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Risk Mitigation Strategies for Rice Marketing in Kendari City

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Abstract

This study aims to analyze price risk in rice marketing and to analyze mitigation strategies for rice price risk in Kendari City. The research area was determined purposively based on the consideration that the location is closer to where I live. Respondents consisted of 25 people. Data analysis using Fuzzy FMEA analysis. The results showed that there are five sources of price risk in rice marketing. Namely, delays in product production, market demand that occurs if market demand does not match the stock of rice produced, increases in grain prices, large stocks of products that have not been sold out and then experience rising prices due to harvest season increases and, products sold have similar competing products. This research also shows that the mitigation strategy for each source of price risk in rice marketing is routine and scheduled machine maintenance, making supplies that allow the Company to meet demand, product promotion, finding new markets, and expanding the distribution of customer service quality, and utilizing social media to interact with customers.

Keywords: fuzzy fmea, price, rice, risk mitigation, strategy.

INTRODUCTION

The agricultural sector has an important role in improving the economy in Indonesia, which is known as an agrarian country with vast land that can be utilized by the community for livelihoods. Apart from being a source of livelihood, this sector also contributes significantly to the Indonesian economy, as stated by Kusumaningrum (2019). The potential availability of food diversity in Indonesia is very large, especially from carbohydrate sources such as sweet potatoes, rice, corn, and cassava which have high productivity. Food products also have the potential for diversification, diverse nutritional content, and increasing market demand at local,

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regional and export levels (Supardi and Aries, 2017). The food crop subsector is the largest contributor because it produces staple food for most of the population, making Indonesia one of the countries that grow various types of plants as a source of food (Danisa, et al., 2023).

The most important food crop commodity in Indonesia's agricultural development is rice, which is the staple food for almost the entire population. Rice not only has a strategic role in economic, social, cultural, environmental and political aspects, but also as a source of income for farmers and a necessity of life for millions of people. The irreplaceable existence of rice makes it an important political commodity that must be available in sufficient quantities (Purbaningsih, et al., 2021). In addition, rice is a vital commodity in Indonesia's food structure, given its role as the main source of nutrition and the growing needs of the population, which is influenced by the introduction of rice consumption to the non-rice-consuming community, so the demand for rice continues to increase throughout the year (Jiuhardi, 2023).

Previous research related to risk mitigation in production processes and supply chains shows various strategies that are effective in identifying and handling risks. Yahman et al. (2020) examined mitigation strategies in the rice production process using Failure Mode Effect Analysis (FMEA), Fuzzy Logic, and Analytical Hierarchy Process (AHP), with the findings that the highest risks are in rice buyer competitors and machine damage. Irawan et al. (2017) focused research on the production of tempeh chips, where the highest risks were fluctuations in soybean raw material prices, product quality, and uncertain demand. Wardhana (2018) examined the risk mitigation of takwa tofu marketing, focusing on strategies such as price discounts and additional transportation fleets to overcome the risk of competitors and product affordability. Fausayana and Abdullah (2018) mapped risks in coconut palm sugar production, finding that the highest risk was delayed growth of coconut flowers. Naafila et al. (2023) used the Fuzzy AHP method to analyze Pameling avocado supply chain risks, with risk mitigation priorities on land conditions and product quality. Guritno et al. (2018) identified the risk of pest infestation in the rice supply chain, which could affect the supply and quality of rice, and suggested partnerships between farmers and middlemen to mitigate risks at the on-farm and sales stages. These studies highlight the importance of a systematic approach in identifying risks and formulating appropriate mitigation strategies to maintain the stability and efficiency of production and supply chains.

The significant increase in rice production in Southeast Sulawesi in 2020 indicates a positive development in the agricultural sector, although it declined from 1,189 tons in 2020 to 1,176 tons in 2021, before increasing again to 1,338 tons in 2022, recording an increase of 162 tons. Kendari, as the provincial capital, has the highest rice consumption in Southeast Sulawesi, with 43,552.04 tons in 2019, 44,320.14 tons in 2020, and 45,042.97 tons in 2021 (BPS, 2022).

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The increase in rice production is influenced by the growing population and food industry, as well as rising per capita income, which is expected to increase rice demand in the short term, although not significantly in the long term (Sofia, et al., 2018). Challenges in rice supply sustainability and price stability remain key issues, with rice prices influenced by external factors such as market price fluctuations, government policies, climate conditions, and competition, as well as internal factors such as distribution and supply chains. This price instability affects not only producers and traders, but also consumers, especially those with limited purchasing power. In rice marketing, there are risks that affect rice sales, one of which is the risk of uncompetitive product prices. This can cause the Company's revenue to decrease. Therefore, it is necessary to measure in order to determine and measure risks and determine the determination of strategies that can be carried out to prevent risks or the impact of risks that occur.

METHOD

The population in this study were retailers in Anduonuhu Village, Poasia Subdistrict, Kambu Village, Kambu Subdistrict and Baruga Village, Baruga Subdistrict in Kendari City, totaling 25 people. The data analysis technique used *Fuzzy* FMEA to identify price risks in rice marketing and determine rice price risk mitigation strategies. Measuring existing risks requires consideration of *Severity*, *Occurrence,* and *Detection*. After that, the RPN (*Risk Priority Number*) value or priority risk *number* can be calculated. The identified risks were analyzed descriptively to meet the research objectives, namely as a reinforcement of the findings from the previous analysis in formulating mitigation directions. The *severity* scale is rated from 1 to 10, the greater the impact the greater the number. The *severity* scale can be seen in Table 1.

Table 1 Severity scale

Rating	Category	Severity Level
10	Dangerous	Very high severity When potential risks affect sales without warning
9	Seriously	Very high severity When potential risks affect sales with warnings
8	Very High	Trading processes cannot operate with the risk of causing losses
7	High	The trading process cannot operate with risk.
6	Simply	The trading process cannot operate with little risk.
5	Low	The trading process cannot operate with losses

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4	Very Low	Trading processes can operate with performance experiencing a significant drop in revenue
3	Small	The trading process can operate with some performance degradation
2	Very Small	Trading process can operate with little disruption to the smooth running of the trading process
1	None	No influence on the trading process

Source: Wang *et al*., (2009)

RESULTS AND DISCUSSION

Identify Price Risk

Based on the results of surveys and interviews conducted in-depth with respondents as rice traders in Anduonuhu Village, Kambu Village and Baruga Village, Kendari City, several risks faced by traders in marketing rice products were obtained. Identified price risks in rice marketing can be seen in Table 2.

Table 2 Analysis of Risk Events, Risk Causes, and Risk Impacts

No.	Risk Event	Risk Causes	Risk Impact
1	Under-stocked warehouse products	Unexpected or increased demand and production delays	Decreased availability, insufficient stock
2	Increase in grain price	Changing climatic factors may reduce the quality of grain harvests so that farmers cannot produce enough grain.	Price increase, product quality decline
3	Product production delays	Failure of machinery or production equipment damage or delayed maintenance of machinery can hinder the production process and climate change.	Losing customers, and incurring losses
4	A large stock of products that have not been sold out and then	The buildup of previous stocks of unsold rice stocks from the previous season coupled with new supplies from the harvest season resulted in a	Loss of quality or damage, delayed distribution

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No.	Risk Event	Risk Causes	Risk Impact
	experienced a price drop due to the harvest season rising	significant oversupply.	
5	Large stocks of products that have not been sold out and then experienced price increases due to crop failure season	Overstocking Before the harvest failure season, there is overstocking or overproduction of rice so that each stock is abundant in the market	Reduced profit margins for producers and traders, reduced quality
6	Products sold have similar competing products	The staple need for rice means that demand will always be present and stable and the business opportunity of high demand, encouraging many producers to enter the rice market.	Intense competition can trigger price wars where manufacturers constantly lower prices to attract customers. This can significantly reduce profit margins.
7	Products are sold at market prices and prices are not fixed.	Changes in consumer demand due to seasonal, economic, and government policy factors rice prices.	With uncertainty in revenue and product prices that are not fixed, predicting revenue becomes more difficult as revenue can vary depending on changes in market prices.
8	Limited sales area	Poor transportation infrastructure hinders the distribution of rice to more distant areas.	Long delivery time, increasing the risk of product damage

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No.	Risk Event	Risk Causes	Risk Impact
			during shipment
9	Market demand that occurs when market demand does not match the rice stock produced	Demand for rice may increase during certain seasons such as festivals or holiday seasons, while rice stocks are insufficient to meet this increase.	A mismatch between supply and demand can lead to significant price fluctuations.
10	Product delivery over long distances	Areas with supply shortages may have to import from distant regions to meet needs.	Depending on rice imports can make product availability inconsistent. This can disrupt marketing strategies and cause uncertainty in supply.

Based on Table 2, the causes and consequences of marketing price risks of rice products have been identified. 10 marketing risks have been identified that occur in wholesalers and retailers. These risks are obtained from the source of risk, namely technical risk and market risk. Technical risks are those that occur during product production and internal techniques experienced by business actors, namely insufficient warehouse product stocks, rising grain prices, production delays, large stocks of products that have not been sold out and then experience rising prices due to harvest failure season, large stocks of products that have not been sold out and then experience falling prices due to rising harvest season, limited sales areas and shipping products over long distances. Market risk is a risk caused by changes in market factors, namely the products sold have similar competing products, the products sold follow market prices and product prices are not fixed and product shipments travel long distances.

An example of a drastic drop in income when a bountiful rice harvest causes the price of rice to fall, resulting in a very small net profit. Traders in Baruga Village who had purchased rice stocks at Rp8,500 per kilogram were forced to sell at a fixed price per kilogram to adjust to market prices. This resulted in losses.

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Price Risk in Rice Marketing

The measurement of the risk components of rice marketing in this study uses the Fuzzy FMEA *(Failure Mode Effect Analysis)* method to obtain the risk priority level for each price risk component. The results of the Fuzzy FMEA calculation can be used as a basis for determining handling priorities and risk levels for marketing risk components. The aggregated value of the Fuzzy number weight and the aggregate average of the S, O and D factors can be seen in Table 3.

Table 3 Aggregate Value Weights S, O, and D

Factor	Aggregate Value	Rank
Baruga		
Severity (S)	0,197	0,228
Occurance (O)	0,338	0,391
Detection (D)	0,33	0,382
Kambu		
Severity (S)	0,696	0,345
Occurance (O)	0,729	0,362
Detection (D)	0,59	0,293
Anduonohu		
Severity (S)	0,726	0,442
Occurance (O)	0,553	0,337
Detection (D)	0,363	0,221

In Table 3, the calculation of the weight value is carried out by multiplying the existing Fuzzy numbers with the respondents' importance weights. The value of the importance weights will be used as the rank value for each factor in the FRPN calculation. According to Basjir (2011), each factor has its own weight, in contrast to conventional FMEA which considers all factors to have weights taking into account the relative importance of risk factors and treating them in the same level of importance.

This is in accordance with the opinion of Wang *et al,* (2009) that FMEA shows each factor has its own weight, in contrast to conventional FMEA which assumes all factors have the same weight of importance. Conventional FMEA does not take into account the same. Conventional FMEA does not take into account the relative importance of risk factors and treats them in the

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same level of importance.

Fuzzy Risk Priority Number (FRPN)

In the calculation of the FRPN value of each risk, it is sorted from the largest to the smallest FRPN value. The risk that has the largest FRPN value is the highest ranking. This highest FRPN value indicates that the risk is a potential risk that must be prioritized and then can determine the mitigation strategy. The FRPN value will be calculated based on each village, namely Baruga Village, Kambu Village and Anduonohu Village, Kendari City, Southeast Sulawesi.

Table 4 FRPN Value

No.	Risk	Baruga		Kambu		Anduonohu	
		FRPN	RANK	FRPN	RANK	FRPN	RANK
1	Under-stocked Warehouse Products	0,68	5	1,96	7	2,50	8
2	Increase in grain price	1,02	3*	2,58	5	9,23	3*
3	Product production delays	1,60	1*	2,77	4	12,7	1*
4	Product stocks that are still large have not been sold out and then experienced a price drop due to the harvest season rising	0,19	9	0,80	9	5,84	4
5	Large stocks of products that have not been sold out and then experienced price increases due to crop failure season	0,97	4	4,77	1*	9,31	2*
6	Products sold have similar competing products	0,65	6	3,12	3*	3,42	6
7	Products are sold at market prices and prices are not fixed.	0,51	7	1,94	8	2,49	9
8	Limited sales area	0,16	10	0,58	10	1,04	10
9	Market demand that occurs when market demand does not match the rice stock produced	1,04	2*	3,70	2*	3,35	7
10	Product delivery over long distances	0,44	8	2,38	6	3,61	5

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Based on table 4 above, the researchers can describe it as follows;

1. Based on the results of the FRPN value calculation, each risk is ranked from highest to lowest value to facilitate the determination of risks that need to be addressed. The top three risks have a significant difference with other risks, namely product production delays as the top priority, followed by the mismatch of market demand with rice stocks, and grain price increases. The risk of product production delays, with an FRPN value of 1.60, is caused by damage to outdated and poorly maintained production machinery, which interferes with meeting consumer demand (Khaurullah, 2022). The second risk is fluctuations in market demand that do not match rice stocks, with an FRPN value of 1.04, often occurring during certain seasons such as holidays, triggering supply shortages and price increases (Lihan, 2009). The third risk, with an FRPN value of 1.02, is the increase in grain prices due to climate change that negatively affects the growth of grain crops, ultimately leading to supply instability and price increases in the market.
2. Based on the results from Table 4, the highest risk in Kambu Village is the large stock of rice products that have not been sold out, then experiencing price increases due to harvest failure season, with an FRPN value of (4.77). Overstocking occurs due to excessive rice production, resulting in abundant stocks in the market but not immediately sold. Harvest failure season has a significant impact on rice availability and prices, causing supply imbalances throughout the year (Hakim, 2018). The second risk is the mismatch between market demand and rice stocks with an FRPN value of 3.70, which is often experienced in Baruga Village. Demand for rice may increase while stocks are insufficient, triggering price increases and hardship for consumers (Edison, 2012). The third risk is competition with similar products, with a FRPN value of 3.12. Intense competition in the rice market means traders must compete on price, quality and service to retain customers, and require appropriate strategies to survive in a dynamic market (Adiwijaya, 2009).
3. Based on the results of Table 4, the highest risk in Kelurahan Anduonohu is product production delays with an FRPN value of 12.70, which is similar to the situation in Kelurahan Baruga. These delays are mainly caused by production machinery failure or delayed maintenance, as well as erratic climatic conditions, such as high rainfall or drought, which disrupt the agricultural process and result in delays in rice production (Engkus, 2017). The second risk is overstocking, where product stocks are

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still abundant in the market but not yet sold out, with an FRPN value of 9.31. The increase in rice prices due to harvest failure season exacerbates this situation, causing old stocks to remain unsold and potentially degrade in quality (Lihan, 2009). The third risk is an increase in grain prices with a FRPN value of 9.23, triggered by climate change that negatively affects the quantity and quality of the harvest. This increase in grain prices not only affects farmers who have to face increased production costs, but also impacts traders and consumers, who have to bear the increased cost of purchasing rice.

Price Risk Mitigation Strategies in Rice Marketing

Based on the highest FRPN values in Kelurahan Baruga, Kelurahan Kambu, and Kelurahan Anduonohu, these risks show the potential to cause serious impacts, so appropriate strategies are needed to reduce these risks. Effective decision-making strategies are needed to prevent and mitigate these risks using descriptive analysis methods. This approach allows the identification of key characteristics of rice price risks, such as market fluctuations, and helps formulate appropriate mitigation strategies based on an in-depth understanding of the risks.

1. Product production delays, price risks in rice marketing due to production delays are major challenges for traders. These delays are often caused by machine failure or erratic weather conditions. Yahman (2020) emphasizes the importance of scheduled machine maintenance to prevent breakdowns and ensure optimal operations. In addition, by having multiple suppliers from different regions, merchants can reduce dependence on a single source and maintain supply stability despite disruptions. This strategy helps reduce the risk of production delays and keeps rice prices stable in the market.
2. When market demand does not match the rice stocks produced, the price risk in rice marketing due to the mismatch between market demand and available stocks poses a significant challenge for traders. Demand for rice can increase suddenly, especially during festival or holiday seasons, while insufficient stocks trigger price spikes due to supply shortages, which harms consumers and destabilizes the market. Mukti (2022) emphasizes the importance of inventory control to ensure product availability without relying on suppliers, while Arigan (2012) suggests the government monitor production, supply, and stock to maintain price stability. With this strategy, traders can cope with demand fluctuations and keep rice prices stable in the market.
3. Grain price increases, the price risk in rice marketing due to rising grain prices is a significant challenge for traders. These increases are often caused by climate change that

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damages crops and reduces yields, so grain supply decreases and prices rise, while demand remains high. Nuraisah (2019) stated that climate change increases the frequency of extreme weather, causing crop failures and grain stock vacancies. This not only affects rice prices, but also economic stability in rice-producing areas. Diversifying grain suppliers can be a mitigation strategy to reduce the impact of price increases, by seeking suppliers from more stable regions or with lower production costs.

4. The price risk in rice marketing caused by the accumulation of unsold stock and then experiencing a price increase due to the harvest season increases , Price risk in rice marketing caused by the accumulation of unsold stock and then experiencing a price decrease due to the excess harvest season is a challenge for traders. The oversupply of old stock plus the new harvest causes rice prices to drop as supply exceeds demand, which can be financially detrimental to traders. To overcome this, traders can implement promotional strategies to accelerate the sale of stocks before the next harvest. In addition, market diversification can help mitigate the impact of oversupply by expanding distribution to areas experiencing rice shortages. According to Wijayanti (2011), efficient distribution is essential for managing stocks and keeping prices stable.
5. Price risk in rice marketing due to similar competing products is a challenge for traders, as high demand attracts many producers into the market, creating intense competition. This competition often forces traders to lower selling prices to attract customers, which can reduce profit margins and threaten business sustainability. According to Ulum (2019), traders need to analyze and forecast competition by conducting research to identify competitors' weaknesses. Wibisana (2017) also stated that competitor analysis can reveal strategic threats and opportunities. Traders can offer rice with certain advantages, such as better quality, and build strong relationships with customers. This strategy helps to increase competitiveness and maintain price stability and business continuity.

CONCLUSION

Based on the results of the research, it can be concluded that there are five types of price risks in rice marketing in each Kelurahan. namely in Kelurahan Baruga the types of risks identified are production delays, market demand that occurs if market demand does not match the stock of rice produced, and increases in the price of rice grain. Kambu Village with the type of risk that there are still many stocks of rice products that have not been sold out and then experienced an increase in prices due to an increase in the harvest season, market demand that

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occurs if market demand does not match the stock of rice produced, and products sold have similar competing products. Anduonohu Village with the type of risk of delays in the production of rice products, large stocks of rice products that have not been sold out and then experiencing rising prices due to an increase in the harvest season and an increase in the price of rice grain. The mitigation strategies for each source of risk in rice marketing are routine and scheduled machine maintenance, conducting inventory that allows the company to meet demand. Product promotion, seeking new markets, and expanding distribution. quality customer service and utilizing social media to interact with customers.

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