

i-RIC 2024

INTERNATIONAL RESEARCH & INNOVATION CONFERENCE

PROCEEDING

“HARMONY IN DIVERSITY: FOSTERING UNITY
SUSTAINABLE RESEARCH AND INNOVATION SOCIETY”

24 & 25 JULY
| 20
| 24

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PREFACE

It is a great privilege for us to present the proceedings of the International Research and Innovation Conference (i-RIC 2024) to the authors and delegates. We hope that you will find it useful, exciting, and inspiring. The International Research and Innovation Conference (i-RIC 2024) was held online from 24 to 25 July 2024, organized by Politeknik Nilai in collaboration with Universitas Logistik dan Bisnis Internasional (ULBI) with the theme, “Harmony in Diversity: Fostering Unity Sustainable Research and Innovation Society.”

i-RIC 2024 aims to gather more researchers, students, government agencies, and private sectors in an event with a larger international impact. The organization of this program also serves as a platform for sharing research findings, ideas, and knowledge among members of polytechnics, community colleges, higher education institutions, public universities, as well as government and private agencies involved. Researchers, academics, and experts from various sectors will have a global stage at i-RIC 2024 to discuss the latest findings and research that support sustainable development goals. The conference aims to generate knowledge to make our world greener and better for us and our future generations.

There were 4 keynote speeches covering different areas of the conference. The first day started with Associate Professor Dr. Ir. Agus Purnomo (ULBI Indonesia) talk on "How to Boost Green Supply Chain Resilience?" and Professor Dr. Mohamed Kchaou (University of Bisha, Saudi Arabia; University of Sfax, Tunisia) on "Latex Based Membrane for Oily Wastewater Treatment Technology Process and Perspectives". The second day featured Professor Dr. Recai Kus (Selcuk University, Turkey) on "Load Optimization of AISI 1040 and AISI 5140 Joint" and Dr. Umawathy a/p Technamurthy (Universiti Kebangsaan Malaysia) with her talk on "Harnessing the Potential of Maker Education in Enhancing Student Learning Outcomes".

A total of 124 presenters participated in the parallel presentation sessions, which ran smoothly over the two-day event supported by 109 i-RIC 2024 organizing committees. This included 16 online presentation moderators, 42 reviewers, 19 judges, and all participants who took the time to attend the online sessions. A total of 124 research papers and 56 innovations were presented in this program across 7 fields, namely:

- A. Engineering and Technology
- B. Business Management
- C. Education, Teaching, and Learning
- D. Health and Life Sciences
- E. Social Sciences
- F. Information Communication Technology
- G. Logistics and Supply Chain

Information regarding i-RIC 2024 can be accessed through the Program Book at <https://heyzine.com/flip-book/521619ef82.html> and overall results can be found at <http://iric.polinilai.edu.my/.../confe.../results-innovation>.

We would like to express our heartfelt thanks and sincere appreciation to all the authors for their contributions to this publication. We also express our gratitude and appreciation to all of the reviewers for their constructive feedback on the papers. Warmest thanks to the members of the organizing committee for their hard work and dedication in ensuring the success of the event.

Congratulations to everyone involved in making this conference a success.

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LOGISTICS AND SUPPLY CHAIN MANAGEMENT

**“HARMONY IN DIVERSITY: FOSTERING UNITY
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Challenges and Strategies for Rice Price Stability: A Systematic Review of Supply Chain Dynamics in Indonesia During Critical Periods

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Abstract

This study aims to analyze the challenges of rice price stability in Indonesia, especially during critical periods such as Idul Fitri and other holidays. The main problem faced is rice price instability due to limited supply, surge in demand, and weak anticipation during the holiday period. To evaluate government policies, distribution networks, and production factors that affect rice prices, this study utilizes a logical framework approach. The methodology used includes a systematic review of the literature and analysis of market data. Data were collected from various sources, including government reports, market data, and academic studies. The results show that limited rice supply, spikes in demand during holidays, and weak government anticipation contribute significantly to price instability. The main factors affecting rice prices include high production costs, logistical issues, and international market fluctuations. The role of the National Logistics Agency (Bulog) in managing national rice reserves and stabilizing market prices also proves crucial. This study concludes that early anticipation, coordinated policies, and improved supply chain efficiency are essential to maintain rice price stability. Proposed strategies include agricultural intensification, improved distribution systems, and strategic reserve management. The findings provide valuable insights for policymakers and market players to reduce price volatility and ensure food security in Indonesia in a sustainable manner, particularly in an effort to achieve rice price stabilization in the 2025 Idul Fitri period.

Keywords: Rice Price Stability, Supply Chain, Logical Framework, Price Volatility, Critical Periods

1. Introduction

Rice is a staple food commodity consumed by almost all people on the Asian continent as well as other parts of the world, especially in Asia, Africa and Latin America. As the main source of carbohydrates, rice plays an important role in food security and social stability in many countries (Dhungel & Acharya, 2017). As stated on the Goodstat website, China is one of the countries with a population that has a high interest in consuming rice, which is 160 million tons in 2023 (Khor et al., 2015). In Southeast Asia itself, many countries also consume rice as a staple or source of carbohydrates.

By looking at the results of countries that have the highest indicators in consumption, we can see the involvement of various parties in the supply chain. This supply chain involves several actors, ranging from rice farmers, traders, rice millers, importers, to consumers (Octanica, 2019). These linkages are directly related to various distribution channels, from downstream to upstream. This supply chain is vulnerable to various factors that can hinder operations, such as weather changes, diseases, trade policies, price fluctuations, and public interest in staple foods such as rice (Davis et al., 2021). These factors can negatively impact food security and the global economy when it comes to the quality and price of rice. Based on the described drivers of inflation-inducing fluctuations, effective supply chain management plays an important role in stabilizing rice prices and improving food security (Kalkuhl et al., 2019). Effective supply chain management strategies

reduce disruptions or bottlenecks in the process, increase efficiency, and improve market transparency (Patel, 2023). This impacts all actors in the supply chain, from farmers to end consumers, who benefit in the form of price stability and more secure supply.

Discussing supply chains, a country that also has high complexity is Indonesia. Supply chain actors in Indonesia are very diverse, starting from farmers spreaded throughout the island and have rice granaries in each region (Connor et al., 2023). Indonesia is an Asian country whose culture requires rice consumption (Wijaya, 2019). Many controversies have occurred during the sale of rice in Indonesia related to the previous factors. As well as having a role in national food stability and countries that cooperate in rice imports, one of which is Thailand. The rise in rice prices in Indonesia has been triggered by various interrelated factors. Extreme weather changes such as droughts and floods have disrupted rice production, reduced yields, and increased rice prices due to reduced supply (Sekhar, 2018). In addition, pest and disease attacks on rice plants also reduce yields.

Another contributing factor is government policies related to rice imports, subsidies, and minimum prices that affect the price of rice in the domestic market (Wurdiana, 2019). In addition, rising production costs, such as the price of fertilizers, pesticides, and labour, add to the burden on producers, which in turn is passed on to the selling price of rice. Distribution and logistics issues, such as poor infrastructure and high transportation costs, also add complexity to the supply chain. Furthermore, growing demand as the population grows also puts pressure on rice supply, while price fluctuations in the international market impact domestic prices, especially when Indonesia has to import rice (Linn & Maenhout, 2019).

In recent times, Indonesia has faced various obstacles related to rising rice prices. The main causes of these price increases are usually limited supply and a drastic increase in demand. Rice price increases often occur around national holidays such as Ramadan and Eid al-Fitr (Hamzah, 2022). This phenomenon recurs every year, and is considered normal by the public as it is difficult to avoid. High demand during this period, coupled with weak anticipation of price increases during Eid, causes rice prices to spike. In addition, poor economic conditions also exacerbate the situation. Other factors affecting rice price increases include raw material shortages, problems in the production and distribution process, and government policies. Empty or depleted stocks in regional granaries also contribute to price increases. Therefore, early anticipation and appropriate policies are needed to address this issue.

Based on previous research data, journals that discuss supply-side price instability include *Dynamic Impacts of External Uncertainties on the Stability of the Food Supply Chain: Evidence from China* by (Li & Song, 2022), *Rice Price Formation in the Short Run and the Long Run: The Role of Market Structure in Explaining Volatility* by (Timmer, 2012), and *A Contribution to the Empirics of Food Price Behavior: The Case of Rice Price Dynamics in Italy* by (Barboza et al., 2021). Prices that experience instability are caused by the factors previously described. The study conducted is different from previous research because this research is directly related to a phenomenon that often occurs in Indonesia, namely price increases on certain days or periods. This research will use a method in the form of a rice market stability strategy with a logical framework approach.

In the next section, we will discuss the methods used, results obtained, and conclusions. The methods used will be related to the stability strategy to determine the supply chain dynamics of rice prices. This study will evaluate how government policies, distribution, and production affect

rice prices and identify measures that can be taken to reduce price volatility in the future. The results of this study are expected to provide concrete recommendations for policy makers and market players to maintain rice price stability in Indonesia.

2. Research Methodology

The research method used in the research is a systematic literature review, the method described has a sequence in reviewing, summarizing, and interpreting the findings or phenomena found (Deperiky et al., 2020). The research raised is current issues that have occurred in Indonesia in recent years. The literature used aims to direct the research to avoid mistakes and be subjective. Figure 1 explains that this research is supported by the gap research approach, conceptual and framework developed from the research.

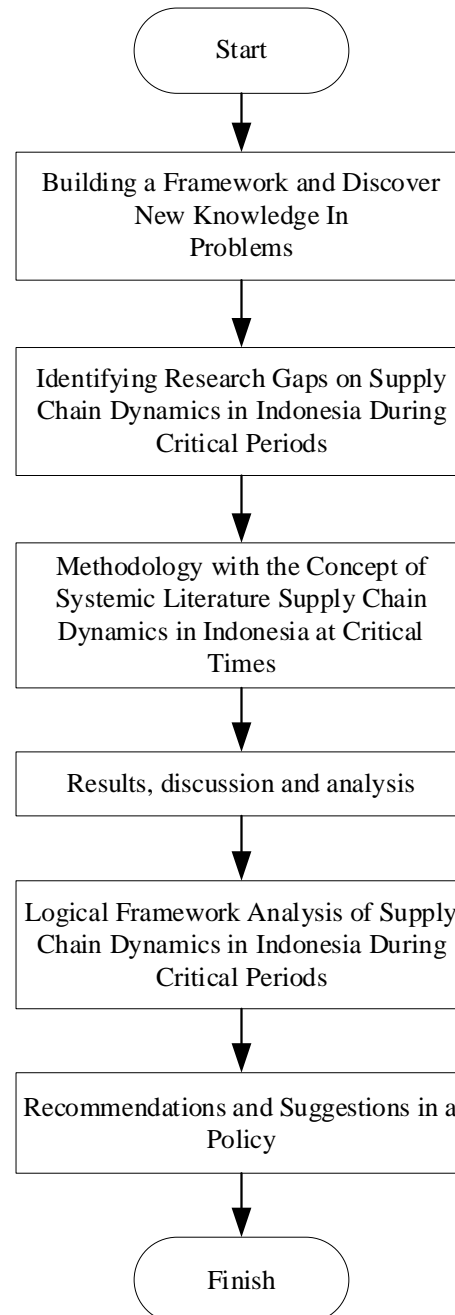


Figure 1: Process of Literature Review and Analysis
Source: Author, 2024

This flowchart illustrates the systematic process of conducting a literature review and analysis of supply chain dynamics in Indonesia during critical periods. The process starts with building a framework and discovering new knowledge in the problem at hand (Pre-Review). The next step is to review the conceptual knowledge on supply chain dynamics in Indonesia during critical periods based on previous research, and build a system framework for the literature review (Theoretical Framework). After that, identifying research gaps related to supply chain dynamics in Indonesia during critical periods.

In the methodology stage, the concept of systemic literature review was used to understand supply chain dynamics in Indonesia during critical periods. Results, discussion and analysis were conducted at the advanced review stage. Then, a logical framework analysis of supply chain dynamics in Indonesia during critical periods is conducted, followed by a framework overview and suggestions. Finally, policy recommendations and suggestions are provided based on the analysis conducted. The process ends once all stages have been completed and conclusions have been drawn.

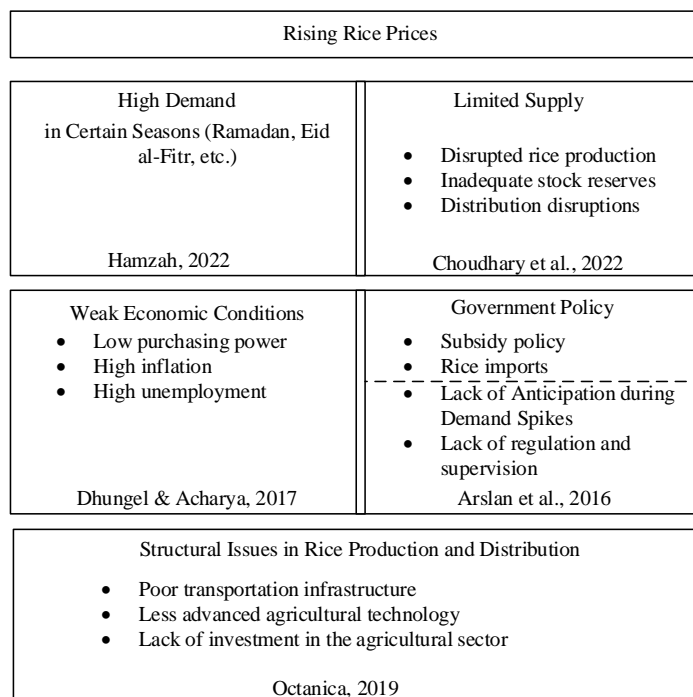


Figure 2: Supply Chain and Rice Prices: Analysis of Dynamics and Impact of Critical Periods
Source: Author, 2024

The price of rice, a staple food for Indonesians, fluctuates frequently, especially during certain periods. This phenomenon causes unrest in the community and impacts national food security (Rozaki, 2020). Rice price increases are triggered by various interrelated factors, ranging from seasonal demand, limited supply, macroeconomic conditions, government policies, to structural problems in the rice production and distribution system. High demand during certain seasons, such as during Ramadan and Eid al-Fitr, causes a surge in rice consumption. The tradition and culture of Indonesians in welcoming these holidays increases the demand for rice significantly. A similar phenomenon also occurs on other national holidays such as Christmas and New Year. Natural disasters such as earthquakes, floods, or droughts can disrupt rice production and distribution, triggering a spike in demand and prices. Rice supply limitations may occur due to production disruptions caused by extreme weather, plant pests and diseases, or conversion of agricultural land (Fahad et al., 2018). National rice reserve stocks managed by Bulog may not be sufficient to meet demand when consumption spikes occur.

Other factors that worsen the situation are distribution disruptions due to poor transportation infrastructure, inefficient logistics, and hoarding of rice by speculators. Weak economic conditions such as low purchasing power, high inflation, and high unemployment can depress rice demand and affect prices (Mane, 2014). Poorly targeted rice subsidy policies can lead to inefficiencies and encourage overconsumption, which in turn increases prices. Uncontrolled rice imports can also disrupt the domestic market and depress local rice prices. Weaknesses in the regulation and supervision of the rice market provide opportunities for fraudulent practices and price manipulation, which exacerbate rice price fluctuations. Government policies on rice subsidies can help ease the burden on the poor, but need to be well-targeted and sustainable to avoid inefficiencies and an overall increase in rice prices (Silalahi et al., 2019). Rice imports can help fulfill supply shortages, but must be done in a timely manner and diversify import sources to protect local farmers. The government needs to conduct an in-depth analysis of rice demand and maintain adequate rice reserves to anticipate spikes in demand and maintain price stability. Strong rice market regulations and strict distribution supervision are needed to prevent fraudulent practices, hoarding, and price disparities.

Structural issues in rice production and distribution such as poor transportation infrastructure, inadequate road networks, and inefficient transportation systems can increase rice distribution costs and push up prices (Choudhary et al., 2022). Traditional farming technologies and lack of adoption of modern technologies hinder the improvement of rice productivity and lead to higher rice prices. Lack of investment in infrastructure, research, and development in the agricultural sector also slows down the increase in rice production and price stability.

3. Result and Discussion

Based on books and journals in several literatures with a total of 11 out of 21 sources that discuss rice price increases and supply chain strategies, a total of 21 sources were used in compiling this paper. The purpose of the research summary table is to provide a comprehensive overview of the research related to the Rice Price Stabilization and Enhancement of National Rice Reserves in Indonesia project (Arslan et al., 2016). The table not only presents a summary of the key findings of each study but also serves as an analytical tool to identify the main focus, key findings, and relevance of each study to the project.

With this table, comparisons between different studies become easier, which can help in understanding the key factors affecting rice price stability and supply chain management. Furthermore, the table provides a solid foundation for formulating effective strategies to achieve food security. In this context, the table serves not only as a tool for researchers and policy makers but also as a guide for other stakeholders in identifying research gaps and priority areas that require further attention (Hawwash et al., 2018). By presenting structured information, the table 1 facilitates the literature review process, enables more effective communication of research findings to various stakeholders, and supports evidence-based decision-making within the project. Overall, this summary of Table 1 is an invaluable tool for understanding and integrating research relevant to rice price stabilization efforts and increasing national rice reserves developed from research (Yuniarti, 2015). By utilizing the information presented in this table, stakeholders can formulate better and more effective strategies to achieve the project's objectives of rice price stability, increased national rice reserves, and food security for all Indonesians.

Table 1: Matrix Framework logic of Rice Price Stabilization and National Reserve Increase

Project Summary	Indicators	Means of Verification	Risks / Assumptions
Goal	Stabilize rice prices on the big Eid al-Fitr holiday next year (2025) and increase national rice reserves	Percentage change in rice prices in Idul Fitri 2025 compared to Idul Fitri 2024 - Increase in the amount of national rice reserves stored in Bulog	- Rice price report from Bulog - Rice reserve Data from Bulog
Outcome	Rice price stability and increased national rice reserves	- Percentage change in rice prices in Idul Fitri 2025 compared to Idul Fitri 2024 - Increase in the amount of national rice reserves stored in Bulog	- Rice price report from Bulog - Rice reserve Data from Bulog
Outputs	1. Increased national rice production	- Increased productivity of Rice farming land	- Rice production reports from the Ministry of Agriculture
	2. Improved rice distribution and logistics system	- Reduction of post-harvest Rice losses	- Distribution and logistics reports from Perum Bulog
	3. Stable and effective government policies on rice imports and minimum rice prices	- More stable and effective Rice import policy	- Policy documents from the Ministry of Agriculture and Ministry of Trade
Activities	1. Increase national rice production through agricultural intensification and extensification programs	- Increased productivity of Rice farming land	- Training and mentoring reports - Seed and Fertilizer Assistance and subsidy reports
	- Training and mentoring of farmers in applying modern Rice cultivation techniques that are more productive		
	- Assistance and subsidies for superior seeds		
	- Fertilizer Assistance and subsidies		
	2. Improve the rice distribution and logistics system	- Reduction of post - Harvest Rice loss	- Rice storage infrastructure report - Transportation network report - Information technology Utilization report
	- Improve Rice storage infrastructure		
	- Improving transportation network for more efficient Rice Distribution		
	- Utilization of information technology to monitor Rice stocks and Distribution		
	3. Regulating government policies on rice imports and minimum rice prices	- A more stable and effective Rice import policy	- Policy documents from the Ministry of Agriculture and Ministry of Trade
	- Establish a prudent Rice import policy based on national stock assessments		
	- Review of the minimum Rice price policy		

4. Conclusion

Based on the project logframe for rice price stabilization and increasing national reserves, more detailed conclusions can be outlined as follows. The project aims to achieve rice price stabilization in the Eid holiday period of 2025 and increase the number of national reserves stored in the Badan Urusan Logistik (Bulog). To achieve this goal, several strategic steps must be taken, including increasing rice production through agricultural intensification and extensification. This includes training farmers in applying modern cultivation techniques, superior seed assistance, as well as fertilizer subsidies to increase rice land productivity.

In addition, improving the rice distribution and logistics system is key in reducing post-harvest losses and ensuring that rice is efficiently available throughout Indonesia. This includes improving rice storage infrastructure and developing a more effective transportation network. In addition, the government's policies on rice imports and minimum rice pricing should be strengthened to ensure long-term market stability. Consistent and prudent policy implementation, supported by continuous monitoring of national stocks and global market conditions, is key to the project's success in achieving the objectives of stabilizing rice prices and increasing national reserves in a sustainable manner.

5. Future Research for Rice Price Stabilization

The Rice Price Stabilization and National Rice Reserve Enhancement Project offers a long-term solution to Indonesia's food security. Its success depends not only on effective implementation, but also on continuous research and development. A holistic approach that includes increased production, improved distribution, and effective policy settings has the potential to stabilize rice prices and enhance food security. Rigorous monitoring and evaluation will ensure project effectiveness and goal achievement. The success of this project has a direct impact on the welfare of the Indonesian people by maintaining the affordability of rice as a staple food.

For future research, several important areas need to be addressed. First, in-depth rice demand research is needed to study complex demand patterns and accurately predict rice demand, so as to anticipate demand spikes and prevent shortages. Second, optimization of the distribution and logistics system needs to be done by utilizing the latest technology to increase efficiency, transparency, and minimize post-harvest losses. Third, diversification of rice import sources should be identified, by establishing mutually beneficial long-term cooperation with reliable alternative supplier countries. Fourth, the development of superior rice varieties is a priority, by investing in research and development of rice varieties that are more productive, pest and disease resistant, and adaptive to climate change. Fifth, the utilization of information and communication technology (ICT) is essential, by developing digital platforms to connect rice market players and applying educational technology to improve farmers' knowledge. Finally, the impact of global policies and economics needs to be analyzed, by examining the impact of international policies and global food price fluctuations on the domestic rice market, and developing risk mitigation strategies.

By focusing on these research areas, Indonesia can strengthen the foundation of the Rice Price Stabilization and National Rice Reserve Improvement Project. Continued research and development will contribute to the achievement of lasting food security, rice price stability, and ultimately improve the welfare of the Indonesian people.

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