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TACKLING SELF-SUFFICIENCY CHALLENGES: EMPIRICAL ANALYSIS OF RICE PRICES, PRODUCTION, AND CONSUMPTION IN THE PHILIPPINES

Introduction

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Written by:

Dr. Cristina Teresa N. Lim
Department of Decision Sciences and Innovation
College of Business
DLSU-Manila

Rice is a vital crop in the Filipino table and a backbone of agricultural employment in the Philippines. Despite ongoing government efforts, the nation's rice self-sufficiency ratio (SSR) fell to 77 percent in 2022—the lowest in over 20 years—making it one of the world's largest rice importers (Arcalas & Ordinario, 2023). This study analyzed rice production, consumption, and pricing using data from 15 rice-producing regions (2003–2020) and time-series data (1998–2020). It identified production area and irrigation spending as the main factors driving production, while fertilizer costs have minimal impact on rice prices. Granger causality tests showed that consumption significantly influences self-sufficiency, and pricing affects production. This brief provides key policy directions, specifically (1) expanding of rice Farming and irrigation systems, (2) monitoring consumption and buffer stocks, (3) enhancing the competitiveness of the local rice industry, and (4) implementing price stabilization measures.

Summary of Facts: Competitiveness and Government Policy

From 1970 to 1980, rice production in the Philippines rapidly flourished, resulting in a net surplus (Tibao, 2009). Yet, population growth and rapid urban development led to the transformation of agricultural areas to industrial, commercial, and residential spaces (Cao, Chaiwan, & Chaiboonsri, 2023), steering to a shortage of local rice supply. The government started importing rice from neighboring countries to meet local demand, making the Philippines one of the biggest rice importers (Freedman, 2013). This issue underlined the challenges of managing rice as a political commodity, directly tied to Sustainable Development Goal 2 (SDG 2): Zero Hunger, which seeks to end hunger, ensure food security, improve nutrition, and promote sustainable agriculture.

An analysis of data from 15 rice-producing regions in the Philippines (2003–2020) revealed an average annual yield of 106,727 metric tons, with notable fluctuations during specific periods. The decline in 2008 was primarily due to a global rice market crisis that led to a food shortage (Dawe, 2012). In the same vein, the drop from 2013 to 2015 was caused by the devastating impact of Super Typhoon Haiyan on Central Luzon, the country's main rice-producing region (Figure 1).

The average worth per kilogram of rice in the sample was PHP 30.90, peaking at PHP 43.39 for ordinary rice. As exhibited in Figure 5, rice rates have soared, particularly during year 2008 food crisis and progressing to escalation due to production losses from Typhoon Haiyan and further price hikes in 2018. The increasing rice prices resulted in declining purchasing power for low-income households, exacerbating poverty and health issues as families are forced to cut spending on essential needs like healthcare and nutritious food (Dawe, 2012; Djulius et al., 2022).

Further, production figures showed that farm workers earned an average daily wage of PHP 174.00, relatively low compared to other costs. Irrigation costs average PHP 358.00 per hectare, rising to PHP 1,124.00, while pesticide expenses average PHP 1,245.00 and can reach PHP 2,874.00. Fertilizers are the highest expense, averaging PHP 4,186.00 per hectare, with some exceeding PHP 8,738.00, thus demonstrating the economic pressures faced by Filipino rice farmers.

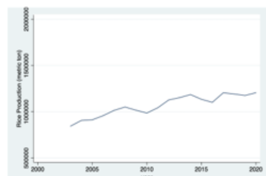

Figure 1. *Volume of Rice Production in the Philippines, 2003 to 2020*

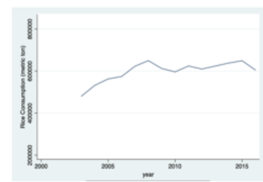

Figure 2. *Volume of Rice Consumption in the Philippines, 2003 to 2016*

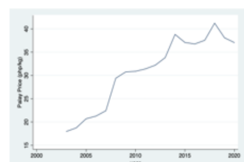

Figure 3. *Per-kilogram Price of Rice, 2003 to 2020*

What are the issues?

The ongoing debate between local rice self-sufficiency and rice importation highlights the tension between national food security goals and economic practicality. Despite the government's efforts to boost rice self-sufficiency by promoting hybrid rice varieties and funding research to increase yields, reduce crop maturity, and improve resistance to pests and diseases (Redoña et al., 2003), these initiatives have not been successful. The Philippines continues to rely on rice imports to address its supply shortages (Cardona & Garcia, 2016). As a result, the country is expected to remain the world's largest rice importer in 2024, surpassing even China in 2023. In 2023, the Philippines imported 3.6 million metric tons of rice, one of the most consumed grains globally (Philippine Daily Inquirer, 2024). This paper then explores potential strategies as to how the Philippines can improve its self-sufficiency initiatives on rice supply by examining factors influencing rice prices, consumption, and production.

Discussion

The Philippine Rice Research Institute (PPRI) (2011) emphasized that achieving true rice self-sufficiency requires meeting national demand while maintaining a strong buffer stock for emergencies. However, PPRI argues that focusing solely on rice production is insufficient and calls for a broader approach to ensure food security and agricultural sustainability. In line with the agricultural sufficiency measure of the Food and Agricultural Organization (FAO), self-sufficiency ratio of rice sourced from PSA was utilized. The self-sufficiency ratio is given by Equation 1:

$$SSR = \left(\frac{rice\ production}{rice\ production + rice\ imports - rice\ exports}\right) * 100 \quad (1)$$

The rice self-sufficiency ratio (SSR) measures the share of rice production relative to domestic consumption. It indicates how much of the country's rice supply comes from local production versus reliance on external sources.

Panel Estimation

To determine the factors influencing rice production, consumption, and prices, the following models were estimated:

$$RiceProduction_{it} = \beta_0 + B_1 AR_{it} + \beta_2 IR_{it} + \beta_3 FE_{it} + \beta_4 PE_{it} + \varepsilon_{it} \quad (2)$$

*where **RPit** is the rice production volume in region i at time t; **ARit** (rice production area in hectares); **IRit** (irrigation cost per hectare); **FEit** (inorganic fertilizer use); and **PEit** (pesticide cost).*

$$RiceConsumption_{it} = \beta_0 + \beta_1 PCI_{it} + \beta_2 PR_{it} + \beta_3 PO_{it} + \varepsilon_{it} \quad (3)$$

*where **RCit** represents the rice consumption volume in region i at time t; **PCIit** (per capita income as gross regional domestic product per capita), **PRit** (average annual rice price), and **POit** (regional population).*

$$PriceRice_{it} = \alpha + \beta_1 CL_{it} + \beta_2 CF_{it} + \beta_3 PE_{it} + \beta_4 IR_{it} + \varepsilon_{it} \quad (4)$$

*where **PRit** represents the rice price in region i at time t. Key factors include **CLit** (labor cost as agricultural wage rates), **CFit** (fertilizer cost), **PEit** (pesticide cost), and **CIit** (irrigation cost paid by farmers).*

The rice production model observes the volume of rice produced in a region, with key factors comprising the area of land used for rice farming, the cost of irrigation per hectare, the amount of inorganic fertilizer applied, and the cost of pesticides. The rice consumption model analyzes the volume of rice consumed in a region, induced by per capita income (measured as gross regional domestic product per capita), the average annual price of rice, and the regional population. Lastly, the rice price model identifies the determinants of rice prices, considering the cost of labor (measured through agricultural wage rates), the cost of fertilizers, pesticides, and irrigation. These models postulate valuable insights for policymakers, easing to address challenges in rice production, affordability, and food security.

A panel data analysis was utilized to probe the three equations presented. This method sifts data across different regions and over time to capture variations that might not be visible in a single point-in-time study (Porter & Gujarati, 2009). This approach supports control for unobserved differences between regions and lessens issues like multicollinearity, where independent variables are too closely related and may distort results. To effectively combine regional and time-based data, pooling methods were applied, allowing the model to reflect both short-term and long-term trends in rice production, consumption, and pricing. Panel data models provide a more accurate representation of how these factors interact by considering both cross-sectional (regional) and time-series (historical) influences. As Gujarati and Porter (2009) highlight, this method enhances the ability to analyze complex relationships between variables, posing a more flexible and reliable framework for policymaking and market assessments.

The Vector Autoregressive (VAR) Model

The Vector Autoregressive (VAR) model was exhausted to comprehend how rice self-sufficiency, consumption, production, and prices are connected over time. The VAR model facilitates to predict changes in one area (like rice prices) can affect others (like production or consumption). It looks at how each factor in the system is influenced by past values of all the other factors. This model is valuable as it can handle the uncertainty about which factors are truly independent and shows how different factors interact over time (Sims, 1980). The following equations explain how these four factors—production, consumption, prices, and self-sufficiency—are related in the VAR model.

$$SSR_t = \beta_{10} - \beta_{12}RP_t - \beta_{13}RC_t - \beta_{14}PR_t + \gamma_{11}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{12}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{13}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{14}\sum_{m=1}^{m=j} PR_{t-m} + \varepsilon_{SSRt} \quad (5)$$

$$PR_t = \beta_{20} - \beta_{21}SSR_t - \beta_{23}RC_t - \beta_{24}RP_t + \gamma_{21}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{22}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{23}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{24}\sum_{m=1}^{m=j} PR_{t-m} + \varepsilon_{PRt}$$

$$RC_t = \beta_{30} - \beta_{31}SSR_t - \beta_{32}RP_t - \beta_{34}PR_t + \gamma_{31}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{32}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{33}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{34}\sum_{m=1}^{m=j} PR_{t-m} + \varepsilon_{RCt}$$

$$PR_t = \beta_{40} - \beta_{41}SSR_t - \beta_{42}RP - \beta_{43}RC_t + \gamma_{41}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{42}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{43}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{44}\sum_{m=1}^{m=j} PR_{t-m} + \varepsilon_{PRt}$$

In Equations 5, SSR_t represents rice self-sufficiency, RP_t represents rice production, RC_t represents rice consumption, and PR_t represents the price of rice at year t. The ε_{SSRt}, ε_{PRt}, ε_{RCt}, ε_{PRt} are white noise disturbance terms with standard deviation σ_{SSR}, σ_{RP}, σ_{RC}, and σ_{PR} respectively and zero means. The contemporaneous effects are measured by the β parameters while the lag m effects are measured by the γ's. Moreover, note that the equations were not in reduced form because, for instance, SSR_t exhibit a contemporaneous effect on RP_t, RC_t, and PR_t. Henceforth, isolating time t variables in the left-hand side, Equations 5 would be:

$$SSR_t + \beta_{12}RP_t + \beta_{13}RC_t + \beta_{14}PR_t = \beta_{10} + \gamma_{11}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{12}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{13}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{14}\sum_{m=1}^{m=j} PR_{t-m} + \varepsilon_{SSRt} \quad (6)$$

$$\beta_{21}SSR_t + PR_t + \beta_{23}RC_t + \beta_{24}RP_t = \beta_{20} + \gamma_{21}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{22}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{23}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{24}\sum_{m=1}^{m=j} RP_{t-m} + \varepsilon_{PRt}$$

$$\beta_{31}SSR_t + \beta_{32}RP_t + RC_t + \beta_{34}PR_t = \beta_{30} + \gamma_{31}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{32}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{33}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{34}\sum_{m=1}^{m=j} PR_{t-m} + \varepsilon_{RCt}$$

$$\beta_{41}SSR_t + \beta_{42}RP + \beta_{43}RC_t + PR_t = \beta_{40} + \gamma_{41}\sum_{m=1}^{m=j} SSR_{t-m} + \gamma_{42}\sum_{m=1}^{m=j} RP_{t-m} + \gamma_{43}\sum_{m=1}^{m=j} RC_{t-m} + \gamma_{44}\sum_{m=1}^{m=j} PR_{t-m} + \varepsilon_{PRt}$$

Transforming Equations 6 in matrix form,

$$[1\ \beta_{12}\ \beta_{13}\ \beta_{14}\ \beta_{21}\ 1\ \beta_{23}\ \beta_{24}\ \beta_{31}\ \beta_{32}\ 1\ \beta_{34}\ \beta_{41}\ \beta_{42}\ \beta_{43}\ 1\ ][SSR_t\ RP_t\ RC_t\ PR_t\ ] = [\beta_{10}\ \beta_{20}\ \beta_{30}\ \beta_{40}\ ] + [\gamma_{11}\ \gamma_{12}\ \gamma_{13}\ \gamma_{14}\ \gamma_{21}\ \gamma_{22}\ \gamma_{23}\ \gamma_{24}\ \gamma_{31}\ \gamma_{32}\ \gamma_{33}\ \gamma_{34}\ \gamma_{41}\ \gamma_{42}\ \gamma_{43}\ \gamma_{44}\ ][SSR_{t-m}\ RP_{t-m}\ RC_{t-m}\ PR_{t-m}\ ] + [\varepsilon_{SSRt}\ \varepsilon_{PRt}\ \varepsilon_{RCt}\ \varepsilon_{PRt}\ ]$$

The matrix can then be simplified as:

$$BX_t = \Gamma_0 + \Gamma_1 X_{t-m} + \varepsilon_t$$
$$X_t = B^{-1}\Gamma_0 + B^{-1}\Gamma_1 X_{t-m} + B^{-1}\varepsilon_t$$
$$X_t = A_0 + A_m X_{t-m} + e_t$$

where $X_t = [SSR_t\ RP_t\ RC_t\ PR_t\ ]B =$

$[1\ \beta_{12}\ \beta_{13}\ \beta_{14}\ \beta_{21}\ 1\ \beta_{23}\ \beta_{24}\ \beta_{31}\ \beta_{32}\ 1\ \beta_{34}\ \beta_{41}\ \beta_{42}\ \beta_{43}\ 1\ ]$, $\Gamma_0 = [\beta_{10}\ \beta_{20}\ \beta_{30}\ \beta_{40}\ ]$, $\Gamma_1 = [\gamma_{11}\ \gamma_{12}\ \gamma_{13}\ \gamma_{14}\ \gamma_{21}\ \gamma_{22}\ \gamma_{23}\ \gamma_{24}\ \gamma_{31}\ \gamma_{32}\ \gamma_{33}\ \gamma_{34}\ \gamma_{41}\ \gamma_{42}\ \gamma_{43}\ \gamma_{44}\ ]$, $\varepsilon = [\varepsilon_{SSRt}\ \varepsilon_{PRt}\ \varepsilon_{RCt}\ \varepsilon_{PRt}\ ]$

Equation 7 is the reduced-form representation of the four-case variables VAR model. X_t is a $(k\ x\ 1)$ vector of endogenous variables, A_m are matrices of coefficients to be estimated, and e_t is a $(k\ x\ 1)$ vector of serially uncorrelated white noise residuals.

Model Selection

Table 1 displays the results of three statistical tests—Hausman Specification Test, Wald's Test, and the Breusch-Pagan Lagrange Multiplier (LM) Test—to determine the best model for analyzing panel data. These tests were applied to three models: Pooled OLS, Fixed Effects, and Random Effects. The main test, called the Hausman test, found that the Fixed Effects model is usually the best choice because it showed that the error in the model is linked to the factors being measured. The table also includes p-values, which exhibit the most reliable model. When the p-values are low, it means the Fixed Effects model is a better fit. So, based on these tests, the Fixed Effects model is preferred for understanding rice production, consumption, and prices.

Table 1. *Results of the Hausman Specification Test, Wald's Test, and the Breusch Pagan Lagrange Multiplier Test for Model Selection for the Pooled OLS, Fixed, and Random Effects*

Model Number	Model Comparison	p –value	Remarks
Model 1A and 1B	Pooled OLS - Fixed	0.0016	Fixed effects model was selected.
Model 1A and 1C	Pooled OLS – Random	0.0000	Random effects model was selected.
Model 1B and 1C	Fixed – Random	0.0000	Fixed effects model was selected.
Model 2A and 2B	Pooled OLS – Fixed	0.0000	Fixed effect model was selected.
Model 2A and 2C	Pooled OLS – Random	0.0000	Random effects model was selected.
Model 2B and 2C	Fixed – Random	0.0039	Fixed effects model was selected.
Model 3A and 3B	Pooled OLS – Fixed	0.0000	Fixed effects model was selected.
Model 3A and 3C	Pooled OLS – Random	0.0000	Random effects model was selected.
Model 3B and 3C	Fixed – Random	0.0014	Fixed effects model was selected.

Notes. 1 = rice production, 2 = rice consumption, 3 = price of rice; A = Pooled OLS, B = Fixed effects, C = Random effects

Panel Estimation Results

Table 2 shows the estimates from the regression model analyzing production, consumption, and rice prices using pooled OLS, fixed effects, and random effects panel data methods. The adjusted R-squared implies that independent variables—area of production, irrigation, fertilizer, and pesticides—account for 95.83% of the variability in rice production in the Philippines. Among these, the area of production and irrigation costs were significant predictors at the 1% level. Specifically, expanding the rice plantation area by 1,000 hectares marks an additional 5,963 metric tons of production, allying with the expectation that larger cultivation areas boost output. Notably, higher irrigation costs, reflecting fees for irrigation services, also correlate with increased production volumes, as farmer participation in irrigation systems enhances yield.

The fixed effects model found that population size significantly affects rice consumption at the 1% level, while rice prices and income levels were statistically insignificant. A marginal increase in the population by 1,000 people is associated with an increase in rice consumption by 8,930 metric tons, consistent with findings from Hsiaoping (2005) and Bashir and Yuliana (2019) on rice consumption in China and Indonesia. As rice is a staple in Filipino households, a growing population logically leads to higher consumption.

In the price model, fertilizer costs demonstrated a significant inverse relationship with the price of ordinary rice. However, a peso increases in fertilizer cost per hectare had minimal impression on rice prices. The weak inverse relationships between labor, fertilizer, and pesticide costs allude that farmers may seek low-cost alternatives when input prices rise, such as sourcing unpaid labor from family members. The model's R-squared value indicates that the regressors explain 98.22% of the variability in regional rice prices.

Table 2. *Regression Results of Pooled OLS, Fixed Effects, Random Effects Estimates*

Variables	Pooled OLS	Fixed Effects	Random Effects
Model 1: Production (RP)			
AR	**0.4048***	**0.5963***	**0.5011***
	(0.0051)	(0.0199)	(0.0141)
IR	**0.0357***	**0.0127***	**0.0158***
	(0.0043)	(0.0035)	(0.0029)
FE	**5.4813***	**0.9284**	**2.7313***
	(0.9203)	(0.8353)	(0.7072)
PE	**-0.0048***	**-0.0002**	**-0.0013**
	(0.0017)	(0.0018)	(0.0018)
Constant	**-38.483***	**-70.8986***	**-50.3525***
	(3.8926)	(6.6333)	(6.1743)
Adjusted R^2 (overall)	0.9681	0.9527	0.9588
F-test	$p < 0.0001$	$p < 0.0001$	–
Wald's test	–	–	$p < 0.0001$
Model 2: Consumption (RC)			
PCI	**-10.2406***	**2.9482**	**-9.7506**
	(2.2481)	(4.749)	(3.8795)
PO	**1.141***	**0.893***	**1.0013***
	(0.0245)	(0.0716)	(0.0615)
PR	**0.0966**	**-0.2013**	**0.2063***
	(0.1022)	(0.3048)	(0.0898)
Constant	**115.9688***	**-20.4832**	**114.2555***
	(23.8623)	(53.6291)	(41.2992)
Adjusted R^2 (overall)	0.9142	0.9104	0.9146
F-test	$p < 0.0001$	$p < 0.0001$	–
Wald's test	–	–	$p < 0.0001$

Model 3: Price of rice (PR)			
CL	**0.0715*** **	**-0.0006**	**0.075*** **
	(0.0063)	(0.0046)	(0.0061)
CF	**0**	**0**	**0.0003**
	(0.0003)	(0.0001)	(0.0003)
PE	**-0.0011**	**-0.0006** **	**-0.0009**
	(0.0007)	(0.0003)	(0.0008)
IR	**0.0061*** **	**0.0004**	**0.0072*** **
	(0.0018)	(0.0005)	(0.0019)
Constant	**17.7038*** **	**18.6597*** **	**14.8308*** **
	(1.5361)	(0.7301)	(1.6022)
Adjusted R^2 (overall)	0.4681	0.9719	0.4692
F-test	$p < 0.0001$	$p < 0.0001$	–
Wald's test	–	–	$p < 0.0001$

Note. Coefficients are in bold; standard errors are in parentheses; *, **, and *** denote significance at the 10, 5, and 1% levels (two-tailed), respectively.

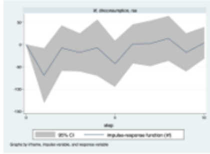

Figure 4. *Response of rice self-sufficiency to consumption*

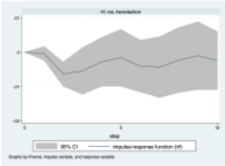

Figure 5. *Response of production to rice self-sufficiency*

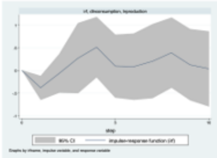

Figure 6. *Response of rice production to rice consumption*

Figure 7. *Response of rice production to rice prices*

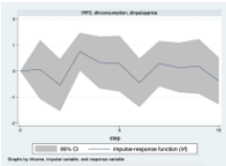

Figure 8. *Response of rice prices to consumption*

Granger Causality Test

The Granger causality test in the VAR model showed that consumption Granger-causes rice prices, which aligns with economic logic: higher consumption reduces supply, driving prices upward. Moreover, at a 1% significance level, rice self-sufficiency, consumption, and prices all Granger-cause rice production. Self-sufficiency's positive Granger causality suggests that local production can meet national demand without relying on imports. However, this must be interpreted carefully, as self-sufficiency can result from both production and imports.

The results also illustrated that consumption also Granger-causes production, signaling farmers and stakeholders to increase output as demand rises. Similarly, prices Granger-cause production, as higher prices incentivize farmers to boost output for higher income. However, as noted by Conteh, Yan, and Sankoh (2012), rising rice prices, while incentivizing producers, could also strain production and lead to greater reliance on imports.

Impulse Response Function Test

The Granger causality test only showed the direction of causality. To measure the magnitude of the significant Granger causality, variance decomposition (Cholesky factorization) was conducted.

Recall in the Granger causality test, consumption of rice Granger-cause self-sufficiency positively, which is not aligned with economic intuition as increasing consumption negatively impacts the availability of rice supply (Cardona & Garcia, 2016; Hsiaoping, 2005; Bashir and Yuliana, 2019). Yet in Figure 4, observed a one-time shock in consumption would decrease rice self-sufficiency. This illustration is pivotal for policymakers given that cumulative consumption levels could cast negative effects in the short run. Consequently, the government may necessitate to respond to consumption shocks through importation efforts to furtherance the local rice supply.

Rice production exhibited virtually no response in rice self-sufficiency shocks in the first period as observed in Figure 5. However, production started to dwindle in the second and third periods. Amidst a rise in self-sufficiency, policymakers need to bolster their initiatives and avoid complacency in production efforts to keep up with the country's rice supply. Additionally, Figure 6 shows that a shock in consumption would at first negatively impact production. It can be observed, nevertheless, that production moderately adjusts to the sudden increase in consumption levels over time, thus meeting consumption demand.

Figure 7 shows that a shock in rice prices would decrease rice production. As consumers experience declining buying power, greater preference for relatively cheaper imports might dampen incentives for local production of rice. Policy-wise, it would be prudent for the government to sustain an open trade stance with regard to rice importation. Moreover, Figure 8 presents that a drastic increase in Filipino consumption of rice would have minimal impact on the price at first, yet the price started to observably increase as a consequence of the rice consumption in the third period. As such, there might be a lagged response in prices given consumption shocks. On this note, policymakers should be wary of increasing consumption levels as this could result in upward pressure on rice prices.

Conclusions

The policy propositions are clear: the Philippine government must adopt a holistic approach that deals with production expansion, irrigation system improvement, price stability, and competitive safeguards to ensure long-term rice self-sufficiency.

Expansion of Rice Farming and Irrigation Systems

Key findings illustrated that expanding rice farming areas and improving irrigation systems significantly enhances rice production. Specifically, a 1,000-hectare expansion results in an additional 5,963 metric tons of rice. Such a positive relationship between irrigation costs and production suggests that investments in irrigation technologies can boost yields. To support these findings, policy initiatives should prioritize increasing the land allocated for rice farming and modernizing irrigation infrastructure.

Practical actions for legislative bodies in the Philippines could include allocating budgets to provide incentives for farm owners to convert their land into rice paddies or shift from crops like sugarcane to rice farming. The Department of Agriculture (DA) could also expand the ARGI-Puhunan program (DA, 2024), which supports rice farmers, to encourage non-rice farmers to adopt rice farming. In addition to offering free seedlings, the government may incentivize crop farmers to convert some of their land into rice paddies. To ensure this happens, a clause could be added to government memoranda encouraging the conversion of other agricultural land to rice farming.

Monitoring Consumption and Buffer Stocks

The analysis also found that rice consumption Granger-causes self-sufficiency, meaning that spikes in consumption could threaten self-sufficiency by depleting available supply. To address this, the government must take immediate action to manage consumption surges, particularly by monitoring buffer stocks. The National Food Authority's declining reserves from 2011 to 2018 (Cuevas, 2019) underscored the need for improved stock management.

In practical terms, the government should invest and implement a real-time monitoring system to track consumption trends and identify periods of high demand, such as during holidays or following natural disasters. When consumption spikes, the government can respond by increasing rice imports to fill the gap, mobilizing existing buffer stocks, or encouraging local farmers to boost production through short-term support measures like subsidies or tax incentives. Additionally, the government could consider expanding rice reserves during periods of lower consumption to better prepare for future demand fluctuations.

Enhancing Competitiveness of Local Rice Producers

Given that rice prices and self-sufficiency influence production, it implies that a sudden increase in self-sufficiency driven by rice imports has led to a decline in domestic production, highlighting the challenges local farmers face in competing with cheaper imports. To address this, the DA should implement targeted policies to enhance the competitiveness of local rice producers.

For credit, the government may start and/or partner with private lending institutions in creating low-interest loan programs or subsidies for rice farmers to improve their access to capital for purchasing seeds, equipment, and fertilizers. These loans could be tied to performance-based criteria to encourage better farming practices and ensure repayment. In light of education, the DA may expand training programs to teach farmers modern farming techniques, sustainable practices, and how to maximize yield using available resources. Collaborations with agricultural universities (University of the Philippines - Los Baños) and NGOs could facilitate these programs, providing farmers with the latest knowledge on improving production efficiency and quality.

Further, the DA, in terms of value chain integration, should mobilize resources on linking rice farmers with millers, distributors, and retailers to reduce post-harvest losses and improve market access. This could include setting up farmer cooperatives that facilitate bulk purchasing of inputs and collective selling of harvests, helping farmers negotiate better prices and reducing transaction costs. Moreover, fostering partnerships between local farmers and private companies could open up opportunities for contract farming, where farmers are assured of a stable market for their rice.

Price Stabilization Measures

The analysis demonstrated the negative effects of rising rice prices on production. While higher prices may encourage more rice production, they also reduce consumer purchasing power, increase reliance on imports, and shrink the local market share. This makes it crucial to maintain stable rice prices to support sustainable production and prevent market volatility from harming both producers and consumers. To stabilize prices, the government could adopt measures suggested by Dawe and Timmer (2012), such as setting price floors and ceilings. A price floor would protect farmers from price drops, while a ceiling would prevent prices from becoming too high for consumers. These measures would reduce market uncertainty on rice prices which promote the rice sufficiency of the country.

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