



# Synergy of National Food Security System

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**Abstract:** The high population will have an impact on the food crisis and poverty if it is not balanced with food security. The Indonesian government must be able to formulate a national food policy that can improve food security. The food policy includes the availability of food Supplies in good quantity and quality as well as affordable food prices by the community and safe for consumption. The purpose of this study is to examine the synergy of the national food security system. This type of research is qualitative research with the aim of explaining the phenomenon by reviewing existing data. Data sources are obtained through bibliographic data from manuscripts obtained from Google Scholar and analyzed using the Systematic Literature Review (SLR) which is a method that uses previous evidence-based evidence through reviews, evaluations, structured evaluations, classifications and categorizations. Based on the results of the review, the results of this study include: implementing good governance as a challenge and solution to food security; food security stability also affects price and distribution policies; increasing rice production will make a major contribution to rice production. Superior rice varieties will increase food security and reduce poverty; food distribution is still not optimal so that availability in each region and prices in each region vary.

**Keywords:** Government policy; National food security; Rice production; Synergy.

## Introduction

Developing countries face a difficult challenge in meeting the ever-increasing needs for food, water and energy, exacerbated by climate change (Tchoukouang et al., 2024). Changing resource needs in the use of land, water, energy and other vital needs must be done efficiently with coordinated efforts to minimize trade-offs and maximize synergies. In general, various developing countries do not take into account the relationships and dependencies between these three sectors. Although the relationship between water, energy and food with climate change has become an urgent need, so far little effort has been made to understand the relationship (Rasul et al., 2014). The high population will have an impact on the food crisis and

poverty if it is not balanced with food security. This is because economic access is a key component of overall food security. So that policies and programs are needed to strengthen its implementation (Rozaki, 2021).

One of them, the Indonesian Government in realizing food sovereignty and maintaining food security strengthens national food reserves through a multi-layered process in the national food reserve mechanism, consisting of Central Government Food Reserves, Regional Government Food Reserves, and Community Food Reserves (FAO, 2016). Government decisions can affect the national food security system related to food availability to meet the population in Indonesia. Indonesia is known as an agricultural country with abundant natural resources, but this condition does not necessarily make Indonesian people

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able to access food easily and cheaply. In this decade, Indonesia is known as a food importing country. In 2015, Indonesia imported approximately 2.2 million tons of rice with a value of around USD 1 billion (BPS, 2020).

Regional food security systems are influenced by interacting factors, such as climate change, population growth, excessive use of resources, changes in consumption, governance failures, and problems in the allocation and distribution of resources appropriately under increasing pressure and uncertainty (Toromade et al., 2024). Food security itself has always been an issue in Indonesia's national development from the old order, the new order until now. Food security has always been one of the main goals that the Indonesian government wants to achieve (Yulianis et al., 2021). The role of the agricultural sector as a food producer in Indonesia is very important in meeting the food needs of the Indonesian people (Yulianis et al., 2021). Food security is very important because it is estimated that the population of Indonesia, which is currently 267 million, is projected to continue to increase to 319 million in 2045 (BPS, 2020)

The food systems perspective on food security provides a trade-off between economic growth and food supply (imports) (Limenta et al., 2017) revealing the importance of not only the quantity of food produced but also its distribution, accessibility, quality and safety, all factors that are influenced by land-use planning decisions, and the proximity of agricultural land to other land uses. More broadly, the food security perspective also includes attention to the livelihoods of people who depend on food production and marketing, as well as considering the ecological impacts and benefits of food production and processing practices, and the potential for more sustainable use of natural resources.

Policy makers, and other development partners have developed and implemented several strategies over the years, including improving the rice sector, which has been identified as a vital component of food security and poverty alleviation (Grassini et al., 2017). Several components that must be met to achieve food security conditions according to Law Number 18 of 2012, namely: adequate food availability, stability of food availability, accessibility to food and quality including food safety. Government policy in realizing food security is shown in the active role of the government in building a good and resilient food security system. The success of government policy in realizing food security will depend greatly on the paradigm or approach chosen in viewing the context of food security and integrating food security policies with other national development policies such as poverty alleviation policies and macroeconomic policies (Sari et al., 2024).

The subsystem is an inseparable part with the support of natural resource input (land and water) and

other input support such as institutions, culture and technology. Agricultural equipment subsidies and incentives are important for the application of harvesting mechanisms and the application of GAP (Good Agricultural Practice). Accompanied by technology to increase rice production with good quality (OECD, 2022). Other inputs such as institutions that encourage good food security will immediately become a capable supporting factor in the development of national food security. The expected output from the development of the food security system is the fulfillment of the right to food (food entitlement) and the development of quality human resources as well as increasing economic resilience and national resilience. This will have an impact on healthy and more productive Indonesian people. Logistics facilities and post-harvest processing facilities are still limited so that the flow of goods is not smooth and product quality often deteriorates. Fulfillment of rice supply is a complex system problem that involves various components and elements in it (Fristin et al., 2021).

Based on the explanation, various elements of the system in food security must work together to produce a harmonious balance so as to obtain something optimal. Because the problem of the food system is multidimensional, synergy is needed to realize food security. So the purpose of this study is to examine the synergy of the national food security system.

## Method

This type of research is qualitative research with the aim of explaining phenomena by exploring existing data. Data sources were obtained through bibliographic data of manuscripts obtained from Google Scholar which were analyzed using Systematic Literature Review (SLR). A structured literature review is used to map and evaluate a literature in order to determine potential research gaps and to determine limitations of knowledge, usually carried out through an iterative cycle to determine the right search keywords, search for literature, then complete the analysis (Sauer et al., 2023). a type of evidence synthesis in which broad or narrow research questions are formulated, and data directly related to the systematic review questions are identified and synthesized. Data were collected through a review of previous research literature. Then, it was concluded through deductive reasoning (general to specific) (Sugiyono, 2016). The following will describe the flow of this research. The data obtained are related to the theme of this research, namely the synergy of the national food security system. The articles used are international journal articles that are searched using an online database on Google Scholar. The keywords used in the search for the terms synergy and "food security system"

which include 81 studies. Furthermore, the articles are sorted based on 3 criteria, namely: Published in English, Original studies and reviews, and Published in 2012-2022. This study has a bibliography of 32 studies taken through searches and used as references in the discussion. The following describes the flow of this research.

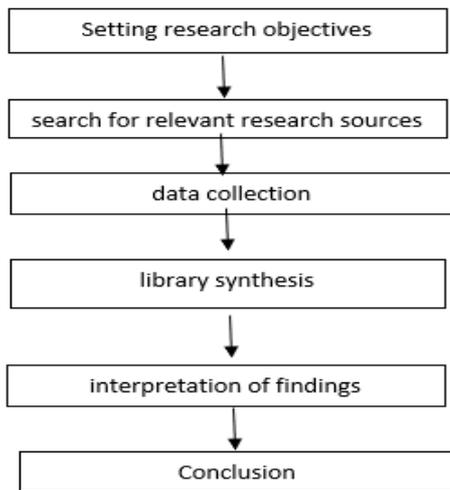


Figure 1. Research flow

## Result and Discussion

Food security is a global problem that often affects national development, one of which is in Indonesia. Along with the increasing population growth in Indonesia, this will affect the level of demand for rice for food needs. The problem of rice consumption and its fulfillment is important. If Indonesia does not want to depend on rice imports, then rice production must continue to be increased. Therefore, food availability in each region is maintained to realize food security (Aprillya et al., 2019). Due to the increasing need for rice, there is a need for follow-up to increase its production (Lubis et al., 2022), because the high population will have an impact on the food crisis and poverty if it is not balanced with food security. This is because economic access is a key component of overall food security. However, policies and programs are needed to strengthen its implementation (Young et al., 2021). Therefore, the policy implications of the National Food Security Law to increase consumption need to be implemented as a price consideration. Policy concern for farmers' business income and food security has an impact on the estimated marketing and logistics margins for rice distribution. The food security system consists of three subsystems, namely availability, affordability, and utilization of food. Various parameters can be used to measure food security performance. In this paper, six parameters were selected, namely the achievement of self-sufficiency targets for five important food

commodities, availability of energy and protein per capita (availability), proportion of poor people, energy and protein consumption per capita (affordability), achievement of the Expected Food Pattern (PPH) score, and nutritional parameters in children under five years of age or toddlers (utilization).

The food security system perspective provides an overview of economic growth and food supply. So that food security indirectly impacts the livelihoods of people who depend on production and distribution that considers environmental needs. Because each food security system used by each region is different according to its needs. In low and middle income countries, it is stated that a good food security system can be created by capturing the latest issues, looking at the household level, and the social institutional system (Béné et al., 2019). So that food security is a task of agriculture and political will and is combined with the distribution of product delivery. Misselhorn et al. (2012) expressed the importance of food quantity not only from production but also its distribution, accessibility, quality and safety, all factors influenced by land use planning decisions, and the proximity of agricultural land to other land uses. Periodically, the Food Security Agency (BKP) compiles a food balance sheet, which presents domestic production data and national consumption needs. Production data is sourced from the Central Statistics Agency (BPS) for rice, corn, and soybeans; the Indonesian Sugar Council (DGI) for domestically produced granulated sugar; and BPS and the Directorate General of Animal Husbandry and Animal Health for beef.

Effective food security strategies often involve collaboration between government and community. In Indonesia, the synergy between government initiatives and community efforts is essential to address food availability challenges and improve domestic production technology (Hanspach et al., 2017; Kline et al., 2017; Walls et al., 2019; Widiana et al., 2022). This collaboration helps mitigate issues like drought and economic instability, which can impact food access and nutrition levels.

Social capital plays a significant role in enhancing food security by facilitating knowledge and product sharing within communities. This interaction improves food availability, access, and utilization, thereby strengthening the overall stability of food systems (Labadarios et al., 2011; Nosratabadi et al., 2020). Social networks increase community resilience and decrease vulnerability, contributing to a more robust food security framework.

Indonesia faces challenges in food production and distribution, with lessons to be learned from countries like Vietnam, India, and Japan. These countries have successfully built systems and institutions to manage

food supplies and distribution channels. The development of technology and data systems is essential for improving productivity and achieving food security (Essien, 2019; Fauzia & Mustafa, 2024; Ivana et al., 2020; Tan et al., 2024; Widyaningsih & Andriyani, 2019).

In conclusion, achieving national food security requires a multifaceted approach that involves social capital, institutional collaboration, technological advancement, and international cooperation. By leveraging these synergies, countries can work towards sustainable and resilient food systems.

Considering governance in supporting the food security system to be more efficient in meeting food availability for community needs needs to be followed up. The impact of this policy not only affects the food sector, but also water, energy, and other sectors. The governance approach to food security emphasizes coordination, policy integration, or holism (Pérez-Escamilla et al., 2017). However, good governance is a challenge and solution for food security (Candel, 2014). De Fraiture et al. (2014) argue that an integrated approach can lead to increased economic benefits and provide a different perspective on land use conversion. The results of land use conversion are expected to improve the community's economy so that income will increase significantly. In addition, the potential for superior rice varieties can increase food security and reduce social factors such as poverty (Arouna et al., 2017). The financial crisis has made adjustments to the dynamics of poverty and consequently to the challenges of hunger (Burchi et al., 2016; Lipton et al., 2017; Martin et al., 2016).

Environmental conditions can disrupt the activities of the food system which has an impact on malnutrition. Food and nutrition security are human rights in the Sustainable Development Goals that cannot be separated (Fanzo et al., 2022). A sustainable food system must be aware of the competitiveness or conflict between the interactions of food security, nutrition, health, income, environment, and culture that determine how the food security system will develop (Béné et al., 2019). Social factors can play an important role in shaping purchasing intentions and purchasing behavior (Yin et al., 2019). Consumer trust in rice quality is a major driver in determining purchasing decisions because they believe that rice quality will have an impact on health (Fristin et al., 2021; van Loo et al., 2013; Wahyudi et al., 2019). In addition, the influence of age, education level, marital status and ethnicity on food consumption (Woo et al., 1999).

The development of the food availability subsystem includes regulating the stability and continuity of food supply, both from domestic production, reserves, and imports and exports. The development of the distribution subsystem includes physical and economic

accessibility of food to food between regions and over time, as well as the stability of strategic food prices. The development of a consistent subsystem includes food management at the regional and household levels to ensure that each individual obtains food in the appropriate quantity, nutritional quality, safety and diversity. Rice quality is very important in transactions because it will determine the price level and the benefits received. Debnath et al. (2018) found that the rice subsidy program will have an impact on rice prices, resulting in a significant increase in rice consumption, while the income effect will have an impact on rice production, consumption and exports needs. Increasing rice production to meet demand can be done by increasing the adoption of post-harvest harvesting mechanisms coupled with the application of GAP. This will increase rice production, thereby contributing greatly to rice production. However, there are problems with the distribution system which is still fragmented without coordination in the supply chain from upstream to downstream (Malau et al., 2023). Food distribution is still not optimal so that availability in each region and prices in each region are different.

## Conclusion

Food security is one part of Indonesia's national development goals. Food security is very important because it is estimated that Indonesia's population, which is currently 267 million, is projected to continue to increase to 319 million in 2045. Based on the analysis that has been carried out, the food synergy system that is carried out includes 1) Implementing good governance as a challenge and solution to food security; 2) Stability of food security also affects price and distribution policies; 3) Increasing rice production will make a major contribution to rice production. Superior rice varieties will increase food security and reduce poverty; 4) Food distribution is still not optimal so that availability in each region and prices in each region vary.

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## Author Contributions

All authors contributed equally to the writing of this.

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## Conflicts of Interest

All authors declare that they have no conflict of interest.

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