

An association between food policy and rice food balance sheet

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Abstract. This research examines the association between food policy and the rice food balance sheet. Normative juridical analysis explains that the purpose of National Food Agency (BAPANAS) Regulation No. 7 of 2023 concerning the highest retail price of rice is to maintain the affordability of rice prices at the consumer level. In August 2023, the average retail price of rice in several provinces exceeded the highest retail price. The rice food balance sheet was estimated based on the production and consumption of rice in 34 provinces in Indonesia. Production and consumption of rice were calculated from BPS-Statistics Indonesia data on wet unhusked grain (GKP) and the population of Indonesia by province. In 2022, the rice food balance sheet estimation showed a rice surplus in 11 provinces and a rice deficit in 23 provinces. The provinces with the largest surplus of rice are South Sulawesi, Central Java, and East Java. The provinces with the largest rice deficits are Jakarta, Riau, and North Sumatra. Local governments experiencing rice deficits should coordinate with various stakeholders to ensure the availability and affordability of rice in their respective provinces. State-owned enterprises must help maintain the government's rice reserves, especially in provinces with rice deficits.

1 Introduction

Food is the most basic human need, and its fulfilment is a part of human rights. Based on Law No. 18 of 2012 concerning food, the state is obliged to realise the availability, affordability, and fulfilment of adequate, safe, quality, and nutritionally balanced food consumption, both at the national and regional to individual levels evenly throughout the territory of Indonesia always by utilising resources, institutions, and local culture.

Indonesia faces unique challenges in ensuring food security for its population. Based on the BPS-Statistics Indonesia [1] prediction, the population of Indonesia in 2023 will be 278 million, and in 2050, it will be 328 million. The Indonesian government has implemented various food policies to address this crucial issue, focusing on rice and other staple foods.

Indonesia's food policy revolves around several key objectives. First, food security, ensuring a stable and sufficient rice supply to meet the nation's needs, is paramount. Second, price stability: the government aims to control fluctuations in rice prices, making it accessible

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to all income groups and provinces. Spikes in rice prices can lead to food insecurity and social unrest. Third, income support for farmers: supporting farmers by offering fair prices and incentives to encourage cultivation is crucial for sustaining the rice industry.

Rice is a dietary staple in Indonesia and a cultural and social symbol deeply embedded in the country's fabric. For centuries, rice cultivation has shaped the way of life of millions of people in Indonesia. Unsurprisingly, rice is central to Indonesian food policy. Therefore, this article explains Indonesia's food policy and estimates its rice food balance sheet.

2 Methodology

Normative juridical analysis comprehensively examines legal documents and regulations to understand their purpose, intent, and implications. Highlight its relevance in deciphering the legal framework surrounding food policy in Indonesia. This research identifies the key legal document under the National Food Agency (BAPANAS) Regulation No.7 of 2023 concerning the highest retail price of rice. The complete text of the regulation and any associated documents, amendments, or explanatory notes were then collected. In addition, supplementary legal materials should be gathered, including relevant laws, degrees, and legal commentaries that contextualise the regulation.

Furthermore, this research thoroughly reviews BAPANAS Regulation No. 7 of 2023, paying specific attention to its content, structure, and legal provisions. Identify key sections, articles, and clauses pertaining to the highest retail price of rice and its objectives. In addition, it analyses the broader legal framework within which the regulation operates. Examine local government policies, national laws, and international food policy and pricing agreements.

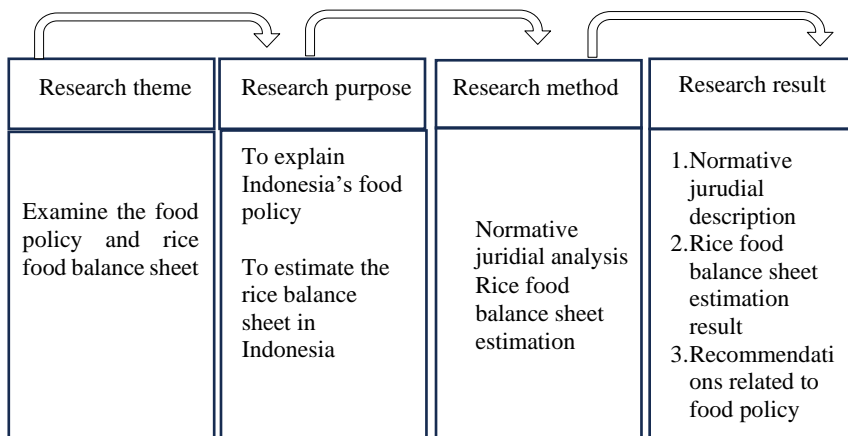


Fig. 1. Stages of the analytical framework.
 Source: [2]

There are four ideal key components of the rice food balance sheet estimation: production, consumption, import/export, and stockpiles/supply. Production of rice is monitoring rice production levels, including crop yields, and harvest forecasts, is crucial. Any fluctuations can directly impact food security in Indonesia. Consumption of rice accurate data on rice consumption patterns, including regional variations, helps ensure a stable rice supply for all citizens. Indonesia occasionally imports rice to increase the government stock and stabilise prices. Exports, on the other hand, are very strict and highly regulated. In this research, the imports and exports data are not calculated in the rice food balance sheet to simplify the data estimation. Stockpiles/supply maintaining strategic rice stockpiles/supply is essential for responding to emergencies and preventing price shocks.

Based on the Ministry of Agriculture [3] and Jati [4], there are nine steps in estimating the rice food balance sheet related to production and consumption data in 34 provinces of Indonesia, which are introduction, data collection, province selection, production estimation, consumption estimation, calculation, validation and quality assurance, analysis, and interpretation. First, the introduction to the research methodology begins by providing an overview, explaining that it focuses on estimating Indonesia's rice food balance sheet.

Emphasise the importance of accurate rice production and consumption data in ensuring food security and policy effectiveness. Second, the data collection is to identify the primary data sources for this methodology: the BPS-Statistics Indonesia data on wet unhusked grain (GKP) and population figures categorised by province. Access and gather the most recent and reliable datasets from official sources, ensuring data consistency and accuracy. Third, the province selection is to clarify the selection of the 34 provinces within Indonesia for analysis, emphasising the significance of comprehensive coverage to gain a holistic understanding of the rice food balance across the nation. Fourth, rice production estimation describes the process of estimating rice production. Fifth, calculate the total rice production in each province by aggregating the GKP data for that province. Highlight any adjustments or considerations made in the estimation process, such as accounting for variations in rice types, cropping seasons, or cultivation practices.

Sixth, the rice consumption estimation explains the procedure for estimating rice consumption. Seventh, calculate the total rice consumption in each province based on population data and per capita consumption rates. Discuss cultural preferences, regional differences, or demographic trends affecting consumption patterns. Eighth, rice food balance calculation describes the calculation of the rice food balance for each province. Subtract the estimated rice consumption from the estimated rice production to determine whether there is a surplus or deficit of rice in each province. Ninth, data validation and quality assurance. Discuss the steps to validate and ensure the data quality used in the estimation process. Highlight data validation techniques, cross-referencing with other sources, or error-checking procedures. Tenth, statistical analysis is performed to derive insights from the rice food balance data and explain the chosen statistical methods and their relevance to the research objectives. Eleventh, the interpretation of the results describes how the estimated rice food balance data can be interpreted and its significance in understanding regional variations in rice production and consumption within Indonesia.

3 Results and discussion

The analysis of normative juridical described in the given information about rising rice prices and the breach of the National Food Agency's highest retail price (HET) regulations can be broken down as follows:

- 1) Rising rice prices: the data shows that rice prices in Indonesia have steadily increased, with a significant jump since August 2023. As of September 10, 2023, the national average price of medium-grade rice was IDR 12,700 per kg, while premium-grade rice was IDR 14,330 per kg. This indicates a considerable increase from the average price of medium-grade rice in August 2023, IDR 12,070 per kg [5].
- 2) Indication of infringement of highest retail price (HET) regulations: BAPANAS had set HET regulations in March 2023, specifying price ranges for both medium-grade and premium-grade rice. However, the current prices have exceeded these HET limits, indicating difficulty in controlling rice prices according to the agency's guidelines. This breach has implications for food security and affordability for the Indonesian people.
- 3) Inflation impact: rice is a staple food in Indonesia, and its prices significantly impact its overall inflation rate. According to BPS-Statistics Indonesia [6], the inflation rate for rice in August 2023 reached 13.76% year-on-year, the highest in eight years. This high

inflation rate can adversely affect the cost of living for ordinary citizens, particularly those with limited income.

- 4) Economic and social impacts: rising rice prices can have several economic and social impacts. First, it can lead to increased living costs for households, potentially pushing more people into poverty or worsening the financial situation of vulnerable communities. Second, it can negatively affect food security, as higher prices may reduce access to this essential staple food. Lastly, it can contribute to social unrest or protests if the government does not effectively address the issue.
- 5) Potential causes: to address the issue effectively, it is essential to understand the underlying causes of rising rice prices. Possible factors include fluctuations in production, distribution challenges, supply chain disruptions, weather-related issues affecting harvests, and global market trends impacting rice imports. Government policies, trade regulations, and international market prices can influence domestic rice prices.

Table 1 shows Indonesia's rice food balance sheet estimation [4]. The rice data for wet unhusked grain/GKP and population data in 34 provinces in Indonesia are from BPS-Statistics Indonesia [1]. The estimation of rice production is based on conversion assumptions that 60.44% of GKP production can become ready-to-eat. In 2017, rice consumption in Indonesia was one of the highest in the world, with 112 kg per capita per year, but in 2012, the rice consumption was more significant, with 115 kg per capita per year [7]. So, this research used the recent rice consumption per capita, about 112 kg per capita per year.

The findings of the rice food balance sheet estimation for 2022 indicate a disparity in the calculation results across different provinces. Notably, there is a rice surplus in 11 provinces, with South Sulawesi, Central Java, East Java, South Sumatera, and Lampung being the provinces with the most substantial rice surpluses. In contrast, 23 provinces face a deficit in rice supply, with Jakarta, Riau, North Sumatra, Papua, and Banten grappling with the most significant shortfalls. Provinces with surplus rice (Top 3):

- 1) South Sulawesi has the most substantial rice surplus, with approximately 2 million tons in 2022 or an increase of 7.7% from 2021. This surplus results from favourable climatic conditions, efficient agricultural practices, and a history of rice cultivation. Based on BPS-Statistics Indonesia [8] data, rice production in South Sulawesi from 2018 to 2022 has always experienced a surplus. The production value of rice is always greater than that of rice consumption.
- 2) Central Java, known as Central Java, is Indonesia's rice production centre. It also recorded a significant rice surplus of approximately 1.1 million tons or a decrease of 13.3% from 2021. Its well-established agricultural infrastructure and supportive policies contribute to robust rice production. Central Java received inorganic fertiliser and seed input subsidies from the government to maintain the rice productivity and surplus, contributing to national food security [9].
- 3) East Java, another prominent rice-producing province, displayed a surplus of rice in 2022 of approximately 821 thousand tons, which decreased 18% from 2021. The province benefits from a climate conducive to rice cultivation and a strong agricultural sector. East Java is the biggest province that produces wet unhusked grain (GKP), approximately 9.77 million tons or 17.91% compared to the other 33 provinces in Indonesia [10].

Provinces with deficit rice (Top 3):

- 1) Jakarta: the business city faces the most significant deficit in rice supply, with approximately 1.1 million tons in 2022 or an increase of 1%. Its high population density and limited agricultural land make it heavily reliant on external rice sources. Jakarta must bring rice from other regions to meet material needs of food. The agricultural land is spread across mostly Jakarta's outskirts, and some are squeezed between city buildings [10].

- 2) Riau, located on Sumatra Island, experiences a notable rice deficit of approximately 619 thousand tons or an increase of 2.6%. Factors contributing to this deficit may include land use conflicts, urbanisation, and competition for agricultural land. Many productive lands in Riau that were previously food plots have been turned into plantation land, resulting in decreased rice land and land use in the last five years, reaching 43,987 ha [12]. Another trigger is the decrease in irrigation as a source of material water for rice cultivation. Too many have been damaged from existing, good irrigation in Riau is only 30%, and the remainder is in a state of disrepair or can not irrigate existing rice fields [13].
- 3) North Sumatra, also on Sumatra Island, reports a substantial rice deficit of approximately 502 thousand tons or a decrease of 5.3%. Challenges related to agricultural productivity and land availability likely contribute to this deficit. Based on research by Hutabarat [14] on 25 districts in North Sumatra, a region with a developing level of availability, the highest is Toba Samosir District. In contrast, the region with the lowest development level of availability is Nias Barat District.

Table 1. Estimation of rice food balance sheet (000 tons).

No	Prov.	Prod. 2021	Cons. 2021	Sup. 2021 (+/-)	Prod. 2022	Cons. 2022	Supply 2022 (+/-)
1	South Sulawesi	2,901	1,023	1,878	3,055	1,033	2,022
2	Central Java	5,482	4,115	1,367	5,333	4,147	1,185
3	East Java	5,580	4,578	1,001	5,430	4,608	821
4	South Sumatra	1,454	957	497	1,581	969	612
5	Lampung	1,416	1,017	399	1,532	1,027	504
6	Aceh	931	597	334	860	605	254
7	West Nusa Tenggara	809	603	205	828	613	215
8	West Sumatra	750	624	125	782	631	151
9	Central Sulawesi	494	338	155	424	343	80
10	West Sulawesi	177	160	16	201	163	38
11	Gorontalo	133	132	1,33	136	133	3.29
12	South Kalimantan	579	461	117	467	468	-1.32
13	South-east Sulawesi	302	297	4.28	273	302	-29
14	North Kalimantan	17	79	-62	17	81	-64
15	Bengkulu	154	227	-73	160	230	-70
16	Yogyakarta	317	415	-98	320	421	-101
17	Bali	352	488	-135	387	494	-106
18	Central Kalimantan	217	302	-85	196	307	-110
19	West Papua	15	129	-114	13	132	-118
20	Bangka Belitung	40	164	-124	35	167	-132
21	North Maluku	15	145	-129	13	147	-133
22	West Java	5,194	5,463	-268	5,377	5,533	-156
23	Maluku	66	208	-142	52	210	-157
24	North Sulawesi	132	295	-162	138	297	-158
25	East Nusa Tenggara	417	603	-186	430	612	-181
26	West Kalimantan	405	612	-206	416	620	-203
27	Riau	0.487	237	-236	0.289	244	-243
28	Jambi	169	401	-231	158	406	-248
29	East Kalimantan	139	426	-287	136	432	-295
30	Banten	913	1,350	-437	1,019	1,372	-352
31	Papua	163	487	-324	110	494	-384
32	North Sumate	1,142	1,672	-530	1,190	1,692	-502
33	Riau	123	727	-603	121	740	-619
34	Jakarta	1.85	1,188	-1,186	1.33	1,196	-1,194
	Indonesia	31,016	30,540	476	31,206	30,886	320

Source: [1,6], note: Prov (Province), Prod (Production), and Cons (Consumption)

There are some explanations related to the rice food balance sheet estimation condition:

- 1) Regional disparities in agricultural productivity: the stark contrast between provinces with surplus and deficit rice highlights the significant regional disparities in agricultural productivity across Indonesia. Climate, soil quality, infrastructure, and historical agricultural practices are pivotal in these disparities [15,16].
- 2) Urbanisation and land use: provinces with major urban centres like Jakarta face inherent challenges in maintaining self-sufficiency in rice production. Rapid urbanisation increases demand for non-agricultural land, reducing the available land for rice cultivation.
- 3) Dependency on imports: provinces with rice deficits, especially those heavily urbanised, depend on rice imports from surplus-producing provinces or foreign countries. This dependency underscores the importance of efficient distribution networks and transportation systems to maintain a steady rice supply in urban areas.
- 4) Government intervention: the government's role in addressing regional disparities in rice supply is crucial. It may involve targeted policies and support to enhance rice production in deficit provinces and measures to stabilise prices in urban areas.
- 5) Climate change and environmental factors: climate change and environmental degradation can affect rice production in various provinces. Provinces susceptible to these factors may require adaptive strategies to maintain or increase their rice yields.
- 6) Food security [17]: the findings underscore the significance of a comprehensive national food security policy considering each province's unique challenges and opportunities. Ensuring regions with deficits have reliable access to rice is essential for overall food security.

Examining Indonesia's food policy and the rice food balance sheet provides critical insights into the nation's food security challenges and opportunities. Key conclusions drawn from this analysis include:

- 1) Regional disparities: Indonesia exhibits significant regional disparities in rice production and consumption. While some provinces boast rice surpluses, others grapple with deficits, particularly in urbanised areas.
- 2) Affordability and accessibility: the central objective of Indonesia's food policy, as reflected in BAPANAS Regulation No. 7 of 2023, is to ensure the affordability and accessibility of rice for consumers. This commitment to consumer welfare underscores the government's dedication to food security.
- 3) Role of local governments: local governments in provinces experiencing rice deficits are pivotal in addressing this issue. Coordination with various stakeholders, including BAPANAS, is essential to strategise and implement measures that guarantee the availability and affordability of rice within their regions.

In light of these disparities, local governments in rice-deficit provinces must collaborate closely with various stakeholders, including BAPANAS, to develop strategies ensuring rice's consistent availability and affordability within their respective regions. The state-owned enterprises (SOEs) (e.g. Bulog) are pivotal in this regard, as they must actively maintain the government's rice reserves/supply. This is crucial in provinces confronting rice deficits, where BULOG can play a critical role in stabilising prices and ensuring the food security of the provinces.

Based on the explanations above, two policy options can be made: policy responses and long-term solutions. Policy responses to mitigate the impact of rising rice prices, the government may need to consider various policy responses. This could include providing subsidies to rice farmers, improving infrastructure and logistics to reduce distribution costs, increasing rice imports if there is insufficient domestic supply, and closely monitoring and enforcing price regulations. Then, the long-term solutions to address the issue of rising rice prices should also involve long-term strategies, such as investing in agricultural technology

and practices to boost domestic rice production, diversifying food sources to reduce reliance on rice, and promoting economic development to improve the population's purchasing power.

4 Conclusions and policy recommendations

The results of the normative juridical analysis of BAPANAS Regulation No. 7 of 2023 concerning the highest retail price of rice indicate that the primary purpose of this regulation is to maintain the affordability of rice prices at the consumer level within Indonesia. This finding is rooted in the language and provisions of the regulation itself, as well as its broader context within the nation's food policy framework. The regulation's text explicitly references ensuring affordable rice prices for consumers. It articulates a maximum retail price for rice, which serves as a cap to prevent excessive price increases. This cap indicates the government's commitment to shielding consumers from the negative impacts of volatile rice prices. Furthermore, the regulation includes provisions for monitoring and enforcement, underscoring its intent to safeguard affordability throughout the retail rice market.

In conclusion, addressing the challenges posed by regional disparities in rice production and consumption in Indonesia requires a multifaceted approach that involves cooperation between local governments, stakeholders, and strategic interventions by entities like BULOG. By implementing the recommended policies and fostering collaboration, Indonesia can move closer to achieving its goal of food security for all its citizens. Future research can investigate the historical context that led to food policy/regulation formation. Explore the events, policies, or crises that may have influenced its creation.

Moreover, several policy recommendations can be developed related to policy/regulation and estimation of the rice food balance sheet, which are:

- 1) Regional food security plans: local governments (such as Jakarta, Riau, and North Sumatra) should develop comprehensive regional food security plans considering their provinces' unique challenges and opportunities. These plans should address strategies for increasing rice production, improving distribution networks, and enhancing market accessibility.
- 2) Support smallholder farmers: encourage and support smallholder farmers in deficit provinces (Jakarta, Riau, North Sumatra) through agricultural training, access to modern farming practices, and financial incentives. Empowering local farmers can significantly contribute to increased rice production.
- 3) Strategic rice reserves: supporting BULOG's capacity to maintain strategic rice reserves. Ensure that these reserves are strategically located, focusing on provinces with recurring rice deficits. This approach can help stabilise prices and mitigate shortages during times of crisis.
- 4) Infrastructure development: invest in rural infrastructure, including transportation networks, irrigation systems, and storage facilities. Improved infrastructure can enhance the efficiency of rice production and distribution, reducing losses, and costs.
- 5) Price monitoring and regulation: strengthen price monitoring mechanisms to ensure that the highest retail price of rice is adhered to across regions. Implement effective price regulation measures to prevent price gouging and protect consumer interests.
- 6) Research and development: promote research and development initiatives to increase rice yields and resilience to climate change. Encourage the adoption of innovative rice cultivation techniques and drought-resistant rice varieties.
- 7) Public awareness and education: conduct public awareness campaigns to educate consumers about the importance of conservation and responsible rice consumption. This can help reduce food waste and ensure the equitable distribution of rice resources.

Based on the information in this research, we can conclude a recognised connection and association between government food policy and the overall balance of rice production,

distribution, and consumption in Indonesia. It serves as a general statement of acknowledgement that food policies can impact the rice food balance in the country.

Acknowledgement. The author wants to acknowledge the support of all the leaders in the Ministry of Trade, especially the Head of the Center for Handling Strategic Issues, the Indonesian Society of Agricultural Economics-ISAE (PERHEPI), and the committee of the International Conference on Agriculture Natural Resources, and Rural Development (2nd ICANaRD).

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