Effect of Price Variation in Agricultural Produce on Farmers' Profitability in Wukari and Ibi Local Government Areas of Taraba State

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Abstract

This study examined the price variation in agriculture produce and how it can enhance farmers' profitability in Wukari and Ibi Local Government Areas, Taraba State. The study sampled 355 respondents adopted simple random sampling technique to collect data. The data were analyzed using multiple regression with the aid of SPSS 23. The study revealed that, price variation in agricultural produce positively influenced the income of farmers and investment decision in Wukari and Ibi Local Government Areas, Taraba State. This finding signifying that price variation of agricultural produce contributes to higher income levels and investment decision for farmers. In such a sense, farmers' investment decision and income is determined by price variation in the markets. The study suggests that, there is need for government agencies, marketing officers and other stakeholders to provide marketing information to farmers from time to time to be aware of price variation of agricultural produce. Such a move will increase farmers' investment decision and yearly income of famers in Wukari and Ibi Local Government Area, Taraba State.

Keyword: Agriculture Produce, Decision, Farmer's Profitability, Income, Investment & Price Variation

Introduction

Globally, prices of agricultural produce remain inherently volatile and have attracted great attention from both government and policy makers especially in developing countries. World prices of agricultural produce have changed over time, causing major concerns on food security among policymakers and politicians especially in Northeastern Nigeria (Kweka, 2023). Apart from agricultural produce price variations, maintaining farmers' profitability in the agricultural sector has strong implications for the enhancing macroeconomic stability by maintaining stable food prices and environmental protection (Chou *et al.*, 2021). Consequently, the effect of agricultural produce price variation on farmers' profitability relays on their market positions and geographical location (Kweka, 2023). As a largely agricultural communities, the level of agricultural product prices has greatly affected profitability level of farmers, and thus, affecting development and threatening food security (Kingu, 2020). Low production, poor pasture regeneration, livestock and water shortage and management for irrigation have all contributed to the food insecurity situation (Laureti Benedetti & Branca, 2021).

Despite the potential benefits, many farmers in Wukari and Ibi Local Government Areas struggle to take advantage of price variations due to limited access to information, financial constraints, and inadequate infrastructure (Ibrahim & Yusuf, 2023). Thus, understanding how farmers can leverage these fluctuations to enhance their profitability is essential for developing sustainable agricultural practices and improving rural livelihoods. In addition, extreme variability of the output and input prices, as well as changes in weather conditions, have continued to underscore the initiatives to improve or enhance farmers' profitability. Equally, agricultural produce price

increases can induce households to reduce their food consumption and then generate a longer-term nutritional impact (Moncarz & Barone, 2020).

Farmers' profitability gains are observed to be higher when they can sell their produce at higher prices (Kweka, 2023). It is worthy to note that farmers are both the producers and consumers of agricultural produce. High agricultural prices, especially those of cereal products are of importance in stimulating agricultural production and preserving employment opportunities in the agricultural sector. Clearly, income from agricultural sales is liable in financing education, health services, water, better houses, and better meals as well as financing small business activities within the farmers' households (Mbwilo, 2024).

Despite the roles played by agriculture in the economy, prices remain highly unstable, exerting uncertainty on consumption, production as well as on farmers' profitability. However, there is an unresolved empirical question of whether the farmers prefer low price of agricultural produce to smoothen households' consumption or high price of agricultural produce to encourage profitability, trade, and export earnings. Moreover, the lack of market intelligence and information on price trends limits farmers' ability to make informed decisions. Given these challenges, it is imperative to investigate how farmers can strategically navigate price variations to enhance their profitability. Therefore, with this background, this study seeks to examine the effect price variations of agricultural produce have on farmers' profitability in Wukari and Ibi Local Government Areas, Taraba State with the following research questions:

i. What effect does price variation in agricultural produce has on farmers' income in Wukari and Ibi Local Government Areas?
ii. What effect does price variation in agricultural produce has on farmers' investment decisions in Wukari and Ibi Local Government Areas?

Conceptual Clarification

Price Variations in Agricultural Produce

Price variations in agricultural produce are the fluctuations in the prices of agricultural commodities, influenced by factors such as seasonal changes, supply and demand dynamics, transportation costs, and government policies (Akinyemi, Bello, & Yusuf, 2021). These fluctuations can be highly unpredictable and significantly affect farmers' revenue streams and strategic decision-making processes. Understanding these variations is crucial for assessing their impacts on agricultural sustainability and economic viability. Consequently, the study of Huka, Mchopa and Ruoja (2014) assert that, price variation in agricultural produce is a frequent rise and fall of commodity prices in the market as a result of changes in the market situations, which it can be seasonal whereby prices of commodities change during certain seasons of the year due to the increase in supply and demand. Price variation in the agricultural market can take a short term due to a slight change in demand or supply of commodities in the market. But it can also last long due to the increased inflation rate which highly affects the prices of commodities in the market and its effect last long and limits the ability of customers to purchase commodities in the market (Mchopa, 2012).

Farmers' Profitability

Farmers' profitability refers to the financial returns that farmers receive from their agricultural operations after all production costs have been subtracted. This profitability is chiefly influenced by market prices, cost of inputs, productivity levels, and the efficiency of storage and marketing

facilities (Eze & Okpala, 2019). Ensuring sustainable profitability is vital for the long-term economic health of farming enterprises and their ability to contribute to food security. Farmers' profitability refers to the financial gains farmers achieve after accounting for production costs, market dynamics, and external economic influences. It is a crucial factor in determining the sustainability and growth of agricultural enterprises, whether small-scale or commercial. Profitability in farming is generally measured as the difference between total revenue and total costs (Kay *et al*, 2019).

Theoretical Framework

This study is anchored on the Demand and Supply theory formulated by Alfred Marshall in 1890 as one of the cornerstones of economic thought. This theory provides a fundamental framework for understanding how demand and supply influence the prices of goods and services in the market. This theory elucidates the delicate equilibrium between consumer preferences and producer capabilities (Safiullin, 2015). The Law of Demand asserts that, all things being equal, as the price of a commodity rises, the quantity demanded by the consumer decreases, and conversely, as the price falls, the quantity demanded increases. In the context of agricultural produce price variation, the Law of Demand highlights price's critical role in influencing consumer behavior. When produce prices surge, particularly staple crops that form a significant portion of rural diets, consumers may reduce their purchases, impacting food security and nutrition (Safiullin, 2015). This can have direct implications for small-scale farmers who rely on local demand. Marshall's theory articulates that the dynamics of demand and supply are intricately linked and exert a pivotal influence on market prices.

In the context of agricultural produce price variation, the demand and supply theory provide an indispensable lens through which to analyze the forces at play. Variations in agricultural produce prices can often be traced back to imbalances between the quantities of produce supplied and the quantities demanded in the market. When supply outpaces demand due to factors such as increased production or favorable weather conditions, prices may experience downward pressure, impacting the incomes and investment decision of farmers.

Therefore, the choice of this theory was important because it helps to explain the causes that influence price variation in the context of agricultural produce. For instance, when demand exceeds supply, prices tend to rise. However, the theory explains the relationship between consumer demand and the market price of goods and services. The theory also provides a framework for developing ethical price variation in agricultural produce. Generally, the theory was relevant in describing and explaining the effect of Agricultural produce price variation on farmers' profitability in Wukari and Ibi Local Government Area of Taraba State.

Empirical Review

Price Variations and Farmers' Income

Dwi and Nur (2021) examined the impact of price fluctuations on the income of leek farmers in Sajen village, Pacet, Mojokerto. The study adopted a quantitative approach with the population of 105 vegetable farmers in the Sajen village. The results revealed that price fluctuation leeks affected the income of farmers. The study recommended that, future studies should use the latest methods, technologies for planting leeks without looking at the climate with consistent results.

Equally, Emmanuel *et al* (2020) investigated the impact of output price support on smallholder farmers' income in Ghana, using a household and farm-level data from 252 beneficiaries and 268

non-bene*fi*ciaries of buffer stock operations in Ghana. The study found that, sustained price stabilization mechanisms are mostly lacking and there is instability in smallholder farmers' income in developing countries due to unstable farm prices has been a challenge for farmers and agricultural policymakers over the years. The study recommended that, future research should examine how transparent information about government buffer stockholdings in developing and lower-middle-income countries may impact private buffer stockholdings and what this could imply for smallholder farmers' income in these countries.

Consequently, Stefaniia, Peter and Yanina (2023) analyzed the impact of the price factor on farmers' incomes, including the total impact of prices on manufactured products and energy carriers. The results showed the negative nature of such an impact, which requires increased state support for farm income during the crisis period. Based on the findings the study proposed to reorient government support from simple subsidies to incentives for farmers to produce bioenergy from waste. This proposal will increase farmers' energy independence, reduce income dependence on rising energy prices, and increase the efficiency of public spending.

Price Variations and Farmers' Investment Decisions

Ihli and Musshoff (2013) experimentally analyzed the investment behavior of smallholder farmers in Uganda. The study considers a problem of optimal stopping, stylizing an option to invest in a project. The study ascertained whether, and to what extent, the real options approach and the classical investment theory can predict farmers' investment behaviors. The study also examined differences in the investment behavior with respect to the presence of a price floor, which is often used to stimulate investments. Furthermore, they looked at learning effects. The results shown that, both theories do not exactly explain the observed investment behavior. Also, the presence of a price floor and learning from personal experience during the experiment do not significantly affect the investment behavior. However, the study suggested that, real options models better predict the decision behavior of farmers than the classical investment theory.

Likewise, Fabienne, Laure and Jean-Paul (2021) conducted a study on responsiveness of farm investment to price changes: Evidence from the French crop sector. The study investigated the investment behaviour of French crop farmers between 2002 and 2014, with a focus on their adjustments to investment prices and farm output prices, which became more volatile after 2007. The study estimated an econometric model of farm investment accounting for farm heterogeneity and allowing for change in behavioural parameters after 2007. The results of the study revealed the evidence of a significant behavioural change in large investments over time, related to a change in farmers' preferences towards risk, which can explain the relative stability of farm investment over the period, despite the strong increase in crop price levels and in crop price volatility after 2007. The study suggested that, modelling other types of expectations includes more complexity in the model but may also make it more flexible. In addition, the changes in economic conditions on crop markets might have generated a change in expectation schemes that appears as a change in risk preferences in our model.

Equally, FAO and IPA (2022) investigated prices and farmer investment evidence from experimental studies. The study used cross-sectional data, which has limitations when measuring the impacts of output price support, potentially better captured through dynamic analysis. However, evidence from experimental and quasi-experimental studies beyond the methodological scope of the study suggested that, in some contexts Fairtrade price floors lead to certification of more output than can be sold, eroding producer benefits.

Methodology

The study engaged a survey research pattern in gathering data from the respondents. The population of the study constitutes 3,168 registered farmers engaged in agricultural production and agribusiness enterprises in Wukari and Ibi Local Government Areas of Taraba State. A Sample of 355 was determined using Yamane's (1967) formula. A Simple random sampling technique was embraced in selecting the respondents for the study. The study employed a structured questionnaire to collect data from the respondents. The reliability of the instrument was assessed using Cronbach's alpha, which measures the internal consistency. Content validity was established by having the survey instrument reviewed by experts. The instrument was found to be both valid and reliable for the study. The hypotheses were tested using multiple regression analysis with the aid of Statistical Package for Social Sciences (SPSS V23).

Result of the Findings

Descriptive Statistics

The following were data concerning price variation in agricultural produce, farmers' investment decision and farmers' income form 300 respondents in Wukari and Ibi Local Government Area, Taraba State. This data was potentially used to run the regression analysis so as to find out the relationship.

Table 1: Descriptive Statistics

	Mean	Std. Deviation	N
APPV	4.2742	.29495	300
FID	3.8900	.35235	300
FI	3.7592	.29651	300

Source: *Research Findings*

Table 1 shows the summary of the descriptive statistics of all the statement in the questionnaire. Agricultural produce price variation has a mean of 4.2742 and standard deviation of .29495. This shows that majority of the respondents agreed to most of the statements made in the questionnaire on agricultural produce price variation. Farmers' investment decision has a mean of 3.8900 and standard deviation of .35235 this shows that majority of the respondents were not agreed to most of the statements made in the questionnaire on farmers' investment decision. Farmers' income has a mean of 3.7592 and standard deviation of .29651 this show that majority of the respondents agreed to most of the statement made in the questionnaire on farmers' income.

Regression Analysis

The study conducted a multiple regression analysis to examine how independent variables (price variation in agricultural produce) affect the dependent variable (farmers' profitability). The table below presents the findings of this analysis.

Table 2: Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.528[a]	.279	.272	.25169	.279	38.207	3	296	.000

a. Predictors: (Constant), APPV

b. Dependent Variable: FID, FI
Source: *Research Findings*

From Table 2, the R-square value shows .279 which means that our independent variable which is price variation in agricultural produce has 27.9% effect on the dependent variable which is farmer's profitability. This is to say 27.9% change in Investment Decision and Farmer's income is as a result of price variation in agricultural produce in Wukari and Ibi Local Government Area of Taraba State**.**

Table 3: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	2.443	.370		6.604	.000
	FID	.266	.054	.318	4.954	.000
	FI	-.167	.049	-.167	-3.376	.001

a. Dependent Variable: APPV
Source: *Research Findings*

The outcomes of the regression analysis are captured in Table 3, which shown the relative contribution of independent variable in explaining the dependent variable. The coefficient table indicates the degree of relationship between each variable that represent the farmer's profitability through farmer's investment decision and farmer's income in Wukari and Ibi Local Government Area.

Discussions

The generic hypothesis in line with the main objective of this study states that there is no significant effect of price variation in agricultural produce on farmers' profitability. Hypothesis one states that the price variation in agricultural produce has no significant effect on farmers' investment decision. From the regression result based on the result of respondents' views (p=.000), the null hypothesis was rejected. The findings emphasize the crucial role of price variation in agricultural produce in the economic empowerment in Wukari and Ibi Local Government Areas. This study's finding did not align with the perspective of Olabode and Ogunrinola (2018) who highlighted the relationship between agriculture expenditure and prices of agricultural commodities in Nigeria. Their study's findings revealed that, there was a negative relationship between government capital and recurrent expenditures and price of cocoa on the level of Gross Domestic Product (GDP) in the short-run with a positive relationship in the long-run for individual investments in agriculture commodities in Nigeria.

Additionally, hypothesis two states that, price variation in agricultural produce has no significant effect on farmers' income. From the regression result based on the result of respondents' views (p=.001) the null hypothesis was also rejected. The result was in agreement with a study by Stefaniia, Peter and Yanina (2023) that analyzed the impact of the price factor on farmers' incomes, including the total impact of prices on manufactured products and energy carriers. The results showed the negative nature of such an impact, which requires increased state support for farm income during the crisis period.

Conclusion

This study has examined the effect of price variation in agricultural produce on farmers' profitability in Wukari and Ibi Local Government Areas of Taraba State. The findings of the study revealed that, price variation in agricultural produce positively influenced the income of farmers and investment decision in Wukari and Ibi Local Government Areas, Taraba State. This finding signifying that price variation of agricultural produce contributes to higher income levels and investment decision for farmers. In such a sense, farmers' investment decision and income are determined by price variation in the markets. The study suggests that, there is need for government agencies, marketing officers and other stakeholders to provide marketing information to farmers from time to time to be aware of price variation of agricultural produce. The study concludes that, price variation in agricultural produce has a positive significant influence on farmers' profitability in Wukari and Ibi Local Government Area.

Recommendations

Based on the findings of the study, the following recommendations are made:

i. Government agencies and agricultural organizations should collaborate to provide farmers with up-to-date market information, including price variation and demand dynamics. Access to this information can empower farmers to make investment decisions regarding agricultural produce selection and timing of sales, reducing the negative impact of price variation
ii. Government should facilitate access to credit for farmers to provide a financial safety net during periods of low income resulting from produce price fluctuations. This will help farmers maintain their income and continue investing in agricultural activities.

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