

**POST HARVEST HANDLING PRACTICES: INFORMATION NEEDS
AMONG TOMATO FARMERS IN EGOR LOCAL GOVERNMENT
AREA, EDO STATE, NIGERIA.**

BY

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EXTENSION SERVICES
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BENIN CITY.**

MAY, 2024

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF
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CERTIFICATION

This is to certify that this project work was carried out by precious osemudiamen ,IHAZA (AGR1800032) of the Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, Benin City.

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Date

Date

DEDICATION

This project is dedicated to Almighty God, my source, my strength, the author and finisher of my faith and also to the less privileged, orphans out there; I want to say hope is coming.

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TABLE OF CONTENTS

Cover page	i
Title page	ii
Certification	iii
Dedication	iv
Acknowledgements	v
Table of contents	vi
List of tables	vii
Abstract	ix
CHAPTER ONE	
1.0 INTRODUCTION	1
1.1 Background Information	1
1.2 Statement of problem	4
1.3 Objectives of the study	7
1.4 Justification of the study	7
1.5 Hypotheses of the study	9
CHAPTER TWO	
2.0 LITERATURE REVIEW	10
2.1 Post-harvest handling practices on tomato	10
2.2 Information needs of tomato farmer on post-harvest handling practices	19
2.3 Sources of information on post-harvest handling practices among tomato farmers	20
2.4 Constraints to tomato post-harvest handling practices	20
CHAPTER THREE	
3.0 METHODOLOGY	25
3.1 Study area and scope	25
3.2 Sampling techniques and sample size	26
3.3 Instrument for Data Collection	26
3.4 Measurement of variables	27
3.5 Data analysis	29
3.5 Test of Hypothesis	29
CHAPTER FOUR	
3.0 RESULTS AND DISCUSSION	30
4.1 Socio-economic characteristics	30
4.2 Postharvest practices engaged by tomato marketers	37
4.3 Information needs of tomato marketers	39
4.4 Information sources of tomato marketers; availability, accessibility and preference	41
4.5 Constraints to tomato postharvest practices	43

4.6 Hypotheses testing	45
CHAPTER FIVE	
5.0 SUMMARY, CONCLUSION AND RECOMMENDATION	47
5.1 Summary	47
5.2 Conclusion	50
5.3 Recommendation	51
REFERENCES	52
APPENDIX ..	49

LIST OF TABLES

Table 1: Socio-economic characteristics	35
Table 2: Postharvest practices engaged by tomato marketers	38
Table 3: Information needs of tomato marketers	40
Table 4: Information sources of tomato marketers	42
Table 5: Constraints to tomato postharvest practices	44
Table 6: Multiple Regression showing influence of socio-economic characteristics on information needs	46

ABSTRACT

This study examined the postharvest practices information needs among tomato marketers in Egor local government area, Edo state, Nigeria. The specific objectives were to; describe the socioeconomic characteristics of the marketers, examine various tomato postharvest practices engaged by the respondents, ascertain the information needs of tomato marketers on post-harvest practices, identify sources of information on post-harvest practices among tomato marketers, and identify constraints to tomato post-harvest practice in the study area.

A two stage sampling technique was employed in this study. Data for this study were obtained from both primary and secondary sources. Primary data were obtained through the use of structured questionnaire administered through interview schedule to Eighty (80) randomly selected respondents from the study area. Data obtained were analyzed using Multiple Regressions.

Results from the descriptive statistic showed that all (100%) of the respondents was female, and majority (68.8%) was married. The mean age, mean household size, mean years of marketing experience and mean average monthly income were 42.16years, 4.83 members, 13.34years and N43,771.19 respectively. Majority (85%) of the respondents was educated and majority (98.8%) was Christians. Majority (75%) of the marketers were members of an association and majority (93.8%) were retailers. The study showed that information on how best to preserve tomatoes, information on tomato storage, and information on how best to transport tomatoes were the major information needs of tomato marketers in the study area. These information needs were adjudged as needed information with all above the mean benchmark of 3.0. Information sources of tomato marketers were analyzed based on their availability, accessibility and preference. It was observed that information sources such as; fellow marketers, friends and neighbours and marketers union or cooperative were available, accessible and preferred by the marketers, with means above the benchmark of 2.0. The postharvest practices engaged by marketers were sorting, grading, cleaning, disinfecting, transportation and marketing. The major

constraints to postharvest practices information needs of marketers were inadequate financial support, lack of knowledge of relevant postharvest handling information, and poor language of information presentation. They all had mean above the benchmark of 2.5 and were adjudged to be serious. Multiple regressions showed that only membership of an association significantly correlated with information needs on postharvest practices at 1% level of significance. The study concluded that though the marketers were experienced due to high years of marketing experience, they still need information on postharvest practices to improve their knowledge and extension agents should conduct an outreach for tomato marketers to help inform them more on postharvest practice they require.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

Tomato, (*Solanum lycopersicum*) is a staple fruit vegetable. Tomatoes are significant to a healthy, well-balanced diet, as they are rich in vitamins, minerals, essential amino acids, sugars, dietary fibers, iron and phosphorus which are essential for human health (Agbo, *et al*, 2015). Tomato is one of such that has a very high economic importance to human diet and is the most popular and widely grown vegetable in the world (Asare *et al*, 2017). Tomatoes are grown as fresh market and as processing tomatoes. They are important for food industry as they serve as raw material for production of value added products. The domestic consumption and demand for tomato is growing due to increase in population. It is very important vegetable with substantial nutritional value. Tomato can be consumed fresh as salad or cooked in sauces, soup and meat or fish dishes. They can be processed into pastes or purees, juices and ketchup. Some are canned and dried up as a post-harvest practice, to make them more economically important processed products for export (Shankara, Marja, and Hilmi, 2019).

Nigeria as a country exports tomatoes. Tanzania, Niger and USA are the major buyers of Nigeria tomatoes with purchase of 55%, 37% and 7.09% in 2022 (Trend Economy, 2023). Nigeria is the 14th largest producer of tomatoes in the world, second in Africa and accounts for about 65% of tomatoes produced in West Africa. Tomato

consumption accounts for 20% of the daily vegetable, with annual market demand of approximately 2.3 million metric tonnes. Production of tomatoes in Nigeria is not a problem, however post-harvest practices of tomatoes is poor (Olanrewaju, 2017).

Post-harvest is the stage of crop production immediately following harvest, including cooling, cleaning, sorting, grading, packaging, storing, transporting and marketing. The instant a crop is removed from the ground, or separated from its parent plant, it begins to deteriorate. Postharvest treatment largely determines final quality, whether a crop is sold for fresh consumption, or used as an ingredient in a processed food product. The most important goals of post-harvest practices are keeping the product cool, to avoid moisture loss and slow down undesirable chemical changes, and avoiding physical damage such as bruising, to delay spoilage (Janet and Richard, 2012).

After the field, post-harvest processing is usually continued in a packing house. This can be a simple shed, providing shade and running water, or a large-scale, sophisticated, mechanized facility, with conveyor belts, automated sorting and packing stations, walk-in coolers and the like. In mechanized harvesting, processing may also begin as part of the actual harvest process, with initial cleaning and sorting performed by the harvesting machinery. Initial post-harvest storage conditions are critical to maintaining quality. Each crop has an optimum range of storage temperature and humidity. Also, certain crops cannot be effectively stored together, as unwanted chemical interactions can result. Various methods of high-speed cooling, and sophisticated refrigerated and

atmosphere-controlled environments, are employed to prolong freshness, particularly in large-scale operations and seasonal crops.

Unfortunately, tomatoes are not only seasonal but highly perishable and deteriorate few days after harvest, losing almost all their required quality attributes and some could likely result to total waste. In developing countries like Nigeria, marketers need to be informed that storing, packaging, transporting and handling techniques, if poorly executed can lead to considerable losses of produce. Furthermore, because of its highly perishable nature, many problems are encountered in tomato marketing. These problems include diseases, nematodes, insect pests, high flower drop, all these resulting in low yield and poor quality fruits. These, coupled with poor post-harvest handling as a result of lack of storage facilities, good road network, good marketing channel amongst others, brings to the fore the need for efficient post-harvest practices in tomato marketing. (Idah *et al.*, 2017).

According to Muhammad *et al.*, (2012), lack of information to adequate post-harvest handling practices also account for loss of produces. Understanding the many factors that contribute to post harvest losses of fruits and vegetables is very critical, these factors include environmental conditions such as heat, drought, mechanical damage during harvesting and handling, improper post-harvest sanitation, unsuitable packaging materials, poor cooling and storage practices.

1.2 Problem statement

Nigeria is one of the leading producers of tomatoes, yet an alarming rate of roughly, about one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tons per year (FAO, 2014). In addition, 30 to 40% of tomatoes produced in the world are never consumed as a result of damage, rotting as well as pests and diseases which affect crops after harvest (Meena *et al.*, 2013). Tomato losses indicate a waste of productive agricultural resources such as land, water, labour, managerial skills and other inputs that could have been channeled into more viable ends.

Poor post-harvest practices of perishable produce by the marketers have been traced to the lack of information (Charles, 2012). This tends to have a multiplying effect of rot on the healthy fruit. Also, fruits and vegetables which include tomatoes produced in rural areas are hardly taken to the markets either due to lack of access to nearby market or inadequate market information by these marketers. Since these marketers have little or no capacity to process their produce and coupled with the fact that there are no modern storage facilities, their products are prone to damages and post-harvest losses (Kadar, 2015). Even when the farmers decide to take their produce to the market, they are often constrained by problems of transportation such as poor road network and inefficient mode of conveying their produce to the market. In Nigeria, this includes the use of dilapidated trucks. All these problems together reduce the quality of the farmer's products and force them to sell the rotten (popularly known as *esa* among the

Yoruba and *awalawa* among the Igbo) at ridiculously low prices. This in-turn reduces their income and ultimately their welfare as they are not able to afford other basic necessities of life.

One of the Nigeria's agricultural policy thrust specifies that farmers and marketers are encouraged to use simple but effective on-farm, off-farm storage facilities and agro-processing technology in order to add value to farm produce and increase their shelf life (Federal Ministry of Agriculture and Rural Development, FMARD, 2014). In line with this, the Nigerian Stored Products Research Institute (NSPRI) together with Food and Agriculture Organization (FAO) developed techniques for the storage of fruit and vegetables especially tomatoes. Though, this information may not be available to many marketers. On the other hand, many of the techniques would require high energy sources like refrigeration which are not available and affordable to the local marketers unlike in developed countries. These techniques could help increase the shelf-life of the tomatoes and make them stay longer before they are sold. However, the non-availability and non-affordability of these facilities to local marketers implies that marketers will always have to sell at reduced prices as they cannot keep the highly perishable products for an extended period of time. This has grave implications on the income of marketers and could consequently result into a rapid decline in their welfare. Information on post-harvest practices by tomato marketers are important to enables marketers be aware of dangers of poor post-harvest practices as it can result in a total decline in their economic returns and impact their welfare negatively. Therefore,

proper information on post-harvest practices can result to a reduction in post-harvest food loss, which could guarantee increase in food availability thereby reducing the need for food importation and consequently impact positively on the welfare of marketers (Adesina, 2012). Also, this is very pertinent for Nigeria to attain food self-sufficiency and food security.

Based on all the above statement and fact that information on post-harvest activities is a major determinant to adequate postharvest practices, this study seeks to address the following research questions:

1. What are the socio-economic characteristics of tomato marketers in the study area?
2. What are the various tomato post-harvest practices engaged by tomato marketers in the study area?
3. What are the information needs of tomato marketers on post-harvest practices in the study area?
4. What are the available, accessible and preferred sources of information on post-harvest practices among tomato marketers in the study area?
5. What are the constraints to assessing post-harvest practices information among tomato marketers in the study area?

1.3 Objective of the study

The general objective of the study was to assess the post-harvest information needs of

tomato marketers in Egor Local Government Area, Edo state. The specific objectives were to:

1. describe the socioeconomic characteristics of the respondents.
2. examine various tomato post-harvest practices engaged by the respondents.
3. ascertain the information needs of tomato marketers on post-harvest practices.
4. identify the available, accessible and preferred sources of post-harvest practices information among tomato marketers in the study area.
5. identify constraints to tomato post-harvest practice in the study area.

1.4 Justification of the study

Post-harvest losses have been highlighted as one of the determinants of the food problem in most developing countries. Nigeria ranks as the 16th largest tomato producing nation in the world and has the comparative advantage and potential to lead the world in tomato production and exports (Sambo *et al.*, 2016). Yet, it is distressing to note that with so much devotion to planting these tomatoes, so many resources spent on irrigation, fertilizer application and crop protection management could only be wasted in few days after harvest due to poor post-harvest practices.

Several studies have been conducted on tomato production. Kader (2015) reported that less than 5% of resource allocation in agricultural research in developing countries is on post-harvest. This means more than 95% of resource allocation is on production.

More so, extensive studies have been carried out on post-harvest practices on tomatoes. Authors such as Oyediran, (2017) assessed the post-harvest practices among tomato *solanum lycopersicum* farmers/processors in Abeokuta- north local government area of Ogun state, Nigeria. Also, Adepujo, (2014) investigated the post- harvest losses and welfare of tomato farmers in Ogbomosho, Osun state, Nigeria. Also, Arah *et al.*, (2016) studied the post-harvest handling practices and treatment methods for tomato handlers in developing countries. But only very few study have been conducted on postharvest information needs of tomato marketers in Egor L.G.A. of Edo state. Author like Muhammad *et al.*, (2012) assessed the post-harvest knowledge of fruit and vegetable farmers in Garun Mallam local government area in Kano state.

This study therefore will fill the gap by informing tomato marketers on the importance of proper post-harvest practices and also seek to know the indigenous post-harvest practices engaged by tomato marketers.

This study will enlighten tomato farmers and all who make reference to this study about the dangers of poor execution of these practices as it can result to decreased market efficiency, severe reduction in income and consequently loss of welfare. It also leads to a waste of productive agricultural resources such as land, water, labour, managerial skills and other inputs.

1.5 Hypotheses

HO₁: There is no significant relationship between the socio-economic characteristics of the respondents and tomato post-harvest practices information needs.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Post-harvest handling practices on tomato

According to the Horticulture Innovation Lab Researchers (2023), after harvest, fruits and vegetables need to be handled with care to maintain freshness, nutrient content, taste and quality. Fruits and vegetables are highly perishable, and so rough handling during harvesting and after harvesting can cause mechanical injuries which can affect the postharvest quality and shelf life of harvested fruit like tomatoes (Arah, Amaglo, Kumah, and Ofori, 2015). Good postharvest handling is critical to reducing postharvest losses of fresh produce, to maintain quality, preserve nutrient content, and earn higher prices at market. It is therefore important to know suitable postharvest handling practices needed to maintain the quality and extend the shelf life of harvested tomatoes for producers in developing countries.

Some post-harvest handling practices on tomato include:

2.1.1 Harvesting:

The physiological maturity of any fruit at harvest has an important effect on postharvest quality of that fruit (Beckles, 2012). Therefore, care must be taken as to when to harvest the fruit in order to attain the best quality. The shelf life of fruits and vegetables is described by postharvest physiologists in three stages: the maturation, ripening, and senescence stages. The maturation stage gives an indication of the fruit

being ready for harvest (Food and Agriculture Organization, 2018). Tomatoes can be harvested in either matured green, partially ripe, or ripe state. Tomato being a climacteric fruit can be harvested at the matured green state allowing ripening and senescence to occur during the postharvest period of the fruit. Producers targeting distant markets must harvest their tomatoes in a matured green state (Moneruzzaman *et al.*, 2019). Harvesting tomatoes in matured green state will not only give producers ample time to prepare the fruit for the market but also prevent mechanical injuries during harvesting. Unfortunately, most producers from developing countries especially those in Africa harvest tomatoes when they are partially or fully ripened (Arah, 2015). Fully ripened tomatoes are susceptible to mechanical injuries during harvesting resulting in shorter shelf life (Toivonen, 2017). Care must therefore be taken when harvesting tomatoes in ripe state to avoid these injuries which will hasten deterioration. Also, the use of harvesting and packaging containers with sharp edges must be discouraged to prevent bruising and puncturing of the fruits. Harvesting of fruits should be done in either early or late hours of the day to avoid excessive field heat generation. The inability of producers to follow these simple but vital harvesting procedures coupled with some inefficiency, like lack of ready market and processing facilities, in the entire value chain may explain the reasons why there are lots of losses in tomatoes harvested at fully ripened state in most developing countries.

2.1.2 Pre-cooling after harvest:

Field heat is usually high and undesirable at harvesting stage of many fruits and vegetables and should be removed as quickly as possible before any postharvest handling activity. Excessive field heat gives rise to an undesirable increase in metabolic activity and immediate cooling after harvest is therefore important (Akbudak *et al.*, 2012). Precooling minimizes the effect of microbial activity, metabolic activity, respiration rate, and ethylene, whilst reducing the ripening rate, water loss, and decay, thereby preserving quality and extending shelf life of harvested tomatoes production (Shahi *et al.*, 2012). The suitable temperature range of about 13-20°C for tomato handling can be attained either in the early hours of the morning or late in the evening. Harvested fruit must be precooled to remove excessive field heat if harvested at times other than the recommended periods. A cheap but effective way of precooling harvested tomatoes for producers of developing countries can be by dipping fruits in cold water (hydro-cooling) mixed with disinfectants such as thiabendazole and sodium hypochlorite if availability of clean water is not a challenge. This method is effective in removing field heat whilst reducing microbial loads on the harvested fruits. Tomato producers in developing countries especially those from Africa assemble their harvested produce under tree shade in an attempt to reduce field heat (Olayemi *et al.*, 2015). Tree shade, however, is not a reliable and effective way of reducing field heat in harvested produce. Therefore adoption of a simple on-farm structure like a small hut made of thatch can be very beneficial in precooling of harvested tomatoes.

2.1.3 Cleaning or Disinfecting:

Proper hygiene is a major concern to all produce handlers, because of not only postharvest diseases, but also incidence of food-borne illnesses that can be transmitted to consumers. Unfortunately, cleaning or disinfecting tomatoes after harvest is not a common practice for most tomatoes handlers in developing countries especially those from Africa. This practice may be attributed to either the unavailability of portable water at the production sites or the sheer ignorance of the practice. However, in places where water is not a constraint, the use of disinfectants in water either for washing or for cooling can reduce both postharvest and food-borne diseases in fruits and vegetables. The use of various disinfectants during postharvest treatment of tomatoes is well documented. For instance, sodium hypochlorite solution has been used to sterilize tomato fruits in order to reduce the incidence of fungal infection before any postharvest treatment was applied (Genanew, 2013). Dipping of tomato fruits in thiabendazole solution reduced the microbial load on the fruits. Fruits and vegetables are usually treated with chlorinated water after washing to reduce the microbial load prior to packaging. Workneh *et al.* (2012) indicate that anolyte water dipping disinfection of tomatoes not only reduced the microbial loads on the fruits but also maintained superior quality of tomatoes during storage. Disinfection can be used in conjunction with hydro-cooling to achieve the purpose of reducing excessive field heat and reducing microbial infection at the same time.

2.1.4 Sorting or Grading:

One of the most important processes in packaging and marketing of fruit and vegetables is sorting and grading (Arjenaki *et al.*, 2013). Sorting is the removal of rotten, damaged, or diseased fruits from the healthy and clean ones. The damaged or diseased fruits can produce ethylene in substantial amounts which can affect the adjacent fruits. Grading is also the process of categorizing fruits and vegetables on the basis of colour, size, stage of maturity, or degree of ripening. The two processes are vital in maintaining postharvest shelf life and quality of harvested tomatoes. Sorting limits the spread of infectious microorganisms from bad fruits to other healthy fruits during postharvest handling of tomatoes. Grading also helps handlers to categorize fruits and vegetables in a given common parameter which enables easy handling. For instance, grading on the basis of colour or maturity stage will help eliminate overripe fruits which will easily produce ethylene to hasten the ripening process in the whole batch. Commercial tomato producers normally use sophisticated systems that require precise sorting and grading standards for their produce. Small-scale producers and retailers in developing countries in contrast may not use written down grading and sorting standards; however, the produce must still be sorted and sized to some degree before selling or processing it.

2.1.5 Packaging:

Packaging is also one of the important aspects to consider in addressing postharvest losses in fruits and vegetables. It is enclosing food produce or product to protect it

from mechanical injuries, tampering, and contamination from physical, chemical, and biological sources (Prasad and Kochhar, 2014). Packaging as a postharvest handling practice in tomato production is essential in putting the produce into sizeable portions for easy handling. However, using unsuitable packaging can cause fruit damage resulting in losses (Idah, Ajisegiri, and Yisa, 2017). Some common packaging materials used in most developing countries include wooden crates, cardboard boxes, woven palm baskets, plastic crates, nylon sacks, jute sacks, and polythene bags (Idah *et al.*, 2017). Most of the abovementioned packaging materials do not give all the protection needed by the commodity. Whilst the majority of these packaging materials like the nylon sacks do not allow good aeration within the packaged commodity causing a build-up of heat due to respiration, others like the woven basket have rough surfaces and edges which cause mechanical injuries to the produce. The wooden crate and the woven palm basket are some of the common packaging materials used in many developing countries especially those in Africa for packaging tomatoes. The major shortcoming of the wooden crate is in its height which creates a lot of compressive forces on fruits located at the base of the crate. These undesirable compressive forces cause internal injuries which finally result in reduced postharvest quality of the tomatoes (Arah, 2015). There have been suggestions of modifying the wooden crate to make it more suitable for packaging tomatoes. Kitinoja (2018) therefore suggested that the depth of the crate should be reduced considerably to reduce the build-up of compressive forces which can cause mechanical injuries to fruits at the base of the

crate after packaging. The palm woven baskets used by tomato handlers have sharp edges lining the inside which puncture or bruise the fruit when they are used. It was also recommended by Idah *et al.*, (2017). that woven palm baskets should be woven with the smooth side of the material turned inward.

2.1.6 Storage:

Tomato has very high moisture content and therefore is very difficult to store at ambient temperatures for a long time. Meanwhile, storage in the value chain is usually required to ensure uninterrupted supply of raw materials for processors. Storage extends the length of the processing season and helps provide continuity of product supply throughout the seasons. For short-term storage (up to a week), tomato fruits can be stored at ambient conditions (Znidarcic and Pozrl, 2016) if there is enough ventilation to reduce the accumulation of heat from respiration. For longer-term storage, ripe tomatoes can be stored at temperatures of about 10-15°C and 85- 95% relative humidity (Castro *et al.*, 2015). At these temperatures, both ripening and chilling injuries are reduced to the minimal levels. These conditions are also difficult to obtain in most tropical countries and therefore losses of appreciable quantities of harvested tomatoes have been reported. This is consistent with the claim that the quality of tomato is compromised when exposed to high temperatures and high relative humidity (Parker and Maalekuu, 2013). Very low temperature storage too is detrimental to the shelf life and quality of many tropical fruits like tomatoes. For instance, refrigerating a tomato will reduce its flavour, a quality trait of tomatoes which is largely determined

by the total soluble solids (TSS) and pH of the fruit. An understanding of the correct temperature management during storage of tomatoes is vital in extending the shelf life of the fruit whilst maintaining fruit qualities. Tomatoes handlers in tropical countries can store tomatoes for short to intermediate time by using evaporative cooling system made from woven jute sacks.

2.1.7 Transportation:

In most developing countries, the production sites for many tomato producers are far from the marketing centers and also inaccessible by road. Transporting harvested tomatoes to the market on such bad road network and the lack of proper transportation like refrigerated vans become a big challenge for both producers and distributors (Abimbola, 2014). This challenge therefore causes unnecessary delays in getting the produce to the market. Meanwhile, any delay between harvest and consumption of tomatoes can result in losses. Losses of up to about 20% are incurred by producers due to transportation delays (Babatola, Ojo and Lawal, 2018). Producers will therefore make use of any available means of transport for their produce without considering its appropriateness in order to avoid delays. Some modes of transportation include human labour, donkeys, public transport, rented trucks, busses, lorries, fuel tankers, articulator trucks, and pick- up vans. However, the use of appropriate transportation for tomatoes is a major factor to consider in postharvest handling of the fruit. During transportation, the produce should be immobilized by proper packaging and stacking to avoid excessive movement or vibration. Vibration and impact during transportation as a

result of undulations on roads is one of the major causes of postharvest losses to most fruits and vegetables especially tomatoes (Idah *et al.*, 2017). The bad nature of road networks in most developing countries therefore provides these unfavourable factors during transportation resulting in great losses. The wobbling nature of most of the vehicles coupled with the bad nature of roads causes a lot of mechanical damage to the produce before it reaches its destination. Handlers from developed countries on the other hand use refrigerated containers and trailers which travel on reasonably good roads. Transporting tomatoes in refrigerated trucks is not only convenient, but also effective in preserving the quality of fruits. However, both the initial investment and the operation costs of these vehicles are very high and beyond the affordable reach of most producers in developing countries. Handlers of developing countries therefore transport their produce using the most affordable mode of transport without considering the effect it will have on the postharvest quality of the produce. Even though handlers from developing countries may not have the capacity to use refrigerated trucks, they should be well educated on the consequences that any other transportation option they use may have on their produce.

2.2 Information needs of tomato marketers on post-harvest handling practices

Information needs could be seen as a demand, requirement, want or desire. Yusuf (2012) defined information need as the extent to which information is required to solve problems. It is also a degree used to express satisfaction and dissatisfaction with the

information. Adio *et al.* (2016) explains that, information need is a state or process when one perceived that there is a gap between the information and knowledge available to solve a problem and the actual solution of the problem.

Information needs are many and multi-dimensional and this is could be linked to the diverse nature of communities. On a daily basis, tomato farmers need information to help develop and strengthen their business. Generally, farmers seek to acquire accurate, timely and high quality information to take decisions on crop production, reducing losses and maximizing productivity. Oдини (2014) stated that, farmers need relevant and adequate information on agricultural inputs, marketing and selection of varieties of seeds, high yield crops, and pest control and fertilizer application.

According to Abubakar and Magaji (2020), the following includes some of the information needs of tomato farmers on post-harvest handling method: Information on agricultural credit and loans, weather and climate conditions, marketing and price of tomato produce, Government subsidy on tomato, storage methods and facilities, pests and diseases, packaging, preservation and new agricultural technologies.

2.3 Sources of information on post-harvest handling practices among tomato farmers.

Tomato farmers' information sources are the central elements of advanced tomato farming activities as well as the fundamental and essential promoter of tomato farming activities. Sani, Boadi, Kalusopa and Oladokun (2014) stated that information sources

can be distinguished by form of representation - textual (books, journals, manuscripts), graphic (graphs, diagrams, plans, charts), and audio visual (sound recordings, motion pictures, slides).

According to Ajagbe, Oyediran, Omoare and Sofowora (2014) the following includes some of the sources of information of post-harvest handling method us by tomato farmers: Fellow farmers, extension agents, friends and neighbours, farmers union or cooperative, television, radio, internet, online forum, newspapers, magazines and research institute.

2.4 Constraints to tomato post-harvest handling practices

Post-harvest constraints are challenges faced by producers, processors, distributors, retailers as well as exporters in handling the produce after it has been harvested until it gets to the final consumer. Post-harvest challenges can be an on-farm or off-farm problem.

2.4.1 On-farm challenges

1. Inappropriate harvesting stage/periods: The physiological maturity of the fruit at harvesting stage has a major effect on quality (Beckles 2012). Care must therefore be taken as to when to harvest the fruit in order to attain the best quality. It can be harvested either in matured green, partially ripened or ripened state. Tomato being a climacteric fruit can be harvested at the matured green state allowing

ripening and senescence to occur during the postharvest period of the fruit. Meanwhile, farmers in most African countries harvest tomatoes when they are partially or fully ripened. Fully ripened tomatoes are susceptible to injuries during harvesting resulting in shorter shelf life. This may be the reason why there are high level of losses in tomatoes harvested at fully ripened stage.

2. Lack of appropriate harvesting containers: Tomatoes are harvested by manual picking instead of mechanical picking in most developing countries. In harvesting, care should be taken to avoid mechanical damage which can be an entry point for disease causing pathogens. The majority of farmers from Africa use wooden crates and woven baskets with hard and sharp surfaces which cause mechanical injuries to the harvested fruits. Overloading during harvesting can cause a buildup of excessive compressive forces resulting in crushing of fruits that are found at the base of the containers (Hurst, 2018).

3. Excessive field heats: The field heat of harvested crop is usually high, and should be removed as quickly as possible before any postharvest handling activity. Field heats also give rise to a sudden increase in metabolic activity and prompt cooling after harvest to reduce the metabolism is very important (Akbulak et al. 2012).

4. Lack of on-farm storage facilities: Farmers in developed countries make use of on-farm cooling systems in dealing with excessive field heats. An example of such facility used in the US is the force-air cooling system. Although, some farmers in developing countries are already using low cost on-farm cooling systems in the form of structures, they form a small proportion (less than 10%) of the number of tomato producers especially those in Africa (Olayemi et al. 2015). This is an indication that over 90% of farmers have no on-farm storage facilities and therefore leave their harvested produce at the mercy of the weather.

5. Inappropriate packaging materials: A good packaging system should protect the commodity against pathogens, natural predators, moisture loss, temperatures extremes, crushing, deformation and bruising of the product. Some of the most common packaging materials used in developing countries include large green leaves, clay pots, woven cane baskets, wooden crates, cardboard crates, cardboard boxes, plastics buckets, nylon sacks, jute sacks and polytene bags. The majority of these packaging materials do not allow better aeration within the packaged tomatoes causing a buildup of heat due to respiration.

2.4.2 Off-farm challenges

1. Lack of access or bad nature of roads: Lack of access roads to production fields in many African countries is a major challenge hampering the success of the tomato industry. Majority of the production fields are located in remote areas, which are far from improved roads making access to competitive markets difficult and costly.

2. Inappropriate mode of transport: The use of appropriate transportation is another factor to consider in postharvest handling of tomatoes. During transportation, the produce should be immobilized by proper packaging and stacking to avoid excessive movement or vibration.

Vibration and impact during transportation as a result of undulations on roads is one of the major causes of postharvest losses to most fruits and vegetable especially tomatoes (Idah et al. 2017). The bad nature of road networks in most developing countries therefore provides these unfavorable factors during transportation resulting in great losses. Farmers in develop countries use refrigerated containers and trailers which travel on reasonably good roads. Transporting tomatoes in refrigerated trucks is not only convenient, but also effective in preserving the quality of fruits.

3. Lack of processing equipment/factories: The unavailability of processing factories or redundancy in the available ones is also another challenge tomato producers in developing countries are faced with. The solution to this challenge is to promote the use of low cost postharvest processing technologies that can be used to process the raw materials into a more durable form.

4. Lack of reliable market: Market availability is a big challenge facing most tomato producers in developing countries especially those in Africa. This challenge can be attributed to many factors. One of the factors is the pattern of production resulting in gluts. There is lack of communication between producers and consumers,

and also lack of market information (Kader 2015). This has been the main reason for the mismatch between production and available markets. Marketing cooperatives are needed by producers in African countries in major tomatoes producing areas to create market for producers

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Area and Scope

Egor is a Local Government Area of Edo State in the South-south geo-political zone of Nigeria which has its administrative headquarters in Uselu town. It lies in the geographically coordinate of latitude 6⁰37' North and longitude 5⁰61' East. It has a landmass of 93km² and a 2022 projected population size of 502,700 people. It has an adult male population of 249,339 and an adult female population of 253,361. The postal code of the area is 300. Egor is one of the Local Government Areas that are part of the larger metropolitan area of Benin City with the area hosting members of several tribal groups such as the Esan, Bini, and the Owan. The area is home to Christians, Muslims, and traditional worshippers.

A number of towns and villages make up of Egor local government area and these include Okhoro, Uselu, Uwelu, Iguikpe, Ugbighoko, Iguediaye, Evbougide and Oghedaivbiobaa. Egor Local Government Area is known for its bustling marketplaces, such as the Uselu Market, Uwelu Market, Egor Market and Ogida Market, where a wide range of goods and services are sold.

The people of Egor LGA are known for their delicious cuisine, which is characterized by the use of local ingredients and spices. Some popular dishes include Owo soup, Afemai soup, black soup, and pounded yam. The people of Egor LGA celebrate several

festivals throughout the year, such as the Igue festival, which is a thanksgiving ceremony to the gods for a bountiful harvest. Other festivals include the Ewere festival, Ekaba festival, and Emaudo festival. The people of Egor LGA are known for their artistic skills in pottery, weaving, and carving. They produce beautiful artifacts, such as pottery, baskets, and wooden carvings, which are sold in local markets and tourist shops. The people of Egor LGA are also known for producing variety of crops like maize, pumpkin, melon, plantain, oil palm and sometimes tomato.

3.2 Sampling technique and sample size

The tomato marketers in the study area make up the respondents and were selected using a multi- stage sampling procedure. First stage was the selection of the four markets from Egor Local Government Area. These markets included Uselu market, Egor market, Uwelu market and Ogida market. The second stage was a simple random sampling of 20 respondents from each market to give a total sample size of one hundred and twenty (80) respondents for the study.

3.3 Instrument for Data Collection

Data for the Study were obtained through primary and secondary sources. The primary data were obtained through the use of administered questionnaire. The secondary data were from literatures and existing documents such as text books, journals, e-books and relevant literatures.

3.4 Measurement of Variables

The Respondents was asked to indicate the following:

1. Age: Respondents was asked to fill in their actual number of years.
2. Sex: This was measured nominally as follows: Female scored 0, Male scored 1.
3. Marital status: This was measured nominally as follows: Single scored 1, Married scored 2, Divorced scored 3, Widowed scored 4 and Separated scored 5.
4. Household size: Respondents was asked to fill in the number of persons feeding from the same pot and living together.
5. Religion: This was measured nominally as follows: Christian scored 1, Muslim scored 2, Traditional worshipper scored 3 and others scored 4.
6. Education: This was measured using nominal measurement scales by indicating if they have: primary education scored 1, secondary education scored 2, and tertiary education scored 3.
7. Years of marketing experience: Respondents was asked to fill the number of years they had spent in tomato value chain. Interval scale was used to measure their years of farming experience.
8. The information needs of tomato farmers on post-harvest handling practices: This was measured from a list of information needs of tomato farmers on post-harvest handling practices using a five (5) likert type rating scale of strongly disagree = 5, Disagree = 4, Neutral = 3, Agree = 2 and Strongly Agree = 1. A mean score of 3.0 and above was taken to mean that

the mentioned information needs is very serious while a mean score below 3.0 was taken to mean that the mentioned information needs was less serious on tomato post-harvest handling practices.

9. The sources of information on post-harvest handling practices among tomato farmers: This was measured from a list of identified sources of information on post-harvest handling practices using their availability, accessibility and preference. A mean score of 2.0 and above was taken to mean that the information source was available, accessible and preferred while a mean score of less than 2.0 was taken to mean that the information source was less available, less accessible and less preferred.

10. The various tomato post-harvest handling practices engaged by the respondents: This was measured from a list of identified tomato post-harvest handling practices using a five (5) likert type rating scale of strongly disagree = 5, Disagree = 4, Neutral = 3, Agree = 2 and Strongly Agree = 1. A mean score of 3.0 and above was taken to mean the most engaged post-harvest handling practices among tomato farmers while a mean score of less than 3.0 was taken to mean less engaged post-harvest handling practices.

11. The constraints to tomato post-harvest handling practice in the study area: This was measured using a list of possible constraints with a 4 point rating scale of very serious (scored 4), serious (scored 3), not serious (scored 2) not a problem (scored 1). A mean score of 2.5 and above was taken to mean that the respondents encounter

serious problem on tomato post-harvest handling practices and a mean score of less than 2.5 showed that less significant problem exist in tomato post-harvest handling practices in the study area.

3.5 Data Analysis

Objective 1: This was analyzed using descriptive statistics such as mean, frequency count, percentage, standard error, and tables.

Objective 2 was analyzed using descriptive statistics such as mean, frequency count, percentage, standard error, and tables.

Objective 3 was analyzed using mean score. **Objective 4:** This was analyzed with the use of mean. **Objective 5:** This was analyzed with the use of mean.

3.6 Test of Hypothesis

Hypotheses 1: This was analyzed using Multiple Regression. The Multiple regression formula is given as:

$$= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + e$$

Where,

= Dependent variable

β_0 = Population intercept

β_1 = Population slope

X_1 and X_2 = Independent variables e = random error term

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter presents the results of data analysis, interpretation and discussion of 80 tomato marketers in the study area.

4.1 Socio-economic characteristics

4.1.1 Sex

Data in Table 1 show that all (100%) of the respondents in the study area were female. Although, this study is not gender based, the result indicates the fact that female marketers are dominant in the study and could be linked to the nature of the business which is tomato business. This finding agrees with the findings of Ajibade and Oyibo (2021), which stated that though there maybe high population of men in tomato production but women are dominant in the marketing of tomatoes especially as retailers.

4.1.2 Age (Years)

It was observed that the mean age of the respondents sampled and interviewed for this study was approximately 42 years where close to half (37.5%) were found between 40 to 49 years, 30% were found between 30 to 39 years, 16.3% were found between 50 to 59 years, 12.5% were found between 20 to 29 year, and only 3.8% were 60 years and above. By implication, tomato marketers

in the study area were in their active age and were able to carry out various activities involved in tomato marketing. This finding agrees with Ibitoye et al. (2015)

4.1.3 Marital status

Furthermore, results in Table 1 show that majority (68.8%) of the sampled respondents were married, while only 7.5% were unmarried, and 10% and 13.8% were divorced and widow/widowers respectively. This means that most of the respondents were married and being married is associated with being responsible and so respondents are expected to make end meet to cater for their family. This agrees with the findings of Sekumade and Toluwase (2014) whose study result revealed that respondents who are married will make positive economic decisions.

4.1.4 Household size (Number)

Results also show that the mean household size of the respondents was approximately 5 persons where majority (66.3%) had a household size of 5 persons and below, 31.3% of the respondents had household size of 6 to 10 person, and only 2.4% had household size above 10 persons. This implies that the respondents have many dependents who could also serve as sources of family labour in tomato marketing. This finding also agrees with the work of Sekumade and Toluwase (2014) whose study result also has mean household size of marketers as 5 persons.

4.1.5 Level of Education

Based on the findings from the study, it was observed that close to half, (41.3%) of the respondents had only primary education, 38.8% had secondary education, 5% had up to tertiary education and 15% had no formal education. This means majority (85%) of the marketers were educated while only 15% were not. The level of education acquisition has an implication in the adoption and utilization of best handling practices information on tomatoes. This finding agrees with Ibitoye et al. (2015) who reported that high literacy level is associated with better handling practices.

4.1.6 Religion

Furthermore, results in Table 1 show that almost all (98.8%) the marketers in the study were Christians, 1.2% were Muslims. The implication of this finding is that there is no discriminating against religion groups as everyone has their freedom to religion in Nigeria.

4.1.7 Years of marketing experience

Result from table 1 showed that the mean years of marketing experience was found as approximately 13 years. It was observed that higher proportion (46.3%) had marketing experience of 10 years and below, 33.8% and 11.3% had marketing experience of 11 to 20 years and 21 to 30 years respectively, while only 8.6% of the marketers had marketing experience above 30 years. This implies that a greater number of the

respondents have been involved in tomato marketing for a long time and could have learnt from their past mistakes and are able to correct them as well as project best post-harvest practices for tomatoes. This may increase their level of efficiency, because the more experienced a farmer is, the more efficient he/she is and vice versa. These findings are in consonance with Shankara, *et al.* (2019), who reported a positive and significant relationship between farming experience and technical efficiency among farmers in Adamawa State.

4.1.8 Average income per month (Naira)

The average monthly income of the marketers was analyzed and ranged as follows. Majority (90.0%) earned below ₦50,000 monthly, 8.8% earned between ₦50,000 to ₦100,000 monthly, and only 1.2% of the marketers earned ₦100,000 to ₦150,000 monthly. Analyzing the monthly average income, it could be observed that the marketers earned a mean income of approximately ₦44,000 monthly. This implies that respondents are not earning so much and it may affect their ability to pay for information that may not be freely given. This agrees with the finding of Shankara, *et al.* (2019), who reported that some valid information are paid for.

4.1.9 Membership of association

Results also show that majority (75%) of the marketers were members of an association, while 25% were not members to any association or cooperative society. The implication to this is that majority of the marketers could easily source help from

their association and will be up to date with information on post-harvest practices of tomatoes. This finding agrees with the findings of Ajibade and Oyibo (2021) who stated that associations and groups are vital information sources to members.

4.1.10 Category of marketers

Results from Table 1 also showed the category of tomato market with majority (93.8%) of the marketers as retailers and only 6.2% of the marketers as wholesalers. This further agrees with the findings of Ajibade and Oyibo (2021) which stated that women are dominant in the marketing of tomatoes especially as retailers.

Table 1: Socio-economic characteristics

Variables	Freq. n = 80	%	Mean	Std. Dev.
Sex				
Male	-	-		
Female	80	100.0		
Age				
20-29 years	10	12.5		
30-39 years	24	30		
40-49 years	30	37.5	42.16	8.71
50-59 years	13	16.3		
60 and above	3	3.8		
Marital status				
Unmarried	6	7.5		
Married	55	68.8		
Divorced	8	10		
Widow/Widower	11	13.8		
Family/household size				
<= 5.00	53	66.3	4.83	2.26
6.00 - 10.00	25	31.3		
11.00+	2	2.4		
Level of Education				
No formal education	12	15		
Primary education	33	41.3		
Secondary education	31	38.8		
Tertiary education	4	5		
Involve in other occupation?	17	21.3		
Religion				
Christianity	79	98.8		
Islamic	1	1.3		
Tradition				
Years of marketing experience				
<= 10.00	37	46.3		

11.00 - 20.00	27	33.8		
21.00 - 30.00	9	11.3	13.34	9.73
31.00+	7	8.8		
Average income per month				
<N50,000	72	90.0		
N50,000-N100,000	7	8.8	43,771.19	12,619.31
N100,001-N150,000	1	1.2		
N150,001-N200,000				
>N200,000				
Membership of association?				
Yes	60	75		
No	20	25		
Category of marketers				
Wholesaler	5	6.2		
Retailer	75	93.8		
Formal training on postharvest handling in tomato marketing?				
How often does the extension agent visit your market?	5	6.3		
Never	79	98.8		
Weekly				
Fortnightly				
Monthly				
Yearly	1	1.3		

Source: Field Survey, 2024.

4.2 Postharvest practices engaged by tomato marketers

The results from Table 2 showed multiple responses on postharvest practices engaged by tomato marketers in the study. The result showed that all (100%) marketers practiced sorting, grading, transportation and marketing. 93.8% also practiced cleaning and disinfecting, and only 21.3% and 11.3% practiced storing and preservation respectively. The implication to this is that marketers practiced sorting, grading, transportation and marketing the most, this may be due to their lack storage and preservation facilities to elongate the shelf life of their produces. Therefore, they quickly sort, grade and market their tomatoes to prevent loss due to high perishability. This agrees with the findings of Olayemi et al. (2015) which recorded that over 90% of marketers have no storage facilities and lost one-fifth of their grains, tubers, fruit and vegetable.

Table 2: Postharvest practices engaged by tomato market

List of various tomato post-harvest practices	Freq.	%
Harvesting		
Pre-cooling after harvest		
Cleaning or Disinfecting	75	93.8
Sorting	80	100
Grading	80	100
Preserving	9	11.3
Packaging		
Storing	17	21.3
Transportation	80	100
Marketing	80	100

Source: Field survey, 2024.

4.3 Information needs of tomato marketers

Table 3 indicates that a mean of above 3.0 was used as the benchmark for the information needs of tomato marketers in the study. Specifically it was observed that; information on how best to preserve tomatoes ($\bar{x} = 4.86$), information on tomato storage ($\bar{x} = 4.82$), information on how best to transport tomatoes ($\bar{x} = 4.80$), information on how best to package tomatoes ($\bar{x} = 4.76$), information on cleaning and disinfecting ($\bar{x} = 4.08$), information on tomato marketing ($\bar{x} = 3.76$) and information on pre-cooling ($\bar{x} = 3.43$) all had above a benchmark of 3.0 out of a total of 10.0. They were therefore, adjudged as needed information. This agrees with the findings of Abubakar and Magaji (2020) on the information needs of tomato marketers. Their study result revealed that marketers require information on packaging (61.5%), information on preservation and storage (59.9%) and information on disinfecting (55.5%).

Table 3: Mean distribution of information needs of tomato marketers

Information needs	Mean	Std. Dev.
Information on harvesting tomato	2.98	1.32
Information on pre-cooling	3.43*	1.32
Information on cleaning and disinfecting	4.08*	1.21
Information on tomato sorting	2.48	1.53
Information on tomato grading	2.48	1.53
Information on how best to preserve tomatoes	4.86*	0.52
Information on how best to package tomatoes	4.76*	0.54
Information on tomato storage	4.82*	0.62
Information on how best to transport tomatoes	4.80*	0.56
Information on tomato marketing	3.75*	1.71

Source: Field Survey, 2024.

*Mean > 3.0 = Information is needed

4.4 Information sources of tomato marketers; availability, accessibility and preference Table 4 indicated that a mean above 2.0 was used as the benchmark for the available, accessible and preferred information sources of tomato marketers in the study area.

On availability, it was observed that; fellow marketers ($\bar{x} = 2.88$), friends and neighbours ($\bar{x} = 2.25$) and marketers union or cooperative ($\bar{x} = 2.30$) all had means above the benchmark of 2.0 out of 8.0. They were adjudged to be available.

On accessibility, it was observed that; fellow marketers ($\bar{x} = 2.93$), friends and neighbours ($\bar{x} = 2.33$) and marketers union or cooperative ($\bar{x} = 2.35$) all had means above the benchmark of 2.0 out of 8.0. They were adjudged to be accessible.

On preference, it was observed that; fellow marketers ($\bar{x} = 2.98$), extension agents ($\bar{x} = 2.15$), friends and neighbours ($\bar{x} = 2.38$) and marketers union or cooperative ($\bar{x} = 2.74$) all had means above the benchmark of 2.0 out of 8.0. They were adjudged to be preferred.

This implies that information sources such as; fellow marketers, friends and neighbours and marketers union or cooperative were available, accessible and preferred by the marketers. This agrees with the findings of Ajagbe, Oyediran, Omoare and Sofowora (2014) on sources of information on post-harvest practices of tomato marketers. Their study revealed that information from marketers is readily available

and accessible to their fellow marketers due to proximity in distance and such information are very much preferred because they have been tested.

Table 4: Mean distribution of information sources

Information sources	Available		Accessible		Preferred	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Fellow marketers	2.88*	0.33	2.93*	0.27	2.98*	0.16
Extension agents	1.38	0.49	1.11	0.36	2.15*	0.68
Friends and neighbours	2.25*	0.46	2.33*	0.50	2.38*	0.63
Marketers union or cooperative	2.30*	0.86	2.35*	0.86	2.74*	0.47
Television/ Radio	1.84	0.49	1.50	0.60	1.50	0.53
Internet / Online forum	1.23	0.45	1.05	0.27	1.14	0.42
Research Institute	1.35	0.48	1.05	0.27	1.05	0.22
Newspapers/ Magazines	1.66	0.53	1.66	0.53	1.05	0.22

Source: Field survey, 2024.

*Mean > 2.0 = Available, accessible and preferred.

4.5 Constraints to tomato postharvest practices

Results in Table 5 show that a mean of above 2.5 was used as the benchmark of the constraints to tomato postharvest practices by tomato marketers. Specifically, it was observed that 8 of the selected constraints all had above a benchmark of 2.5 out of a total of 17.0. They were adjudged to be serious. However, inadequate financial support ($\bar{x} = 3.91$), lack of knowledge of relevant postharvest handling information ($\bar{x} = 3.34$), and poor language of information presentation ($\bar{x} = 3.01$) ranked as first, second and third constraints respectively. The implication to this is that marketers lack adequate financial support to purchase facilities to store and preserve their tomatoes from spoilage. Some marketers still lack relevant knowledge on postharvest handling of tomatoes. This result agrees with the findings of Kader (2015) whose study result revealed that marketers faced difficulties in their practice of postharvest activities due to poor postharvest information.

Table 5: Constraints to tomato postharvest practices

Constraints	Mean	Std. Dev.
Inadequate financial support	3.91*	0.02
Processing of tomato into paste is strenuous	1.99	1.04
Lack of knowledge of relevant postharvest handling information	3.34*	0.55
Inadequate extension service training	2.01	0.78
Low demand of the tomato	1.03	0.23
Inadequate market information on tomatoes	1.91	0.94
Lack of reliable market	1.83	1.21
Inadequate comprehension to information content	2.78*	0.81
Poor medium of information communication	2.76*	0.78
Lack of feedback	2.21	0.99
Inability to access formal channel of information	2.98*	0.86
No time to consult information sources	2.74*	1.10
Poor language of communication	2.13	0.88
Lack of tomato association	1.74	1.29
Inability to read and write	2.45	1.03
Inadequate contact to extension agents	2.71*	1.06
Poor language of information presentation	3.01*	1.01

Source: Field survey, 2024.

*Mean > 2.5 = serious constraints.

4.6 Hypothesis testing

4.6.1 **There is no significant relationship between the socio-economic characteristics of the respondents and tomato post-harvest practices information needs.**

Results of Multiple Regression showing significant relationship between selected socio- economic characteristics of marketers and tomato postharvest practices information needs showed that only membership of an association ($r = 0.001$; $t < 3.57$) significantly correlated with information needs on postharvest practices at 1% level of significance. This implies that being a member to an association is a very importance factor in getting adequate information on postharvest practices. This also agrees with the findings of Ajagbe *et al.* (2014).

The pseudo R-squared value, ($R^2 = 0.294$) implies that the socioeconomics characteristics of the respondents contributed significantly to their information need.

Table 6: Multiple Regressions showing influence of respondents' socio-economic characteristics on information needs

Variables	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig
(Constant)	32.79	3.11		10.55**	0.000
Age	-0.51	0.64	-0.13	-0.80	0.426
Marital status	0.79	0.65	0.16	1.23	0.224
Family size	0.14	0.21	0.08	0.67	0.504
Educational status	0.64	0.68	0.12	0.94	0.352
Years of marketing experience	0.03	0.07	0.07	0.40	0.691
Income	-0.88	2.23	-0.07	-0.40	0.693
Membership	3.77	1.06	0.42	3.57**	0.001
Training	4.24	2.83	0.27	1.50	0.138

Source: Field survey, 2024.

**Sign. at 0.01 level of
significance R = 0.542;

R Square = 0.294

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Tomato is one of such that has a very high economic importance to human diet and is the most popular and widely grown vegetable in the world. Tomato consumption accounts for 20% of the daily vegetable, with annual market demand of approximately 2.3 million metric tonnes. Production of tomatoes in Nigeria is not a problem, however post-harvest practices of tomatoes is poor. Post-harvest is the stage of crop production immediately following harvest, including cooling, cleaning, sorting, grading, packaging, storing, transporting and marketing. Poor post-harvest practices of perishable produce by the marketers can also be traced to the lack of information on the part of some marketers. Thus, this study was conducted to generally examine the postharvest practices information needs among tomato marketers in Egor local government area, Edo state, Nigeria. Specifically, it was done to describe the socioeconomic characteristics of the marketers, examine various tomato postharvest practices engaged by the respondents, ascertain the information needs of tomato marketers on post-harvest practices, identify sources of information on post-harvest practices among tomato marketers, and identify constraints to tomato post-harvest practice in the study area.

Scientifically recognized sampling procedure was used to select 80 respondents with

the use of validated structured questionnaire and interview schedule while data collected were analyzed with frequency counts, percentages, mean and standard deviation while multiple regression was used to analyze the hypotheses of the study.

Some of the results showed that female respondents dominated the study as all sampled respondents were women and the finding fall within the apriori expectation in the Nigeria market which indicates that women dominate the tomato business. The sampled respondents were in their mid-ages and energetic to carry out various activities involved in tomato marketing. Most of the respondents were married and being married is associated with being responsible and so respondents are expected to make end meet to cater for their family. Average household size was 5 persons and this means that the respondents have many dependents who could also serve as sources of family labour in tomato marketing. Most of the respondents were educated and high literacy level is associated with better handling practices. The average years of marketing experience is 13 years and this may increase their level of efficiency, because the more experienced a farmer is, the more efficient he/she is and vice versa. The mean monthly income of the marketers was observed as N44,000. Majority of the marketers were members of an association and this means that majority of the marketers could easily source help from their association and will be up to date with information on post-harvest practices of tomatoes. Majority of the marketers were retail traders. The study showed that information on how best to preserve tomatoes, information on tomato storage, and information on how best to transport tomatoes

were the major information needs of tomato marketers in the study area. Information sources of tomato marketers were analyzed based on their availability, accessibility and preference. It was observed that information sources such as; fellow marketers, friends and neighbours and marketers union or cooperative were available, accessible and preferred by the marketers, with means above the benchmark of 2.0. The postharvest practices engaged by marketers were sorting, grading, cleaning, disinfecting, transportation and marketing. The major constraints to postharvest practices information needs of marketers were inadequate financial support, lack of knowledge of relevant postharvest handling information, and poor language of information presentation. They all had mean above the benchmark of 2.5 and were adjudged to be serious. Logit regression showed that only membership of an association significantly correlated with information needs on postharvest practices at 1% level of significance.

5.2 Conclusion

The study established that though the marketers were experienced due to high years of marketing experience, they still need information on postharvest practices to improve their knowledge. Information on how best to preserve tomatoes, information on tomato storage, information on how best to transport tomatoes, information on how best to package tomatoes, and information on cleaning and disinfecting were in high demand.

Also, though marketers had their fellow marketers, family and friends and market

groups as their available, accessible and preferred source of information, it was also observed that they preferred the presence an extension agent to help break down some information to their level of understanding because part of their constraints to postharvest practice is not being able to decode the information they got.

The postharvest practices engaged by marketers were sorting, grading, transportation and marketing. This can be easily comprehended as marketers lack storage and preservation facilities, so they quickly sort, grade and market their tomatoes to prevent loss due to high perishability. Being a member of an association is a very importance factor in getting adequate information on postharvest practices.

5.3 Recommendations

Based on this study, the following recommendations were made;

1. Extension worker should conduct an outreach for tomato marketers to help inform them more on postharvest practice they require.
2. There is need for the provision of preservative and storage facilities for marketers to help them store and preserve their highly perishable tomatoes.
3. Marketers should belong to an association as it has proven to be very helpful in getting adequate information on postharvest practices.

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RESEARCH QUESTIONNAIRE
DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION
SERVICES FACULTY OF AGRICULTURE
UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

Dear Sir/Madam,

I am an undergraduate student of the above-named institution, seeking for information that will assist in my project work which is **“POST HARVEST PRACTICES INFORMATION NEEDS AMONG TOMATO MARKETERS IN EGOR LOCAL GOVERNMENT AREA, EDO STATE, NIGERIA”**. Your co-operation in filling this questionnaire will be highly appreciated. All information is purely for academic purposes.

Thank You

PRECIOUS, Osemudiamen Ihaza

INSTRUCTION: Please tick (\checkmark) or fill in the spaces as appropriate.

SECTION A: SOCIO-ECONOMIC CHARACTERISTICS

1. Market: _____
2. Sex: (a) Male (b) Female
3. Age: (a) 20-29years ; (b) 30-39years ; (c) 40-49years ; (d) 50-59years ; (e) 60 and above
4. Marital status: (a) Unmarried (b) Married (c) Divorced (d) Widow/Widower
5. Family / household size: _____ (Number of persons in your family feeding from the same pot)
6. Level of Education: (a) no formal education (b) primary education ; (c) secondary education (d) tertiary education Others (specify): _____
7. Any other occupation(s) _____

8. Religion: (a) Christianity []; (b) Islamic []; (c) Tradition []

9. Years of farming experience: _____

10. Average income per month: (a) Less than N50,000 []; (b) N50,000-N100,000 [];

(c) N

11. Do you belong to any association? (a) Yes [] (b) No []

12. Are you a wholesaler or a retailer? (a) Wholesaler [] (b) Retailer []

13. Do you have any formal training on postharvest handling in tomato marketing? (a) Yes [] (b) No []

14. How often do you extension agent visit your market? (a) Weekly [] (b) Fortnightly [] (c) Monthly [] (d) Yearly []

SECTION B: VARIOUS POST-HARVEST PRACTICES ENGAGED BY TOMATO MARKETERS

15. What are the various tomato post-harvest practices you engage in? Tick \checkmark

S/No	List of various tomato post-harvest practices	Practiced	Not practiced
1	Harvesting		
2	Pre-cooling after harvest		
3	Cleaning or Disinfecting		
4	Sorting		
5	Grading		
6	Preserving		
7	Packaging		
8	Storing		
9	Transportation		
10	Marketing		

SECTION C: INFORMATION NEEDS OF TOMATO MARKETERS ON POST- HARVEST PRACTICES

16. Please tick (√) in the appropriate box the post-harvest information that best represent your need as a tomato marketer?

S/No	Information needs on tomato post-harvest practices	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Information on harvesting tomato					
2	Information on pre-cooling					
3	Information on cleaning and disinfecting					
4	Information on tomato sorting					
5	Information on tomato grading					
6	Information on how best to preserve tomatoes					
7	Information on how best to package tomatoes					
8	Information on tomato storage					
9	Information on how best to transport tomatoes					
10	Information on tomato marketing					

SECTION D: SOURCES OF INFORMATION ON TOMATO POST-HARVEST PRACTICES

17. What are your sources of information of post-harvest practices on tomato?

S/No	List of sources of information on tomato post-harvest practices	Available			Accessible			Preference		
		RA	A	NA	VA	A	NA	HP	P	NP
1	Fellow marketers									
2	Extension agents									
3	Friends and neighbours									
4	Marketers union or cooperative									
5	Television/ Radio									
6	Internet / Online forum									
7	Research Institute									

8	Newspapers/ Magazines										
Others please specify:											
9											
10											

Where; RA = Readily available, A = Available, NA = Not available, VA = Very accessible, A = Accessible, NA = Not accessible, HP = Happily preferred, P = Preferred and NP = Not preferred.

SECTION E: CONSTRAINTS TO SOURCING TOMATO POST-HARVEST PRACTICE INFORMATION

18. Identify some of the constraints to sourcing tomato post-harvest practices information. Please tick (√) in the appropriate box.

S/No	Constraints to tomato post-harvest handling practices	Not a problem	Not serious	Serious	Very Serious
1	Inadequate financial support				
2	Processing of tomato into paste is strenuous				
3	Lack of knowledge of relevant postharvest handling information				
4	Inadequate extension service training				
5	Low demand of the tomato				
6	Inadequate market information on tomatoes				
7	Lack of reliable market				
8	Inadequate comprehension to information content				
9	Poor medium of information communication				
10	Lack of feedback				
11	Inability to access formal channel of information				
12	No time to consult information sources				
13	Poor language of communication				
14	Lack of tomato association				
15	Inability to read and write				
16	Inadequate contact to extension agents				
17	Poor language of information presentation				