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THE IMPACT OF THE GLOBAL FOOD CRISIS AND INDONESIA'S STRATEGIES FOR ACHIEVING FOOD SECURITY

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Abstract:
The world food crisis, triggered by various factors such as climate change, geopolitical conflicts, and a global pandemic, has had significant impacts on food security in various countries, including Indonesia. This article aims to identify and analyze sustainable strategies that can be implemented to address the impacts of the global food crisis on Indonesian food security and achieve food self-sufficiency. This research uses a qualitative descriptive method with a literature review approach using relevant sources. The research results indicate that sustainable strategy efforts to achieve national food security and food self-sufficiency include: (1) Increasing the productivity of agricultural food commodity, (2) Expansion of agricultural areas, (3) Diversification of local carbohydrate food sources, (4) Optimizing marine resource, (5) Community empowerment, and (6) Policy support and holistic cooperation. Overall, national food security can be achieved through a holistic socio-economic approach involving various aspects, from stakeholders, academia, and society.

Keywords: Food Security, Food Crisis, Sustainable Strategies, Food Self-Sufficiency.

INTRODUCTION

The food crisis has become a trending topic in global issues today. As commonly understood, the world is facing serious challenges regarding the global food crisis. It is not only caused by the imbalance between the world's population growth and global food production but also by disruptions in food supply chains. According to FSIN (Food Security Information Network) and Global Network Against Food Crises (2024), more than 281 million people across 59 countries are experiencing acute food crises. This figure has increased significantly compared to the 105 million people recorded in 2016. The food crisis is driven by factors such as conflict and insecurity, climate change, and economic shocks.

Food crises are often closely linked to conflicts arising from global wars, particularly concerning food security and energy interests. Such conflicts lead to the destruction of food production systems and the displacement of populations. War can serve as a mechanism for controlling food resources, with hunger and food vulnerability being utilized as instruments of warfare (Kemmerling, Schetter and Wirkus, 2022). A positive correlation is evident in the Russia-Ukraine conflict, which resulted in a significant decline in wheat production and exports from both Ukraine and Russia during the years 2021-2022 (Behnassi and El Haiba, 2022). This situation has led to a decrease in the availability of processed wheat products and an increase in food prices (with declining subsidies), resulting in widespread hunger and acute food insecurity (Lin et al., 2023).

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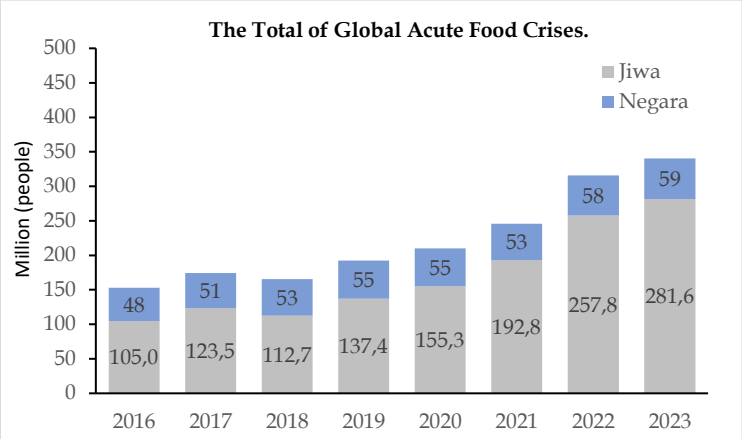

Source: FSIN and GNAFC (2024)

Figure 1. Prevalence increases in total cases of the Global Acute Food Crisis

Climate change is a significant factor contributing to food vulnerability, alongside the current issues related to armed conflict. The rise in global temperatures leads to arid agricultural lands and crops that are increasingly susceptible to diseases, resulting in decreased food production and even crop failures. Climate change presents a unique internal challenge within the agricultural sector. The adverse effects of climate change, such as crop failures and reduced productivity in livestock and fisheries, are particularly pronounced in regions such as Sub-Saharan Africa (SSA) and South Asia (El Bilali et al., 2020). Furthermore, previous research has highlighted a disparity between global population growth and the availability of food supplies. Projections indicate a continuous increase in population from 1990 to 2030, which is likely to precipitate a global food crisis (Suranto, 1999). As a result, the demand for food will escalate, leading to negative repercussions, including instances of hunger due to insufficient food supply.

The repercussions of economic shocks significantly impact food security. According to a report from the World Food Programme United Nations, the number of individuals experiencing food insecurity nearly doubled, reaching approximately 265 million by the end of 2020, largely due to the COVID-19 pandemic. This crisis poses a severe threat to the attainment of food security and exacerbates the risks of poverty and hunger. During the lockdown period, there was a marked increase in the global population facing poverty and hunger, particularly in developing nations (Workie et al., 2020).

The global food crisis, affecting numerous countries, driven by conflict and climate change, poses a significant threat to Indonesia's food security. The national demand for food is rising in tandem with the increasing population of Indonesia. The Central Statistics Agency (BPS) has reported a consistent annual increase in the population up to 2023. This population growth has led to a heightened demand for food (Putra, Tong and Pribadi, 2020). The threat to national food security has become increasingly apparent, as the availability of essential food commodities is diminishing, necessitating imports to meet the shortfall, given that the country is not yet capable of fully satisfying its own food needs. Ongoing conflicts and international trade dynamics will influence long-term imports, while food supply will increasingly compete with global demands. Additionally, another factor contributing to this issue is the decline in agricultural yields due to climate change (Rahman, Toiba and Huang, 2021).

According to a report by The Economist Impact (2022) on the Global Security Food Index (GSFI), Indonesia ranks 69th out of 113 countries, with a score of 60.2. The food index in Indonesia

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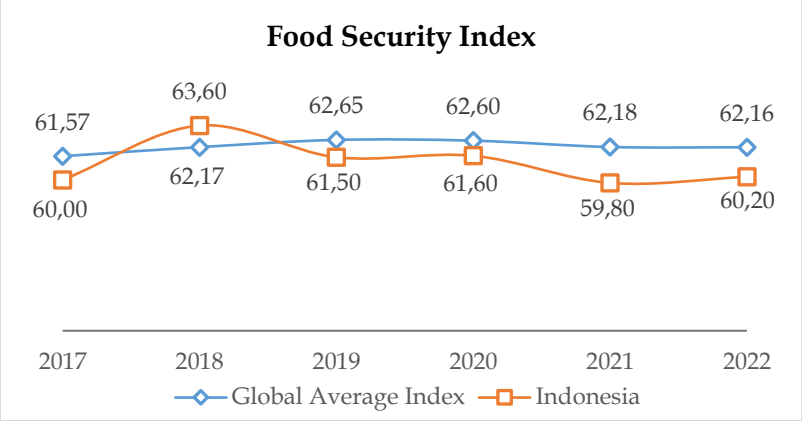
has experienced fluctuations since 2017; however, the current score remains below the global average of 62.2 and the Asia-Pacific average of 63.4. Over the past five years, the national food security index has consistently fallen short of the global average. This situation serves as a warning regarding Indonesia's food safety. In various measurements of the global food index, including food availability, nutritional quality, and sustainability, Indonesia is still assessed poorly in comparison to other countries in the Asia-Pacific region.



Source: The Economist Impact (2022)

Figure 2. National food security index value and global average

Given the current circumstances, Indonesia must efficiently implement tangible and comprehensive measures to ensure sustainable food security. The objective is to achieve food sovereignty and food resilience. Indonesia faces unique opportunities and challenges in addressing the impacts of the global food crisis. As a tropical nation endowed with abundant natural resources and biodiversity, Indonesia has yet to optimize these assets in their management and utilization fully. It presents a significant challenge in realizing the goal of food self-sufficiency.

Food security is indeed a crucial aspect of achieving societal welfare. Key considerations include availability, accessibility, adaptability, and sustainability. Several challenges to achieving food security and self-sufficiency in Indonesia include a rapidly growing population, decreasing agricultural land and yields, and a continued reliance on food imports. The adoption of modern agricultural technologies and sustainable farming practices remains suboptimal. Government support and future policies aimed at addressing national food security are also critical. Therefore, pursuing food sovereignty must involve collaborative efforts across various sectors, from government to community engagement.

METHODS

The method used in this study is a qualitative descriptive approach with a systematic literature review method. The scope of data in this study includes the impact of the global food crisis, food security, national food production, national food import-export data, and government programs/strategies in maintaining food self-sufficiency. The information used in this study is empirically based, meaning that only verified and accurate information is utilized. These information sources include comprehensive prior research findings and various online media platforms, such as institutional portals, articles/journals, and e-books, which serve as supporting data to strengthen the analysis (Fariq, Zamsiswaya and Tambak, 2022). The analysis is conducted using the Meta-Analysis Approach, categorizing relevant literature into three main areas:

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1. Factors contributing to the global food crisis such climate change, seasonal anomalies, and geopolitical conflict.
2. The impact of the crisis on Indonesia.
3. Government strategies in Indonesia through the Ministry of Agriculture and the National Food Agency (e.g., policies on food self-sufficiency, food diversification, farmer protection, and food security programs).

A thematic analysis is then performed to identify key patterns in policies and challenges faced in the implementation of food security strategies. Furthermore, Indonesia's strategies are compared to global best practices recommended by FAO Indonesia and other international organizations. The results of this analysis are expected to provide evidence-based recommendations for strengthening national food security policies in the future.

RESULT AND DISCUSSION

Indonesia possesses significant potential due to its diverse landscapes, abundant natural resources, and remarkable biodiversity. The geographical location of Indonesia is particularly conducive to the flourishing of biodiversity, given its tropical climate. However, the country has yet to meet its domestic food needs, as both productivity and quality have been declining (Wardhana et al., 2022). Currently, Indonesia faces substantial challenges related to food security and high levels of food imports. Nevertheless, there remains considerable potential for Indonesia to address global food crises by leveraging its rich biodiversity and strategic geographical position, coupled with the appropriate application of technology and comprehensive government agricultural programs. The government is actively pursuing strategies to tackle national food security issues, aiming for self-sufficiency or food sovereignty. However, these efforts encounter numerous challenges, particularly in the areas of food supply and production. One significant challenge is the ongoing conversion of agricultural land, which adversely affects food production levels (Sudarma et al., 2024).

	Jan	Feb	Mar	Apr	Mei	Jun	Jul	Ags	Sep	Okt	Nov	Des
2022	0,47	0,77	1,76	1,42	0,83	0,87	0,93	0,81	0,84	0,79	0,61	0,36
2023	0,45	0,94	1,65	1,17	0,97	0,95	0,83	0,86	0,84	0,70	0,50	0,35
2024*	0,29	0,48	1,16	1,59								

Figure 3. Comparison of rice harvest area from 2022 to 2024 (BPS, 2024).

Based on Figure 3, the area of rice harvests has mostly shown a downward trend. The decline occurred in 2023, reaching 2.29% from 2022, or decreasing to 10.21 million hectares from 10.45 million hectares. A decrease also occurred in 2024, reaching 1.64% from 2023, or decreasing from 10.21 million hectares to 10.05 million hectares (BPS, 2025). The decrease in harvested land area has a positive effect on the productivity of staple food crops such as rice. The annual decline in rice productivity has led to an increase in rice imports each year, as food demand continues to rise (Susilawati & Halim, 2024). Fluctuations in food productivity are influenced by the phenomenon of

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global climate change anomalies, which disrupt planting patterns and crop growth (Liu et al., 2023). The decline in food availability and the increase in consumption have caused inflation in the prices of staple foods.

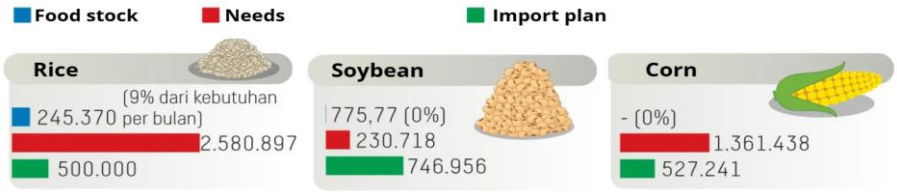

Figure 4. Staple food reserves (carbohydrate sources) and demand levels in Indonesia (National Food Agency, 2023)

Based on data released by the National Food Agency (2023), the demand for staple foods (carbohydrate sources) is very high, in inverse proportion to their availability. As a result, in meeting the country's food reserves (availability), the government will rely on imports of staple foods to meet the population's consumption. The government plans to import 500,000 tons of rice, 527,241 tons of corn, and 746,956 tons of soybeans to meet this demand.

The reliance on imports for national food commodities indicates an insufficiency in domestic agricultural production to meet food consumption needs in Indonesia. Over the past decade (2010–2019), Indonesia's rice imports have highlighted a decline in productivity and land use, with respective decreases of 1.8% and 1.6%. The limited volume of exports has contributed to a trade deficit in rice within the country (Pudjiastuti, Arisena and Krisnandika, 2021). Furthermore, imports of food commodities from other nations have occurred for six out of nine essential goods. Over the last eleven years, the government has spent approximately US$84.8 billion, equivalent to around Rp. 1,272 trillion, on importing these essential items, which include rice, milk, onions, salt, meat, sugar, and wheat from international markets (CNBC Indonesia, 2023). It is saddening that despite the country's high natural resource potential and large population, it is unable to meet its own food needs. It is a serious challenge that must be addressed immediately in order to increase food productivity and reduce dependence on imports.

Food security has become a key strategic issue for the government. With a population of nearly 280 million, Indonesia faces a major challenge in meeting its food needs, despite its abundant natural resources. However, this abundance has not yet translated into prosperity for the people. The factors involved in addressing the current food challenge are not only related to food availability, but also to easy access for the community and economic stability. Therefore, a holistic strategy across various sectors and special attention from the government are required.

The Indonesian government has currently established National Strategic Projects (PSN) contained in "Asta Cita" (national development pillars), which include natural resource management (food) and human resource empowerment. The implementation of these projects takes the form of national programs that are still controversial, such as the national food bank. This study provides recommendations in the form of concrete implementation concepts based on the country's strategic resource opportunities and demographic potential (Mukaddas et al., 2024).

Based on research by Akbar et al. (2024), the government has prioritized its budget for agricultural production in order to address food security issues. The factors examined include increasing food productivity, improving agricultural facilities, and expanding food production areas. The following are the government's priorities in its efforts to increase food production:

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Table 1. Distribution of strategic budget priorities in addressing food security

Strategic budget allocation	Percentage	Priority
Increasing production capacity	32,3%	1
Strengthening food reserves and logistics	18,1%	2
Developing food diversification	16,8%	3
Improving nutrition and food health	12,2%	4
Revitalization of food institutions/agencies	11,2%	5
Community development and empowerment	9,4%	6

Compiled by the author, source: Akbar et al. 2024

The country's abundant natural resources offset the challenges in addressing food security in Indonesia. Indonesia, which is known as an agrarian country, should no longer rely on food imports. Therefore, the optimization of natural resource management and the determination of government priorities must work together to create conditions for food availability.

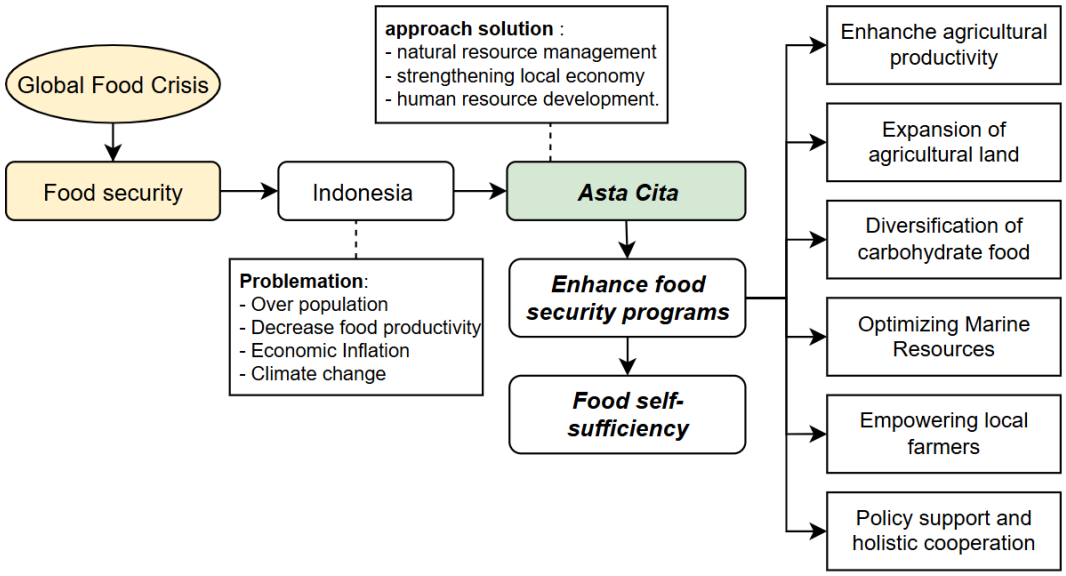

Figure 5. Strategies for overcoming national food security in realizing food sovereignty.

Enhancement of Agricultural Productivity. The decline in agricultural productivity is attributed to several factors, including soil infertility resulting from intensive chemical fertilizer use, drought, soil erosion, and insufficient application of adequate technology (Amanullah, 2020). Furthermore, the exploration and implementation of genetic transformation in crops have not been fully optimized. Strengthening food productivity must also be supported by the government through the provision and subsidization of organic agricultural fertilizers and the provision of modern technology to each community/region.

Currently, there is a significant push towards organic farming, which is intended to offer numerous benefits. Organic farming is considered safer and poses less risk compared to the use of chemical pesticides and fertilizers. This approach is beneficial for both crops and ecosystems, whether in aquatic or terrestrial environments, and the resulting products are deemed much safer for consumption (Benbrook, Kegley and Baker, 2021). Additionally, crops grown with organic fertilizers tend to be more nutrient-rich compared to non-organic agricultural products, which are often high in vitamins and minerals (Faoro et al., 2024). The advantages of organic farming for soil

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health include the maintenance of soil fertility and the support of soil microorganism ecosystems, which in turn provide optimal nutrients for plants (Soni et al., 2022). Economically, organic farming does not rely on synthetic fertilizers, insecticides, or herbicides, instead using natural materials derived from plants (such as compost) and livestock waste (Gamage et al., 2023). This approach can be gradually integrated into national agricultural methods by reducing the use of non-organic materials that negatively impact productivity and the environment.

The enhancement of domestic food productivity necessitates adequate infrastructure and facilities. It is anticipated that the government will engage in greater collaboration and support for Indonesian farmers by providing insights and technological assistance through provincial government programs aimed at fostering efficient modern agriculture. Modern technology has been extensively developed across various agricultural methods to facilitate efficient management and optimize agricultural outputs. The advantages of modern technology include increased efficiency in labor, monitoring time, and the processes from planting to harvesting (Tóth, Pintér and Nagy, 2022). The modernization of agriculture has entered the 4.0 era, with Smart Farming 4.0 technologies presenting significant potential to boost income and contribute to agricultural sustainability. Smart Farming technologies can efficiently provide inputs for crops and farmland. Several methods within Smart Farming utilize drone sprayers for fertilizer application, surveillance drones for land mapping, and soil and weather sensors. Additionally, Smart Farming leverages the capabilities of Artificial Intelligence (AI), including smart irrigation systems, Agriculture War Rooms (AWR), and information systems like Siscrop (Rachmawati, 2021).

The implementation of modern technology, or smart farming, in Indonesia cannot be executed simultaneously across all regions. However, the government can adopt a phased approach, focusing on specific priority areas with clear plans and targets. While the application of modern technology is perceived to be costly, it simultaneously offers the potential for increased efficiency and productivity. Consequently, a transformation in the agricultural sector is feasible.

Expansion of Agricultural Land. The enhancement of national food production is challenging when there is a significant conversion of productive agricultural land to other uses, such as residential development and industrial activities. Achieving self-sufficiency in food supply for the domestic population becomes increasingly difficult due to a decline in food production (Sudarma et al., 2024). Although the government has established policies to safeguard productive agricultural land through Law No. 41 of 2009 concerning the Protection of Sustainable Food Agricultural Land, the implementation of these measures has not yet been fully optimized.

Optimization of government programs in the National Strategic Program (PSN) for food security in the form of New Planting Area Expansion (PATB). The function of food land expansion is to increase food productivity. The current condition of raw rice fields (LBS) is only 7 million hectares. To meet the basic food consumption needs of the population by 2025, an additional 10.5 million hectares of farmland will be required (BPN, 2025). Indonesia has set a target for the Rice Granary Program 2045, making food production (agriculture) a national priority at present. Previous government programs aimed at increasing production and harvest area are deemed insufficient and require further evaluation. While these programs have good intentions, they need collaboration with experts and community empowerment to achieve optimal results. The area designated for rice cultivation in Indonesia is projected to reach 10.2 million hectares in 2023, yielding approximately 53.63 million tons of rice. This figure represents a decline from 2022, when the area was 10.45 million hectares, resulting in a production of 54.75 million tons (BPS, 2023).

Table 2. Land area and food bark targets in Indonesia.

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No.	Province	2020 to 2023 (hectares)	2024 Target (hectares)
1	Central Kalimantan	4435	70000
2	East Nusa Tenggara	6350	10000
3	West Java	590	1000
4	Central Java	1262	2000
5	East Java	700	1175
6	Yogyakarta	600	1000
Total target			**94175**

The land expansion program has not yet achieved optimal food productivity and still requires further evaluation of agricultural methods and land. The solution to optimize the program is to involve local farmers, create an integrated irrigation system, and select seeds that are suitable for the planting location.

Diversification of Local Carbohydrate Food Sources. Diversification serves as a strategy to provide a variety of food commodities for public consumption. The diversification of the food sector encompasses both the diversification of food crops and the diversification of food consumption. These two dimensions are crucial for food safety programs. The diversification of food crops concerns the management of agricultural patterns, while the diversification of food consumption relates to the organization of community consumption patterns to meet their nutritional needs (Wardhana et al., 2022). The objective of food diversification is to ensure that nutritional requirements beyond staple foods are met through the availability of local food diversity.

Numerous community service initiatives have been undertaken to utilize non-rice food sources as substitutes and to produce various products. The use of purple sweet potatoes in Papua serves not only as a local food source but also as a raw material for noodles, substituting wheat flour (Elwin et al., 2022). Sago, a staple food in Eastern Indonesia, can be processed into sago flour, which is then employed in the preparation of various food items, including cakes, bread, and noodles (Rajab and Munisya, 2020). Currently, sorghum is gaining attention due to its high fiber, protein, mineral, and energy content, making it a viable food source. It can be used as a substitute for wheat in flour and bread production, and many industries are incorporating it into cereal food products (Firmansyah, 2023).

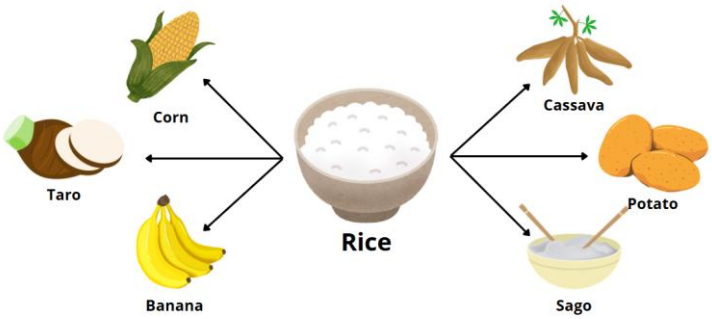

Figure 6. Diversification of local foods to substitute rice (carbohydrates)

The national food agency has recommended diversifying local foods to replace rice, such as corn, taro, bananas, cassava, potatoes, and sago. Alternative food commodities beyond rice in Indonesia hold significant potential to address the shortage of essential food supplies for the population. These alternative food crops can also be cultivated amid climate change, which has

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increasingly led to rice crop failures. Furthermore, non-rice food sources offer various advantages and health benefits.

Optimizing Marine Resources. Indonesia is an archipelagic nation recognized for its maritime identity, endowed with abundant marine resources. It is largely due to the fact that two-thirds of Indonesia's territory consists of water. The richness of the seas provides a diverse array of food sources that are high in protein, omega-3 fatty acids, and iron, essential for meeting the nutritional needs of the population. The fisheries sector is anticipated to increase the nutritional content derived from animal protein, boost non-oil and gas exports, and improve the welfare of fish farmers in the face of global crisis threats (Nikawanti, 2021). The fisheries sector has significantly contributed to national revenue, positioning Indonesia as one of the largest fish exporters globally. In 2022, fishery production reached 22.18 million tons, with exports totaling 1.22 million tons valued at approximately US$6.24 billion. Over the past five years, fishery commodities have positively impacted both the economic and social dimensions. It underscores the fisheries sector's vital role for both the community and the nation, given its potential for abundance. Therefore, the sustainable development of the fisheries sector remains imperative (Badan Pusat Statistik, 2023).

The government has also endorsed the sustainable utilization of marine and oceanic resources through Presidential Regulation No. 59 of 2017, aimed at sustainable development. The Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia supports the vision of Indonesia as a global maritime axis, with the objective of establishing Indonesia as a sovereign, independent nation with a strong identity rooted in the spirit of cooperation and local community involvement. The mission is to transform Indonesia into a self-reliant, advanced, and robust maritime nation, focused on national interests.

The advancement of marine fisheries utilization is intrinsically linked to the modernization efforts within the fishing sector. This initiative has the potential to produce beneficial outcomes for the livelihoods of fishing families, as it can enhance their income, living standards, and overall well-being. The improvement of community welfare can be achieved through the marine fisheries sector, which plays a crucial role in elevating the quality of life for fishermen. Success in this sector will also contribute positively to the development of national resilience (Nurdiansyah, Helena and Amran, 2023).

Community Empowerment. Empowerment in efforts to address national food security can be achieved by strengthening community knowledge in the field of agriculture. Empowerment aims to increase community independence in managing agricultural yields, distributing and accessing food independently, along with their local communities, so that they do not depend on external assistance (Nelsi, Akbar and Kristianti, 2024). Strengthening the quality of farming communities is promoted through government outreach, education, training, mentoring, subsidies (facilities), and collaboration between communities and the government. Collaboration and synergy among communities will drive food security at the village, regional, and national levels (Apriyanto et al., 2023). The significant demographic factor can be a potential for developing human resources that are more attentive to food issues. Therefore, the government must always involve the community in programs related to national food security to address common challenges.

Another main objective of community empowerment is to create an adaptive farming community. The community is encouraged to adapt to climate change, natural disasters, and economic fluctuations. The results of empowerment will reduce the risk of vulnerable communities facing food crises and enable them to take appropriate mitigation measures to maintain their food supply (Nelsi, Akbar and Kristianti, 2024).

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Policy Support and Holistic Cooperation. Based on Government Regulation No. 68 of 2022 concerning national food security, it is explained that the government implements policies and responsibilities for the implementation of food security in its regions (Article 13, paragraph 1), and the government needs to evaluate and control the progress of food security (Article 17). Therefore, the government (central/regional) must provide full support and foster synergy to provide the necessary infrastructure and facilities for enhancing community food security from upstream to downstream. The government's strategic programs in supporting national food security must be evaluated and improved. The government must actively involve local communities in managing these programs. Government policies must be transparent and educational in managing inclusive food productivity to receive positive feedback from the community (Juwenie et al., 2024). Forms of government support can include policy expenditures that encourage local agricultural production, farmer incentives, agricultural infrastructure subsidies, and strengthening local products over imported products (Juwenie et al., 2024).

Holistic cross-sector cooperation between central and regional stakeholders, industry players, and the community can create conducive conditions for overcoming food security issues. Cooperation must be based on the authority of a government that is fully committed to formulating food policies. The policy covers the planning, implementation, monitoring, and evaluation of programs that support regional and national food security.

Recommendation. Based on the discussion, the following are concrete recommendations for achieving national food security:

1. Strengthening the agricultural sector by the government with community involvement. The agricultural sector needs to be supported by modern facilities and infrastructure to create production efficiency. Community involvement is needed to provide empowerment and modern technology in food production.
2. Targeted expansion of agricultural land. The government's land expansion program should be evaluated, particularly the conversion of peatlands into agricultural land. This expansion should consider geographical conditions and the availability of strategic land to enable community participation.
3. Optimization of the availability of carbohydrate food resources as rice substitutes. Indonesia is very rich in this regard, so that food diversification can be carried out. Production of raw food products from rice substitutes.
4. Optimization of Indonesia's marine wealth by protecting fishermen from competition with imported fish protein.
5. Equitable empowerment of farmers in each region. Provision of guidance, supervision, and protection of agricultural products.
6. The government fully supports clear autonomous policies for each region to manage and protect the sustainability of local food production.

CONCLUSION

Efforts to address food security in Indonesia face dynamic challenges. Indonesia has been affected by the global food crisis, experiencing a decline in food productivity due to climate change, rising demand for food, and poor collaboration between the community and the government. These national food security challenges are balanced by the potential to achieve food sovereignty by 2045. Indonesia has a high demographic bonus, abundant natural resources (diverse food sources), and vast land and sea areas. The government has prioritized food security issues through the "Asta Cita" initiative, which includes several programs. Strategic solutions to address food security and achieve

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food self-sufficiency by 2045 include: increasing agricultural production; expanding cultivated land; diversifying staple food sources (containing carbohydrates); optimizing marine resources; empowering local communities and farmers; and providing full support for agriculture and cross-sectoral collaboration.

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