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Research Article

Food Prices Volatility and Farmer's Terms of Trades: Basis of Policy and Program Formulation for Farmers

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ABSTRACT

The economic support of many farmers in the Philippines is shaky, mainly due to the unstable prices of the agricultural products and livestock they deal in, along with the constant increase in the prices of basic necessities. The research investigated the link between food price volatility and Farmer's Terms of Trade (FTT), which is a metric for measuring farmers' purchasing power, for the period from 2018 to 2024. Six leading commodities, namely rice, copra, lakatan banana, pork, broiler chicken, and cattle, were studied. The volatility of food prices was assessed using Coefficient of Variation (CV), while FTT was computed through the use of Producer and Consumer Price Index data. The analysis unveiled that rice was the least fluctuating item and thus, it provided farmers with a more stable income source. Bananas came next with less variability. On the other hand, copra prices were the least stable, as reflected by the extremely high CV, indicating a very risky market. Among the animals, pork, being the most volatile, faced high prices and disease outbreaks. The FTT numbers showed severe poverty issues from 2018-2020, meaning farmers' incomes had fallen behind their needs, hence they could not afford to live. The situation slightly improved from 2021 when a partial recovery was seen, but the values remained close enough to indicate a very weak improvement in buying power. The results imply that the combination of high price volatility and weak FTT means farmers ascend through the low-income tunnel, and their welfare gets worse. There is an urgent need for such policies as price stabilization, rural market strengthening, and farmers' protection from shocks, all of which will help secure agricultural livelihoods as well as food security.

Keywords: *Food price volatility, Farmer's Terms of Trade, Agricultural welfare, Philippines, Farmgate prices*

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Background

Farming industry is a lifeline of sustaining food security and providing for the means of existence to Filipino farmers. On top of supplying food for the nation, agriculture also serves the immediate interest of farming families, for who's well-being not only production levels matter but return values for their products as well. Farmers require their products to be sold at prices that would allow them to meet household consumption and agricultural input needs. However, one of the greatest challenges has continued to be the stability of prices of agricultural products, as disturbances in commodity prices and input costs usually impact farmers' earnings and their general well-being.

Research in the area of agricultural and rural development has provided additional proofs that economically and socially, even the environment determines the life quality of people in the Philippines and their neighbors. For example, the government has been the main reason for the farms' low incomes and productions in the case of Laurio & Malto (2023). In a similar manner, agroclimatic analysis of the Southeast Asian countries point out that the very situation, rainfall variability, in particular, affects the farmers' planning for stable yields in times when climate conditions are rapidly changing and becoming more unpredictable (Madubun, Ririhena, Laimeheriwa, & Simamora, 2024). Farmers' sources of income and living conditions have been highlighted through assessments of robusta coffee production in Quirino province (Martinez, 2023). All these studies indicate the overlapping pressures that farmers have to deal with from all sides—market, institutional, and climatic, and the need to study the issue of food price volatility together with Farmer's Terms of Trade if one wants to have a clearer perspective on the welfare conditions of agricultural households in the Philippines.

International and domestic causes such as climate, production shocks, and changes in demand and supply affect food price volatility (Gilbert, 2010). Government pricing and trade policies can also strengthen or weaken food markets, shaping price volatility and household welfare (Octania & Biru, 2019). The past years have witnessed socio-political and health-aggravated disturbances to food price volatility. The COVID-19 pandemic in particular disrupted supply chains and marketing channels, aggravating price instability in many countries (FAO, 2021; Yudha et al., 2023). Similarly, the Russia-Ukraine war caused great global uncertainty specifically with regard to the supplies of grains, fertilizers, and energy; and that, in turn, led to price hikes and volatility in the market for staple foods in developing countries (Reuters, 2022; World Bank,2023). The mentioned shocks, besides the increasing costs of inputs like fertilizers and fuels, have rendered rural communities more vulnerable and have negatively impacted the already poor living conditions of smallholder farmers (The New Humanitarian, 2023).

Filipino farmers, having the least social and economic power, are one of the groups that have to cope with a set of overlapping and adverse factors, both structural and environmental, that not only reduce their living standards but also negatively impact food supply. In 2021, the poverty rate among farmers and fisherfolk was very high (around 30%), significantly higher than the national average, Moreover, farmers receive only a tiny fraction of the national income, which is underscored by the national statistics and sector reports (Philippine Statistics Authority [PSA], 2023; PhilSEED, 2023). The majority of farmers cultivate very small and fragmented pieces of land, which is one of the factors that maintains the intergenerational poverty cycle (Farmonaut, 2025). Prices of inputs, mainly fertilizers and fuels, increased drastically after 2020, which led some farmers to rely on high-cost borrowing and eventually become indebted (The New Humanitarian, 2023). Climate change has already caused the farmers to face, amongst others, a more frequent occurrence of typhoons, droughts, and, finally, erratic weather that, in turn, disrupts the production cycles further and makes the revenue unstable, (Farmonaut, 2025). Considering all these factors collectively, the situation clearly demands more rigorous empirical research.

Along the terms of the farmer, which reflects the ratio of prices that farmers receive for

their produce to the prices they pay for consumption and production inputs is commonly used by the evaluators to assess farmer welfare, the so-called Farmer's Terms of Trade (FTT). FTT is typically derived from a ratio of a Producder Price Index (PPI) for agricultural outputs to sub-indices of the Consumer Price Index (CPI). The PPI summarizes price changes of agricultural outputs received by farmers, while CPI indicates the prices paid for necessities. A higher FTT signals a comparatively better exchange of farm products for goods and services, while a lower FTT indicates decreased purchasing power. Hence, studying food price fluctuation along with FTT trends provides an important perspective to analyze income stability and welfare of farming families.

This paper analyzed food price volatility and Farmer's Terms of Trade in the Philippines using PSA data for 2018–2024. It focused on six widely important commodities which is rice, copra, bananas (Lakatan), pork, broiler chicken, and cattle and used year-average prices (no regional disaggregation). CPI sub-indices most relevant to farmers' consumption and production-related costs (e.g., "Food and Non-Alcoholic Beverages," "Housing, Water, Electricity, Gas, and Other Fuels") were used where possible. Limitations include omission of farmgate-vs-retail price gaps, incomplete CPI coverage for direct farm inputs, and exclusion of socio-economic heterogeneity (land ownership, market access, farmer type) all of which can affect welfare interpretation. Informal market transactions (not captured in PSA data) may under-represent rural trade realities.

Despite the importance of the topic, there are relatively few Philippine-focused studies explicitly linking staple price volatility to FTT and farmer welfare. Most national literature emphasizes production levels or household income rather than detailed price-volatility–welfare analysis. This study fills that gap by using PSA secondary data (2018–2024), measuring volatility via coefficient of variation (CV) and calculating FTT as the PPI/CPI ratio for the commodities of interest, to inform policy discussions on agricultural pricing, trade, and food security in the Philippines.

Literature Review

Coefficient of Variation

The coefficient of variation (CV) is a unitless index of relative dispersion defined as the standard deviation divided by the mean, typically expressed as a percentage. It is an appropriate measure for comparing variables of different types or magnitudes since it adjusts variability relative to the mean, although it becomes less meaningful when the mean is very small (Abdi, 2010; NIST/SEMATECH, 2017). The CV is generally computed using the formula CV = standard deviation/mean × 100, which makes it useful across multiple disciplines for standardized comparisons (The University of Texas at Dallas, n.d.; NIST, 2017).

Its equivalent in practice is to say that the CV is being "widely used in applied statistics." The residual modeling applications could also be expressed as RMSE divided by the mean of the dependent variable. This is documented in a host of applied statistics manuals and is thus a flexible and well-accepted measurement for quantifying dispersion and relative variability in data (UCLA OARC Statistical Consulting Group, nd.;.) Most application in agricultural economics is well-grounded because CV rightly serves as a medium of value in the estimation of variability in prices, yields, and incomes on the farm. Recent empirical and review studies on food-price volatility and agricultural price variability make frequent use of relative dispersion measures (such as CV) or discuss their role alongside other volatility measures (e.g., standard deviation, GARCH-type measures), underscoring the CV's usefulness for cross-commodity comparisons and policy interpretation (Gilbert, 2010; Tadesse et al., 2014; Serra & Gil, 2013).

The importance of the methodology in agricultural risk assessment has received considerable attention recently due to numerous studies. For example, Just, Barrett, and Bellemare (2013) found that price volatility of commodities in rural Ethiopia destroyed farm household welfare by generating uncertain incomes, restricting consumption smoothing, and inhibiting investments. This supports Baruah's finding (2021), who showed that extreme fluctuations in agricultural prices adversely affect the

welfare of poorer farmers in developing countries. These applications together demonstrate that CV is not just a number; it is a significant risk assessment tool that impacts the choice of interventions aiming at securing the welfare and livelihoods of farmers.

Farmer's Terms of Trade

The Farmer's Terms of Trade (FTT) index serves as a gauge that tracks how much the farmers' prices for their crops compare with the prices for the inputs and the consumer goods. It is actually a way of indicating farmers' purchasing power and real income changes. When the index is more than 100, it means that the farmers have better purchasing power, whereas if the index is less than 100, it indicates that the farmers have less purchasing power (BPS-Statistics Indonesia, 2022; ABARES, 2020). Thus, it has been recognized that the FTT index has been used for a long time and has become recognized as an indicator of the welfare of the farm households in agricultural economics.

The calculation of the FTT is usually done by taking the ratio of the output price index to the input price index, multiplying it by 100, and following the index number methodologies like the Laspeyres formula (Maria & Colleagues, 2023; IMF, 2010). This way of looking at the data allows the analysts to see whether the rises in farmgate prices have been able to cover the increases in the costs of inputs and consumer goods sufficiently. These assessments are very important in identifying cases where the farmers' nominal income gains do not necessarily translate into improved welfare. Theoretical and empirical work on terms-of-trade (including single-factoral or net-barter measures) and on the role of price and market adjustments for farm welfare provides a strong methodological foundation for using FTT in welfare monitoring and policy design (Fleming, 2007; Gouel & Laborde, 2021; Hossain, 2008). Researchers have pointed out the great value of FTT as a tool for economic tasks. For example, Asmara (2016) cites its role in the monitoring of farmers' welfare and in the case of Indonesia also designing and implementing the right interventions. Recently, Bano, Nendissa, Elvani, and Lerik (2023) evaluated the changes in food prices and their link with FTT in Indonesia and discovered that during the pandemic plantation farmers often had FTT values greater than 100 while food crop farmers were mostly below it. These differences point out that the changing market conditions do not affect the different subsectors equally, which is a signal to the policymakers that they should use FTT in creating and adopting interventions for the stabilization of rural livelihoods.

Theoretical Framework

The present research work is based on the two well-recognized theories of agricultural economics, the Cobweb Theory and the Agricultural Household Model (Barnum-Squire Model). The theories offer a solid foundation to comprehend the interaction between agricultural price volatility and the welfare of farmers in the Philippines.

The Cobweb Theory was first presented by Ezekiel (1938) and describes the price movements of agricultural commodities as cyclical and unstable. The theory indicates that the farmers use the prices of the previous period to determine their output, but only after biological or seasonal delays the actual productioncomes on the market. Thus, during high-price periods, the farmers raise their production, which causes the future oversupply and the fall of the price; in the same manner, the low-price period leads to the shortage and the following period is characterized by the price rise. The differences in production response times lead to continuous movements of farmgate prices that may eventually come closer, drift apart, or remain stable depending on supply elasticity and the market situation. Cobweb Theory explains that price volatility can be analyzed through the Coefficient of Variation (CV) which is the reason for the instability of the farmgate prices for rice, copra, banana (Lakatan), pork, broiler chicken, and cattle during the periods of a shock like African Swine Fever (ASF), COVID-19, and global price fluctuations.

The Agricultural Household Model (AHM), also known as the Barnum–Squire Model (Barnum & Squire, 1979), enhances Cobweb Theory by showing how the farmers' welfare is determined by relative prices. The model combines production and consumption decisions in one

household and thus recognizes that farmers are both producers and consumers at the same time. The well-being of the farmers is determined not only by the prices they get for their products (PPI) but also by the prices they pay for other goods and services (CPI). The Farmer's Terms of Trade (FTT), expressed as the ratio PPI/CPI × 100, is a measure of the household's purchasing power, when PPI increases more than CPI, welfare improves and vice-versa. The model holds strong for the Philippines where external shocks and unstable market conditions might decrease the farmers' real income even if the nominal farmgate prices are high. Thus, AHM gives theoretical support for using FTT as an indicator of farmers' welfare in this research.

The study, through the integration of Cobweb Theory and Agricultural Household Model,was able to explain the cause of price volatility in agricultural products and the impact of such volatility on the farmers' welfare. Cobweb Theory dealt with the reasons for the fluctuation of farmgate prices over time, and the Agricultural Household Model showed how these changes lead to fluctuations in the real purchasing power of farmers and hence their economic well-being. The conjoining of the two theories hence, underpinned the choice of CV as a measure of price volatility and FTT as a measure of farmer welfare in the study.

Scope and Delimitations

The research mainly concerned looking into the volatility of agricultural prices and the welfare of farmers in the Philippines for the period of 2018 to 2024. It was conducted in a national size and involved the study of six commodities that have a significant economic impact which are: rice, copra, banana (Lakatan), pork, broiler chicken, and cattle. The study used annual average farmgate prices, the Producer Price Index (PPI), and the Consumer Price Index (CPI) as data, all of which were provided by the Philippine Statistics Authority (PSA). Major variables were price volatility measured by the Coefficient of Variation (CV) and the Farmer's Terms of Trade (FTT) defined as the ratio of producer to consumer prices. The research combined these data sets with the objective of illustrating the ups and downs in key agricultural prices and evaluating the extent to which farmers' relative purchasing power changed during the seven years period under review.

The study was confined to the exclusive use of secondary data that were obtained solely from the databases of PSA and the official releases of statistics; thus, no primary surveys, focus group discussions, or interviews with key informants were carried out. The national averages served as the basis for the analysis, thereby implying that regional or provincial differences in farmgate prices, though they could be of considerable importance for the welfare of farmers in the vicinity, were completely disregarded. Moreover, the general CPI indices found application because specific agricultural input indices by commodity, e.g., fertilizer-only CPI, were not available during the study period. The range of commodities was restricted only to six main agricultural products, which were the most relevant in terms of national importance and data accessibility, thus excluding vegetables, fishing, and other high-value crops. Socio-economic factors like land tenure, access to credit, transportation costs, or distance to markets were also not taken into account, although they were contributing significantly to farmer welfare, as they were beyond the economic and statistical scope of this study.

Methodology

The study provided a detailed analysis of the interplay between food price fluctuations and the Farmer's Terms of Trade (FTT) in the Philippines. It focused on six (6) agricultural products that are not only basic food items but also the principal source of income for farmers, namely: rice, copra, banana (Lakatan), pork, broiler chicken, and cattle. The period of the data that is utilized in this study spans from January 2018 to December 2024, thus permitting the time-series evaluation of the trends in food prices and FTT for both short and long terms.

Research Design

This is a quantitative, descriptive research design that investigated the relationship between the fluctuation in food prices and the

terms of trades of farmers. The method measured the changes in agriculture through the Coefficient of Variation (CV) next, it determined the farmers' buying power by FTT, and lastly, it plotted yearly trends and investigated the relationship between price volatility and welfare outcomes. The methodology followed the most recent empirical research in agricultural economics, as Bano et al. (2023) have indicated, and even with past approaches suggested by Asmara (2016), which acknowledged the relevance of statistical trend analysis and index-based welfare assessment.

Participants

Since the research was based entirely on secondary data, The participants are shown as collective numerical records like annual farmgate prices for selected commodities, national CPI data representing the, and Producer Price Index data showing price changes affecting agricultural producers that were published. Since the study did not deal with any human subjects, ethical issues regarding data confidentiality and personal involvement were not an issue.

Instruments

The instruments in the research were both documentary and statistical sources and mainly consisted of the Farmgate Prices of Selected Agricultural Commodities, the Producer Price Index (PPI), and the Consumer Price Index (CPI) from the Philippine Statistics Authority. Access to all these was through PSA and official statistical releases, which lasted from 2018 to 2024. The Coefficient of Variation and the Farmer's Terms of Trade calculations were performed using Microsoft Excel and statistical calculators and involved formulas adapted from Abdi (2010), National Institute of Standards and Technology (NIST, 2017), and the index computation guidelines provided by the International Monetary Fund (IMF, 2010).

Statistical Analysis

The study assessed price volatility using Coefficient of Variation (CV) as formulated by Abdi (2010) and NIST (2017) to specify the extent of variation in commodity prices. The welfare of the farmers was analyzed using Farmers' Terms of Trade (FTT) calculated as the ratio of PPI to CPI multiplied by 100, as per IMF (2010) guidelines for index-based purchasing power analysis. To aid in the interpretation of the price fluctuations and to determine the years of relative advantage or disadvantage for the farmers, descriptive trend analysis was used. The comparative interpretation was further carried out to determine how the volatility patterns matched with the changes in FTT, particularly during the major shocks such as African Swine Fever (ASF), COVID-19, and the global food price hikes, which also influenced the periods. All the interpretations were based on PSA datasets, which were further supported by the context provided by the FAO and World Bank food security reports.

A. Measurement of Price Volatility

Price fluctuations for each commodity were analyzed using the Coefficient of Variation (CV), expressed as:)

$$CV = \frac{\sigma}{\bar{x}} \times 100$$

Figure 1. Formula for Coefficient of Variation

Where:
σ = Standard deviation of the price series
x = Mean price of the series

Table 1. Parameters of the Coefficient of Variation and its Interpretation

Indicators	CV	Interpretation
1. Prices are very stable with minimal fluctuations.	≤ 5%	Low Volatility
2. Prices show some fluctuations but remain fairly manageable.	5% < CV ≤ 9%	Moderate Volatility
3. Prices are highly unstable and change significantly.	> 9%).	High Volatility

B. Measurement of Farmer's Terms of Trade

Farmer's Terms of Trade (FTT) was calculated as the ratio of the Producer Price Index to the Consumer ` Price Index sub-indices.

$$\text{FTT} = \frac{PPI}{CPI}\ x\ 100$$

Figure 2. Formula for Farmer's Terms of Trade

Where:
PPI represents the average prices received by farmers for their agricultural produce.
CPI sub-indices represent the prices paid by farmers for goods and services, including household consumption and farm inputs.

Table 2. Indicators of the FTT values and its Interpretation

Indicators	FTT	Interpretation
1. Costs incurred by farmers for daily needs are higher than income from agriculture.	<100	Disadvantaged
2. Costs of the farmer's needs are balanced with his income.	= 100	Stable
3. Farmer's income is greater than the cost of his needs.	>100	Advantaged

Results and Discussion

Table 3. Coefficient of Variation values of six (6) significant agricultural, livestock, 7 poultry commodities in the Philippines 2018-2024

Agriculture/Live Stock/Poultry	2018	2019	2020	2021	2022	2023	2024	CV%	Volatility
Rice	45	43	42	42	42.5	44	53	8.12%	Moderate
Copra	17.5	11	16	27.5	28	19.5	24	28.44%	High
Banana	37	44	45	42	38	46	51	10.31%	High
Pork	114	104	109	157	173	169	180	21.46%	High
Broiler Chicken	105	110	110	120	151	148	149	15.14%	High
Cattle	118	125	132	158	162	170	195	16.91%	High

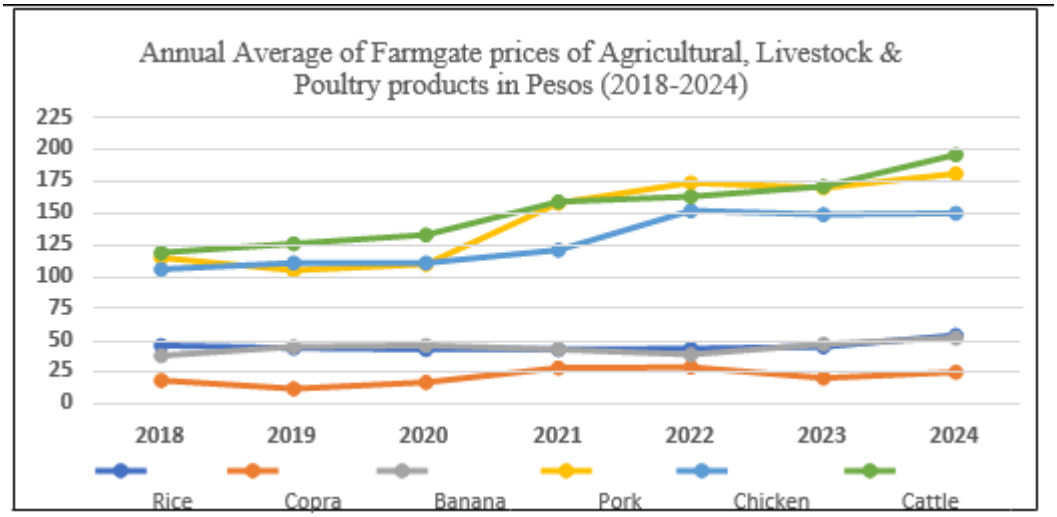

Figure 3. Annual Average of Farmgate prices of Agricultural, Livestock & Poultry products in Pesos (2018-2024)

Based on the results, rice recorded the lowest coefficient of variation at 8.12%, which indicate that farmgate prices were generally stable throughout the years it was monitored. Bananas might have been next in popularity, but the recorded variability was at a moderate 10.31%, while the variance observed for copra was highest at 28.44%, signifying extreme fluctuations and high uncertainty in the market. These findings indicate that produced rice and bananas were mostly predictable income for farmers as opposed to the producers of copra, who had to endure the risk factor in planning production and household finances (FAO, 2021).

In the livestock and poultry sector, there was higher price variability than that of most crops. Pork had the highest of all coefficients of variation with 21.46%, followed by cattle, which had a CV of 16.91%, and broiler chicken at 15.14%. The high price variation exhibited by the market proved to be very susceptible to external factors, such as pandemics, feed price hikes, and supply chain interruptions. The African Swine Fever outbreak in the Philippines is a case in point, as it resulted in a series of price hikes for pork that was both an opportunity and a risk for the producers (Philippine Statistics Authority, 2023).

Unlike rice, which is an assured product, livestock farmers continue to be affected by price fluctuations. The year 2020-2021 serves as a further illustration of this volatility. The prices paid to produce copra soared from about ₱11.53–₱28.63/kg in 2020 to ₱27.13–₱32.50/kg in 2021, indicating a hike of more than 165% at its peak. In addition to this, banana prices also went up, and the Lakatan variety recorded an increase of ₱4.54/kg during the same period. These price patterns corroborate the high CV values indicated by the data, particularly for copra, and highlight the problem of farmers being at the mercy of volatile markets during crisis times like the COVID-19 pandemic.

For the farmers in the Philippines, the results mentioned above are very important. Rice being a stable product ensures a constant income for the farmers, but on the other hand, the price fluctuations of commodities like copra and pork inject uncertainty into the farmers' finances. The government can offer price stabilization programs, suitable insurance, and encourage farmers to take up diversification strategies whereby they would produce both stable and risky products. By reinforcing the support systems, not only would the farmer's livelihoods be protected, but also the country's agricultural sector would be more resistant to hardships (World Bank, 2020).

Table 4. Rate of Farmer's Terms of Trade of Philippine Farmers and its implications from 2018-2024

Year	Producer Price Index (PPI)	Consumer Price Index (CPI)	Farmer's Terms of Trade	Implication
2018	100	117.1	85.40%	Disadvantaged
2019	94.4	119.75	78.83%	Disadvantaged
2020	95.1	121.95	77.98%	Disadvantaged
2021	103.4	107.4	96.28%	Disadvantaged
2022	118.6	113.95	104.08	Advantaged
2023	134.2	121.25	110.68	Advantaged
2024	125.9	125	100.72	Advantaged

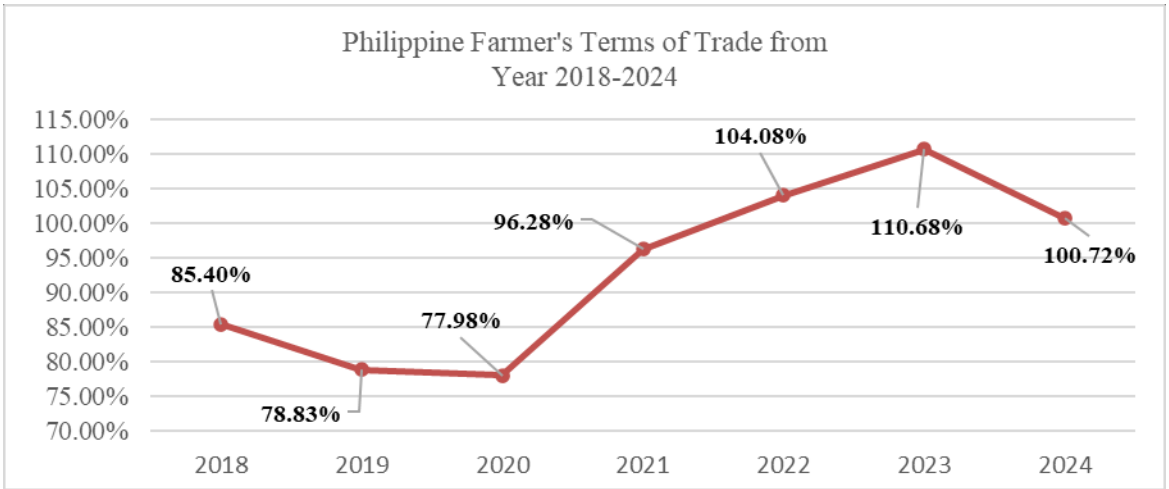

Figure 4. Philippine Farmer's Terms of Trade from Year 2018-2024

Farmers in the Philippines incurred losses from 2018 to 2020 as the ratio of the Producer Price Index (PPI) to the Consumer Price Index (CPI) fell below 100%. The Farmer's Terms of Trade (FTT) particularly deteriorated from 85.40% in 2018 to 77.98% in 2020, which points out the decline of farmers' purchasing power during the time. This means that, on one hand, consumer prices (CPI) went up significantly, but on the other hand, the prices of goods to the farmers (PPI) didn't increase much, hence the farmers were not able to buy goods and services with their income. This trend signals weak farmgate support for prices and inflationary pressures that work to diminish farmers' real incomes (Philippine Statistics Authority [PSA], 2023) Briones and Tolin (2019) provided similar arguments when they claimed that unceasing differences between the farmgate and retail prices of rice, coconut, and other commodities restrain the distribution of fair income for growers.

In 2021, it fell to a slightly higher FTT value of 96.28%, but it was still far from the 100% mark that indicates complete utilization by farmers. This slight improvement can be attributed to a brief recovery in producer prices as Agri markets started to adapt after the COVID-19 pandemic caused disruptions. It is important to carefully examine the relationship between the Coefficient of Variation (CV) and FTT since they both have an impact on purchasing power and income security. Rice received a CV of 8.12%, indicating stable earnings, while copra received a CV of 28.44%, indicating extreme volatility and unpredictability. CV is related to farmgate price stability. In the meantime, the relationship between producer and consumer price is expressed by FTT. Even if farmgate prices appear to rise, farmers' purchasing power is reduced when the FTT falls below 100%. Due to their unstable incomes and declining purchasing power, farmers therefore perform at their lowest level when the CV is high and the FTT is low (Food and Agriculture Organization [FAO], 2021; PSA, 2023).

The welfare of farmers is impacted by the interaction of these two factors. Pigs and copra as livestock had high CV values during the 2018–2020 period, when FTT was typically below 100%. As a result, farmers faced price volatility as well as a decline in real income for both investing in farm improvements and meeting their basic household needs. On the other hand, there was a relative recovery in purchasing power between 2022 and 2024, when FTT was primarily above 100%.

Conclusions

According to the study, the welfare of Filipino farmers was significantly impacted by the fluctuations in food prices and the Farmer's Terms of Trade (FTT). According to the findings, rice has been the most reliable and consistent source of income for farmers, with less price volatility than copra and pork, whose extremely volatile prices make farmers more financially vulnerable. Moreover, the insights from FTT have indicated that the period

between 2018 and 2020 was marked by the FTT dropping below a hundred percent, which signified that farmers were sliding into poverty and could no longer afford to buy essentials. The situation got better in 2021 when FTT got close to or over 100% but the recovery by itself could not lead to a continuous benefit for farming households.

These results are important as they reveal the two major problems that the farmers encounter: the first one is the unreliable income that is caused by the price volatility and the second one is the reduced purchasing power due to the unfavorable terms of trade. The combination of low FTT with high farmgate price volatility throws farmers into a situation of compounded vulnerabilities where they are stuck in a cycle of poverty and cannot afford to invest in projects that would increase their productivity. As the survival of the nation's food supply is directly dependent upon the sustainability of agriculture, it is not only important to farmers' welfare but also to the country's food security to take these problems seriously.

Consequently, the importance of this study consists in the fact that it opens up a path for policy discussions on agricultural pricing, trade, and support mechanisms. The emphasis on price stabilization policies together with improvements in market access and introduction of risk management instruments can provide the farmers the protection they need from volatility and at the same time ensure that the benefits of increased producer prices are not lost due to rising input and consumer costs. In the end, the improvement of the existing balance between food price stability and favorable FTT is indispensable for the advancement of the welfare of Filipino farmers and the establishment of a more robust agricultural sector in the Philippines.

Recommendations

Based on the findings of this study, three recommendations are formulated as follows:

For Policymakers and Government Agencies

By disaggregating Farmers' Terms of Trade (FTT) and food price volatility, policymakers will be able to, at regional and local levels, consider the various categories of farmers and their different geographical vulnerabilities. This would result in revealing the differences in welfare that are obscured by national averages, especially for smallholder farmers who are located either far from or in climate-sensitive areas. They should also work on creating price stabilization schemes and providing additional support to farmers to cope with price fluctuations.

For Market Stakeholders and Agricultural Value Chain Actors

The stakeholders should explore the function of intermediaries and informal market channels in the determination of farmgate prices and farmer income. Inasmuch as a lot of rural trade remains unregistered in official statistics, it is important to analyze how value is added or lost throughout the farmgate-to-retail chain. The identification of the points of income leakage, as well as the determination of the maximally benefiting parties, will inform the design of more equitable market interventions and support mechanisms that not only improve farmer welfare but also guarantee a fairer distribution of agricultural value.

For Researchers and Academics

Future studies are expected to be using mixed-method approaches not only based on price indicators but also looking into wider socioeconomic and non-price welfare outcomes like income diversification, access to credit, food security, education, and health. The analysis that includes farmers' lived realities will provide a great understanding of how price instability and weak FTT affect daily livelihoods and that will be the basis for evidence- based recommendations on long-term farmer welfare.

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