

HOUSEHOLD'S COPING STRATEGY WITH PRICE SHOCK RESULTING FROM AGRICULTURAL PRODUCT SEASONALITY IN ONDO STATE, NIGERIA (A CASE STUDY OF TOMATOES)

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Abstract:

This study identified the households' coping strategies with the price shock resulting from the seasonality of tomatoes in Ondo State, Nigeria. A multi-stage sampling procedure was used to constitute the population (150) of the study. Data was analyzed using frequency, percentage, mean statistics, chi-square, and regression. The study found that every respondent consumed tomatoes; the majority (87.3%) of the respondents were aware of tomato seasonality; and 66% of respondents said that price hikes were the reason they were aware of tomato seasonality. The purchase of canned tomatoes (42%), and the use of sachet tomatoes (38.7%), were among the coping mechanisms used during the off-season for tomatoes. About 53% of the respondents said that the coping mechanisms used were successful. Education level is a factor that affects price shock among households ($t = -2.150$; $p = 0.034$). Chi-square analysis revealed that coping mechanisms had no impact on the price shock brought on by tomatoes' seasonality. Homeowners were advised to plant tomatoes both in the growing season and off-season. To prevent price shock, the government, non-governmental organizations (NGOs), and other farmer associations should inform households about ways to preserve tomatoes. Tomato prices should be regulated by the government during the off-season.

Keywords: *Coping strategy, household, price shock, tomatoes, seasonality*

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1.0 Introduction

Risks, shocks, and susceptibility are common phenomena in life (Gizaw & Baye, 2025). Risks are closely related to vulnerability, which determines the extent to which an individual is exposed to shocks (Jeanne *et al.*, 2021); therefore, a shock will result in reduced welfare. Shocks refer to any change to fundamental macroeconomic variables or relationships that has

a substantial effect on macroeconomic outcomes and measures of economic performance such as unemployment, consumption, and inflation (Aladwani, 2025). Shocks are often unpredictable and are usually the result of events thought to be beyond the scope of normal economic transactions (Abdullahi *et al.*, 2023). Understanding shocks and their consequences is essential for developing effective poverty

alleviation strategies that strengthen existing coping measures in developing economies like Nigeria (Ayoo, 2022) at present, a better understanding of this linkage is lacking because comprehensive empirical data are rare.

In most developing countries, agriculture remains one of the main sources of income for the majority of the population in rural areas (Pawlak & Kolodziejczak, 2020). The profitability and seasonality of agricultural production affect, in many ways, not just the lives of farmers but also the lives of other people in their communities; as they also depend on the agricultural sector (Giller *et al.*, 2021). Seasonality is an occurrence that causes crop prices (comprising cash, stocks, basis, option volatility, intra-market, inter-market, and inter-commodity spreads) to behave in a relatively predictable manner, year in and year out (Nilusmas *et al.*, 2020). The harvest decline and the post-harvest rally are often the two essential parts of harvest seasonality. Seasonality continues to be restricted to a single production phase (the gap between one manufacturing episode and the next) (Baino, 2020). Seasonality is based on variations in supply and demand and continues to be related to the calendar as per months or times of the year. Knowing the degree of food price seasonality is important for a number of reasons, one of which is that dietary intake and nutritional outcomes may be negatively impacted by episodes of nutritional deficiency during the first 1000 days of life, which are especially harmful for cognitive development and future earnings (Christian & Dillon, 2018).

Tomato is a berry that can be eaten from the plant *Solanum lycopersicum*, also known as the tomato plant (Carrasco-Gil *et al.*, 2018). Tomato plant originated in Central America and western South America (Razifard *et al.*, 2020). Tomatoes are consumed in a variety of ways, either fresh or prepared in dishes including pastes, salads, and juices.

Even though tomatoes are considered berries by botanists, they are frequently utilized as a

vegetable element or side dish (Gentilcore, 2020). One of the most commercially significant crops in the world is generally regarded as being tomatoes. When compared to the cost in terms of time, money, and effort, tomatoes offer good value. They have several advantages over cultivating other types of crops because they are short-duration crops and are well-suited for diverse cropping techniques that are used on grains, pulses, cereals, and oilseeds. They may be produced both indoors in green rooms and outdoors.

It is impossible to overstate the significance of tomatoes in the typical Nigerian diet. They are the main dietary source of the antioxidant lycopene, which has been linked to numerous health benefits, including a decreased risk of cardiovascular disease and cancer. The nutrients vitamin C, potassium, folate, and vitamin K are also abundant in them.

It is common knowledge that agricultural prices fluctuate according to the season, usually reaching their highest, before harvest and sharply declining right after (Gilbert *et al.*, 2017). The magnitude of this seasonal variation across food items, countries, or marketplaces within countries is, however, the subject of relatively little rigorous research (Jones, 2017). Surprisingly little is known about how short-term fluctuations in food prices would affect food and nutrition security.

Contrarily, there is a large body of research on the causes of under-nutrition and malnourishment. This typically focuses on the roles of income (poverty), gender, feeding habits, access to clean water and sanitation, access to health services, or other socio-economic factors that do not significantly change over relatively short periods of time (Nweze *et al.*, 2020). However, just a few studies have examined the impact of price shocks, and those studies mostly contrast changes in FNS indicators before and after a price, weather, or income shock (Matz *et al.*, 2015). One of the main causes of this bias in scientific research is the need for longitudinal data with some variation over

time to understand the effects of shocks, as opposed to the ease with which data collected at one point in time can be used to analyze relatively static socio-economic factors (Niedzwiedz *et al.*, 2021). However, the goal of this study is to evaluate households' coping mechanisms with price shocks brought on by seasonality in agricultural products in Ondo State, Nigeria.

To this end, the following research goals were assessed: to identify the factors that affect price shocks resulting from the seasonality of tomatoes in the study area; to ascertain the respondents' coping mechanisms with price shock resulting from the seasonality of tomatoes in the study area; to ascertain the relationship between respondents' coping mechanisms and factors that influence price shock resulting from the seasonality of tomatoes in the study area; and to ascertain the relationship between respondents' coping mechanisms and factors that influence price shock resulting from the seasonality of tomatoes in the study area.

2.0 Methodology

2.1 Study population and sampling techniques

For this investigation, a multistage sampling method was employed. Three Local Government Areas (LGAS) in the state—Akure-South, Owo, and Akoko-North—were chosen at random for the first stage. To create a total of six communities, two communities from each of the three local government areas—Akure-South (Shagari and Ilara), Owo (Isuada and Ehinogbe), and Akoko-North (Oka and Iwaro)—were randomly chosen. The third stage involved selecting twenty-five (25) households at random (from each neighborhood, for a total of 150 households) and interviewing them using a well-planned interview schedule.

2.2 Data analytical techniques

Data analysis techniques include the use of descriptive statistics like frequency counts,

percentages, and means. The coping mechanisms of the respondents and variables influencing price shocks brought on by the seasonality of tomatoes in the research area were put to the test using chi-square.

3.0 Results and Discussion

3.1 Socio-economic characteristics of respondents

Table 1 revealed that a greater percentage of respondents were female (69.3%), which may be due to the fact that women are more involved in the buying and selling of agricultural products than men are. The majority of respondents (70.0%) were married, suggesting that married people had greater responsibility, which led to their involvement in tomato purchasing and selling. The respondents' median age of 38 years suggests that they are reasonably young, active, and developed, which may positively affect their ability to deal with price shocks brought on by the seasonality of tomatoes in the study area (Table 1). Five people made up the respondents' average household size. This might have an impact on how much tomato is bought and consumed both in season and out of season, as well as a favorable impact on how these households deal with price shock. (Table 1). The majority of respondents (68.7%) finished tertiary education, which is thought to have exposed them to the most recent information regarding tomato seasonality and techniques to deal with price shock.

The respondents' major occupation and average monthly income are also displayed in Table 1. The bulk of respondents (37.3%) were public employees who depended on their salaries for maintenance. The respondents' principal occupation generated a mean monthly income of ₦27,467. As a result, their capacity to absorb the shock brought on by an increase in tomato prices during the off-season may be negatively impacted. This suggests that the majority of respondents were low-income earners.

The respondents' secondary occupations and average monthly earnings were displayed in Table 1's results. The majority of the respondents were traders who intended to address the issues that each of their particular families faced with regard

to feeding. The respondents' mean average monthly salary for trade as a supplementary occupation was ₦22,110. Additionally, this can aid them in overcoming problems with the family, such as feeding the kids mostly tomatoes.

Table I: Socio-economic characteristics of respondents

Characteristics	Variables	Freq.	%
Sex	Female	104	69.3
Marital status	Married	105	70.0
Age	21-30	44	29.3 (38yrs)
Household size	-5	80	53.3 (5persons)
Level of Education	Completed tertiary edu.	103	68.7
Primary occupation	Public service	56	37.3
Average monthly income	₦50,001-₦80,000	62	41.3 (₦27,467)
Secondary occupation	Trading	71	47.3
Average monthly income	₦20,001-₦50,000	35	23.3 (₦22,110)

Source: Field survey, 2023

All of the respondents consume tomatoes, according to Figure 1. This suggests that people were aware of tomatoes' value to the human body and their widespread consumption.

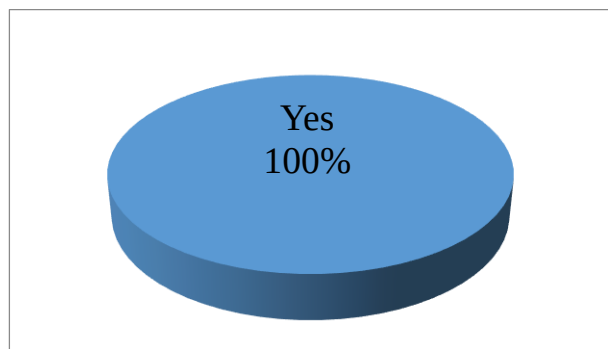


Figure 1 Tomatoes Consumption

Source: Field survey, 2023

Form, Most Preferred Form, and Reason for Preference of Tomato consumption

Table 2 findings revealed how respondents consumed tomatoes in various formats. The majority of respondents (86.0%) ingested fresh tomatoes, followed by sachet tomato paste (74.0%), canned tomatoes (48.0%), dried tomatoes (26.7%), and tomato ketchup (14.0%). Table 2 further shows that fresh tomatoes were favored by 76.0% of respondents above other tomato varieties. This is understandable given that the majority of them take it in its freshest state (Table 2). According to respondents, the reasons they preferred certain foods were that they tasted better and were more delectable (44.8%), were natural (8.3%), and were fresh (4.2%). Their methods for adjusting to price shock during the off-season may be influenced by their preference to consume tomatoes in their freshest state.

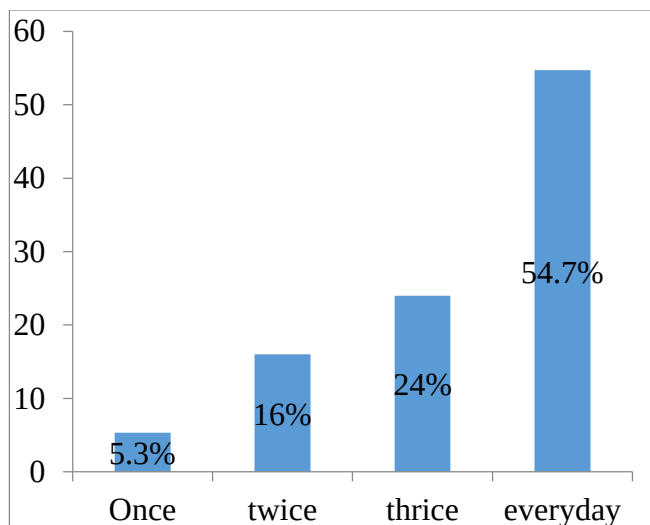
Table 2: Form, Most Preferred Form, and Reason for Preference of Tomato consumption

Factors	Variables	Freq.	%
Form of Tomato Consumption	Fresh	129	86.0
	Dry	40	26.7
	Sachet Tomato Paste	111	74.0
	Tomato Ketchup	21	14.0
	Canned Tomato	72	48.0
Most Preferred Form	Fresh	114	76.0
Reason for Form Preference	It tastes good & delicious	43	44.8
	It's natural	8	8.3
	It's fresh	4	4.2

Source: Field survey, 2023

Weekly Consumption of Tomato

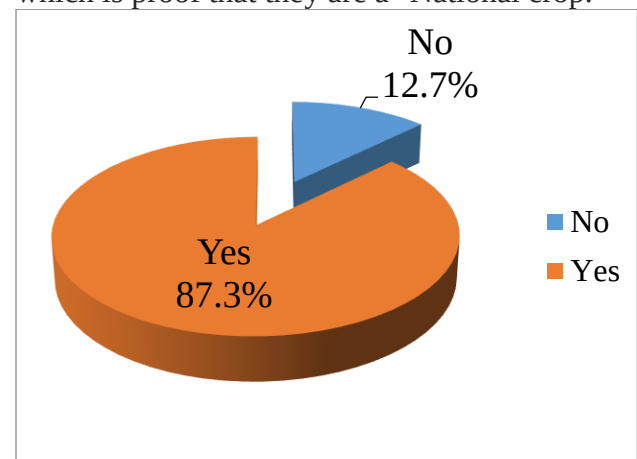
Results in Figure 2 displayed the respondents' weekly consumption of tomatoes. It was discovered that 54.7% of the respondents ingested tomatoes daily, 24.0% did so three times each week, 16.0% did so twice per week, and 5.3% did so just once. This suggests that because tomatoes are significant and provide value to daily meals, respondents in the research area consume them every day. This demonstrates that tomatoes are a necessary good for consumers and supports the findings of Faromiki (2019), who found that imports and domestic production of tomato paste are positively correlated as a result of rising consumer demand.



Source: Field survey, 2023

Figure 2: Distribution of respondent base on Tomato consumption in a week**Awareness on seasonality of tomato**

Figure 3 revealed that almost all of the respondents (87.3%) were aware of the seasonality of tomatoes. This may be related to the fact that they all consume tomatoes every day, which is proof that they are a "National crop."

**Figure 3: Respondents' awareness on seasonality of tomatoes**

Source: Field survey, 2023

Causes of Tomato Seasonality Awareness

More than half (66%) of respondents said price increases were the reason they learned about tomato seasonality when asked how they first learned about it (Table 3). When asked where they

learned about tomato seasonality, 30.5% mentioned a tomato shortage, while 3.1% said they learned about it from the availability of many tomato varieties in the market. This study demonstrates the need for understanding

seasonality in agricultural products and developing consumer-friendly strategies for coping with price shock by citing price increases as the primary source of seasonality awareness.

Table 3: Causes of Seasonality Awareness

	Frequency	Percentage (%)
Price increases	87	66.4
Tomato becomes scarce	40	30.5
Different varieties of tomatoes becomes available in the market	4	3.1

Source: Field survey, 2023

Month(s) of Tomato Seasonality within the Year

Results from Table 4 showed the month or months that tomatoes are seasonal throughout the year. According to 58.8% of respondents, tomato

seasonality often manifests itself in May, 19.8% in April, and 10.7% in June. This shows that the tomato season typically lasts from April through Jun.

Table 4: Month(s) of Tomato Seasonality within the Year

	Frequency	Percentage (%)
January	2	1.5
February	1	0.8
March	6	4.6
April	26	19.8
May	77	58.8
June	14	10.7
July	2	1.5
December	3	2.3

Source: Field survey, 2023

Weekly Amounts Spent on Tomato during the On-Season

The respondents' weekly spending on tomatoes during the on-season was displayed in Table 5 results. It was shown that a higher proportion of respondents (93.3%) purchased tomatoes weekly for less than ₦5,000. The average weekly amount

spent by respondents on tomato purchases was ₦2,652. This suggests that respondents spend around one-fourth of their average monthly income on buying tomatoes, further demonstrating the significance of this commodity and the need to address price shocks brought on by its seasonality.

Table 5: Distribution of Weekly Amounts Spent on Tomato during the On-Season

	Frequency	Percentage (%)	Mean
≤5000	140	93.3	
5001-10000	1	0.7	
10001-15000	5	3.3	₦2,652
15001-20000	2	1.3	
≥20001	2	1.3	

Source: Field survey, 2023

Weekly Amounts Spent on Tomato during the Off-Season

The weekly amounts spent on tomato purchases during the off-season are displayed in Table 6. The majority of respondents (72.7%) spent between ₦5,001 and ₦10,000 each week on

Tomato. The respondents' average weekly cost for tomatoes during the off-season was ₦4,879. This suggests that respondents spend, on average, half of their typical monthly salary on tomatoes during the off-season.

Table 6: Distribution of weekly amounts spent on tomato during the off-season

	Frequency	Percentage (%)	Mean
≤5000	36	24.0	₦4,879
5001-10000	109	72.7	
10001-15000	1	0.7	
15001-20000	1	0.7	
≥20001	3	2.0	

Source: Field survey, 2023

Price and frequency of demand of basket of tomato during the on-season and off-season

Results in Table 7 demonstrate the price changes for a basket of tomatoes during the growing and off-growing seasons. Customers must need tomatoes because they are a necessity, so it follows that demand does not diminish as the price rises. This is seen in Table 7, which shows that when a basket of tomatoes cost between ₦15,000 and ₦20,000, nearly every respondent

(95.1%) continued to purchase it. During the ON and OFF seasons, a basket of tomatoes averaged ₦10,517 and ₦23,635 correspondingly. This suggests that off-season tomato prices are very high. As shown in tables 5 and 6, where a variance can be noticed from spending one-fourth (₦2,652) of their income during the on-season to spending half (₦4,879) of their revenue during the off-season, it is also a testimony of a shock on the respondents' income.

Table 7: Price and frequency of demand of basket of tomato during the on-season and off-season

Price of Basket (₦)	On-Season		Off-Season	
	Freq.	%	Freq.	%
≤ 5,000	24	16.7	1	0.7
5,001-10,000	67	46.5	5	3.5
10,001-15,000	41	28.5	1	0.7
15,001-20,000	11	7.6(₦10,517)	53	36.8(₦23,635)
≥ 20,000	1	0.7	84	58.3

Source: Field survey, 2023

Coping strategies adopted and reason for adoption during tomato off- season

The respondents' coping mechanisms and justifications for adopting them during the off-

season for tomatoes are shown in Table 8. To get by during the off-season, a larger number of respondents (80.7%) used canned and sachet tomatoes. Adoption was justified as being less

expensive (69.3%), simpler to preserve (15.3%), and stress-free (1.3%).

Table 8: Coping strategies adopted and reason for adoption during tomato off- season

Coping Strategies Adopted	Freq.	%	Reason for Adoption	Freq.	%
Buying canned Tomato	63	42.0	It is cheaper	59	39.3
Use of sachet Tomato	58	38.7	It reduces cost of purchase	45	30.0
Use of dry Tomato	16	10.7	It last long	23	15.3
Use of local Tomato	6	4.0	It is stress free	9	6.3
Melon, Onion and Pepper	3	2.0	It is easier to get	4	2.7
Storing fresh Tomato in freezer	2	1.3	It is expensive but natural	1	0.7
Planting of Tomato	2	1.3			

Source: Field survey, 2023

Effectiveness of coping strategies

Table 9 shows the effectiveness of the coping mechanisms used by the respondents in the study area. More than half of the respondents (53.3%) said the coping mechanisms used were successful. The average efficiency of the coping mechanisms

used was 4.16. This shows that the respondents' coping mechanisms are quite predictable and successful in mitigating the price shock brought on by the tomato's seasonality as an agricultural commodity.

Table 9: Effectiveness of coping strategies

	Frequency	Percentage (%)	Mean
Ineffective	3	2.0	4.16
Less effective	8	5.3	
Indifferent	5	3.3	
Effective	80	53.3	
Highly effective	54	36.0	

Source: Field survey, 2023

Consumers' advice to minimize shock resulting from the seasonality of tomato

Results in Table 10 provided consumers with suggestions on how to lessen the shock associated with tomato seasonality. To reduce shock, the

majority of respondents (92.4%) advised planting tomato plants around their homes, while 3.1% suggested purchasing extra tomatoes when they were in season. The use of a freezer for tomato preservation was also advised by customers.

Table 10: Consumers advice to minimize shock resulting from the seasonality of tomato

	Frequency	Percentage (%)
To plant tomatoes around my house	121	92.4
I should be able to plant tomatoes and buy in excess during on-season	4	3.1
Buy many and keep inside freezer	3	2.3
Eating less tomatoes	1	0.8
Learn ways of preserving tomatoes	1	0.8
Learn to dry tomatoes	1	0.8

Source: Field survey, 2023

3.2 Hypotheses Testing

Factors that influence price shock resulting from the seasonality of tomato among household

The price shock brought on by the seasonality of tomatoes among households in the research area was influenced by educational level, according to the regression results in Table 11 ($t = -2.150$; $p =$

0.034). This suggests that this degree of education accounts for 12.4% of the prediction factors that affect price shock brought on by tomato seasonality among households. The influence of education may be explained by the exposure and level of intelligence of educated individuals. Higher educated respondents have a better chance of avoiding the price shock brought on by the seasonality of tomatoes among households.

Table 11: Factors that influence price shock resulting from the seasonality of tomatoes among household

Variables	Coefficients	T-Value	P-value	Association
Sex	.070	.756	0.451	NS
Marital Status	-.077	-.692	0.490	NS
Household size	.076	.447	0.656	NS
Highest Educational Level	-.200	-2.150	0.034	S
Primary occupation	-.024	-.260	0.795	NS
Income per month from primary occupation	-.128	-1.237	0.219	NS

Source: Field survey, 2023

*significant at $p \leq 0.05$ $R^2 = 12.4\%$ (S=Significant, NS=Not significant)

Association between coping strategies and factors that influence price shock resulting from the seasonality of tomatoes

According to table 12, chi-square analysis results, there is no correlation between coping mechanisms and variables that affect the price

shock brought on by tomatoes' seasonality. It was discovered that the following coping mechanisms did not have an impact on the price shock brought on by the seasonality of tomatoes: purchasing canned tomatoes ($X^2 = 0.832$), using sachet tomatoes ($X^2 = 0.153$), using dry tomatoes ($X^2 = 2.278$), using local tomatoes during the off-season

($X^2 = 0.492$), buying fresh tomatoes and storing them in the refrigerator ($X^2 = 0.396$), and planting

tomatoes ($X^2 = 1.027$). Therefore, the null hypothesis is accepted.

Table 12: Chi-square association between coping strategies and factors that influence price shock resulting from the seasonality of tomatoes

Coping Strategies	X^2	Df	P-value	Association
Buying canned tomatoes	0.832	2	0.660	NS
Use of sachet tomatoes	0.153	2	0.926	NS
Use of dry tomatoes	2.278	2	0.320	NS
Use of local tomatoes during off season	0.492	2	0.782	NS
Melon, Onion, pepper	0.102	2	0.950	NS
Buying fresh tomatoes and refrigerate	0.396	2	0.820	NS
Planting of tomatoes	1.027	2	0.598	NS

Source: Field survey, 2023

df=degree of freedom Significant at $p < 0.05$ (S=Significant, NS=Not significant)

4.0 Conclusion

The majority of the families were found to be aware of tomatoes' seasonality, according to the study's findings, which were used to determine how households in Ondo State, Nigeria, coped with price shock caused by seasonality. Additionally, it was discovered that the homes used canned tomatoes, sachet tomatoes, dried tomatoes, local tomatoes, and melon, onion, and pepper as coping mechanisms. The study comes to the further conclusion that, among households, educational degree was the element that influenced the price shock brought on by tomatoes' seasonality.

The study concluded that there is no correlation between the respondents' coping mechanisms, such as purchasing canned tomatoes, using sachet tomatoes, using dry tomatoes, using local tomatoes during the off-season, purchasing fresh tomatoes and storing them in the refrigerator, and planting tomatoes, and the variables that affect the price shock brought on by the seasonality of tomatoes. It was suggested that households encourage themselves to plant tomatoes both

during the on-season and off-season in order to lessen the price shock brought on by the seasonality of tomatoes. The Government, non-governmental organizations (NGOs), and other farmers' associations should inform the public about the best ways to preserve tomatoes in order to prevent price shock. Additionally, the government should control tomato prices during the off-season by using a variety of informational resources to raise public awareness of tomato price shock caused by the seasonality of the tomato.

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