DETERMINANTS OF FRUIT WASTAGE AMONG FRUIT MARKETERS IN BENIN METROPOLIS, EDO STATE

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Abstract

The study examined factors influencing fruit wastage among marketers in Benin Metropolis, Edo State. Data were obtained purposively from fifty fruit marketers from three major markets in Edo State using a structured questionnaire. Descriptive and inferential statistics were used to analyze data. Findings revealed that 60% of the respondents were between the ages of 26-45years, 64% were females, 48% were married, 48% had less than four persons as household size, 90% had formal education and 50% takes farming as their other occupation. It was also revealed that orange ranked 1st in fruit perishability and 48% recorded fruit wastage weekly. Regression result shows that the co-efficient of variability was 0.320 and sex (X_1=0.242) and year of starting fruit marketing (X_2=0.000) were significant at 0.05. Standard transport facility was a major problem (92.0%) encountered by fruit marketers and ranked 1st. The study concluded that if fruit spoilage is avoided, fruit marketers will have more profits and Edo state will be more food secured. It was recommended that efforts should be intensified in establishing good road network in Edo State so as to reduce fruit wastages and enhance marketing capacity of fruit marketers.

Key Words: Fruit Marketers, Fruit Wastage, Edo State, Fruit Perishability, Fruit Loss.

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INTRODUCTION

Botanically, a fruit is a seed-bearing structure that develops from the ovary of a flowering plant. They could be succulent or dry and fleshy when ripened (Live Science, 2012). They are widely cultivated and consumed globally. There are archaeological evidences which prove their existence since pre-historic times. Fruits such as citrus, banana, apple, pear, almond, cherry, peach, and plum were domesticated in Central and East Asia. With domestication and breeding came bigger, sweeter and more flavorful fruits with less astringency. Despite some exceptions, most fruits have an obvious appeal of taste, which is a combination of sweetness and acidity considered delicious because of the aromatic constituents. This appealing, sweet taste is associated with their natural selection for propagation (Janick, 2008).

Fruits are vital components of a balanced diet because they supply essential vitamins and minerals such as calcium and iron to the body. These nutrients, such as vitamins A and C are not abundant in the staple foods of many tropical areas. They are therefore required in diets to enhance the nutrition of diverse categories of the population e.g. children and pregnant women. They serve as raw materials in food drink industries and

possess a huge potential for any nation to diversify its economy through foreign exchange earnings (Ayandiji and Omotoso, 2009).

However, fruits are perishable crops and this makes them susceptible to wastage due to spoilage and infestation. As a result, large quantities are lost even before reaching the final consumers (SPORE, 2011; Olayemi *et al.*, 2012). ACF (2014) argued that food wastage, fruits inclusive, constitutes significant postharvest loss. The term "postharvest loss" refers to measurable quantitative and qualitative food loss in the postharvest system. This system comprises interconnected activities from the time of harvest through crop processing, marketing and food preparation, to the final decision by the consumer to eat or discard the food. Olayemi *et al.*, (2012) contended that food wastage occurs at all stages in the post-harvest chain. In some countries, including Africa, where tropical weather and poor infrastructure contribute to the problem, food wastage can regularly be as high as 40-50% (SPORE, 2011). For instance, in Nigeria, over 55 percent of the fruits and vegetables produced perish before consumption (AFPGEAN, 2016). This makes food supply, especially that of fruits, highly unstable; thereby exacerbating food insecurity. Moreover, food wastage amounts to loss of effort and profit along the agricultural value chain (Olayemi *et al.*, 2012).

Food loss, food waste and food wastage are important components of postharvest losses. Food waste is regarded as a subset of food loss and refers to discarding food or making use of food that is safe and nutritious for human consumption in alternative (non-food) ways. It occurs along the entire food supply chain, from primary production to household consumer level. Food loss describes the decrease in quantity or quality of food occurring at the production, harvest, post-harvest and processing phases and is more common in developing countries, due to poor infrastructure and low investment in food production systems (FAO, 2014; UN, 2017). However, according to EU FUSIONS (2016), FAO (2013) stated that food wastage refers to any food lost by deterioration or waste. Thus, the term "wastage" encompasses both food loss and food waste.

In Africa, postharvest losses in some crops including fruits can be as high as 50 percent (Voices Newsletter, 2006). Nigeria is one country where fruits and vegetables grow in and out of season but the problem of processing and preservation leads to post-harvest losses. Records by the National Bureau of Statistics (NBS), the Central Bank of Nigeria (CBN) and the Federal Ministry of Agriculture and Rural Development (FMARD) have shown that as a result of poor or absence of Good Agricultural Practices (GAP) and poor post-harvest handling, the acceptance of local products from Africa and other developing Countries has been difficult to find their way in the international market.

According to Nellemann *et al.*, (2009), damage to fruits at the marketing stage can occur during transport; spoilage; poor handling or losses caused by poor storage. Storage and packaging in wrong materials can bruise fruits causing damage and leading to wastage. During transport to point of sale, bad road conditions can cause vibrations in the vehicles conveying the fruits which can cause damage or spillage onto the road. Most marketers have micro and small scale businesses and are lacking in basic infrastructures like processing and storage equipment. This is because the incessant electricity supply common in most developing countries makes such a venture an expensive one (Taylor, 2017).

ACF (2014) argued that weather is a key issue at harvest. Hot weather reduces the shelf life, causing deterioration at a faster rate. In developing countries with hot climates, most small-holder farmers rely on sun drying to ensure that crops are well dried before storage. If unfavourable weather conditions prevent crops from drying sufficiently, then losses will be high along the food supply chain.

Moreover, poorly developed technology in processing, storage and transportation are closely linked to the poor conditions of infrastructure such as power, roads, communication and even research institutions in many developing countries. Due to lack of theses identified basic infrastructure, postharvest losses will be on the high side which can add to sizable quantity to the global food. Insecurity thus leading to hunger and malnutrition among others. It is against this backdrop, that the study therefore aims to examine factors influencing fruit wastage among fruit marketers in Edo state. The hypothesis tested for this study was stated in the null form; there is no significant relationship between the socioeconomic characteristics of fruit marketers and level of fruit wastage.

METHODOLOGY

The study was carried out in Edo State, a multistage sampling technique was used. Purposive sampling technique was used in the first stage to select Benin City being the major producer of fruits such as pineapple and plantain, in the second stage, purposive sampling technique was also used to select three (3) major markets and fifty (50) fruit marketers were selected purposively in the last stage. Data was collected through the use of a well-structured questionnaire and analyzed using both descriptive and inferential statistics. The descriptive statistics include frequency distribution, percentages and mean scores. The inferential statistics utilized was regression analysis to determine the extent of fruit wastage caused by certain independent variables such as sex, educational level and years of fruit marketing experience among the respondents.

RESULTS AND DISCUSSION

Table 1 presents the socioeconomic characteristics of the respondents. Most (44%) of them were aged between 26 and 35 years with a mean age of about 37 years. This is corroborated by Akwiwu *et al.,* (2005) that the youth are characterized by vigour and strength. This implies that most of the respondents are still in their youthful age and therefore, have the strength to pursue their fruit marketing business. Table 1 also shows that majority (64%) are females while 36% are males. This could imply that more females are involved in fruit marketing than males. This is in line with the assertion of the World Bank (2003) and Olayemi *et al*., (2012) that women are more involved in agricultural value chain than men. This is necessary in their financial empowerment to boost the welfare of their families. About 48% of them were married. This implies that the income realized from fruit marketing will be useful for the upkeep of their families. Also, 48% of the respondents had a household size of between 1and 3 persons. Most (44%) of the respondents stopped at the secondary school level of education.

This literacy level possessed is expected to have a positive influence on their hygiene and quality maintenance practices as education aids the adoption of innovations (Onemolease, 2005). 50% of the respondents engaged in farming as their other occupation. This implies that agriculture remains the predominant occupation in Nigeria as in other parts of sub-Saharan Africa (FAO, 2014; Taylor, 2017). About 36% earned between ₦15, 000 and ₦25,000 a month with an average earnings of ₦31,360 monthly.

Table 1: Socio Economic Characteristics of Respondents (N=50)

Socio-Economic Characteristics	Frequency (Percentage)	Mean score
Age		
<25	6(12.0)	
26-35	22(44.0)	37.4
36-45	12(24.0)	
46-55	1(2.0)	
>55	9(18.0)	
Sex		
Male	18(36.0)	
Female	32(64.0)	
Marital Status		
Single	19(38.0)	
Married	24(48.0)	
Divorced	1(2.0)	
Widow	6(12.0)	
Household Size		
1-3	24(48.0)	
4-6	16(32.0)	3.36
7-9	10(20.0)	
Level of Education		
No Formal education	5(10.0)	
Primary Education	9(18.0)	
Secondary Education	22(44.0)	
Tertiary Education	9(18.0)	
Adult Education	5(10.0)	
Other Occupation		
Civil Service	10(20.0)	
Farming	25(50.0)	
Teaching	15(30.0)	
Average Monthly Income		
> ₦15,000	2(4.0)	
₦15,000-₦25,000	18(36.0)	
₦26,000-₦35,000	14(24.0)	₦31,360
₦36,000-₦45,0000	12(24.0)	
₦46,000-₦55,000	1(2.0)	
>₦55,000	3(6.0)	

Source: Field Survey (2017)

Table 2 shows that majority (76%) of the respondents started selling fruits between 2007 and 2016. The proliferation of fruit marketing industry in recent years could be as a result of recent awareness on healthy living which encourages people to consume more of fruits and vegetables hence increasing the demand and marketing of fruits. According to FAO (2014), postharvest activities such as marketing and agro processing are regarded by African youth as modern and not as laborious as the primary production activities. About 36% sold pineapple only. This could be related to its high nutritive content and fine flavor which makes it the choice of many juice industries (Ugwu, 2018). Most (48%) of the respondents indicated that they experienced fruit wastage on a weekly basis. Also, most (42%) of them obtained their fruits from wholesalers. This is in agreement with the submission of Tracey-White (2003) that wholesalers are the bulk buyers of fruits and they in turn sell to retailers and even consumers. Half (50%) of the respondents indicated that they experienced low fruit wastage while transporting the fruits and most (46%) of the respondents sold to final consumers. The display of fruits by roadsides was employed by about 38% of fruit marketers in order to market their wares.

Majority (60%) of fruit marketers could not afford to store the fruits to prolong their shelf-life. Poor electricity supply makes storage an expensive venture (Olayemi *et al*., 2012). Majority (80%) indicated that the quality of the fruits, i.e. the freshness, determined the price offered for the fruits as indicated in Table 3, while about 54% of respondents claimed pineapple perishes in less than a day, about 72% claimed either banana or plantain perishes in less than a day, majority (74%) claimed orange is the most perishable fruit. Lack of standard transport facility ranked highest on the list of marketing problems by majority (92%) as shown in Table 4. Conveying fruits in specialized vehicles with the right equipment in order to preserve their quality will help to reduce fruit damage during transport (ACF, 2014).

Table 2: Distribution of Respondents According to Fruit wastage, Fruit sales and Patronage (N=50)

	Frequency(Percentage)
Year of Starting Fruit Marketing	
1987-1996	3(6.0)
1997-2006	9(18.0)
2007-2016	38(76.0)
Types of Fruit Sold	
Pineapple	
Banana/plantain	18(36.0)
Orange	11(22.0)
Others	10(20.0)
Banana/plantain and others	2(4.0)
Pineapple and banana/plantain	3(6.0)
Orange and others	1(2.0)
Pineapple and others	2(4.0)
Fruit Wastage	3(6.0)
Daily	
Every other day	7(14.0)
Weekly	15(30.0)
Fortnight	24(48.0)
Sources of Fruit	4(8.0)
Wholesaler	
Retailer	21(42.0)
Farm Gate	16(32.0)
Wastage During Transportation	13(26.0)
High	
Moderate	6(12.0)
Low	19(38.0)
Method of Marketing Fruits	25(50.0)
Hawking	
Wheel barrowing	5(10.0)
Roadside	9(18.0)
Supply companies	19(38.0)
Supply companies and others	16(32.0)
	1(2.0)

Source: Field Survey (2017)

Table 3 shows that orange ranked 1st (74%) in perishability, deteriorating in less than a day due to punctures from postharvest handling which enhances spoilage. This finding supports the findings of Brown (1998) who discovered that oranges and lemons are vulnerable to spoilage caused by physical injury. He further explained that peel oil released from oil glands in the rind is phytotoxic and causes necrosis and collapse of surrounding

healthy epidermal cells resulting in spoilage. Corroborating this assertion Fakayode *et al* (2010) emphasized on the perishability nature of sweet orange in Nigeria resulting from poor storage/shelf life of the fruit as a major problem facing sweet orange market in Nigeria. In the light of the foregoing to reduce fruit spoilage and wastage it is therefore expedient to provide fruit marketers with adequate storage and processing facilities that can enhance fruit marketing in the study area.

Table 3: Distribution of Respondents According to the Perishability of Fruits (N=50)

Fruits	Less than a day f (%)	1-3 days f (%)	4-5 days f (%)	6-7 days f (%)	Above 7 days f (%)	Rank
Pineapple	27(54%)	1(2.0%)	11(22.0%)	8(16.0%)	3(6.0%)	3rd
Banana/plantain	36(72.0%)	3(6.0%)	6(12.0%)	5(10.0%)	0(0.0%)	2nd
Orange	37(74.0%)	2(4.0%)	3(6.0%)	4(8.0%)	4(8.0%)	1st

Table 4 shows problems affecting fruit marketing in the study area. As at the time of the study standard transportation facility ranked 1st (92%) among problems affecting fruit marketing in the study area. This implies that transportation system is very germane to reducing fruit wastage among fruit marketers in Edo state as transportation of agricultural produce plays a vital role in agricultural marketing as Identified by Weitz (2003) that transportation is a final function of the marketing system that connect almost all the stages of production ranging from production to distribution of agricultural products. Storage facility problem ranked 2nd (88%) alongside seasonality of fruit (88%). Fruits are seasonal and when harvested bountifully in season, it is bound to waste in the absence of adequate storage and processing facilities. To curb the problem of food wastage among fruit marketers and enhance sustainable fruit production, it is therefore necessary to provide adequate fruit storage and processing facilities for fruit marketers.

Table 4: Distribution of Respondents According to Problems Affecting Fruit Marketing (N=50)

Problems	Yes F (%)	No F (%)	Rank
Bad pricing	40(80.0%)	10(20.0%)	5th
Seasonal problem	44(88.0%)	6(12.0%)	2nd
Nutritional information problem	18(36.0%)	32(64.0%)	6th
Level of demand problem	41(82.0%)	9(18.0%)	4th
Standard transport facility problem	46(92.0%)	4(8.0%)	1st
Storage facility problem	44(88.0%)	6(12.0%)	2nd

Source: Field Survey (2017)

Regression Result

Regression model was used to estimate the variable that determines the level of wastage of fruits among marketers and the mode is stated thus:

$Y= b_0+ b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots e_i$

Where:

Y = Level of Fruit wastage during transportation

X_1 = Sex (Male/Female)

X_2 = Age (Years)

X_3 = Marital Status

X_4 = Highest Educational Level

X_5 = Household Size (Persons)

X_6 = Years of Experience in Fruit Marketing
X_7 = Methods of Fruit Marketing

(0.845) (0.242) (0.015) (0.157) (0.092) (0.057) (0.000) (0.099)

$$Y= -0.393- 0.569X_1 + 0.024X_2 – 0.005X_3 + 0.103X_4 + 0.004X_5 + 0.001X_6 + 0.036X_7$$

$\bar{R}^2 = 0.320$ $R^2 = 0.207$ $F = 2.828$

The regression model shows that sex of the respondents and the year of starting fruit marketing were significant at 0.05 level of significance. This could imply that female marketers are likely to decrease the level of fruit wastage since they are more involved and experienced in fruit marketing. Furthermore, the year of starting fruit marketing was likewise significant to fruit wastage level among fruit marketers. This could imply that the number of years in the fruit marketing venture contributes significantly to the level of fruit wastage among marketers. In other words, fruit marketers with quality years of experience can curb the effect of fruit wastage appropriately.

R^2 is the coefficient multiple of determination and it specifically measures the goodness of fit of the regression model. The R^2 value is 0.320, this implies that 32.0% of the variables in output is being accounted for by the specified independent variables. From the regression model, the positive sign associated with age of respondents, educational level, household size, year of starting fruit marketing, and how respondents market fruits means that the higher the magnitude of these variables, the lower the level of fruit wastage by the marketer. On the other hand, the negative sign associated with sex and marital status implies that the higher the magnitude of these variables, the higher the level of fruit wastage.

Conclusion

Fruit wastage level is dependent on certain factors which are the sex of the marketer, level of education, storage facility or technique in use, years of experience in the marketing venture, transportation facility, category of people who patronize the marketers, method of marketing fruit and selling techniques. The study concludes that if fruit spoilage is avoided, fruit marketers will have more profits and the state will be more food secured. It was recommended that efforts should be intensified in establishing fruit processing companies in Edo State so as to reduce fruit wastages and enhance marketing capacity of fruit marketers.

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