International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(RESEARCH ARTICLE)

Check for updates

Factors affecting to fluctuation of paddy price in Polonnaruwa district in Sri Lanka

NGCK Nissanka * and RKD Randeni

Rajarata University of Sri Lanka, Mihinthale, 50300, Sri Lanka.

International Journal of Science and Research Archive, 2025, 16(02), 894-900

Publication history: Received on 06 July 2025; revised on 14 August 2025; accepted on 16 August 2025

Article DOI: https://doi.org/10.30574/ijsra.2025.16.2.2387

Abstract

A quantitative research approach was adopted, guided by the positivist philosophy and employing a deductive methodology. The data collection was conducted through a structured questionnaire using a sample comprised 250 paddy farmers from the Polonnaruwa District. The collected data was analyzed using SPSS Version 24, utilizing various statistical tools including descriptive statistics, correlation analysis, and regression analysis. The findings revealed that the independent variables had a statistically significant impact on paddy price fluctuation. Furthermore, correlation analysis confirmed strong relationships between all independent variables and the dependent variable. The study concludes by offering practical recommendations aimed at enhancing paddy production in terms of quality, quantity, and harvested area. It also suggests improvements in government policy measures such as price regulation, better storage infrastructure, and fixed pricing mechanisms for paddy trading.

Keywords: Agriculture; Paddy Cultivation; Price Fluctuation; Paddy Farmers; Sri Lanka

1. Introduction

Rice, or paddy, is a staple food for over half of the world's population and plays a vital role in the food security, culture, and economy of many countries, especially in South Asia (Bishwajit et al., 2013). In Sri Lanka, rice cultivation holds a central place in agricultural production and rural livelihoods, with a significant portion of the population engaged in paddy farming (Dharmasena, 2010). The Polonnaruwa District, located in the North Central Province, is one of the key paddy-growing regions in Sri Lanka, benefiting from favorable climatic conditions and irrigation infrastructure. Despite its importance, paddy production and marketing in this district face numerous challenges (Prasad et al., 2017), among which price fluctuations stand out as a critical concern for farmers, policymakers, and consumers alike (Kumare et al., 2022). Price fluctuation refers to the variability or instability in market prices over time. In the context of agricultural commodities such as paddy, price fluctuations can significantly affect the incomes and livelihoods of farmers, the stability of food supplies, and the overall functioning of the agricultural sector (Fadilah et al., 2025; Wibowo et al., 2025). Volatile paddy prices create uncertainty, complicate farm management decisions, and can lead to income insecurity for smallholder farmers who often operate at subsistence levels (Coclanis & Stewart, 2011) . Moreover, erratic price movements can influence consumer food security and inflation rates, making price stability a key policy objective in many countries (Ahmed et al., 2025).. Understanding the factors that drive these fluctuations is essential for designing effective interventions to stabilize markets, improve farmer welfare, and enhance the efficiency of the paddy supply chain.

Several factors have been identified in the literature as potential drivers of paddy price fluctuations (Yanti et al., 2021; Thakur, 2025; Rahman, 2021; Ganesahmoorthy, 2016; Jain, 2018). These include supply-side variables such as production volume, quality of the harvested crop, and timing of harvest (Rathnayake & Amaratunge, 2016; Xin et al., 2020; Jain, 2018), as well as demand-side influences like consumer preferences and import/export dynamics (Kuruppu, 2017). Additionally, the geographical distribution of paddy production and logistical considerations such as

* Corresponding author: NGCK Nissanka

transportation and market access play crucial roles in price determination. Government policies, including price controls, subsidies, procurement mechanisms, and trade regulations, are also widely acknowledged as critical determinants of price behavior in agricultural markets (Bandara et al., 2023). In the case of Sri Lanka, government intervention in paddy marketing and pricing has a long history, with varying degrees of influence on market outcomes (Wijesooriya et al., 2016). The Polonnaruwa District presents a unique case for examining these factors due to its significant contribution to national rice production and its exposure to both local and national market dynamics. The district's diverse agro-ecological zones and farming systems create spatial variations in paddy production and marketing conditions, which in turn affect price behavior. Moreover, recent shifts in government policy, fluctuating input costs, and changing climatic patterns have heightened the volatility of paddy prices in the region. Despite the critical importance of price stability for this key agricultural zone, there remains a lack of comprehensive empirical studies focusing specifically on the determinants of paddy price fluctuations. Most existing research tends to concentrate on broader national trends or general supply-demand analyses, often overlooking localized factors. This study aims to fill this research gap by systematically investigating the factors influencing paddy price fluctuations in the Polonnaruwa District. Grounded in a positivist research philosophy, the study adopts a quantitative approach to empirically test the relationships between price fluctuation and its potential determinants, namely paddy supply, paddy quality, harvesting area, and government policies. These variables were selected based on a thorough review of theoretical frameworks and empirical studies, which emphasize their relevance to agricultural price volatility. The study also incorporates farmer perspectives, recognizing that understanding stakeholder experiences is essential for formulating practical policy recommendations. The significance of this research lies in its potential to inform both policymakers and agricultural practitioners about the specific factors that exacerbate or mitigate price volatility in a key rice-producing district. By identifying the most influential drivers of paddy price fluctuations, the study provides evidence-based insights that can guide the development of targeted policy measures, supply chain improvements, and support programs tailored to the local context. This is particularly important for ensuring the economic sustainability of paddy farming households, enhancing food security, and promoting rural development in Sri Lanka. The research also contributes to the academic literature on agricultural price volatility by offering a detailed, district-level analysis in a developing country context, where market imperfections, infrastructural challenges, and policy interventions often interact in complex ways.

2. Methodology

The study adopted a quantitative, cross-sectional, and explanatory research design to investigate the factors affecting paddy price fluctuation in the Polonnaruwa District of Sri Lanka. Grounded in the positivist research philosophy, which emphasizes objectivity and empirical analysis, the study employed a deductive approach to test hypotheses developed from theoretical and empirical literature.

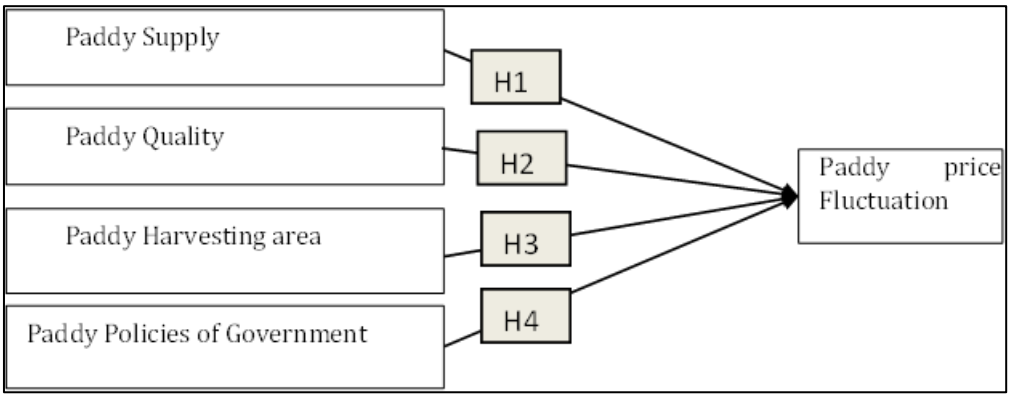

Figure 1 Conceptual Framework of the study

The conceptual framework of the study is presented in the Figure 1 and the paddy supply, paddy quality, harvesting area, and government policies are considered as the key independent variables influencing paddy price fluctuation. The target population included approximately 50,000 paddy farmers in the Polonnaruwa District, and a non-probability quota sampling technique was used to select a representative sample of 250 farmers based on specific characteristics such as geographic location, farming experience, and scale of operations. Data were collected using a structured questionnaire designed in both Sinhala and English, comprising three sections: demographic information, indicators for independent variables, and items measuring the dependent variable—paddy price fluctuation. All variables were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The instrument's

validity was ensured through expert reviews and a pilot study, while construct validity was tested using factor analysis techniques such as KMO and Bartlett's tests. Reliability was confirmed using Cronbach's Alpha coefficients, with all constructs demonstrating acceptable internal consistency ($\alpha > 0.70$). Data analysis was conducted using SPSS Version 24, incorporating descriptive statistics, correlation analysis, and multiple regression techniques to evaluate the relationships among variables and to test the hypotheses.

3. Results and Discussion

3.1. Frequency analysis

Table 1 presents the demographic profile of the respondents involved in the study on factors affecting the fluctuation of paddy prices in the Polonnaruwa District of Sri Lanka.

Table 1 Frequency Analysis

Factor	Frequency	Percentage
Gender		
Male	206	82.4
Female	44	17.6
Age		
Below 25	17	6.8
26-35	25	10.0
36-45	99	39.6
Above 45	109	43.6
Marital Status		
Unmarried	25	10.0
Married	225	90.0
Experience		
06-10	27	10.8
11-15	82	32.8
16-20	96	38.4
More than 20	45	18.0

The majority of respondents are male, accounting for 82.4% (206 individuals), while females represent only 17.6% (44 individuals), indicating a predominantly male participant group. Regarding age distribution, most respondents fall within the middle-aged and older categories, with 39.6% aged between 36 and 45 years and 43.6% above 45 years, together making up over 80% of the sample. This suggests that experienced adults are primarily engaged in paddy-related activities in the district. In terms of marital status, a significant majority (90%) of respondents are married, implying that family responsibilities may play a role in their economic decisions concerning paddy cultivation and price considerations. The experience factor shows that most respondents possess considerable knowledge of the sector, with 32.8% having 11 to 15 years of experience, 38.4% with 16 to 20 years, and 18% having more than 20 years of experience. This high level of expertise among respondents provides valuable insights into the dynamics of paddy price fluctuations in the area.

3.2. Descriptive Analysis

Table 2 provides the descriptive statistics of farmers' perceptions regarding the factors influencing paddy price fluctuation in the Polonnaruwa District.

Table 2 Descriptive Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Paddy Supply	250	1.00	5.00	3.5520	0.76085
Paddy Quality	250	1.60	5.00	3.4632	0.66972
Paddy Harvesting Area	250	1.60	4.80	3.4136	0.64551
Paddy Polices of Government	250	1.00	5.00	3.3104	0.83477
Paddy Price Fluctuation	250	1.00	5.00	3.0704	0.88040
Valid N (listwise)	250				

Among the variables, Paddy Supply appears twice with mean scores of 3.5520 and 3.4632, indicating that farmers generally agree that supply plays a significant role in price changes. The relatively low standard deviations (0.76085 and 0.66972) suggest that responses were moderately consistent across participants. The Paddy Harvesting Area variable has a mean of 3.4136, showing that location-related factors, such as access to markets and transport facilities, are moderately influential in determining paddy prices. Its standard deviation (0.64551) indicates a relatively uniform agreement among respondents. The Paddy Policies of Government received a mean score of 3.3104, reflecting a more neutral but slightly positive perception of how government interventions influence price fluctuations. However, the relatively higher standard deviation (0.83477) implies that opinions varied widely, likely due to inconsistent policy implementation or uneven access to benefits. Finally, Paddy Price Fluctuation itself has the lowest mean score at 3.0704, suggesting that while price instability is recognized by farmers, perceptions vary significantly, as indicated by the highest standard deviation (0.88040). This variation reflects the diverse experiences of farmers in terms of exposure to market volatility and government support. Overall, the table supports the main finding that all variables are perceived as relevant to paddy price fluctuation, with noticeable differences in how strongly each factor is felt across the farming community.

3.3. Correlation Analysis

The table presents the Pearson correlation values and significance levels for the relationship between selected variables and paddy price fluctuation.

Table 3 Correlation Analysis

Variable	Pearson Correlation value	Sig. Value
Paddy Supply	0.548**	0.000
Paddy Quality	0.305**	0.000
Paddy Harvesting Area	0.696**	0.000
Paddy Polices of Government	0.900**	0.000

All variables show statistically significant positive correlations at the 0.01 level, indicating that they are meaningfully associated with price changes. Paddy supply demonstrates a moderate positive correlation with paddy price fluctuation ($r = 0.548$, $p = 0.000$). A second measure of paddy quality, possibly reflecting a different dimension such as consistency or accessibility, shows a weaker but still significant correlation ($r = 0.305$, $p = 0.000$), indicating a less pronounced but relevant influence. The paddy harvesting area exhibits a strong positive correlation ($r = 0.696$, $p = 0.000$), highlighting the importance of geographic and logistical factors in shaping price behavior. Most notably, government policies show a very strong correlation with paddy price fluctuation ($r = 0.900$, $p = 0.000$), underscoring the critical role of state interventions, price controls, and regulatory frameworks in driving market stability or volatility. Overall, the findings confirm that while all examined variables influence paddy price fluctuation, government policy and harvesting location are the most impactful factors in the Polonnaruwa District.

3.4. Regression Analysis

The regression analysis examined the combined influence of paddy supply, harvesting area, and government policies on paddy price fluctuation in the Polonnaruwa District.

Table 4 Model Summary

Multiple R	**0.775**
R Square	0.600 (60%)
Adjusted R square	0.592
Standard Error	0.35694
Observations (N)	250
F	71913.339
Sig.	0.000

The model produced a Multiple R value of 0.775, indicating a strong positive correlation between the observed and predicted values of paddy price fluctuation. The R Square value of 0.600 suggests that 60% of the variance in paddy price fluctuation can be explained by the four independent variables included in the model. The Adjusted R Square (0.592) accounts for the number of predictors and confirms a high degree of explanatory power, even after adjusting for sample size. The model's F-statistic (F = 71,913.339) is highly significant (p = 0.000), indicating that the regression model is statistically valid and provides a good fit to the data.

Table 5 Coefficients

Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	Std. Error	Beta		
1	(Constant)	1.003	0.010		6.286	0.001
	Paddy Supply	0.408	0.040	0.508	3.192	0.002
	Paddy Quality	0.300	0.030	0.400	2.121	0.009
	Paddy Harvesting Area	0.502	0.040	0.500	2.479	0.006
	Paddy Polices of Government	0.991	0.050	0.994	350.110	0.000
a. Dependent Variable: Paddy Price Fluctuation						

Looking at individual predictors, government policy emerged as the most influential variable with a very high standardized coefficient (Beta = 0.994) and a highly significant p-value (p = 0.000), meaning changes in policy have the strongest effect on paddy price fluctuation. Accordingly, the regression results validate the conceptual model by showing that government policies, paddy supply, paddy quality, and harvesting area are all statistically significant predictors of paddy price fluctuation, with government intervention having the most substantial impact**.** The findings of this study provide important insights into the factors influencing paddy price fluctuations in the Polonnaruwa District. The demographic profile shows that most respondents are experienced, middle-aged to older male farmers who are predominantly married. This reflects the typical profile of those involved in paddy farming in the region, and their perceptions offer valuable understanding of the market forces at play. Descriptive statistics reveal that farmers generally view paddy supply as a key factor affecting price fluctuations. The consistency of responses indicates a shared recognition that changes in the quantity and availability of paddy significantly impact prices. The paddy harvesting area also plays a moderate role, suggesting that geographic location and access to markets influence price behavior through logistics and infrastructure. Government policies receive a slightly less strong but still meaningful level of attention, with more varied opinions among respondents. This suggests that experiences with policy measures differ, likely due to inconsistent application or unequal access to support programs. The varied perceptions of price fluctuation itself highlight the complex and diverse experiences of farmers regarding market volatility. Correlation analysis confirms positive and statistically significant relationships between all studied variables and paddy price fluctuation. Among these, government policies show the strongest association, indicating their crucial role in either stabilizing or causing volatility in the paddy market. The strong link between harvesting area and price fluctuation emphasizes the importance of location-based factors such as transport infrastructure and market proximity. Moderate correlations with paddy supply further affirm that supply-side dynamics are key contributors to price changes. Regression analysis highlights that paddy supply, harvesting area, and government policies collectively explain 60% of the variation in paddy price

fluctuations, demonstrating a robust explanatory model. Government policy stands out as the most influential factor, having the greatest impact on price stability. Both dimensions of paddy supply included in the model significantly affect price behavior, indicating that quantity, reliability, and accessibility of supply are important. The effect of harvesting area confirms the role of logistical and infrastructural factors in shaping price outcomes. In summary, the results suggest that although several factors influence paddy price fluctuations, government intervention is the most critical, that comply with the findings of other studies (Gunawardana & Oczkowski, 1992: Ibrahim & Alam, 2016). Effective policy design and implementation are essential to stabilize prices and support the livelihoods of farmers (Hassan, 2024: Srinatha et al., 2024). Additionally, improving supply chain logistics and ensuring stable and adequate paddy supply can further enhance market stability. These findings offer valuable guidance for policymakers and stakeholders working to strengthen the agricultural economy of the district.

4. Conclusion and Recommendations

This study investigated the key factors affecting paddy price fluctuations in the Polonnaruwa District of Sri Lanka using a quantitative and explanatory research design. The analysis revealed that paddy supply, harvesting area, and government policies are significant determinants of price variability, together explaining 60% of the changes in paddy prices. Among these, government policies emerged as the most influential factor, highlighting the crucial role that effective and consistent policy interventions play in stabilizing the paddy market. The demographic profile of respondents—primarily experienced, middle-aged to older male farmers—adds context to the findings, reflecting the core group involved in paddy cultivation and their perspectives on market dynamics. The results underscore the complex interaction between supply factors, geographic conditions, and policy frameworks in influencing price fluctuations. These insights provide valuable empirical evidence for policymakers and agricultural stakeholders aiming to reduce price volatility, support farmers' livelihoods, and promote food security in the region. To enhance the stability of paddy prices, it is recommended that government agencies strengthen the implementation of agricultural policies. Clear, consistent, and transparent policy measures should be developed and effectively communicated to ensure that all farmers benefit equitably. Improving the reach and enforcement of these policies will be critical to minimizing market uncertainty and supporting price stability. Additionally, efforts should focus on stabilizing and increasing paddy supply through better supply chain management. Investments in modern agricultural practices, improved access to quality inputs such as seeds and fertilizers, and timely extension services will help reduce supply-related risks and contribute to more stable market conditions. Infrastructure development is also essential. Upgrading rural roads, enhancing storage and transportation facilities, and improving market access will enable farmers to reach broader markets efficiently and reduce transaction costs. Such improvements can positively impact price stability by smoothing supply disruptions and improving the bargaining power of producers. Capacity building initiatives for farmers are recommended to improve their understanding of market trends, pricing mechanisms, and available government support schemes. Educating farmers will empower them to make informed production and marketing decisions, helping them adapt better to price fluctuations and economic shocks. Finally, future research should explore additional factors that may influence paddy price volatility, such as climatic changes, global commodity prices, and input cost variations. A broader investigation will provide a more comprehensive understanding and guide the development of targeted strategies to enhance the resilience of the paddy market in Sri Lanka.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Ahmed, Z., Kadir, A., Alam, R., & Laskor, M. A. H. (2025). The impact of staple crop price instability and fragmented policy on food security and sustainable development: a case study from Bangladesh. *Discover Sustainability*, *6*(1), 79.

[2] Bandara, P. B., Samaraweera, G. C., & Gunawardana, T. S. L. W. (2023). Does guaranteed price regulate the market price of paddy in Sri Lanka? Sri Lanka Journal of Economic Research, 11(2), 1–18.

[3] Bishwajit, G., Sarker, S., Kpoghomou, M. A., Gao, H., Jun, L., Yin, D., & Ghosh, S. (2013). Self-sufficiency in rice and food security: a South Asian perspective. *Agriculture & Food Security*, *2*(1), 10.

[4] Coclanis, P. A., & Stewart, M. A. (2011). Precarious paddies: the uncertain, unstable, and insecure lives of rice farmers in the Mekong Delta. In *Environmental change and agricultural sustainability in the Mekong Delta* (pp. 103-114). Dordrecht: Springer Netherlands.

[5] Dharmasena, P. B. (2010). Traditional rice farming in Sri Lanka. *Economic review*, *36*(1&2), 48-53.

[6] Fadilah, R. P., Widayanti, S., & Hendrarini, H. (2025). Impact of Rice Price Fluctuations on the Welfare of Paddy Farmers. *Jurnal Teknik Pertanian Lampung (Journal of Agricultural Engineering)*, *14*(4), 1369-1381.

[7] Ganesahmoorthy, K. (2016). An Investigation of the Factor Affecting on Paddy Production. *International Journal of Research*, *3*(13), 172-175.

[8] Gunawardana, P. J., & Oczkowski, E. A. (1992). Government policies and agricultural supply response: Paddy in Sri Lanka. *Journal of Agricultural Economics*, *43*(2), 231-242.

[9] Hassan, B. (2024). The Impact of Agricultural Policy on Global Food Security. *Frontiers in Agriculture*, *1*(2), 325-355.

[10] Ibrahim, A. Z., & Alam, M. M. (2016). Climatic changes, government interventions, and paddy production: an empirical study of the Muda irrigation area in Malaysia. *International Journal of Agricultural Resources, Governance and Ecology*, *12*(3), 292-304.

[11] Jain, A. (2018). Analysis of growth and instability in area, production, yield and price of rice in India. *Social change and development*, *15*(2), 46-66.

[12] Jain, A. (2018). Analysis of growth and instability in area, production, yield and price of rice in India. *Social change and development*, *15*(2), 46-66.

[13] Kumare, S. T., Perke, D. S., & Rede, G. D. (2022). Market integration and seasonal prices of paddy: An economic analysis. *Economic Affairs*, *67*(4), 407-413.

[14] Kuruppu, I. V. (2017). Consumer Preference and Price Behavior Analysis for Selected Rice Varieties in Sri Lanka. *Applied Economics & Business*, *1*(1).

[15] Prasad, R., Shivay, Y. S., & Kumar, D. (2017). Current status, challenges, and opportunities in rice production. *Rice production worldwide*, 1-32.

[16] Rahman, S. (2021). INVESTIGATING PROSPECTS OF RICE MARKET AND FACTORS AFFECTING PRICE FLUCTUATION OF RICE IN BANGLADESH. *International Journal of Information, Business and Management*, *13*(3), 64-78.

[17] Rathnayake, R. M. A. K., & Amaratunge, S. P. P. (2016). An analysis of the technical and allocative efficiency of paddy farming: the case of Mahaweli System H. Sri Lanka Journal of Economic Research, 4(1), 35–57.

[18] Srinatha, T. N., Abhishek, G. J., Pramod, K., & Aravinda, B. J. (2024). Agricultural Policy Reforms and their Effects on Smallholder Farmers: A Comprehensive Review. *Arch. Curr. Res. Int*, *24*, 467-474.

[19] Thakur, A. N. (2025). Impact of socio-economic factors on agricultural prices: A Case study of paddy cultivation in India. *The Indian Economic Journal*, *73*(4), 618-638.

[20] Wibowo, R. P., Pebriyani, D., & Indriyanti, T. (2025). Analysis of Rice Price Volatility in Medan City, Indonesia. *Agro Bali: Agricultural Journal*, *8*(1), 291-302.

[21] Wijesooriya, N., Champika, J., Priyadharshana, D., & Vidanapathirana, R. (2017). *Government Intervention in Paddy Marketing: Issues in Purchasing and Post-stock Management*. Hector Kobbekaduwa Agrarian Research and Training Institute.

[22] Xin, F., Xiao, X., Dong, J., Zhang, G., Zhang, Y., Wu, X., ... & Li, B. (2020). Large increases of paddy rice area, gross primary production, and grain production in Northeast China during 2000–2017. *Science of the Total Environment*, *711*, 135183.

[23] Yanti, M. E., As'ad, O. A., & Sibuea, F. A. (2021). Economic Factors Affecting Rice Price Fluctuation in North Sumatera. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, *4*(2), 2277-2285.