

Stability of rice availability and prices in Indonesia during the COVID-19 pandemic and Russia-Ukraine war

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Abstract. Rice is the staple food for Indonesians and is important in social, economic, and political life. Due to its role, the Indonesian government maintains the stability of rice availability and prices in all regions throughout the year. This task faced enormous challenges in the last three years due to the current external shocks of the COVID-19 pandemic and the Russia-Ukraine War. This paper aimed to analyse the stability of rice availability and prices during these external shocks. This study used secondary data at the national level from 2019 (base year) to 2022. Data was analysed using descriptive quantitative and qualitative methods. A coefficient of variation measures the degree of rice price volatility. This study concludes that during the current external shocks, Indonesia was able to increase rice production to meet household needs and maintain stability in rice availability and price, but national rice reserves were depleted. To achieve food security sustainably, the government should continue to stabilise rice availability and price by increasing domestic rice production, managing government rice reserves, implementing rice price policies at the producer and consumer levels, and adopting rice import policies that consider the interests of consumers and farmers in a balanced manner.

1 Introduction

In the national food system in Indonesia, until now, rice has been a commodity with a strategic position in terms of social, economic, and political viewpoints. In 2021, the

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consumption participation rate of rice was 97.7%. Meanwhile, the total Indonesian population was 275 million, with an average rice consumption per capita of 94.4 kg/year [1,2]. In addition, rice farming has been the primary source of income, providing many employment opportunities and affecting poverty rates in rural areas [3,4]. As an important staple food, any increase in the price of rice will be followed by a rise in the prices of other foods, and of course, it will affect the inflation rate [5]. Therefore, high rice price fluctuations often become a national political issue.

The strategic position of rice commodity in the national economy has driven every Indonesian government administration since the beginning of Indonesian independence to implement rice self-sufficiency as the primary national food policy [6–11]. One of the goals of this policy is to stabilise the supply and prices of rice in all regions, including in remote areas, and at all times. Since the early 1970s, almost every year, the Indonesian government issued Presidential Regulations and several ministry regulations stipulating (1) government procurement price for rice at the farm level to maintain the income of paddy farmers and (2) prices reference of rice at the consumer level to maintain the low-income households' affordability [11]. This policy has been accompanied by a government rice reserves management and a food social assistance program for the poor community to maintain supply and price stability in the face of seasonal harvest, increased demand in specific periods (religious festivities and holidays), and the impacts of climate change and external shocks.

In the last three years (2020–2022), the government's efforts to stabilise rice supply and prices have faced enormous challenges. In addition to continuing climate change with intensity and impact difficult to predict, since early March 2020, the COVID-19 virus was identified as entering Depok City, West Java Province, and rapidly spreading throughout Indonesia. The COVID-19 pandemic caused the Indonesian economy to experience a contraction in 2020 by 2.07% and grew below the 5% target in the following year (2021) by 3.70% [12,13]. The big challenge in maintaining food security in 2022, due to the continuing existence of the pandemic, was exacerbated by the occurrence of the Russia-Ukraine war, which disrupted the international supply chain of food and fertilisers, mainly through the Black Sea.

To overcome the impact of external shocks on the national economy, the Indonesian government has launched a policy that focuses on keeping the national economy running on the right track called the National Economic Recovery Program (Pemulihan Ekonomi Nasional/PEN). In the agricultural sector, to ensure food production meets the growing demand, the government has refocused programs on agricultural development to ensure that food production capacity and farmers' ability to farm optimally are not disrupted.

In 2021, the Indonesian government established a National Food Agency with the tasks, among others, of coordinating the implementation of policies on food availability, food supply and price stability, and food security through President Regulation No 66/2021 [14]. The formation of the National Food Agency was mandated by Law Number 18/2012 about food [15]. Since 2021, the National Food Agency has coordinated policy formulation and implementation to ensure supply and price stability.

The government's efforts to reallocate a sizable development budget for the PEN program, especially policy refocusing in the agricultural sector, must be evaluated for its success. For this reason, this paper aims to analyse the stability of rice availability and prices at the national level during external shocks of the COVID-19 pandemic (2020–2022) and the Russia-Ukraine War (2022). From the results of this study, policy recommendations will be formulated concerning building preparedness to face the threat of a possible food crisis, both caused by the dynamics of the national economy and external shocks.

2 Methodology

This study uses a deductive analysis method to examine the dynamics of selected relevant variables and analyse them qualitatively. Data coverage is at a country level from 2019 (the base year before the pandemic) to 2022. The data analysed included rice production, government reserves, imports, and prices. The primary data sources are the National Food Agency, Ministry of Agriculture, and BPS-Statistics Indonesia. In this study, the COVID-19 pandemic covered 2020-2022, and the Ukraine war was in 2022. Therefore, in 2022, the pandemic and the war were assumed to influence rice price supply and stabilisation.

Rice price stability was measured by a coefficient of variation (CV) using monthly prices. The CV is a simple measure of the relative dispersion of events [16]. The CV shows the distribution of data from the calculated average. A smaller CV value indicates that the data distribution is smaller or more uniform; conversely, a larger value indicates that the data is more spread out or the variation is high. The CV formula is the division between the standard deviation and the average data value [17], as shown in an equation:

$$CV = \frac{s}{\bar{x}} * 100 \quad (1)$$

where $s = \sqrt{s^2}$ is standard deviation; \bar{x} is average of data

3 Results and discussion

Indonesia's economic fundamentals before entering the COVID-19 pandemic were quite good. During 2015-2019, the country's GDP grew consistently around 5%/year (4.9% to 5.2%), and the inflation rate was successfully controlled between 3% and 4% per year. The poverty headcount ratio (USD 2.15 a day, 2017 PPP) was 4.4% in 2019 [18]. In 2020, the pandemic has significantly impacted the national economy, starting in the second quarter.

The Indonesian government issued a rapid and timely response to address this pandemic's negative impacts on health and the economy. The government also implemented several social protection programs, especially for those who have lost their jobs and low-income households. The government launched the PEN Program by adopting comprehensive fiscal and monetary policies, which include increasing domestic consumption, promoting business activity, and maintaining economic stability and monetary expansion [19].

The Russia-Ukraine war started in early 2022 and impacted the global economy, including Indonesia. The impact of this geopolitical conflict on the food and agriculture sector was transmitted through spikes in food, fertiliser, and fuel prices, and supply chain disruption. For example, the global price of Urea fertiliser per ton in April 2021 was USD 328, rose to USD 890 in December 2021, and increased again to USD 925 in April 2022, then tended to decrease afterwards and in December 2022 was USD 519 [20]. The government continued the PEN Program to 2022 in response to the pandemic and the Russia-Ukraine War.

In line with the PEN Program, the Ministry of Agriculture refocused the agricultural development programs to ensure that the food production capacity and farmers' capability in farming practices were not disrupted. The Ministry of Agriculture formulated a strategy called "Five Ways of Action," which includes 1) increasing production capacity through expanding new planting areas for strategic food commodities; 2) promoting food diversification based on local food sources; 3) strengthening food reserves of the government and community; 4) developing modern agriculture, including implementing smart farming and farmer corporation; and 5) accelerating export of agricultural products [21].

3.1 Stability of rice availability

According to the Food Law (No. 18/2012), sources of food availability consist of domestic production, reserves, and imports. The law further directs that the management of these food sources needs to consider (1) the interests of consumers in obtaining food at a reasonable price and (2) the interests of farmers in obtaining reasonable profits from their rice farming. In practice, the Indonesian government strives for the primary source of rice availability to fulfil the population's needs to be met from domestic production, which is marked by pursuing rice self-sufficiency. In line with this policy, the government doubled the effort to increase domestic rice production to overcome the potential global food crisis due to the pandemic and war in Ukraine.

During 2020-2022, the country's rice production can be maintained at around 54.5 million tons of dry milled grain, with an average growth of only 0.09%/year or stagnant (Table 1). The ability to maintain rice production levels is obtained from an increase in rice productivity of 0.85%/year to compensate for a decrease in harvested area of 0.73%/year [22]. Efforts to refocus the agriculture program towards maintaining small-scale farmers' food (rice) production capacity were instrumental in maintaining rice productivity levels amidst public health disturbances and restrictions on the movement of goods and people to suppress the spread of the COVID-19 virus. Those efforts included providing subsidised fertilisers, distributing agricultural machinery, providing extension and mentoring for farmers, increasing access to sources of agricultural financing with low-interest rates (subsidised), and administering output price incentives [23].

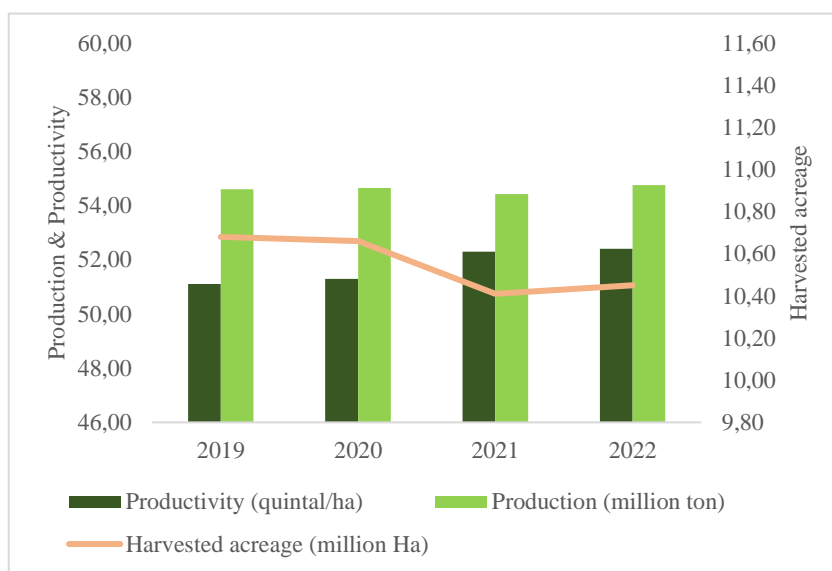


Fig. 1. Rice harvested acreage, yield, and production in Indonesia, 2019-2022.

Source: [22]

The proportion of government rice imports and reserves to the total rice availability was relatively small. Still, it was instrumental in maintaining rice price stability in all regions of the country and throughout the year. During 2020-2022, the volume of Indonesian rice imports did not increase. Instead, it kept below 450 thousand tons/year or around 1.5% of national rice needs. Meanwhile, at the same time, due to the increase in population, the total demand for rice increased by about 250 thousand tons annually (Table 1).

Table 1. Rice availability based on sources in Indonesia, 2019-2022.

Year	Domestic Production	Government reserves	Imports	Total availability
	(million tons)			
2019	31.35	1.88	0.45	33.68
2020	31.39	0.96	0.36	32.91
2021	31.36	0.81	0.41	32.58
2022	31.54	0.33	0.43	32.30

Source: [24]

With the volume of rice production and imports per year relatively constant during 2020-2022, while the need increased yearly, it is logical that the government's rice reserves decreased in that period. As shown in Table 1, at the end of 2019 (the base year before the pandemic), the Indonesian government had rice reserves of 1.88 million tons, which fell by almost half at the end of 2020 and 326 thousand tons by the end of 2022 [24]. During these years, the government actively intervened in the rice market to stabilise prices [25]. The government intervention by releasing rice reserves in reference markets at the right times was a key factor in reducing these price fluctuations.

3.2 Stability of rice prices

One of the indicators for national food security achievement in Indonesia is the stability of nine strategic food commodities at the consumer and producer levels, including rice as the main staple food. One of the instruments the government uses to achieve this target is a price policy that regulates the highest retail price (HRP) at merchants or paid by end consumers. This price policy has been implemented for several years. The latest HRP for rice was regulated through the National Food Agency Regulation Number 7/2023, issued in March 2023. The policy of HRP rice is intended as a reference price for retailers, as consumers pay the highest price. The HRP rice was determined for eight economic regions and two types of rice quality (medium and premium). Food retailers who violate this provision are subject to business administrative sanctions [26,27].

This HRP policy is just one instrument in maintaining rice price stability throughout the year. Other in-line policies and efforts are needed, such as managing government rice reserves, creating an environment for the smooth flow of rice trade among regions, and determining import policies based on the prognosis of rice production potential, among others, concerning the impact of climate change [28,29]. From the demand side, the achievement of rice price stabilisation is influenced by the timely distribution of rice as food social assistance to low-income households. In 2019, the number of beneficiaries was 15.2 million households, and in 2020, it increased to 20 million households to anticipate the impacts of the COVID-19 pandemic [30].

The annual rice production pattern results from monthly production determined by monthly planting patterns with a 3 to 4-month gap. Meanwhile, rice planting patterns follow water availability, which is influenced mainly by two seasons, namely the rainy and dry seasons. Data for 2022 provides a general picture of this monthly rice production pattern (Figure 2). In January 2022, rice production was 4.45% of total production a year, increased in February to 7.45%, and peaked in March at 17.42%. Rice production in the following two months decreased sharply, and during May-October, the monthly production share was stable at between 7.5% and 8.5%. Furthermore, rice production declined again in November, with the smallest production share in December at 3.53% [31].

As presented in Figure 2, the pattern of monthly rice prices of medium quality did not significantly follow the pattern of rice production. Average monthly rice prices were

relatively stable throughout 2019 (before the pandemic) and the following two years (2020 and 2021). During this period, slightly decreasing demand for rice due to the downturn of economic growth in 2020 and slow recovery in 2021 has reduced the pressure on rice price volatility. In 2022, when the pandemic and geopolitical tensions affected the dynamics of the food markets, the monthly price of rice was relatively stable from January to May but increased every month until December. The average medium rice price in 2022 was IDR 10,986/kg (USD 0.697/kg, USD/IDR exchange rate=15,731), with the difference in the average January to December price increase of 4.61%.

In 2020 and 2021, the government could successfully maintain the stability of medium rice prices. In 2019 (the base year before the pandemic), the CV (coefficient of variation) value for monthly rice prices was 0.51%, and in the following two years, the CV value was 0.79% and 0.44%, respectively. However, in 2022, in the second half, prices continued to increase, and this price volatility was reflected in the CV value, which rose to 1.73%. The spike in rice prices in 2022 occurred because rice production only increased by 0.57% from the previous year, the volume of imports was relatively the same as the previous year, around 400 thousand tons, while the government's rice reserves were depleting to the lowest level during the last ten years, namely 330 thousand tons (Table 1).

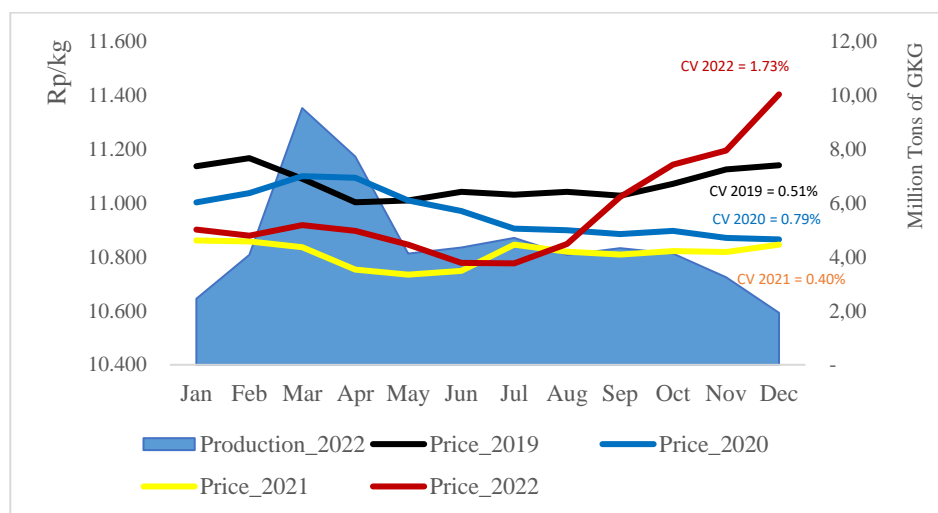


Fig. 2. Monthly paddy production 2022 and monthly rice price in Indonesia, 2019-2022. Source: [22,37]

Previous studies discussed the importance of government food reserves to deal with price fluctuations due to disasters, climate change, and external shocks [32–34]. Several methods are available to determine the sufficient volume of government rice reserves to maintain price stability [33,35,36]. FAO uses a stock-to-utilisation ratio (SUR) formula of 3-5% to determine sufficient cereal food reserves to cover the possible shortfalls in 95-100% of the cases. Using the FAO formula, with the rice needs in 2022 around 30,51 million tons, the government reserve needed to sufficiently stabilise rice prices throughout the year for the next five years is around 0.92-1.53 million tons. On the contrary, as discussed above, government rice reserves in 2022 were only 0.33 million tons.

4 Conclusions and policy recommendations

During the COVID-19 pandemic (2020-2022) and the Russia-Ukraine war (2022), Indonesia was able to maintain rice availability to meet people's needs at a reasonable price. The country could produce rice as planned and manage imports in a very small portion (1.5%) of the total rice needs. However, national rice reserves were depleted and, in 2022, fell to the lowest level in the last ten years. In 2020-2021, the government was able to manage rice price stability. Meanwhile, in 2022, due to the ongoing COVID-19 pandemic, which was exacerbated by the Russo-Ukrainian war, there was a significant increase in rice prices in the second semester. This incident was also caused by the government's low rice reserves, resulting in an insufficient capacity to make market interventions at the time of the price increase.

The policy of stabilising the supply and price of rice is an important instrument to achieve sustainable food security, especially if the geopolitical tension in the Black Sea region is prolonged. In this regard, the government should continue to stabilise rice availability and price by increasing domestic rice production, managing government rice reserves and revitalising community rice reserves, implementing rice price policies at the producer and consumer levels supported by other related policies, and adopting rice import policies that take into account the interests of consumers and farmers in a balanced manner.

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