Determination of Causes of Post-Harvest Losses in Orange Marketing in Selected Markets in Kano State, Nigeria.

James D., A. Abba., Aisha M., Shamsuddeen J., & O.O. Oni.
Federal College of Agricultural Produce Technology
Kano Plot 54-56 Central Bank Road
Hotoro Extensions.
melajames2016@gmail.com

Abstract
This study analysed the causes of post-harvest losses in orange marketing in selected markets in Kano state, Nigeria. Multistage sampling technique was used for sample selection in the study area. The first stage involved purposive selection of three major markets notable for orange marketing. The second stage was based on random selection of 30% of the traders from each of the markets targeting total of 124 orange marketers, 100 retailers and 24 whole sellers. Data for the study was analyzed using descriptive statistics, The result of the socio economics characteristics revealed that age of orange retailers in the study area was found to fall between 23 and 69 years, and that of wholesalers falls between 36 and 69, which is economically active age. The result on major causes of post-harvest losses revealed that poor market patronage, poor transportation facility, inadequate storage facility, poor storage facility, physical damage, inadequate management skill, pest and diseases and weather condition were the major causes of post-harvest losses. The strategies adopted by the marketers to reduced post-harvest losses during orange marketing were through advertisement of the produce, good packaging and persuasion of customers.

Key Words: Post Harvest, Losses, marketing, Causes.

Introduction

Post-harvest loss has been a bane to food security in Nigeria. Even though increased yield has been found to be possible (Arowojolu, 2000). Post-harvest losses have prevented the effect of the increase to be felt on the income of the small-scale farmers. Aworh (2004) stated that the post-harvest losses of fruits run into billions of Naira annually, while Khang (2003) opined that the losses not only affect output but reduce farmers' income all over the world. Post-harvest losses are much higher for highly perishable fresh fruits, vegetables than for cereals and other field crops. Fresh commodities have individual requirement with respect to temperature and other factors that must be provided for during the marketing process.

Orange fruit production as an important part in horticultural industry has emerged as a major economic activity in developing countries, especially those which were hitherto heavily dependent on agricultural production, often at subsistence levels. Horticultural producers in developing countries are mostly small farmers, and they are rarely organized into a formal cooperative or association. It is estimated that 10 to 20% of all farmers are producers of horticultural crops, sometimes in combination or rotation with field crops (FAO, 2010). Despite of economic importance, horticultural crops including orange fruits are important sources of plant nutrients, vitamins and minerals that are essential for human health and well-being, particularly for children and pregnant or nursing women (WFLO, 2010).

Post-harvest losses in tropical fruits vary widely from 10 percent to 80 percent in both developed and developing countries (FAO, 2006). These losses occur all along the supply chain, beginning from the time of harvesting right up to packing, storage, transportation retailing and consumption (WFLO, 2010). In most developing countries, this is mainly due to the combination of poor infrastructures and logistics, poor farm practices, lack of postharvest handling knowledge and a convoluted marketing system (Kitinoja (2002), Ray FAO, 2006) and Ravi (2005) and WFLO (2010) observed that 40 to 50 percent of horticultural crops which includes, fruits and vegetables are lost before they reach consumers. Main reason for waste is due to high rates of bruising, water loss and subsequent decay during postharvest handling (WFLO, 2010).

The unavailability of large scale processing factories that normally help preserve the surplus produced for future use to leaves farmers and traders with no option but to watch their produce go waste any time there is no ready market. These scenarios are most obviously diminishing the fortunes of orange farmers and marketers at the same time when foreign producers are indirectly financed by the government of Nigeria and businesspersons through the importation of fruits products from the foreign market (Anthony, 2011) these losses can therefore lead to decrease in the returns of the marketers and the farmers. It is against this background this study was design to address the following objective;

Objective of the Study
The main objective of the study is to examine the economics of post-harvest losses in orange marketing among the respondents. The specific objectives are to;
1) Describe the socio economic characteristics of orange marketers.
2) Ascertained the causes of post-harvest losses of orange at the course of marketing
3) Describe the methods used by orange marketers to reduce

Methodology
Yan Lemo fruit market is located in Kumbotso Local Government along Na'ibawa Zaria Road. Opposite Sa'adatuRimi College of Education kano state, yankaba market is situated along hadeja road Nasarawa LGA and yankura is situated in fagge LGA it boarders sabon gari market and singa market to north and west respectively these markets were selected for the study due to high concentration of orange traders at retail and whole sale level in the markets.
Data for the study was collected from primary sources. Primary data was collected with the aid of structured questionnaires which were administered to the selected orange marketers. The data was collected by the researcher with the assistance of trained enumerators. Data collected include information on the socio-economic characteristics of the marketers such as gender, educational Qualification, marital status, years of experience etc, causes of post-harvest losses, post-harvest preservation strategies adopted by orange marketers.
Descriptive statistics is one of the simplest and most frequently used tools by researchers (Edward, 1996). It is used to describe and summarize relatively large array of data into meaningful forms such that they could be easily interpreted (Babalola, et al, 2002). The descriptive statistics such as frequency counts, percentages, mean and standard error was be employed in describing the socio economic characteristics of the orange marketers, identifying causes of post-harvest losses and strategies adopted to reduce the loss by the marketers.

Result and Discussion
Socioeconomic of orange marketers in the study area were, Age, house hold size, and marketing experience as in table 1 below.

| Age | Retailers | | Wholesaler's | |
class interval	frequency	percentages	frequency	percentages
18_30	19	19.4	_	_
31_40	32	32.7	1	5.0
41_50	27	27.6	3	15.0
51_60	14	14.3	10	50.0
61abv	6	6.1	6	30.0
Total	98	100	20	100
Minimum	23.00		36	
Maximum	69.00		69	
Std. deviation	10.72		8.85	
Mean	42.30		57.15	
House hold size				
2_10	68	69.4	6	30
11_20	23	23.5	14	70
21_30	7	7.1	_	_
Total	98	100	20	100
Minimum	4.00		13.25	
Maximum	32.00		34.53	
Std. deviation	5.55		7.00	
Mean	10.18		20	
Marketing experience				
1_10	22	22.4	_	_
11_20	37	37.8	4	20.0
21_30	28	28.6	13	65.0
31_40	11	11.2	3	15.0
Total	98	100	20	100
Minimum	3.00		12	
Maximum	37.00		34.00	
Std. deviation	8.47		5.88	
Mean	18.03		25.40	

Source: field survey, 2017

Table 2: Causes of orange post-harvest losses during marketing.

Respondent Causes of post-harvest losses	retail frequency	percentage	wholesale frequency	percentage
Poor market patronage				
Yes	82	83.7	18	90
No	16	16.3	2	10
Total	98	100	20	100
Poor transportation facility				
Yes	81	82.7	16	80
No	17	17.3	4	20
Total	98	100	20	100
Inadequate storage facilities				
Yes	85	86.7	16	80
No	13	13.3	4	20
Total	98	100	20	100
Poor storage facilities				
Yes	89	90.8	16	80
No	9	9.2	4	20
Total	98	100	20	100
Physical damage				
Yes	90	91.8	20	100
No	8	8.2	_	_
Total	98	100	20	100
Inadequate handling skill				
Yes	86	87.8	16	80
No	12	12.2	4	20
Total	98	100	20	100
Pest and diseases				
Yes	86	87.8	19	95
No	12	12.2	1	5
Total	98	100	20	100
Weather condition				
Yes	95	96.9	16	80
No	3	3.1	4	20
Total	98	100	20	100

Source: field survey, 2017.

Table 3: Strategies adopted by the marketers to reduced post-harvest losses during orange marketing.

Actors	Causes PHL	strategies	freq	%
Poor market patronage		Advertisement of the produce	59	60.2
		Good packaging to attract customers	87	88.8
		persuasion of buyers	32	32.7
Poor transportation facility		choice of good keke nepep for transport	65	66.3
		use of wheel barrow	34	43.7
		use of taxi	48	49.0
		use of pickup	86	87.8
Inadequate storage facilities		use of jut bags	78	79.6
		spreading under shade	45	45.9
		spreading in open	67	68.4
Poor storage facilities		spreading under shade	66	67.3
		use of jut bags	85	86.7
		making openings in the bags	48	49.0
		Avoid heaping of produce	32	32.7
		use of basket	54	55.1
Physical damage		separating damage ones	87	88.8
		spreading under shade	31	31.6
Inadequate management skill		training on new management skill	45	45.9
Pest and diseases		covering with Templin at night	86	87.8
		use rat killer	21	21.4
		washing of produce	89	90.8
Weather condition		use of jut/bacco bag	88	8.8
		spreading during hot season	66	67.3

Source: field survey, 2017.

Socio-Economic Characteristics of Orange Marketers
Age of orange marketers could to a certain level affect their marketing ability as it involves interaction with different classes of actors in and outside the markets. The age of the respondent was described and presented in Table.

Age of orange retailers in the study area was found to fall between 23 and 69 years, and that of wholesalers falls between 36 and 69. The mean age of retailers and wholesalers were 42 and 57, with standard deviation of 10.726 and 8.851 respectively. The result also revealed that most of the retailers and wholesalers fall within the age bracket of 31-40 years and 51-60 years representing 32.7% and 50% respectively. This indicates that most of the orange marketers are within their economically active stage of live and thus should be able to execute their marketing function effectively. FAO (1992) described economically active population to be between 15-64 years.

Household size is an important socio-economic parameter in marketing that can determine the food security status of household, because large house hold size implies more social responsibility on the house hold head. Distribution of orange marketer's base on household size is also presented in Table 2. The result revealed that majority of the retailers and wholesalers had household size ranging from 2-10 person and 11-20 persons representing 69.4% and 70% respectively. The minimum maximum and mean of house hold size were 4, 32, and 10 for retailers, and for wholesalers were 7, 20 and 13 respectively. Abdu (2006)

reported that the mean of the household size in savannah zone of Nigeria was 10. He further stress that variation in house hold size may be as a result of polygamous nature of most house hold in northern Nigeria is due to culture and religion.

Number of years of experience has profound influence on the managerial ability and decision making in marketing agricultural commodities. Adesina and kahinde (2008) opined that marketing experience enhance proper utilization of scarce resources, economic decision marking, and timely assessment of alternative resources. Represented in table 2 were also the years of marketing experience of orange traders. The result revealed that high proportion of the retailers (37.8%) had marketing experience within the range of 11-20 years, while majority of the wholesalers (65%) had marketing experience within the range of 21-30 years. This indicates that there could be sustainability of the enterprise through transfer of knowledge and skill to the next generation. Abdulsallam (2004) reported that people gain more expertise and mastery of with experience in their profession. He further stated that experience influence the person perception and understanding of climate, socio-economic policies and factors that affect their vacation over the years. The minimum, maximum, and mean of the year marketing experience were 3, 37 and 18.030 for retailers and 12, 34 25.400 retailers, and for wholesalers respectively. This implies that most of the marketers are experienced which will in turn positively influence their managerial ability and decision making in orange marketing.

Causes of Orange Post Harvest Losses.
In table 4 retailers and wholesalers were provided options to select the major causes of post-harvest losses in orange marketing. Orange marketing involve different stages like transportation, washing/sorting, packaging, and retailing in which post-harvest losses normally take place along different stages. The major causes of post-harvest losses considered are poor market patronage, poor transportation facility, inadequate storage facility, poor storage facility, physical damage, inadequate management skill, pest and diseases and weather condition.

Poor market patronage is presented as one of the causes of post-harvest losses; the result revealed that 83.7% and 90% of the retailers and the wholesalers indicated that Poor market patronage was the major causes of post-harvest losses. 82.7% and 80% of the retailers and wholesalers revealed Poor transportation facility to be one of the major causes of post-harvest losses in orange marketing. While 17.3%, 20% of the retailers and wholesalers indicated that Poor transportation facility was not the major causes of post-harvest losses in orange marketing. Inadequate storage facility was also indicated to be one of the major causes of post-harvest losses with 86.7% and 80% agreeing. Poor storage facility is one of the critical challenge responsible for post-harvest losses in fruits and vegetable orange inclusive, this study revealed that majority of the respondent (90.8%) of the retailers and (80%) of wholesalers indicated that poor storage facility is one of the major causes of post-harvest losses. Physical damage is normally caused during the Packaging of the unprocessed products which is affected by numerous biological factors. Less developed supply chains like in Nigeria have poor or no standards for packaging materials resulting in speedy spoilage. The lack of adequate packaging leads to transportation losses while moving this packaged product to the market. Poorly-packaged food losses moisture quickly when exposed to unfavorable conditions, contributing in turn to food losses. These losses can be greater if poor-packaging is accompanied by poor-logistics for marketing. Poor market logistics is a big concern in less developed food supply chains (Aulakh and Regmi 2013). The result of this findings indicated that 91.8% of the retailers and all the wholesalers (100%) suggested that physical damage is one of the causes of post losses. Inadequate management skill was also indicated by this result to be one of the causes of post-harvest losses in the study area with (87.8%) and (80%) of the retailers and

wholesalers attested to it. Pest and diseases is one of the problems face by fruits and vegetable traders in which is not unconnected to lack of good storage facility and others factors. (87.8%) and (95%) at retail and wholesale level indicated that pest and diseases are some of the causes of post-harvest lost. Hot and cold weather also affect fruits and vegetable, the result shows that (96.9%) of the retailers and (80%) of the wholesalers indicated that weather condition is one of the causes of post-harvest losses

Strategies Adopted by Retailers to Reduced Post Harvest Losses During Orange Marketing.
The strategies adopted by the retailers to reduced post-harvest losses during orange marketing were presented in table 12, poor market patronage as one of the causes of post-harvest losses in orange marketing in the study area, the respondent devise means of mitigating these losses through advertisement of the produce, good packaging and persuasion of customers which accounts for 60.2%, 88.8% and 32.7% of the respondent respectively. 66.3%, 43.7%, 49.0% and 87.7% of the retailers adopted strategies of good choices keke nappep, use wheelbarrow for those who have close retailing point, use of taxi and pickup for transporting the oranges to their retailing point respectively. Inadequate storage facility was one of the challenges faced by the retailers in which. In terms of inadequate storage facility the retailer employed the use jut bags, spreading under shade and spreading in the open which account for 79.6%, 45.9%, 68.4%, of the retailers respectively. Losses incurred through Poor storage facility was reduce by the adoption of spreading under shade (67.3%), use of jut bags (86.7%), making openings on the bags (49.0%), avoiding heaping of orange (32.7%), use of basket (55.1%). In case of physical damage (88.8%) of the respondent separate the damages ones from the good ones and 31% use to spread the orange under shade. Training on the new management skill on how to control post-harvest losses was adopted by the retailers which accounts for 45.9%,. Covering the orange with Templin at night (867.8%), use of rat and insect killer (21%), and washing of the produce 990.8%) were the strategies employed during pest and diseases attack. Use of jut bags during cold season to avoid drying of the orange account for 88.8% and spreading during hot season accounts for 67.6%. The findings of this studies indicates that the marketers are trying to reduce and control post-harvest losses during marketing of their produce.

Conclusion and Recommendation
The study indicates that the value of losses during sorting, packaging, and transportation were negative which implies inverse relationship with the profit level of orange marketing. Despite the fact that orange marketing is a profitable venture as revealed by the studies. There are huge prospects for Nigeria in the marketing of orange fruit considering the large population of consumers, modern ways of controlling post-harvest losses need to be employed in view of available human and material resources.

The following recommendations were made base on the findings of the study.
-There is need for mass campaign and training of orange marketers on how to handle produce, good method of storage and control of pest and diseases will be of great importance.
-Women should be encouraged by relevant institutions to participate in orange marketing this will go a long way in balancing gender challenges and improving orange marketing.
- In order to reduce post-harvest losses in Nigeria, efforts should be made to develop every level of the orange marketing from transportation to consumption. Public Private Partnership can be exploited through the establishment of good storage and transportation facilities like refrigerated containers was go a long way in reducing post-harvest lost in orange marketing.

References

Arowojulo O (2000). Analysis of Rural Women's use of Cassava Post Harvest Technologies in Oyo State. Msc Project.Department of Agricultural Economics and Rural Development, University of Ibadan, Nigeria.

Aulakh and Regmi (2014), post-harvest food losses estimation- development of consistent methodology

Aworh OC (2004) Food Preservation, The art, The Science and The Technology" The Post Graduate School, Universityof Ibadan, Nigeria pp 61.

Badah. And Suleiman (2015). Economic Analysis of post-harvest losses on profitability of fresh tomato marketing in kano state, Nigeria. Unpublished paper.

Compton, J. A., S. Floyd, A. Ofosu, and B. Agbo. 1998. "The modified count and weigh method: an improved procedure for assessing weight loss in stored maize cobs." Journal of Stored Products Research, 34(4), 277-285.

FAO (2015) prevention of post-harvest food losses fruits, vegetable and root crop (FAO training seriesNo; 17/1)

Food Balance Sheet Data. 2013. Available at:http://faostat.fao. org/site/354/default.aspx. Accessed January 10, 2013.

Gangwar, L. S., D. Singh, and Singh, D. B. 2007. "Estimation of post-harvelosses in Kinnow Mandarin in Punjab using a modified formula.". . Agricultural Economics Research Review, 20(2).

Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R., Meybeck, A. 2011."Global Food Losses and Food Waste: Extent Causes and Prevention." Rome, Food and Agriculture Organization (FAO) of the United Nations.

Hodges, R.J., J.C. Buzby, and B. Bennett. 2011 "Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use." Journal of Agricultural Science 149:37-45

Kabas .O (2010). Post-Harvest Handling of Orange. Available in www.batem.gov.tr/yayinlar/bilimsel_makaleler/mekanizasyon/8.pdf. Accessed on 13th September, 2011.

Kader, A.A. and R.S. Rolle. 2004. "The Role of Post-harvest Management in Assuring the Quality and Safety Horticultural Crops". Food and Agriculture Organization. Agricultural Services Bulletin 152, 52 p.Knight, A. and C. Davis. 2007. "What a waste! Surplus fresh foods research projects, S.C.R.A.T.C.H."

Kereth, G.A., Lyimo, M., Mbwana, H.A., Mongi, R.J., and Ruhembe, C.C. (2013), Assessment of Postharvest Handling Practices: Knowledge and Losses of Fruits in Bagamoyo District of Tanzania. Journal of Food Quality and Management.

Kitinoja, L. and Gorny, J. (2009)1. Storage Practices and Structures. Postharvest Technology for Fruit & Vegetable Produce Marketers. Chapter 7.Pp 1.1 – 20.6

Kitinoja, L. (2008)2. Causes and Sources of Postharvest Problems. Postharvest Training CDRom\Sample Presentations. From Ghana. Pp 1 -19.

Ladaniya, M. (2008), Citrus Fruit Biology, Technology and Evaluation Elsevier. Inc. London

Loss-adjusted food availability data, Economic Research Service (ERS). 2011. ERS US Department of Agriculture, Washington, DC.

Olukosi J.O, Isitor S.U and Ode. (2005) introduction to agricultural marketing and prices; Principles and application, Living Book series. Abuja Nigeria G U publication

Post-Harvest Losses Information Systems. 2013. Available at: http://www.aphlis.net/. Accessed January 10, 2013.

Smithers,R2013.Availableat:http://www.guardian.co.uk/environment/2013/jan/10/ half-world-food-waste. Accessed January 14, 2013.

Stephen at. el 2012) determination orange losses and farmers' perceptions on the sweet orange (*Citrus sinensis*) supply value chain in Rusitu Valley , Chimanimani district of Zimbabwe between 2011 and 2012.

Sudheer, K.P., and Indira, V. (2007), Postharvest Technology of Horticultural Crops. Sumit Pal Jain. New Publishing Agency. New Dehli. India

Ubani ON, Okonkwo Ego U, Ade A (2010).Shelf-life of four ORANGE varieties at ambient conditions. Paper presented in Nigerian Stored Products Research In-House Review Meeting held at NSPRI Headquarters, Ilorin, Kwara State, Nigeria, 22nd-24th June, 2010.

Voices Newsletter. 2006. Available online at: http://www.farmradio.org/wp-content/ uploads/ Voices_79.pdf. Accessed April 2, 2013.

World Food Logistics Organization.(WFLO) 2010. Identification of Appropriate   Postharvest Technologies for improving Market Access and Incomes for Small Horticultural Farmers in Sub-Saharan Africa and South Asia. Alexandria VA, March.