



FARMERS' KNOWLEDGE ON POST-HARVEST MANAGEMENT OF TOMATOES IN KOGI AND NIGER STATES, NIGERIA

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ABSTRACT

More than half of tomatoes produced in Nigeria waste away due to improper post-harvest management practices. This scenario always forced farmers to sell at the point of production only for them to buy back at exorbitant prices few months after harvesting. This study assessed farmers' knowledge on post-harvest management of tomatoes in Kogi and Niger States, Nigeria. Multi-stage sampling technique was used in the selection of 340 respondents for the study. Data were collected from primary source using structured questionnaire. Descriptive statistics such as frequency, percentages and mean were used for data analysis. Results showed that 81.2% of the respondents were male with mean age of 42.6 years. Other farmers 75.0%, farmers' forum 67.1% and friends 51.2% were the major sources of awareness on post-harvest management. Less than half 40.9% and 34.7% of the respondents had medium and high knowledge on post-harvest management of tomatoes respectively. Efforts should be made extension agents through training in order to improve knowledge on post-harvest management.

Keyword: Farmers' knowledge; Post-harvest practices; Tomatoes

INTRODUCTION

Tomatoes (*Lycopersicon esculentum*) play important role in supplying human with vitamins and minerals needed for growth and development. The production of tomatoes in Nigeria is mostly carried out on large scale in Northern Nigeria due to suitable agro-climatic condition that favoured its production in large quantities. Tomatoes are either used fresh or processed into paste. Unfortunately, they are not only seasonal but also highly perishable and deteriorate due to lack of proper knowledge on post-harvest practices that would have prolonged its shelf lives. Mohammad, Hionu and Olayemi (2012) estimated that more than 50% of tomatoes produced in Nigeria get wasted due to inadequate post-harvest management. This scenario most times forced farmers to sell their produce immediately after harvesting, only for them to buy it back at an exorbitant price few months after harvesting. The potential increase in income and greater livelihood security will not be achieved if farmers' always sell surplus at the point of production (Saran, Roy and Kitinoja 2012).

Post-harvest management plays significant roles in value addition to tomatoes. It enhances tomato production by reducing post-harvest losses to the barest minimum, improves nutrition, adds value by opening new marketing opportunities, generates new jobs and enhance other related economic sectors for viable growth (Azad, Ali and Islam 2014). Post-harvest management has ability to meet food requirement of the rural households through reduction in post-harvest losses (Abeleira, Pérez, Ferrer, Sánchez and Figueroa 2008). It has been observed that despite the increase in tomatoes production, the post-harvest management in tomatoes and other vegetable present a dismal picture and is mostly comprised of traditional techniques practiced by growers, traders and the

processors resulting in deterioration of physical and nutritional qualities of harvested crops (Oni and Obiakor, 2012). The losses experienced in agricultural products which is due to their perishability in nature affect farmers' output and economic development of Nigeria. Fresh agricultural products deteriorate easily as a result of reduction in moisture content. Agricultural products mostly vegetables and fruits require proper post-harvest management in order to prevent post-harvest losses. The aim of this study was to assess farmers' knowledge on post-harvest management of tomatoes in Kogi and Niger States. The specific objectives were to:

1. describe the socio-economic characteristics of the respondents in the study areas;
2. identify sources of awareness on post-harvest management of tomatoes and
3. assess farmer's knowledge level on post-harvest management of tomatoes.

METHODOLOGY

Kogi State is one of the State where this research was carried out. It is located in the Guinea savannah ecological zone of Nigeria. It consists of 21 Local Government Areas (LGAs), with latitude of 6° 33' and 8° 44' N and longitude 5° 22' and 7° 49' E. Kogi State has a total population of 3,278,487 in (NPC, 2006) and with growth rate of 3.2%, the State has estimated population of 4,636,071 in 2017. The State has land area of about 30,354.74 square kilometers (Kogi State Ministry of Information working document, 2016). Niger State is the second State where this research was conducted. In terms of land mass, it is the largest state in Nigeria. It covers a total land area of 74,224km² thus accounting for about eight percent of Nigeria's land area. About 85% of its land area is good for arable crop production (Niger State Ministry of Information,

2012). It is located within longitude 3° 30' and 7° 20' East and latitude 8° 20' and 11° 30' North, with a population of about 3,950,249 (NPC, 2006) and with a growth rate of 3.2%, the State has an estimated population of 5,586,000 in 2017 (Niger State Geographical Information System, 2015).

Multi-stage sampling procedure was employed for this study in both States. The first stage involved random selection of three (3) out of four (4) Agricultural zones in Kogi State, the Agricultural zones selected were (Zone A, Zone B and Zone C) while all the three (3) Agricultural zones in Niger State (Zone I, Zone II and Zone III) were all selected. The basis of selection was due to high concentration of tomato farmers in these selected zones. The second stage involved random selection of one (1) Local Government Area from each of the zones making a total number of six (6) LGAs from both States. The third stage involved random selection of four (4) communities each from the selected LGAs making a total of twenty four (24) communities. The fourth stage involved the use of proportional sampling to select 10% of the tomatoes producers from the sampling frame of 3343 persons which gave a total of 340 respondents.

Primary data were collected using structure administered questionnaire through personal interview. Descriptive statistics such as frequency distribution, percentage and mean were used to analyse objective i, ii and iii. The knowledge of farmers on post-harvest management of tomatoes was determined by computing a knowledge score based on the farmers' responses against 15 statements on post-harvest management practices. Each of the statements carried a full weight of one (1) for each of the right response, while wrong response was zero (0). Thus, knowledge score of a farmer ranged from 0 to 15, where 1-5=very low knowledge, 6-10 medium knowledge and 11-15=high knowledge.

RESULTS AND DISCUSSION

Socioeconomic characteristics

Table 1 presents the results on the socio-economic characteristics of the respondents. It is shown that majority of the respondents (82.5%) and (80.0%) in Kogi and Niger States respectively were male. The pooled results indicate that 81.2% of the respondents were male. This findings show that majority of the respondents are male. Similar study by Javed (2013) on farmers' knowledge on post-harvest practices of vegetables revealed that majority of sampled respondents were male. The mean age of the respondents in Kogi State according to Table 1 was 42.8 years which is slightly above that of Niger State was 42.4 years. The pooled results indicated a mean age of 42.6 years. This implies that farmers in both States are still within their active age, young, and this may influence their readiness to try new innovation, acquire new skills

and knowledge on every aspects of post-harvest management which is expected to have positive effect on their income and livelihood. This agrees with Barnabas, Pelemo and Ajibola (2019), who reported that majority of the farmers in Kogi State were still in their active and productive age.

The mean farming experience in Kogi State according to Table 1 was 28.9 years, while that of Niger was 26.2 years. The pooled mean farming experience of the respondents was 27.4 years. This implies that farmers from both States have high experience and are well exposed in farming which might have equipped their knowledge and skills on post-harvest management. More so, many years in farming might grant farmers opportunities to get familiarised with every aspect of post-harvest practices that would reduce the menace of post-harvest farm losses and challenges that come with post-harvest handling. However, this was contrary to findings by Muhammed *et al.* (2012) who stressed that majority of farming households in Kano State, Nigeria had moderate farming experience in post-harvest management of tomatoes.

Table 1 shows that larger proportion 91.2% of the respondents from Kogi State had at least one form of formal education which is higher than the 73.9% of the respondents in Niger State. The pooled results on the other hand shows that 82.3% of the respondents had formal education. This findings contradicts the research work by Mohammed, Umar, Olaleye Tyabo, Tsado and Pelemo (2018) who reported that majority of farming populace in Niger State, Nigeria had non-formal education. The distribution of the respondents according to farm size in Table 1 shows that the mean farm size of farmers' in Kogi State was 3.30 hectares while that of Niger State was 2.37 hectares. The pooled farm size of the respondents according to Table 1 was 2.8 hectares. The findings means that farmers from both States are small scale farmers and mostly subsistent producing mainly for consumption and sales. This finding is in line with that of Aliber and Hart (2016) who opined that majority of farmers in rural Sub-Saharan African countries are subsistent in nature.

The distribution of the respondents according to annual income in Table 1 shows that the mean income of the respondents in Niger State was N 277,213, which was greater than that of Kogi State N 116,887. Also, the mean pooled results of the respondents was N 341,589. The findings from both States indicated that respondents earned reasonable income that could assist them in procuring post-harvest materials. However, farmers with high income are not always constraint financially in seeking for new techniques, skills and knowledge that will enhance their income and livelihood. They tend to try new ideas that will enhance their output and standard of living (Dimelu, Enwelu, Attah and Emodi 2014). Table 1 further



shows that the mean annual non-farm income in Niger State was N124,694 while that of Kogi State was N116,887. Also, the pooled of non farm annual income of the respondents was N121,020. This is

considerably low compared to income from farming activities and this could negatively affect adoption of post-harvest management.

Table 1: Distribution of farmers according to their socio-economic characteristics

Variables	Kogi State (n=160) Percentage	Niger State (n=180) Percentage	Pooled (n=340) Percentage
Sex			
Male	82.5	80.0	81.2
Female	17.5	20.0	18.8
Age (years)			
≤30	21.2	17.2	19.1
31-40	20.6	25.0	22.9
41-50	35.6	37.2	36.5
51-60	17.5	18.9	18.2
>60	5.0	1.7	3.2
Mean	42.8	42.4	42.6
Farming experience (years)			
1-10	10.6	8.3	9.4
11-20	18.1	26.7	22.6
21-30	25.0	33.3	29.4
31-40	25.6	21.7	23.5
>40	20.6	10.0	15.0
Mean	28.9	26.2	27.4
Highest educational level			
Non-formal	8.8	26.1	17.9
Primary	28.1	29.4	28.8
Secondary	40.0	28.9	34.1
Tertiary	23.1	15.6	19.1
Farm size (hectares)			
≤1.0	12.5	25.6	19.4
1.01-2.0	25.6	38.3	32.4
2.01-3.0	26.2	20.0	22.9
3.01-4.0	18.1	7.8	12.6
4.01-5.0	5.0	2.2	3.5
>5.0	12.5	6.1	9.1
Mean	3.30	2.37	2.80
Annual farm income (N) (naira)			
≤ 50000	8.1	5.6	6.8
51000-100000	16.2	12.2	14.1
101000-150000	15.0	13.3	14.1
151000-200000	15.6	11.1	13.2
201000-250000	8.8	9.4	9.1
>250,0000	36.2	48.3	42.6
Mean	414012	277213	341589
Annual non-farm income (N)			
≤ 50000	26.9	27.6	27.3
51000-100000	14.1	31.6	23.9
101000-150000	14.1	10.2	11.9
151000-200000	5.1	4.1	4.5
201000-250000	2.6	2.0	2.3
>250,0000	37.2	24.5	30.1
Mean	116887	124694	121020

Sources: Field survey (2018)

Sources of awareness on post-harvest management of tomatoes

Results in Table 2 shows that other farmers ranked 1st as the major sources of awareness on post-harvest management of tomatoes in Niger State, which was followed by farmers forum which ranked 2nd and community meetings ranked 3rd. The farmers in Kogi State indicated that other farmers ranked 1st as the major source of awareness on post-harvest management of tomatoes, this was followed by friends which ranked 2nd and farmers forum that ranked 3rd. The pooled distribution of the farmers according to sources of awareness on post-harvest management revealed that other farmers, farm forum ranked 1st and 2nd respectively, while the least sources awareness according pooled results were field day and written information that ranked 11th

and 12th respectively. The findings imply that other farmers, farmers’ forum and friends are the major sources of awareness on post-harvest management in the study area. These findings agreed with Tsado, Ajayi, Tyabo, Pelemo and Adebayo (2018), who stressed that other farmers and friends were the major sources of information on the improved rice varieties in Niger State, Nigeria. Similar findings by Ajani and Onwubuya (2012) revealed that other farmers and extension agent were the major sources of information on indigenous maize storage among farmers in Anambra State, Nigeria. Also, Elemasho, Alfred, Aneke, Chugali and Ajiboye, (2017) reported that other farmers were the major sources of awareness on post-harvest management in River State, Nigeria.

Table 2: Distribution of farmers by sources of information on awareness of post-harvest management of tomatoes

Sources of awareness*	Kogi State (n=160)		Niger State (n=180)		Pooled (n=340)	
	Percentage	Rank	Percentage	Rank	Percentage	Rank
Friends	68.8	2 nd	35.6	4 th	51.2	3 rd
Field days	10.0	10 th	11.1	10 th	10.6	10 th
Parents	10.7	9 th	12.2	9 th	11.5	9 th
Mass media	34.4	5 th	30.6	6 th	32.4	5 th
Extension officers	38.8	4 th	35.6	4 th	37.1	4 th
Ministry of agriculture	22.5	6 th	16.1	8 th	19.1	7 th
ADP	18.8	7 th	16.7	7 th	17.6	8 th
Farm forum	61.2	3 rd	72.2	2 nd	67.1	2 nd
Others farmers	73.1	1 st	76.7	1 th	75.0	1 st
Exhibition	3.8	12 th	11.1	10 th	7.6	12 th
Community meeting	14.4	8 th	37.8	3 rd	26.8	6 th
Written information	10.0	10 th	7.8	12 th	8.8	11 th

Sources: Field survey, 2018

*Multiple responses

Farmers’ knowledge on post-harvest management of tomatoes

Table 3 indicated that 50.0% of the respondents in Niger State had medium knowledge on post-harvest management of tomatoes while 35.0% had high knowledge. The pooled results showed that 40.9% of respondents had medium knowledge on post-harvest management of tomatoes, while 34.7% had high knowledge on post-harvest management. The pooled results revealed that only few of the respondents had high on post-

harvest management of tomatoes. This scenario is not that good as it could results to post-harvest losses. Moreover, high and medium knowledge of farmers on post-harvest management of tomatoes could assist in combating post-harvest losses. It is also expected that proper and good knowledge on sorting, grading, diseases and pest control and others post-harvest practices are expected to boost farmers output and eliminate post-harvest farm losses while low knowledge could serve as hinderance to farmers from adopting post-harvest management.

Table 3: Knowledge of farmers on post-harvest management of tomatoes

Variables	Score range	Kogi State (n=160)	Niger State (n=180)	Pooled (n=340)
		Percentage	Percentage	Percentage
Low knowledge	1-5	5.0	9.4	10.3
Medium knowledge	6-12	47.5	50.0	40.9
High knowledge	11-15	47.5	35.0	34.7

Sources Field survey (2018)



CONCLUSION AND RECOMMENDATIONS

Tomato production in the study area was dominated by young male farmers with limited formal education. The major sources of awareness on post-harvest management of tomatoes were other farmers, farmers' forum and friends. Moreover, less than half of respondents had medium and high knowledge on post-harvest management of tomatoes. It is recommended that farmers should be enlightened and trained by extension agents and other well learned farmers on the benefits attached to post-harvest management in order to boost their knowledge. Also, efforts should be made by tomatoes farmers to diversify into other income generating activities in order to augment their non-farm income

REFERENCES

- Abeleira, N., Pérez, O. C., Ferrer, J. G., Sánchez, E. G., and Figueroa, H. H. (2008). Postharvest losses of common bean seed in a traditional storage system. *Agricultura Técnica en México*, 34(1), 91-100.
- Ajani, E. N., and Onwubuya, E. A. (2012). Assessment of Use of Indigenous Maize Storage Practices Among Farmers in Anambra State, Nigeria. *International Journal of Innovation and Technology*, 2 (2), 48-53
- Aliber, M., and Hart, T. G. B. (2016). Should subsistence agriculture be supported as a strategy to address rural food insecurity? *Agrecon*, 48 (4), 434-458
- Azad, M. J., Ali, M. S., and Islam, M. R. (2014). Farmers' knowledge on post-harvest practices of vegetables, *International Journal of Experimental Agriculture*, 4 (3), 7-11
- Barnabas, M. T., Pelemo, J. J., and Ajibola, B. O. (2019). Effect of Cashew Production on Rural Poverty Alleviation and its Constraints on Farmers in Kogi State, Nigeria. *Agricultural Economics and Extension Research Studies (AGEERS)*, 7 (1), 86-93
- Dimelu, M. U., Enwelu, I. A., Attah, C. P., and Emodi, A. I. (2014). Enhancing performance of farmers' cooperative in rice innovation system in Enugu State, Nigeria. *Journal of Agricultural Extension*, 18 (2), 206-219.
- Elemasho, M. K., Alfred, S. D. Y., Aneke, C. C., Chugali, A. J. C., and Ajiboye, O. (2017). Farmers' perception of adoption of post-harvest management of selected food crops in Rivers State, Nigeria, *International Journal Agricultural Innovation and Technology*. 7 (1), 22-26
- Javed, M. D. (2013). Farmers' knowledge on postharvest practices of vegetables, thesis submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in partial fulfillment of the requirements for the degree of Master of Science in Agricultural Extension and Information System, Bangladesh. Pp. 1-121
- Kogi State Ministry of Information (2016). *Working Document*. Pp. 1-56
- Mohammed, U., Umar, I. S., Olaleye, R. S., Tyabo, I. S., Tsado, J. H., and Pelemo, J. J. (2018). Assessment of Forest Resources Utilization for the Livelihood of Farming Populace in Kogi and Niger States, Nigeria, *Dutse Journal of Agriculture and Food Security DUJAFS*, 6 (1), 29-37
- Muhammad, R. H., Hionu G. C., and Olayemi, F. F. (2012). Assessment of the post-harvest knowledge of fruits and vegetable farmers in Garun Mallam L.G.A of Kano, Nigeria, *International Journal of Development and Sustainability* 1 (2), 510-515.
- National Population Commission (NPC), (2006). Year book on Nigeria population data. Report of the NPC. Retrieved from <http://www.jstor.org>. 02/02/14.
- Niger State Geographic Information System (2015). Background information. Retrieved from www.nigergis.com/about_niger_state. 04/04/13
- Niger State Ministry of Information. (2012). *Working document*, pp. 1-71
- Oni, K. C., and Obiakor S. I. (2012). Post harvest food loss prevention. The role of the National Centre for Agricultural Mechanization (NCAM) Ilorin under the FGN/UNDP first country Cooperation (ccf-1) framework. Proceeding of National Seminar for Cooperating Agencies under the CCF-1 Framework on Post-Harvest Food Loss Prevention (6th), April 18-19, Ibadan, pp: 1-10
- Saran, S., Roy, S. K., and Kitinoja, L. (2012). Appropriate postharvest management for improving market access and incomes for small horticultural farmers in Sub-Saharan Africa and South Asia. Part 2: Field trial results and identification of research needs for selected crops. *Acta Horticultural*. 934, 41-52.
- Tsado, J. H., Ajayi, O. J., Tyabo, I. S., Pelemo, J. J. and Adebayo, E. (2018). Socio economic analysis of rice farmers' uptake of improved seeds for enhanced well-being in Wushishi community In Niger State, Nigeria. Paper presented at 27th Annual Conference of Rural Sociology Society of Nigeria RUSAN held at Ahmadu Bello University Zaria, 7th-11th October