



Rice Farmers' Rationality and Adaptation to Double Pressure: Input Price Increases and Grain Price Fluctuations in Indramayu Regency

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Abstract:

Background: Indramayu Regency contributes significantly to rice production, facing a serious challenge, namely double pressure. Increase in production input prices (seeds, fertilizers, pesticides, labor) and fluctuations in grain prices that tend to suppress profit margins.

This study aims to explore the form of farmers' rationality to the influence of double pressure and identify the adaptations applied by farmers in managing risks and responding to realities in the field.

Method: A descriptive qualitative approach of data collected through in-depth interviews, observations, and documentation in five main sub-districts, and then analyzed with Miles and Huberman's interactive model with source triangulation techniques to strengthen the validity of the data.

Results: Indicate that profit-loss calculations, limited access to production resources, local social networks, and historical farming experience contextually influence farmers' rationality. Farmer adaptation also reveals the emergence of ecological and institutional dimensions, which are grounded in local experiences and community innovation.

Conclusion, farmers in Indramayu not only survive but also transform the face of double pressures, demonstrating complex rationality and multidimensional adaptation.

Keywords: Farmer Rationality, Adaptation, Double Pressure, Input Prices, Grain Price Fluctuations.



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INTRODUCTION

Indramayu Regency is the most enormous rice barn in West Java, with a rice field area of 114,000 hectares, and contributes to rice production by 10.81% (Permana et al., 2020). The high rice production in Indramayu Regency poses a potential challenge to various factors that affect the productivity and welfare of farmers. One of the biggest challenges is the conversion of rice fields to non-agricultural land. Data from the Ministry of Agrarian and Spatial Planning (ATR) indicate that Indramayu Regency has undergone a conversion of rice fields at an average rate of around 1,000 hectares per year. This process reduces the area of productive land, which ultimately threatens the future rice production capacity.

The phenomenon of "double pressure" is the most relevant issue in the context of the challenges faced by rice farmers in Indramayu Regency. This phenomenon refers to pressure from two sides: an increase in input prices and volatile fluctuations in grain prices. Increases in input prices, such as increases in fertilizer prices, subsidies that are not on target, limited stocks, climate change, pests, and limited agricultural materials, disrupt agricultural welfare and productivity (Khamimiya, 2023). In addition to the increase in input costs, rice farmers in Indramayu Regency also face unstable fluctuations in grain prices.

Fluctuations in grain prices tend to decrease during the harvest period due to excess supply in the market. On the other hand, during the famine season, the price of grain increases, but farmers cannot take advantage of it because their stocks have been sold out early. Although the government has implemented the Government Purchase Price (GPP) policy through Bulog, its implementation in the field still faces obstacles. Farmers often face difficulties accessing Bulog's purchase scheme, and the purchase process does not always proceed optimally.

This condition results in farmers, as actors, having to make decisions. Farmers' rationality enables them to maximize their self-sufficiency by selecting the most efficient and reasonable inputs, ensuring production continuity, and achieving maximum economic benefits. (Khamimiya, 2023). In the aspect of rationality, farmers as social actors who respond to double pressure have not been discussed in an ongoing manner. Most previous research has focused on economic aspects without examining the socio-economic decision-making dynamics of farmers in the context of dual pressure.

This study employs a descriptive qualitative approach to explore the nature of farmers' rationality in response to the influence of double pressure and to identify the adaptations farmers apply in managing risks and responding to the realities in the field.

LITERATURE REVIEW

Theory of Rationality

Rationality in agriculture refers to the actions or decisions of farmers that are based on the principles of efficiency and effectiveness to achieve specific goals, both economically, socially, and environmentally. The concept of rationality is integrated based on the theory of rational choice, such as the point of view by Coleman (1991) deep *Foundations of Social Theory* introduces a theory of rational action that establishes the individual as an actor who acts consciously to achieve a goal through the calculation of profit and loss. This theory emphasizes the significance of understanding the connections between individual actions at the micro level and their influence on social structures at the macro level through micro-macro transition mechanisms.

Coleman emphasized the role of social capital as a facilitator of rational action, which is supported by the existence of farmer groups, fertilizer distribution networks, and local community support, thereby strengthening farmers' adaptive capacity in the face of economic pressures. Study results Yair (2008) Adding that local norms, beliefs, and social networks shape farmers' choices in agricultural practices. Coleman's theory of rationality in this study suggests that farmers' decisions are influenced by a combination of individual interests and strong social influences within the agricultural environment, rather than solely by economic calculations.

Adaptation Theory

Adaptation is interpreted as a process of a series of actions by farmers to adjust their farming practices in response to external challenges, such as climate change, land degradation, and fluctuations in market prices. Adaptation theory was developed by Bennett (1978). It provides a conceptual foundation for understanding the active and rational response of humans to the environmental dynamics that change both physically, socially, and economically. Bennett divides adaptation into three main dimensions: behavioral, strategic, and process adaptation. Behavioral adaptation grows from the direct actions of farmers in response to changes, such as adjusting planting times and choosing types of

fertilizers. Strategic adaptation encompasses long-term measures, such as business diversification and more efficient financial management. In contrast, process adaptation emphasizes the importance of collective learning and social interaction among farmers as a source of information and solidarity in responding to pressures.

Study Imansari & Sarmini (2021) Emphasized that innovations and changes in farmworker strategies during the pandemic illustrate the results of the influence of social values and the learning process; group dynamics play an important role in shaping adaptation patterns. The application of Bennett's adaptation theory enables a holistic examination of farmers' decision-making processes and provides an opportunity to analyze the roles of culture, social relations, and learning in the adaptation process.

METHOD

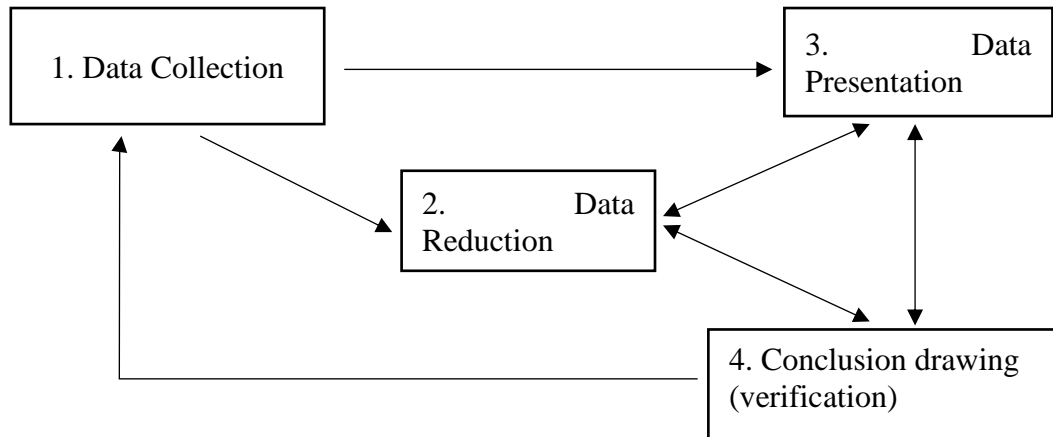
This research was carried out in Indramayu Regency, West Java Province with a research implementation time from May to July 2025. The data for this study were obtained from five sub-districts, as they represent variations in rice farming conditions, including differences in access to production inputs, agricultural systems, land status, and farmers' relationships with the market. The informants selected were 34 farmers, namely 6 Terfill, 6 Sukra, 8 Gantar, 7 Bongas, and 6 Tukdana, as well as 2 representatives from the Food Security and Agriculture Service (DKPP). The approach used is a descriptive, qualitative method with data collection through in-depth interviews. In this study, informants were selected using *purposive sampling techniques, considering the suitability of the set criteria*. The selected informants are called key informants, who are individuals who are considered to have knowledge, experience, and direct involvement that is relevant to the research focus, so that they can provide in-depth and comprehensive information, including:

Table 1. Informant criteria

Yes	Farmer	Service
1	Minimum five years of farming experience	Minimum three years of work experience in the Indramayu area.
2	Faced double pressure	Directly involved in subsidy programs or farmer assistance
3	Status as a land owner, cultivator and farm worker	Playing a role in the planning or evaluation of agricultural policies
4	Have experience accessing and being hampered in agricultural subsidies	Actively interact with farmer groups or gapoktan regarding the dynamics of farming at the local level

Source, 2025 interview results

This study employs the Miles and Huberman interactive analysis model, which comprises three main stages: data reduction, data presentation, and conclusion extraction and verification. This analysis is framed within the theory of rationality by James S. Coleman and the adaptation theory by John W. Bennett. The stages of data analysis are described as follows:



Stages of Data Analysis

In the data reduction stage, **manual coding** is carried out in stages, namely:

- 1) Provision of *open coding* to identify the initial categories of interview transcripts
- 2) *Axial coding* to group categories into main themes
- 3) *Selective coding* to formulate the core findings related to the rationality and adaptation strategies of farmers.

This study uses the source triangulation technique by comparing the information obtained to strengthen the validity of the data. In-depth interviews were conducted not only with farmers as the primary informants, but also with the Indramayu Regency Agriculture Office and field agricultural extension workers. Through this approach, the data obtained from farmers can be strengthened and confirmed through institutional and policy perspectives, allowing for a more comprehensive and in-depth understanding of farmers' rationality and adaptation strategies.

DISCUSSION

Increase in Input Prices

Table 2 indicates an increase in input prices with indicators of seed access and targets, including farmers buying seeds independently, recommendations for superior seeds from the government are difficult to obtain, as well as quota limitations and difficult administration.

To overcome this, the agency also continues to encourage the use of certified seeds, especially new varieties that are more resistant to climate change and attacks by plant pest organisms. The use of superior seeds is the leading choice for farmers to increase plant resistance to pest attacks and uncertain climate impacts (Hakim & Gazali, 2022).

The allocation of fertilizer subsidies in 2024 is smaller than the RDKK submission. The estimated subsidized fertilizer distribution data for 2024 is approximately 14.5 million tons. The subsidized fertilizer allocation is set at 9.55 million tons; however, the actual distribution by Pupuk Indonesia (PI) is only 7.34 million tons, according to PI data. Thus, access to subsidized fertilizers remains limited, insufficient to meet the needs of farmers. Additionally, some farmers lack access to subsidized fertilizers because they are not registered in the RDKK system. Both of these things result in farmers deciding to buy non-subsidized fertilizers.

The high price of subsidized fertilizers triggers farmers to produce organic fertilizers independently. This is in line with Khamimiya (2023) Farmers limit the use of chemical fertilizers and partially replace them with manure as a strategy to save production costs and raise awareness of sustainable agricultural productivity.

Table 2. Results of Analysis of the Condition of Rice Farmers in Indramayu Regency

Yes	Aspects Double Pressure	Condition Analysis Results
1	Increase in Input Prices	
	a. Seed and Target Access	1) Buying seeds independently 2) Using IR64 seeds 3) Using quality local seeds (Inpari 32 jumbo)
	b. Access to Subsidized Fertilizers	1) The availability of subsidized fertilizers is still insufficient 2) Some farmers do not get subsidized fertilizers because they are not registered in the RDKK.
	c. Pesticide Use	1) Excessive use of pesticides and dependence on chemical pesticides 2) Pesticide prices are constantly increasing
	d. Labor Availability	1) Labor availability is increasingly limited 2) Labour wages increase
2	Grain Price Fluctuations	1) HPP 2025 set at 6,500/kg 2) Farmers are still dependent on middlemen 3) Economic pressures and production debt encourage farmers to sell grain directly after harvest

Source, 2025 interview results

In the pesticide use indicator, data were obtained that showed excessive use of chemical pesticides, indicating a dependence on obtaining instant results among farmers. Study results Bakri (2022) Stating that farmers are willing to pay the price for effective pesticides to control plant pest organisms in paddy farming businesses. The high use of pesticides hurts ecosystems and land sustainability. The increase in pesticide prices also increases the burden of production costs and affects profits. In response to this, the agency is gradually promoting a shift towards more environmentally friendly agricultural practices, such as reducing chemical doses, utilizing plant-based pesticides, and implementing integrated pest management.

The availability of agricultural labor is increasingly limited due to labor migration to the non-agricultural sector and a decline in the interest of younger generations in agriculture. According to BPS data from Indramayu Regency, the agricultural sector workforce in 2023 is expected to be 274,970, while in 2024, there will be a decrease of 243 people. These limitations encourage an increase in labor wages, increase the burden of production costs, and prompt farmers to seek alternatives, such as mechanization. The use of agricultural machinery is beginning to expand as a solution. However, it does not entirely address the shortage of human labor, especially for narrow plots or those with limited irrigation. Efforts to build a modern and profitable agricultural image are crucial in attracting the interest of young workers in the village.

Grain Price Fluctuations

Table 2. It shows that the government has set the Government Purchase Price (HPP) of grain at Rp6,500/kg as an effort to maintain price stability at the producer level. Bulog in 2025 will pick up grain directly to the location with the Village Supervisor (Babinsa) and agricultural extension workers through the grain absorption program (Sergab), consisting of absorption in the form of harvested dry grain (GKP), no longer in the form of rice or milled dry grain (GKG). Farmers welcomed this policy positively because it provided an increase in income and a stronger bargaining position for them. This view aligns with the findings (Dewi et al., 2019) that selling agricultural products at a strategic time, such as when prices rise, can maximize income and prevent farmers from incurring losses due to low market prices. The increase in prices has not fully guaranteed the economic needs of farmers. Many farmers in Indramayu believe that the profit margin from harvesting remains fragile,

particularly when it is linked to the rise in the prices of inputs such as seeds, fertilizers, labor, and pesticides.

The reality in the field is that price realization often does not align with the HPP, as farmers still rely on middlemen as their primary sales channel. Although Bulog began to actively purchase grain directly from farmers, farmers preferred to sell to middlemen because of the faster transactions and reduced bureaucracy. Purnomo & Dharmawan (2007) Strengthening the findings that social networks, such as patronage with middlemen or solidarity within farmer groups, have a significant influence on farming strategies. On the other hand, economic pressures and the burden of production debt encourage farmers to sell their crops immediately without waiting for a more favorable price. This condition is understood as a consequence of weak access to formal financing and farmers' dependence on capital loan schemes. The agency began to encourage strengthening access to capital, building village barns, and integrating farmer cooperatives with financing institutions, so that farmers have options other than selling grain in a hurry.

Farmers' Rationality Faces Double Pressure

Table 3. Rice Farmers' Rationality Forms Against Double Pressure (James S. Coleman)

Indicators Rationality	District	Phenomenon	Field Findings	Coleman's Theory	Conformity Field Findings with Coleman's Theory
Actors as decision-makers	Tukdana	Storing harvested seeds	Farmers save seeds from previous harvests for the next growing season	Economic & Social: Rationality is shaped by the structural limitations of access to certified seeds and cost efficiency	Farmers do not simply act out of tradition, but based on trust in the quality of their own seeds and the calculation of profit and loss
Resource utilization available	Gantar and Filled	Transition to semi-organic pesticides	Farmers start mixing organic pesticides with chemicals for efficiency	Functional: Rationality based on long-term calculations of sustainability and production efficiency	Farmers are beginning to form a rational ecological pattern, weighing the long-term costs and the impact on the environment

	Bongas	Stick to using chemical pesticides	Farmers use chemical pesticides because they are considered the most effective even though they are expensive	Functional: Farmers choose inputs that provide maximum yield despite increasing costs	Preference for crop success over cost efficiency
Utilization of labor and technology	Gantar, Terfill, Bongas, Tukdana and Sukra	Using a <i>combine harvester</i> during harvesting	Farmers hire <i>combine harvesters</i> due to the lack of local labor and reduce production costs	Technology: Rationality based on time and energy efficiency, within the limits of reduced labor structure.	Farmers choose cost efficiency and respond to the agricultural workforce regeneration crisis
	Gantar, Terfill, Bongas, Tukdana and Sukra	Using human labor	Using a wholesale system due to high labor availability.	Adapting strategies to the limitations of modern technology	Prioritizing social elements (traditions) for common well-being
Crop sales decisions	Gantar, Terfill, Bongas, Tukdana and Sukra	Farmers sell grain directly to post-harvest middlemen	All farmers choose to sell grain to middlemen because of urgent needs and production debts	Practical: Micro-actions based on rational calculations of individuals to meet short-term economic needs; market structure urges decisions	Farmers' rationality is not merely irrational or forced but a pragmatic strategy that takes into account the security of liquidity and the speed of transactions
	Gantar and Filled	Postponement of grain sales for higher prices	Farmers who have capital reserves can save and postpone selling until prices rise.	Strategic: Resource-based rationality and market risk analysis	Farmers' rationality depends on access to assets such as warehouses and working capital, not just willpower or knowledge
Institutions and social networks	Gantar, Filled, and Sukra	Formation of cooperative	Farmers began to unite their aspirations to	Institutional: <i>Micro-macro</i> transitions:	Rationality extends from the individual to the

		s and partnership initiatives with BULOG	form cooperatives for fair market access	The collective actions of farmers result in changes in local social structures and market bargaining positions	collective, proving that the calculations of farmers also take into account common interests
	Gantar, Terfill, Bongas, Tukdana and Sukra	Digital access to grain and input prices	Farmers use WhatsApp, Facebook, and digital farmer groups to determine the time to sell grain.	Social: Digital social structures provide new rational opportunities for farmers to make decisions based on actual information	Information-based rationality emerged as a new form of adaptation to the market, increasing the economic literacy of farmers.

Source, 2025 interview results

The rationality of rice farmers in responding to the dual pressures of rising input prices and fluctuations in grain prices is not solely based on individual economic logic. However, it is also strongly influenced by social structures and collective resources. Farmers' rationality is not only influenced by profit-loss calculations, but these findings enrich James S. Coleman's theory by showing that farmers' rational actions are not only dependent on economic motives but are also influenced by group norms, social relations, and access to public policy. In addition, the use of digital technology as a decision-making tool reflects a new form of rationality based on information and social networks.

Farmers' Adaptation to Face Double Pressures

Table 4. Farmers' Adaptation Forms to Face Double Pressures (John W Benneth)

Adaptation Indicators	Adaptation	District	Phenomena That Occur	Theory Explanation	Compatibility of Phenomena with Theory
Behaviour	Reduce the dose of fertilizer & combine it with organic	Filled, Tukdana	Fertilizer prices are expensive, farmers combine chemical	Immediate response to keep costs down & maintain fertility	Local knowledge-based adaptation without outside intervention

			fertilizers with organic fertilizers		
	Using social media (WA, Facebook)	Gantar, Bongas	Farmers are actively looking for price and weather information through online groups	Information technology innovations for decision-making	Emergence of an informal digital ecosystem between village farmers
	Stick to using chemical pesticides	Bongas, Gantar	The high price of pesticides encourages farmers to obtain pesticides on credit.	Rational calculation between crop failure risk vs credit	Adaptation trade-off: prioritise results even when debt burden increases
	Keep your own seeds	All sub-districts	Access to certified seeds is difficult, farmers store harvested seeds	Input autonomy, adaptation to distribution structure	Self-reproduction of seeds as a form of local resistance
	Selling gold	Bongas and Squirt	Urgent input costs reflect a quick reaction to cover costs.	Aligned action as a direct action against economic disruption.	Household-based financial adaptation strategy
Strategic	Planting Legowo Rows	All sub-districts	Planting pattern changed for fertilizer & water efficiency	Long-term efficiencies in resource management	Efficient practices based on experience, not formal programs
	Eco-friendly agriculture	Sukra	Using straw compost to avoid chemical fertilizers	Long-term ecological and economic investment	Ecological awareness grows from experience, not extension
	Forms of farmer cooperatives	Filled, Sukra	Farmers initiate cooperatives for input access and milling	Collectively strengthening market bargaining position	Cooperatives are formed independently, not formally
	Make your own semi-organic pesticides	Gantar, Filled	Farmers are formulating semi-organic pesticides from local ingredients to	Substitution of expensive technology with local innovation	Ecological innovation based on local ingredients, cheap and effective

			reduce input costs		
	Borrowing from a bank	Filled and Sukra	Medium-term planning faces economic risks	Risk Management and Sustainability of Farming	Connections with formal institutions.
Process	Farming & Storage Training	Filled, Gantar, Sukra	Cooperative and post-harvest management training	Increased capacity for long-term durability	Transformation of farmers into business actors and post-harvest managers
	Activate farmer groups	Filled, Gantar, Sukra	Reactivation of farmer groups for info and programs	Social solidarity as the foundation of institutional adaptation	Farmer groups are active as local information and advocacy centers
	Village deliberation on fertilizer and planting	Gantar, Bongas	Farmers have a role in making decisions on fertilizer distribution and planting schedules	Institutional participation in decision-making	Adaptation through village politics for input control

Source, Interview Results 2025

The adaptation of farmers in Indramayu is not only in the form of a reaction to the crisis, but also shows a reflective and long-term strategy, both technically, institutionally, and socially. Theoretical *John W. Bennett (1978)* affirms that farmer adaptation is not passive, but rather a conscious action shaped by local experience, access to information, and the collective value of the community. New findings include:

- e. Local innovation of semi-organic pesticides
- f. Self-reproduction of seeds,
- g. A farmer-based digital information ecosystem, and
- h. Activation of farmer groups without formal intervention.

CONCLUSION

1. Farmers' rationality is not singular and linear, but is built from a combination of profit-loss calculations, limited access to production resources, local social networks, and historical experience in farming. Actions such as storing crop seeds, using semi-organic pesticides, and selling grain quickly to middlemen are not purely spontaneous

actions, but decisions based on efficiency, affordability, and the structural conditions of the market faced.

2. Farmer adaptation shows the emergence of ecological and institutional dimensions, which are based on local experiences and community innovation. Farmers play the role not only of passive economic actors, but also as agents of change who are able to respond to dual pressures with community-based innovation, demonstrating the capacity to adapt reflectively, collectively, and sustainably.

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