adoption of postharvest value addition initiatives by the tomato farmers in the study area at 1%, 5% and 10% respectively. This implies that the level of education tends to influence the adopt value addition initiatives in tomato production. This is in line with Mrema (2002) who stated in his report that education imparts knowledge, creates awareness and makes inquisitiveness to explore and learn, helps become skilled and make desirable changes in adoption. Moreover, education favours the acquisition of knowledge and widens the horizon of knowledge by proper understanding of the importance of value addition practices by getting exposed to extension agencies and contacting other informal sources.

Table 4: Tobit Regression Table

Factors	Coefficient	Std error	t – value	P > t	Conclusion
Gender	-0.0066309	0.0078076	-0.85	0.397	Not significant
Age	-0.000501	0.0004753	-1.05	0.294	Not significant
Marital status	-0.007957	0.0057307	-1.39	0.167	Not significant
Household size	-0.0037802	0.0047765	-0.79	0.430	Not significant
Level of education	0.0017466	0.0007972	2.19	0.30***	Significant
Years of experience	0.0004946	0.0005333	0.93	0.355	Not significant
Farm size	-0.0058703	0.0057494	-1.02	0.309	Not significant
Cooperative society	0.014835	0.0090165	1.65	0.102*	Significant
Electricity	0.7.2872	0.0373967	1.88	0.062*	Significant
Extension contact	0.215883	0.0009929	2.50	0.013*	Significant

Sigma	0.0384992	0.002837	0.03832*	0.0441052
Constant	0.05683938	0.0604727	9.40	0.000

Source: *Field Survey, 2013*

Note: ***, **, * variable is significant at 1%, 5% and 10% respectively.

CONCLUSION

The study concludes that prevalent causes of tomato postharvest losses in Surulere Local government area of Oyo State were; unreliable means of transportation, lack of adequate storage facilities, limited alternative uses of produce, diseases/pest infestation and non-accessibility to improved varieties and quality seeds. Furthermore, preventive postharvest losses initiatives mostly adopted were: sun-dried into chips, peeled tomato preserves, fresh refrigerated, pureed and sealed with oil in jars and boiled and sealed. Constraints mostly faced include; inadequate technological knowledge about value addition, inadequate of electricity supply, lack of cold storage facilities and lack of awareness about value addition technologies. Regression analysis shows significant relation between preventive initiatives adopted by tomato farmers and their level of education, agricultural cooperative membership and availability of electricity and extension agents' visit.

Based on findings in the study, it was recommended that (i) agencies responsible from supply of electricity should improve services to farming communities of this study area (ii) Agricultural Development Project extension agents and other agricultural advisory organizations should intensify effect to improve educational knowledge of tomato farmers in the study area on improved skills to further minimise post-harvest losses.

REFERENCES

Adepeju A.O. (2014): Post-harvest losses and welfare of tomato farmers in Ogbomosho, Osun state, Nigeria. Journal of store products and Postharvest, 5(2): 8-13

Afolami C.A, Ayinde I.A. (2002): economics of tomato production in yewa north local government area of ogun state, Nigeria. Agro-Science, J. Trop. Agric. Food Environ. Ext., 1(1&2): 17- 23.

Aidoo R., Danfoku R.A, Mensah J.O. (2014): Determinants of postharvest losses to tomato production in the Offinso North district of Ghana. Journal of Development and Agricultural Economics, 6(8):338-334

Asiabaka C.C., Morse S, and Kenyon L (2001): The Development, Dissemination and Adoption of Technologies Directed at Improving the Availability of Clean Yam Planting Material in Nigeria and Ghana" In Asiabaka CC and Owens M. (2002) "Determinants of Adoptive Behaviours of Rural Farmers in Nigeria", Proceeding of the 18th Annual Conference of AIAEE, 2002, Durban, South Africa. pp. 13-20.

Babalola, D.A. Makinde, Y.O. Omonona, B.T. and Oyekanmi, M.O. (2010): Determinants of postharvest losses in tomato production. Journal of Life and Physical Science. ACTA SATCH 3(2): 14- 18.

Etebu, E., Nwauzoma, A.B. and Bawo, D.D.S. (2013): Postharvest Spoilage of Tomato (Lycopersicon esculentum Mill.) and Control Strategies in Nigeria Journal of Biology, Agriculture and Healthcare, 3(10): 51-60

Erdogan G (2007): The econometric analysis of tomato production with contracting in Turkey. J. Appl. Sci., 7(14):1981-1984.

Idah, P. A., Ajisegiri, E. S. A., and Yisa, M. O. (2007): Fruits and vegetables handling and transportation in Nigeria. Australian Journal of Technology 10(3): 175 – 183

Purcell D.L. and Anderson J.R., (1997): Agricultural Extension and Research Achievements and Problems in National Systems, A World Bank Operations Evaluation Study, The WorldBank,Washington, D.C.

Rogers, E. M. (2003): Diffusion of innovations (5th ed.). New York: Free Press. pp 1-576

Mrema, C. G. and Rolle, S. R. (2002): Status of the postharvest sector and its contribution to Agricultural development and economic growth. 9th JIRCAS International Symposium – Value Addition to Agricultural Product, pp. 13-20

Mujib R., Naushad K., Inayatullah J. (2007): Postharvest Losses in Tomato Crop (A case of Peshawar Valley). Sarhad J Agric. 23:4

Sablani, S.S., Opara, L.U. and Al–Balushi, K. (2006): Influence of bruising and storage Temperature on vitamin C content of Tomato. Journal of Food, Agriculture and Environment 4(1): 54 – 56.