

**ANALYSIS OF POSTHARVEST LOSSES OF TOMATO IN SELECTED MARKETS
IN ILORIN, KWARA STATE, NIGERIA**

***AYINDE, O. E., *G.B. AKINSOLA; **K. F. OMOTESHO AND *D. A. ADEWALE**

***Department of Agricultural Economics and Farm Management,
University of Ilorin, Nigeria.**

****Department of Agricultural Extension and Rural Development,
University of Ilorin, Nigeria.**

Corresponding author's E-mail: okeyinde@yahoo.com; okeyemi@unilorin.edu.ng

Abstract

This study determines the extent of losses in tomato marketing and the factors that determine it in Kwara State. The main source of the data was primary which was analyzed using the descriptive statistics and Ordinary Least Square (OLS) Multiple Regression. The results revealed that majority of the tomato marketers were female: retailers- 93.3% and wholesalers- 78.3%. Most of the marketers (retailers and wholesalers) are 40 years and more while majority have spent ten years in the marketing business. About 80% of the retailers are fully engaged in the business while all of the wholesalers are fully engaged in the business. About 94% of the retailers transport their produce with cars and others use buses while 90% of wholesalers transport their produce with lorries. Much of the losses in tomato occur during transportation on bad roads and during storage process. The OLS result shows that the coefficient of means of transportation(X_5) and marketing experience(X_4) were significant at 5% while age of the marketer (X_1) was significant at 1%, with the means of transportation and age having positive relationship with the postharvest losses while marketing experience have negative relationship on the losses. It is recommended that for tomatoes to be available at cheaper rates, the mode of transportation must be reviewed and further trainings on postharvest technologies through extension agents could be passed across to marketers. Tomato marketers should also form cooperative societies such that the more experienced marketers will disseminate their acquired knowledge to the less experienced ones.

Key words: postharvest losses, tomato, selected markets

Introduction

The issue of food losses is of high importance in the efforts to combat hunger, raise income and improve food security in the world's poorest countries. Food losses have an impact on food security for poor people, on food quality and safety, on economic development and on the environment (Gustavsson et al (2011). Too much of the world's food harvest is lost to spoilage and infestations on transit to consumers (Adewumi et al 2009). Notable is the relatively high losses in agricultural production in Sub-Sahara Africa (Gustavsson et al (2011). In developing countries, where tropical weather and poorly developed infrastructure contribute to the problem, losses are sometimes of staggering proportions. Losses occur in all operations from harvesting through handling, storage, processing and marketing (Adewumi et al 2009). Processing might be as important as technological innovations, as these offer a more effective way of addressing the problem of low fresh fruit prices (Schreinemachers et al, 2010) as well as reducing postharvest losses especially in fruits and vegetables, tomato inclusive.

Tomato is one of the major and more popular vegetables grown in Nigeria. The country ranks among the world's highest producers of Tomato (FAO 2005) and the crop has achieved tremendous popularity over the last century (Rotimi, 2008). It is grown practically

in every country of the world with growing medium ranging from large mechanized fields to hand tilled plots to green houses and net houses .Tomato, originated from the South-American Andes (South American continent) from where it's cultivation has spread throughout the world (Naika et.al 2005). Botanically, tomato belongs to the family solanaceae, which has other crops like potato, tobacco, pepper, and egg plant as members. According to Wener (2000), tomatoes can be classified into fresh market tomatoes and processing tomato. Tomato contributes to a well-balanced diet, it is rich in minerals like Iron and phosphorus which aids healthy functioning of the body. It is also rich in vitamins A, B and C (FAO 2005). Tomato is also rich in essential amino acids, dietary fibre and sugar. Tomato also contains lycopene which is an anti-oxidant, preventing the development of many cancerous forms.

Tomato is consumed extensively in Nigeria, as it forms an integral part of most diets. It is consumed in soups, meats and fish dishes and recently in sauces, salads, purees, juices and ketchup. In Nigeria today, tomato is fast becoming a cash and industrial crop because it serves as industrial raw materials for industries producing ketchups, purees and tomato concentrate. The economic importance of tomato is increasing to such an extent that its cultivation has been moved to places and seasons previously considered unsuitable for the crop (Bodunde et al 1993). Tomato is grown in all parts of the country although in largely varying quantities due to her varied climate and geography. It is however grown commercially in the Northern and South western parts of the country. The south western tomato holdings or plots are mainly rain fed while in the Northern areas, tomato is cultivated under both rain fed conditions and extensive irrigation systems. Between January and April, the supply of fresh tomato is adequate and consumer rarely use other forms (canned and paste) however, from April to September, supply decline drastically, thus specifying the off-season period of the crop (Ammu and Shehu 2003).

However, in recent years, production of tomato has not met up with consumption and the country has to resort to the importation of purees and concentrates from other countries. The production could be adequate, but post-harvest losses accounts for more than 50% of tomato loss in Nigeria. Since the goal of any country is to achieve food security, which is a consequence of food supply, it therefore follows that food security can be reduced by either increase in production or reduction in loss (Ayandiji et.al 2011). Efforts aimed at increasing production of tomato over the year have only resulted in a glut leading to crop wastage and economic loss for the farmers. Since tomato has a poor storage capability owing to its perishability and the fact that it contains more than 60% moisture when harvested, thus making handling, transportation, and marketing difficult. Deterioration of tomato starts during harvesting during which the crop is exposed to varying mechanical and physiological conditions which causes changes in their structure leading to damages in their edibility and wholesomeness. Such deterioration leads to a reduction in quantity, quality and nutritional values of the crop (Sablani et.al 2006). Majority of Nigerian farmers use primitive harvesting techniques which are rough and unsanitary in nature and also lack certain agricultural infrastructures coupled with the absence of proper marketing and storage facilities, low level of technological know-how and handling techniques. All these have contributed to bring about interplay of various physiological, mechanical and pathological forces which result in considerable reduction in quality, quantity and nutritional value of harvested tomato and also in increasing the "post-harvest share of tomato loss in the country. Such primitive handling and harvesting techniques which are grossly inadequate and inappropriate lead to injuries and mechanical damage on the fruits which provide the entry point for bacteria and fungi (Wilson et.al 1995,Idal, 2001).

Post-harvest losses can be defined as the measurable qualitative and quantitative loss of a product along the post-harvest chain and includes; change in availability, edibility,

wholesomeness and quality of food that prevents its consumption (Troger *et al*, 2007).The post-harvest losses have a tremendous effect on the income of the marketers, affecting his purchasing power and reducing his socio economic status. This might be as a result of inadequate market structure especially during glut in the market which drastically lowers the economic value of the crop and resulting in a net loss for traders. According to Ayandiji and Omidiji, (2011), poor storage capability and perishability of tomato have in years past led to daily variations in the price of tomato, making tomato trading a risky enterprise. Effective storage, packaging, transporting and handling techniques are practically non-existent in Nigeria for perishable crops thus allowing considerable post- harvest loss. Quantitative and qualitative loss occurs at all stages of the food chain from harvesting to marketing until crops are delivered to the final consumer and it occurs in many ways (Mrema and Rolle 2002). Post-harvest losses of crops are a set-back to any agricultural system since it reduces food availability. The losses of tomato are so high in the country so that about 56% of the tomato produced in Nigeria is lost before reaching the final consumer (Okunoya 1996). This has in recent years affected the socio-economic status of tomato growers and traders since it leads to a net reduction in income. It has also robbed the National economy of the foreign earnings, the country would have earned on the export of tomato, and however, the country remains a net importer of tomato leading to loss of foreign exchange and other benefits of a home-based tomato industry. The losses have also led to a reduction in the revenue accruable to the agricultural sector of the economy. Therefore the aim of this study is to examine the nature and extent of post-harvest losses of tomato, evaluate factors that influence the losses and identify the measures to guard against post-harvest losses of tomato in the study area.

Methodology

This study was conducted in Ilorin metropolis of Kwara State. The state is located in the north-central-geo-political zone of Nigeria. Ilorin city has a population of 847,582 as at 2007 while the state as a whole has a population of about 2.37million people. The population of the study includes wholesale and retail marketers or sellers of tomato in selected agricultural products/ food stuff markets in Ilorin metropolis.. Six (6) markets were randomly selected across the town. In each market, ten (10) wholesale marketers and ten (10) retail marketers of tomato were randomly selected giving a total of 60 wholesalers and 60 retailers of tomato.

Data that are relevant to the objective of the study were obtained through the administration of well-structured questionnaire. Information on socio demographic data, types of post-harvest loss, postharvest loss estimates and marketing activities were collected. Information as regarding volume or qualities loss at wholesale level and retail level were also collected. Overall content of baskets were weighed and unmarketable fruits were isolated, weighed and recorded. The techniques used to analyze the data include: Descriptive statistics and The Ordinary Least Square (OLS) Multiple Regression Model. The model of the Multiple Regression Analysis is given as:

$$Y=F(X_1,X_2,X_3,X_4,X_5,X_6,X_7, X_8, X_9,U).....(1)$$

Where

Y = Postharvest losses of tomato; X_1 = age (number); X_2 = level of education (years); X_3 = household size (number); X_4 = marketing experience (years); X_5 = means of transportation; X_6 = time taken to reach destination ; X_7 = condition of the road plied; X_8 = cost of transportation; X_9 =quantity purchased.

Four functional functions were fitted and the lead equation was chosen based on econometric criteria

Results and Discussion

Socio economic characteristics

The gender distribution of the respondents shows that majority of the tomato retail marketers (93.3%) were female while the rest (6.7%) were male, the case is the same among the wholesale marketers as well (78.3%) were female while the rest (21.7%) were male. This affirms (Adekanye, 1998) that women dominate foodstuff marketing. About 37% of the retail tomato marketers were single while the majorities were married. About 30% of the wholesale tomato marketers were single while 70% of them were married. In terms of education, 28.3% of the retail tomato marketers have no formal education, 50% have primary education, 16.7% of them have quoranic education and the remaining 5% have secondary education; while 45% of the wholesale marketers have no formal education, 41.7% of them have primary education, 10% of them have quoranic education and about 3.3% of them have secondary education. This implies that a majority of the respondents can read and write.

About 60% of the retailers were more than 40 years of age while others were much younger; while the majority of the wholesalers (51.7%) were more than 41 years of age and the remaining were below this age. The years of experience in tomato marketing reveals that majority of the retailers (about 52%) were 10 years or less in the business while the rest have spent more years in tomato marketing. Almost 62% of the wholesalers have had 10 years or less experience while the rest have more than 10 years of experience.

Nature and Extent of Loss

About 80% of the retailers are fully engaged in the business while the remaining 20% had other business they are involved in. All of the wholesalers are fully engaged in the business. About 94% of the retailers transport their produce with cars and the remaining transport the produce using buses while 10% of the wholesalers carry their produce with buses and 90% of them transport the produce with lorries. It was deduced that the various means of transportation used is a function of the quantity purchased.

Due to the fragile nature of tomatoes, much of the damage occurs during transportation especially on bad roads. Analysis of the state of road plied by the tomato marketer shows that about 33.3% of the retailers ply good roads, 61.7% ply bad roads and 5% of them ply very bad roads while about 35% of the wholesale marketers ply good roads, 53% ply bad roads and about 11.7% of them ply very bad roads.

Tomatoes require good amount of air to retain its freshness during storage, as a result, majority (70%) of the retail marketer use baskets in packaging the produce, 28.3% of them use plastic container and 1.7% use sack in packaging the produce while all (100%) the wholesale marketers use baskets in packaging the produce for transport. Some losses have been reported to occur during the storage of tomato, especially when not properly stored. About 93.3% of the retail marketers store their produce and about 6.7% of them sell off their produce almost immediately after purchase while about 71.7% of the wholesale marketers store their produce and the remaining 28.3% sell off their produce almost immediately after purchase. About 24% of the retailers store their produce in ventilated store house, 1% of the retailers store their produce in personal shops and 32% of them store their produce in joint market shop/store while 3% of the wholesale marketers store their produce in ventilated store and 40% of them store their produce in personal shop. None of the respondents used chemicals for the storage of the produce. One of the major factors that could be responsible for post-harvest loss of tomato is insect infestation. About 97% of the retailers claimed that insects have effect on their produce while 95% of the wholesalers claimed that insect infestation have effect on their produce.

Determinants of spoilage of tomatoes

Result of the Ordinary Least Square (OLS) Multiple Regression

	Constant	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	X ₇	X ₈	X ₉	R ²
Linear	-3.99 (0.00)	3.23 (0.58) **	10.11 (2.46)	-2.12 (11.30))	-2.03 (0.05) *	15.59 (0.00) *	2.34 (4.799)	17.03 (- 12.01)	12.30 (6.0)	9.00 (- 1.78)	0.69
Semi-log	-15.08 (0.00)	-3.35 (0.78) **	49.37 (6.00)	7.523 (-2.06)	36.21 (1.84)	42.88 (8.21)	0.73 (4.803)	9.21 (- 1.12)	18.88 (0.00) *	37.31 (2.81)	0.51
Double log	-0.41 (0.00)	23.57 (-2.39)	-0.40 (0.34) **	74.85 (1.00)	0.62 (1.00) **	7.991 (1.12)	20.11 (0.20) **	7.44 (10.2 3)	31.90 (- 0.34) **	3.43 (0.02) *	0.26
Exponential	5.92 (0.00)	7.93 (-8.49)	2.71 (5.92)	0.41 (0.26) **	2.757 (-2.91)	11.49 (0.10) **	4.26 (0.00) *	30.77 (12.3 2)	2.97 (- 2.43)	8.772 (4.89)	0.21

NB: The values in parenthesis are absolute values of t; (*) significant at 5%;
(**) significant at 10%

Source: computer analysis of field survey data, 2012.

The lead equation is the linear equation. The coefficient of means of transportation(X₅) and marketing experience(X₄) were significant at 5% while age of the marketer (X₁) was significant at 1%, with the means of transportation and age having positive relationship with the postharvest losses while marketing experience have negative relationship on the losses. The positive sign implies that the type of vehicle used in transporting the produce is contributing positively to the spoilage, thereby increasing postharvest losses. The negative sign of marketing experience indicates that the higher the marketing experience of the tomato marketer, the lower the spoilage, this indicates that the measures of guarding against these losses were mostly undertaken by the marketers themselves as a result of the knowledge they have acquired in the long term process of marketing tomato.

Conclusion and Recommendations

The study shows that most of the market losses are incurred by the retailers. It could be concluded with fair accuracy that the losses incurred by the marketers was as a result of bad roads and poor handling of tomatoes. It can be asserted that the problem of infrastructures, when improved upon could also be of benefit in the enhancement of the structure, conduct and performance of tomato market.

It is hereby recommended that for tomatoes postharvest loss to be reduced, the mode of transportation must be made better especially for the retailers and further trainings on postharvest technologies through extension agents could be passed across to them. It is also important that the tomato marketers should form a very viable cooperative society such that the experienced marketers will disseminate their acquired knowledge to the younger ones since years of experience was responsible for the extent of the loss.

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