

## Factors Affecting the Adoption of the Re-Usable Plastic Vegetable Crate in Three Local Government Areas of Kano State, Nigeria

A. Adegbola, E.I. Bamishaiye and F. Olayemi

Nigeria Stored Products Research Institute, Private Mail Bag. 3032, Kano, Nigeria

**Abstract:** The study seeks to know the factors affecting the use of the re-usable plastic crates by farmers and merchants in three (3) Local Government areas namely Kumbosto, Kura and Nassarawa of Kano State, Nigeria. Data was collected through the use of structured questionnaire. One hundred and fifty (150) respondents were randomly selected and sampled for the study. Investigative Survey Research Approach (ISRA) and descriptive statistics were used in analysing data. The study found out these reasons why the respondents are not using the re-usable plastic crate among others; the crate were expensive even when they were available (100%), the crates are not readily available but palm baskets, jute and polythene bags are (91%), the crate is not a unit of measure commensurate with the measure of traditional packaging's (65%), it is difficult changing old habits (18%), there is very low knowledge about the existence of the crate (11%), and finally, lack of contacts with extension agents to push for the use of the plastic crate is seen as a culprit for non- use of the crate (9%). It was recommended that the plastic crate be made available at a highly subsidized cost, plastic manufacturing companies should be given incentives to start production, or better still the government be involved in its production. Plastic manufacturing companies and the government should produce crates that would be commensurate in measurement with the traditional packagings. Finally, extension bodies should be involved in a massive enlightenment campaign in all ramification to make the crate and its' advantages be known over traditional packagings.

**Key words:** Farmers, fruits, merchants, non-use, vegetables

### INTRODUCTION

The Modern trend in handling and packaging of fruits and vegetable have shifted from the use of traditional palm baskets, polythene bags, sacks and jute bags towards the increasing use of plastic crates in which for now is seen as the most efficient method for transporting and handling of fruit and vegetable through all the links of the distributions chain. Nigeria is said to produce fruits and vegetables in large quantity yearly; it produces about 3.8 million tonnes of onions, 6 million tonnes of tomatoes, 15 million tonnes of plantain and 35 million tonnes of citrus (Erinle, 1989). According to Kra and Bani (1988) vegetables production forms about 25% of major food crops cultivated in the tropics, hence, it is an item of commerce and a source of livelihood for a considerable section of the population apart from the fact that they are an important source of vitamins and minerals and a sine qua non part of our diet. Sadly though, increased fruit and vegetable production in Nigeria like other parts of the developing countries have not been met by improvement in post harvest handling to maintain quality and reduce wastage. According to Bachman and Earles (2000) high quality and disease free produce with a good shelf life is the result of proper post harvest handling among others.

But a worrying picture is painted by Charles (2009) when he posits that about 30-50% of fruits and vegetable produced in Nigeria are lost annually at post harvest stages. Fruits and vegetables need to be handled somehow at different stages before they get to the final consumers, and at each of these, injuries which can be external or internal can occur giving way to damages and subsequent losses (Domingo *et al.*, 2004), hence, the more carefully fruits and vegetables are handled, the slower the deterioration process will set in, to this end injuries must be avoided. Again, because fruit and vegetable are highly perishable and one of their basic intrinsic qualities is high water content, this predisposes them to deteriorate fast, this is further aggravated if they are not packed with ideal packaging materials after harvest, during transportation, and at display stage. Daramola (1988) painted a direr picture of the wastage in fruits and vegetable than that of Charles (2009) when he pointed that 50% of fruits and vegetable are lost between harvest and consumption. To reverse this trend the use of appropriate packaging materials can not be over emphasized, more so, the more highly perishable a produce, the greater the importance of the quality of the packaging. Loss of vegetable are a waste of the many resources used for their production (Land, labour, water, seeds, fertilizer and other inputs), if and

when the plastic crates are used, farmers, merchants, transporters and handlers would increase their income by reducing waste and losses on the one hand, and they would have the leeway to stack, display, handle and store produce better without damaging the produce like they would using the traditional baskets and sacks. To crown it all consumers would pay a reduced price for better products. Of what use would the plastic crates be if fruits and vegetable merchants and handlers which it was designed for would not use it despite its plethora of advantages over the palm baskets, polythene, and jute sacks? To buttress the advantages of the plastic crate, Fernando (2006) maintained that reduction of post harvest losses in vegetables actually went from 30%- 5% when plastic crates were used. In a study carried out by Idah *et al.* (2007) it was revealed that 58% of handlers sampled believed that the traditional palm basket is ineffective and 35% believed the polythene and jute bag are ineffective and yet none of the handlers would use the plastic crate. On the contrary the crates were used as sitting stools, stands for display of fruits and vegetable, and as crates for bottles of palm and groundnut oil to mention a few. The non- use of the plastic crates despite it is known advantages over traditional methods by farmers, merchants, handlers and others in the distribution chain is an issue of grave concern because of its negative impact on the economy and food security in the country and as such is worthy of investigation.

## MATERIALS AND METHODS

The survey was carried out in three (3) locations in Kano State they are Yanlemu, Kumbosto LGA, Kwanar Gafan, Kura LGA, and Yankaba, Nassarawa LGA of Kano State, Nigeria from June-November, 2010. A total of 150 respondents identified as professional farmers and merchants were randomly selected and interviewed for the survey by us in tandem with the heads of farmers and sellers (merchants) in these areas. From each of the three (3) locations 50 respondents were selected making the total i.e., 25 farmers and 25 merchants were selected from each location and this sums up to 150 respondents. A minimum of two years experience was used as a criterion for selection. The survey was carried out using the Investigative survey research approach (Anazodo *et al.*, 1986 as quoted in Chukwu (1994). Data was collected from the respondents by means of structured questionnaire which seeks answer to the following germane questions among others; what respondents use to package their produce, if they known the plastic crate, if they have had contacts with extension agents in the past one year, if the crate are available, their reason(s) for not using the plastic crate, awareness level of the crate, if they believe the crate is better than traditional methods among others.

Table 1: Personal characteristics of respondent (N = 150)

Variables	Frequency	Percentage
<b>Gender:</b>		
Male	150	100
Female	0	0
<b>Age:</b>		
30 years and below	27	18
31-40 years	23	22
41-50 years	37	25
51 years and above	53	35
<b>Level of education:</b>		
No formal education	79	53
Primary education	48	32
Secondary education	18	12
Post secondary education	5	3
<b>Farmer's/merchant experience:</b>		
2-5 years	27	18
6-10 years	31	20.6
11-15 years	61	40.6
16 years and above	31	20.6

Table 2: Mode of packaging of respondents

Variables	Frequency	Percentage
What do you use for packaging?		
Palm basket	137	91
Jute or and polythene bag/sack	13	9
Wooden crate	0	0
Plastic crate	0	0

**Data analysis:** The tools used for data analysis for the study is descriptive statistics; this has to do with the use of central tendency including mean frequency distribution and percentages.

## RESULTS AND DISCUSSION

Result of Table 1 shows that fruits and vegetable production, handling and selling is basically and exclusively a male business in the areas under study, the table reveals that 100% of the respondents are male, this may be largely due to the cultural practice in this areas which most often than not limit woman to raising children, taking care of the home and needs of her husband. It further reveals that 18% of the respondents are 30 years of age and below, 22% of respondents are 31-40 years of age, 25% of the respondents are 41-50 years of age, while 35% of respondents are 51 years of age and above. This is a pointer to, and attests to the declining numbers of youths taking to agriculture and its concomitants; it corroborates the position of Ekong (2003) that the younger population are jettisoning agriculture for jobs in the cities. Again, older people are taking to fruits and vegetable farming and selling because it is less labour tasking compared to yam, maize and cowpea etc. Table 1 further reveals that 53% of respondents do not have formal education, 32% have primary education, 12% have secondary education and 3% have post secondary education. Low level education could be adduced as a reason for non-use of the plastic crate, Okoedo-Okojie and Onomolease (2009) lay

Table 3: respondents' perception of the plastics crate (N = 150)

Variables	Frequency	Percentage
<b>a. Knowledge of the plastic crate:</b>		
Have knowledge	121	81
Do not have knowledge	29	19
<b>b. Are the plastic crates available:</b>		
Yes	0	0
No	150	100
<b>c. Have you at any time used the plastic crate:</b>		
Yes	32	21
No	118	79
<b>d. If the plastic crates are available would you used them:</b>		
Yes	133	89
No	17	11
<b>e. Do you know any seller or distributor of the plastic crates:</b>		
Yes	0	0
No	150	100
<b>f. How would you rate the awareness level of the plastic crate:</b>		
Very high	0	0
High	0	0
Low	14	9
Very low	136	91
<b>g. Do you believe the plastic crate is better used and has more advantages over the palm basket and sacks:</b>		
Yes	117	78
No	33	22

credence to this position when they posit that low education may influence non-adoption of technology adversely. A farmer's level of education is expected to have a bearing on his ability to adopt agricultural technology innovation and decisions, however, the lack of this could be fingered as a culprit for non adoption of the plastic crate by respondents. Finally, Table 1 shows that on the whole about 61% of the respondents have over ten years experience in their field, this reveals that those selected for the survey are no green horns in their profession. Table 2 reveals the mode of packaging of respondents, 91% use the tradition palm basket for packaging, 9% use jute or polythene bag/sack, none of the respondent use wooden crate, and lastly, none of the respondents use the plastic crate. The salient point that has eluded scholars is that the palm basket industry is a large thriving and very profitable one and those merchants profiting from it would do all things possible overtly or covertly to remain in the trade. These basket merchants are at a position of advantage (their basket is cheap and readily available) and are closer to the end users than those propagating the use of the plastic crate who are not in sight and who seldom visits; the basket merchants are part of the community, they are respected, and they influence opinion to their advantage (Atala *et al.*, 1992). Table 3a shows that 81% of respondents know the plastic crate, and 19% do not know the crate, this 19% is far too large and leaves much to be desired, there should be a concerted effort by organizations involve in the propagation and use of the crate to do more, Nigerian Stored Product Research Institute (NSPRI) inclusive; the crates have to be known first before they are used let alone adopted. Table 3b shows that none of the

respondents believe that the plastic crate is available. Our trips to four plastic companies in Kano explains more; these companies told us the crates are not available and the best we got was that a company promise us it can produce the crate for us if we place an order for it, however, the condition for this is to pay \$40,000 (forty thousand US dollars) for them to produce the mould in India and the crate can only then be ready in three months. With this one can now fathom what the respondents' attitude would be towards the use of the crate. However, this set back can be overcome if the government at all levels invest in the production or procurement of the crate and give it out to users at highly subsidized rate or give it out outright free as was done in Sri Lanka (Anonymous, 2011a) and Kwara State, Nigeria (Anonymous, 2011b) . Table 3c further shows that 21% of the respondents have used the plastic crate at one time and a whopping 79% have never used it. The data on Table 3d corroborate the conclusion reached from analysis of Table 3c, 89% of the respondents believe that if the crates are available they will use them and a token 11% maintain that even if the crate are available they will not use them. The large numbers of respondents who are ready to use the crate if the crates are available is a pointer that non- availability is a major factor in non-use of the crate. Table 3e further buttresses this, when asked if the respondents know any seller or distributor of the crate, 100% of the respondents answered in the negative. It is only rational for respondents not to use the crate because it is not available and worst still they do not know a single seller or distributor of it even if they desire to use it. Table 3f shows the level of awareness of the crate among the respondents; a whopping 91% of the

Table 4: Main factors responsible for non –use of the plastics crate

Factors	Frequency	Percentage
What in your view is (are) the main factor(s) for non-use of the plastic crate:		
They were expensive	150	100
They are not a unit of measure	95	65
Crates are not readily available but palm baskets and sacks are always available	136	91
Palm baskets and sacks are better	12	8
Do not know the plastic crate	16	11
It is difficult to change old practices	28	18s

\*: Multiple responses, hence, total exceeds sample sizes (150)

Table 5: Respondents’ contact with extension workers

Variables	Frequency	Percentage
Any contact(s) with extension agents in the past one year:		
Yes, I have had	13	9
No, I have not	137	91

respondents believe the awareness level is very low. Explanation to this can not be far-fetched, juxtaposing in Table 3e and 5 with Table 3f, one would come to conclude they have a thing in common; firstly in Table 5, 91% of respondents have not had contacts with extension agents in the past one year, in Table 3e, none of respondents know any seller or distributor of the crate (Table 3g); on whether the respondents believe the plastic crate is better and more advantageous than the palm basket, jute and polythene sacks, 78% of the respondents believe the plastic crate is better used and offers more advantages than the traditional palm basket, jute and polythene sacks. This raises a pertinent question; if 78% of respondents believe the plastic crate is better than traditional packaging, why are they not using the crate? Table 4 holds the key to this, when respondents were asked their reason(s) for not using the plastic crate, 100% of them said the crate were expensive, 91% maintained the crate are not readily available but basket and sacks are always available, 65% said the crate is not a unit of measure, 18% maintain they find it difficult changing their old practices, 11% maintain they do not know the crate, and lastly, 8% maintain that the basket and sacks are better. Table 5 shows that 91% of the respondents have not had contact(s) with extension agents in the past one year. One can categorically infer from this that if respondents have had constant visits (contacts) with extension agents perhaps, they would have been positively inclined to the use of the crates. Moreover, if there is demand for the crate, the plastic companies who are out to make profit would be in a position to manufacture these crates because they are demand and profit driven, and it would be available all over. Besides, Okoedo-okojie and Onomolease (2009) posit that farmers in contact with extension agent are almost twice more likely to use improved technology than those with no contact with extension agents. Atala *et al.* (1992) holds a similar position as the last when he said farmers in contact with extension agents are more likely to adopt improved technology than farmers without contacts, to this end it is

fundamental for extension agents propagating the use of the crate to reach out more and frequently to farmers, handlers, and other would be users of the crate. Furthermore, extension services in all tiers of government should be overhauled, so that farmers and merchants’ confidence would be boosted on the usefulness of extension information (Muhammed-Lawal *et al.*, 2009).

## CONCLUSION AND RECOMMENDATION

Sequel to the analysis of data and results of the study, we can come to the conclusion that though there are a lot of reasons why farmers, merchants, and handlers would not use the re-usable plastic crate, but chiefly among these and firstly, is that the reusable crates are expensive, Secondly, they are not available but the traditional packagings are. Thirdly, the reusable crates are not a unit of measure i.e., they are not commensurate with the measure of the traditional packaging (palm basket, jute and polythene bags). Fourthly, old practices and habits die hard; they are difficult to jettison especially when those profiting from the continual use of the traditional packaging’s live in their community and are part of it. Fifthly, low knowledge about the existence of the crate is a set back and a bane on its use. Lastly, extension agents’ contact with the would-be users of the plastic crate is at low ebb, this has a negative implication for the use of the crate. To facilitate the use of the re-usable plastic crate among farmers, handlers, and merchants, these recommendations are put forward:

Plastic crates should be made available at highly subsidized cost or better still, they should be given free and forced on the users like it was done in Sri Lanka. Again, plastic Manufacturing companies should be giving grants to jump start the production of these crates or better still the Federal Ministry of Agriculture could be involved in its production. Furthermore, extension agents should as a matter of urgency dwell less on rhetoric, rather they should go all out to disseminate and propagate the reusable plastic crate among farmers, handlers, and

merchants. Lastly, the three tiers of government should come together and by this synergy reintroduce the crate and involve in a mass awareness campaign that would make the plastic crates come to be used and come to stay.

Conclusively, the findings/recommendations if adopted would be most invaluable to farmers/ merchants of fruits and vegetables and policy makers in Agriculture in checking the huge wastages that occur due to improper packaging systems.

#### ACKNOWLEDGMENT

We will like to acknowledge Mr Martins Bamishaiye for his technical support and the fruits and vegetables farmers and merchants Association of Yanlemu, Kwanar Gafan, Yankaba markets.

#### REFERENCES

- Anonymous, 2011a. Sri Lanka internet Newspaper. Retrieved from: <http://www.colombopage.com/achive>, (Assessed on: March, 2011).
- Anonymous, 2011b. Kwara State of Nigeria, Ministry of Agriculture, Retrieved from: <http://www.kwarastate.gov.ng/agriculture/ministry-of-agriculture.com>, (Assessed on: March, 2011).
- Atala, T.K., E.E. Akanya and Y.A. Abdullahi, 1992. Adoption of Recommended Horticultural Practices in Kano Municipal LGA of Kano State of Nigeria. *The Nigerian J. Rural Commun. Dev.*, 4: 70-80.
- Bachman, J., and R. Earles, 2000. Post harvest handling of fruits and vegetables. Horticulture Technical Note, Appropriate Technology Transfer for Rural Areas, Fayetteville, AR72702.
- Charles, A., 2009. Reducing Post harvest Losses of Horticultural Commodities in Nigeria through Improved Packaging cited from the world of Food Science article Page.
- Chukwu, O., 1994. Technical evaluation of rice threshed in use in Niger State Nigeria. Mechanical Engineering Project Report (unpublished) from Department of Agricultural Engineering UNN, Nsukka, Nigeria, pp: 56-57.
- Daramola, A.M., 1988. Post harvest handling of indigenous fruits and vegetables: Status, Problems and prospects. Paper presented at the meeting of Experts on Indigenous Crops and Animal Research and Development Nigeria.
- Domingo, M., 2004. Mechanical Damage during Fruit Post-Harvest Handling: Technical and physiological Implications. *Prod. Practices Qual. Assess. Food Crops*, 2: 233-252.
- Ekong, E.E., 2003. An Introduction to Rural Sociology. Dove Educational Publications, Uyo, pp: 25-26.
- Erinle, I.D., 1989. Present Status and Prospect for Increased Production of tomato and pepper in Northern Nigeria. *Proc. Int. Symp. Intergrated Management Practices*. AVRDC, Tainan, Taiwan.
- Fernando, M.D., 2006. Country Paper - Sri Lanka(2), Proceedings of Seminar on Post-harvest Management of fruits and vegetables in Asia-Pacific region, Asian Productivity organization (Tokyo) and Food and Agricultural Organization (Rome), pp: 264-275.
- Idah, P.A., E.S.A. Ajisehiri and M.G. Yisa, 2007. Fruits and vegetables handling and transportation in Nigeria. *Aust. J. Technol.*, 10(3): 175-178.
- Kra, E. and R.J. Bani, 1988. Handling and Transportation of Vegetables in Ghana. *Agricultural Mechanization in Asia, Africa and Latin America*. AMA, 19(2): 52-54.
- Muhammed-lawal, A., O.A. Omotesho and A. Falola, 2009. Technical efficiency of youth participation in agriculture programme in Ondo state, South Western Nigeria. *Nig. J. Agric. Food Environ.*, 5(1): 20-26.
- Okiedo- Okojie, D.U. and E.A. Onomolease, 2009. Factors affecting the adoption of Yam storage technologies in the Northern ecological zone of Edo State, Nigeria. *J. Hum. Ecol.*, 27(2): 155-160.