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The Effectiveness of Community Food Barns in Batam City's Food Diversification Program

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Abstract

The objective of this research is to examine and identify the factors that influence the effectiveness of food barns in upholding food security, as well as the challenges faced by the residents of Batam City in establishing and reinforcing these food storage facilities to achieve food security. Moreover, it aims to assess the quality of available food and enhance its diversity, encompassing options rich in carbohydrates, protein, vitamins, and other essential minerals. Food barns are an integral part of the community's food reserve system and coexist harmoniously with rice culture. A key strategy to ensure food self-sufficiency is through the diversification of food consumption. This research employs qualitative methods and draws on limited research from books, journals, and other relevant literature sources. The findings shed light on the significant role played by food barns in ensuring food security. They serve as vital storage locations for the entire population, addressing food shortages during crop failures or periods of famine, and contributing to the collective income. However, the study also reveals various challenges in the growth and development of food barns, including issues related to food access, limited facilities, availability of food supplies, and health or nutritional concerns. These factors drive the necessity for the establishment of sustainable food barns. Consequently, the implications of the research highlight the limited presence of food barns and the need for increased storage capacity to effectively meet the demands of the community.

Keywords:

Sustainable Development, Community Food Barn, Diversification

Introduction

According to the Central Bureau of Statistics in 2021, Batam city is an industrialized urban center with a populace exceeding one million individuals. The significant populace of Batam City has led to elevated costs associated with sustenance procurement within the locality. In order to mitigate the risk of a potential food shortage and the consequent escalation of commodity prices, the local government of Batam has undertaken the cultivation of land on two islands, namely Canon and Subang Mas islands, with the intention of utilizing said land for agricultural purposes (Gokepri.com, 2021). The provision of food is a fundamental requirement for the sustenance of society. As the populace grows and the standard of living improves, the necessity for food correspondingly increases. The availability of food is a crucial element in the development of human resources. The prioritization of food security is a common objective among nations, as it is widely recognized as a fundamental prerequisite for the success of all other sectors. This is not an unexpected phenomenon, as food security has historically been a matter of political significance, and instances of food insecurity have often led to social and political unrest (Anandhiya et al., 2021). According to Dj and Sudarma (2018), the community food barn serves as a storage and management facility for staple foods, which are intended to function as community food reserves in anticipation of potential scarcity.

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The implementation of food diversification has been identified as a key strategy towards attaining food self-sufficiency and building resilience against potential food crises. The practice of food diversification involves the intentional increase in the consumption of a variety of foods while maintaining a balanced nutritional intake, as described by Dewi and Ginting in 2012. The concept of ensuring food security is based on two fundamental principles, specifically adequacy and accessibility. These principles encompass various aspects such as ensuring stability of food supply, determining tariffs, as well as allocation and utilization of resources. The provision of food access to individuals is a crucial approach towards enhancing their overall welfare, as stated by Prihatin et al. in 2012.

The strategy in question places significant emphasis on the capacity of both the governing bodies and the populace to generate and utilize sustenance in accordance with the demands and resources of the region (Purwaningsih, 2008). The success of initiatives aimed at enhancing food security in a region is contingent upon the capacity of rural communities to consistently and sustainably fulfill food production requirements. This is due to the fact that rural areas serve as the primary foundation of agrarian development, relying on natural resources, labor, and agricultural policies (Nugroho, 2018). The attainment of food security in rural areas is contingent upon the establishment of food storage facilities within villages. These facilities are designed to preserve collected products until they are sold in the market at prices that are deemed satisfactory by farmers. The revitalization of village food storage institutions, which remain essential and socially-oriented, can be achieved through a sustainable and comprehensive empowerment strategy that tackles all pertinent concerns in a systematic manner. It is anticipated that the aforementioned endeavors will effectively contribute towards the attainment of food security by facilitating the transformation of community socio-economic establishments into entities that spearhead the agrarian economy.

The subsequent table displays data regarding the mean monthly consumption expenses of food commodity groups by the general public:

Kelompok Konsumsi Makanan	Nilai Rata-rata Pengeluaran Konsumsi Kelompok Komoditas Makanan (Rupiah/Kapita perbulan)		
	2018	2019	2020
Padi-padian	66467,34	64206,33	66717,00
Umbi-umbian	7360,33	7671,41	8727,00
Ikan/Udang/Cumi-cumi/Kerang	77548,89	81456,60	93337,00
Daging	36993,81	42659,87	40075,00
Telur dan Susu	54203,09	54384,99	61523,00
Sayur-sayuran	61346,16	59715,99	73715,00
Kacang-kacangan	10982,95	11478,10	11664,00
Buah-buahan	37075,56	41231,76	44363,00
Minyak dan kelapa	16341,22	15257,58	16337,00
Bahan minuman	18094,62	18288,97	18189,00
Bumbu-bumbuan	13614,03	13578,08	14958,00
Konsumsi lainnya	13034,71	12725,87	13350,00
Makanan dan Minuman jadi	334124,74	356575,40	322658,00
Rokok, Tembakau, dan Sirih	64365,21	74947,09	78898,00

Figure 1. Data on Consumption Expenditure for the Food Commodity Group
Source: (BPS, 2022)

According to the Central Bureau of Statistics for the City of Batam (BPS, 2022), an analysis of consumption expenditure for food commodities in 2020 has been conducted. The results indicate that the highest order of consumption expenditure was for prepared food and drinks, followed by seafood, tobacco and betel nut, vegetables,

and grains, respectively. As a result of limited land availability within the urban area and a heightened emphasis on infrastructure expansion and industrial growth, the City has experienced a shortage of space. The current situation in Batam necessitates the urgent procurement of food commodities from other regions to meet the demand for supplies. The region of Batam, despite not being traditionally known for agricultural production, is currently pursuing the development of agricultural areas on the island. The aim of this initiative is to provide local residents with increased access to food sources and to promote self-sufficiency within the community. The presence of farmers in the area is expected to contribute to the achievement of these goals. According to a recent report by Gokepri.com (2021), it has been observed that farmers are engaged in the production of fruits and vegetables, which are of satisfactory quality.

According to the findings of a study conducted by Sri Mulyani et al. in 2020, it has been reported that the conversion of paddy fields has resulted in a decline in both the quantity of rice produced and the area of rice harvested. The current trend of population growth coupled with a decrease in food production and an increase in demand for food is expected to have a significant impact on the sustainability of food security.

Literature Review

Sustainable Development

The interpretation of development can be dynamic in nature. The concept of development typically pertains to the utilization of finite resources to meet human desires and needs. During the 1970s, the concept of development was redefined to serve as a tool for augmenting per capita growth rates, with the aim of shifting focus away from issues such as income inequality, prejudice, and poverty.

In the 1990s, the concept of development underwent a transformation wherein the emphasis shifted from augmenting economic growth to implementing measures aimed at enhancing the standard of living. The concept of sustainable development, which entails prioritizing not only immediate needs but also future requirements, was first recognized during the 2000s. As per the report by the World Commission on Environment and Development (WCED) in 1987, commonly accepted as the Brundtland report, sustainable development is defined as the type of development that caters to the present generation's needs while ensuring that the needs of future generations are not jeopardized. The proposal encompasses three key dimensions, namely economic, social, and environmental. According to Iskandar (2020), the achievement of sustainable long-term development necessitates the formulation of a comprehensive strategy that takes into account economic, social, and environmental factors, and is reinforced by robust institutional arrangements.

The development concept of sustainable development, as viewed through an environmental lens, integrates the notion of environmental management, encompassing its resources, into development programs and procedures. As per the official stance of the Indonesian Government, development is a strategic and comprehensive plan that is executed through the implementation of development programs. The objective of these programs is to enhance the abilities, well-being, and standard of living of the populace, with a focus on both the current and future generations. This definition has been documented by Saptari in (2000). The Sustainable Development Goals (SDGs) comprise a developmental framework that encompasses legal and governance pillars, in addition to the three primary pillars of social, economic, and environmental development. According to Salim (2021), the social development framework comprises five pillars. These pillars include the attainment of gender equality, eradication of poverty, establishment of a robust and thriving society, and the provision of inclusive education of high quality.

Food Storage For Food Security

It has been observed that the customary practice of the indigenous population in Indonesia is to preserve their agricultural produce in structures commonly referred to as rice barns. It has been observed that every individual location possesses a distinct barn configuration. In accordance with commonly observed characteristics, a granary is a structure constructed primarily of wood and featuring a roofing material composed of palm fibers. The overall
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appearance of the granary is reminiscent of a raised dwelling. The barn serves as a storage facility or intermediary for fulfilling the requirements of the household or the neighboring populace, particularly in times of scarcity, and is also the primary origin of sustenance (self-cultivated). The act of storing food is commonly defined as the utilization of a building or dwelling to contain reserve provisions, specifically rice, maize, or animal feed, until they are gradually consumed or utilized to satisfy the requirements of a specific household or populace. It has been observed that crops have the ability to be preserved for extended periods of time when stored within barns. According to Mariyani et al. (2018), it has been credited to the Baduy tribe that they have developed barns with distinctive patterns, which have the capacity to preserve rice for as long as a century.

The Ministry of Agriculture's LPD-45 report titled "Indonesia Towards a World Food Barn in 2045" has introduced the notion of achieving self-sufficiency in food. The adequacy of food storage for domestic consumption is of paramount importance. Nevertheless, it can also serve as a contingency plan or a source of sustenance for foreign nations. It is imperative, however, that the domestic requirements are given precedence.

The fundamental tenet of food preservation is the generation and dissemination of foodstuffs to foreign nations. The objective of this report is to examine the utilization of agricultural resources in border areas for the purpose of enhancing local and national food security, as well as improving the welfare of the population. This approach is deemed essential for the growth of the local economy and contributes to the increase in state income through formal cross-border and inter-country trade. The individual or entity in question is recognized for their activity in exporting goods or services. According to the International Potato Center's report of 2019, the objective of export orientation is to promote regional stability and sustainability through the enhancement of food security, economic expansion, and social well-being.

The decline in food storage has been observed due to various factors, including the adoption of high-yielding rice technology through the green revolution, which was perceived as being in opposition to the conventional granary of society. Additionally, the presence of Bulog has played a significant role in maintaining the stability of food (wheat) supply and prices. According to recent observations, there appears to be a lack of motivation to preserve grain in various locations. This may be attributed to the impact of globalization, which has altered consumption patterns by introducing a diverse range of foods, including processed options, to rural areas. Additionally, it has been noted that inconsistent development activities and a tendency towards project-based approaches have rendered training initiatives ineffective.

The present state of food storage indicates that it is predominantly situated in regions that have a past record of food insecurity and are geographically challenged in terms of disaster accessibility. It is recommended that the government provide food reserves that facilitate the movement of food between regions, similar to the actions taken by Bulog, in order to address short-term food insecurity (Rachmat et al., 2011).

Food Diversification Business

The objective is to provide a diverse range of food products in multiple formats, thereby affording consumers a plethora of options for their daily dietary needs (Shah & EF, 2018). The definition of food diversification encompasses three distinct aspects, namely horizontal diversification, vertical diversification, and regional diversification. Horizontal diversification refers to the endeavor to transition from rice-based agriculture to other food crop-based agriculture. Vertical diversification pertains to the development of production after harvest. Lastly, regional diversification involves diversifying food commodities based on the region. The study conducted by Atmaja in 2017 pertains to regional approaches and socio-cultural diversity.

The objective of this initiative is to promote diverse and high-quality food consumption patterns among the population, while ensuring food security and national economic stability. The focus is on diversifying staple foods, which will require the utilization, development, and mastery of various related sciences and technologies. According to Mani (2020), the implementation of diversifying food production or consumption involves two distinct types of goals. These goals are categorized as those that are based on the concept of sustainable development and those

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that are based on factors that promote the welfare of individuals. It is noteworthy that a particular category of essential crops, specifically paddy, continues to hold a significant share or reliance in the context of the overall dietary habits of the nation. The ensuing objectives for diversifying food consumption are founded on the principle of sustainable development. The attainment of nutrition from a wider range of sources that are balanced in nature may be achieved through the process of food verification. It has been observed that the majority of Southeast Asia is a significant producer of rice. As a result, Indonesia, in particular, and the ASEAN region, in general, are progressively incorporating rice into their dietary habits. The Indonesian government has expressed its commitment to attaining rice self-sufficiency by limiting rice consumption to match its production levels. This objective is to be achieved through the implementation of the food diversification program, as defined in Government Regulation Number 68 of 2002 on Food Security, as reaffirmed by the government. (Hardono, 2014).

Research Methods

The present investigation employs a qualitative approach. The identification and cataloging of laws and regulations, case studies, library resources such as writings and scholarly works, and other pertinent sources of information have been undertaken. According to the findings of qualitative descriptive research, an interpretation and description of information related to the social climate, attitudes, and viewpoints has been presented. The study employed the mixed logical thinking data analysis technique to incorporate inductive thinking patterns and generate diverse interpretations of the data that are pertinent to the research discussion topics. The Department of Food Security and Agriculture of the City of Batam has been identified as the designated location for the purposes of this study. The present study was undertaken with the aim of identifying the factors that impact the efficacy of food preservation and enhancing the caliber and diversity of food items that are accessible. This report outlines the strategies for achieving food security in Batam City through the implementation of a food diversification program. The report also examines the availability of land and the capacity of the community or government to sustain food security.

The data utilized in this research was sourced from the official website of the Central Bureau of Statistics, Department of Agriculture, including journals, publications, news, and other media pertinent to the subject matter. Following the collection and processing of data in accordance with research requirements, the data is scrutinized, chosen, and consolidated into a cohesive entity in alignment with the research objectives. A study is required to determine the necessity of implementing diversification strategies in order to preempt food crises and ensure the availability of food security. This is due to the high levels of consumption, growing population, and restricted access to facilities and infrastructure. A discourse pertaining to the preservation of food security's efficacy and the preemptive measures against scarcity is imperative. The study's findings offer recommendations to the Batam City Agriculture and Food Security Service. These include the implementation of food diversification programs and the empowerment of local communities to participate in government-led initiatives aimed at promoting survival and preserving the resilience of the local area.

Results and Discussion

A portion of the APBN Fund has been allocated for the purpose of supporting Community Food Barn initiatives on Mekan Island, Rear Padang District. These activities are overseen by the United Anugerah group. In 2013, the Food Barn, which serves as a rice warehouse, was constructed. The purpose of this facility was to store food reserves. In 2014, a total of 90 sacks of rice, equivalent to 1.5 tons, were deposited in the Food Barn for this purpose. The community project for 2017 of the Batam City Agriculture and Food Security Agency was financed through the Batam City APBD. The objective of the Community Food Reserve (CPM) initiative is to facilitate the accessibility of rice to the local populace at reasonable prices, as per the records of Batam (n.d.). The Community Food Reserve Management Team (BPS) was formed by three distinct groups. These groups are situated on Sarang Island, in Rear Padang District, where the United Nest Group is located. The Bulang Berkah Group is situated in three distinct Denti Permatasari, Timbul Dompok, Lubna Salsabila, and Etika Khairina

locations, namely Bulang Lintang Island, Bulang District. According to available records, the Subang Mas Berlian Community is located in Subang Mas Village, Galang District, Batam. Further details are not currently available. As per the statistics provided by the Food Security Agency, the national consumption pattern between 2018 and 2020 indicates that an average individual utilizes approximately 20,000 kg of grain annually, whereas the consumption of tubers is less than 1,000 kg. The analysis presented herein highlights the significant variability observed in the dietary habits of the populace at large, underscoring the vast range of foodstuffs consumed across the nation. Furthermore, it is noted that the potential of biodiversity remains largely untapped, representing a missed opportunity for the optimization of food consumption practices. According to the Bureau of Public Services (BPS) in 2022, the implementation of local food consumption diversification is deemed a strategic measure that can be undertaken.

However, the implementation of the aforementioned has not been fully realized. The objective of diversification is to expand the range of food products available to consumers, encompassing a diverse array of types and forms. This is intended to enhance the number of menu options available to consumers on a daily basis. The objective of food diversification is to promote a robust and thriving local economy while fostering the development of healthy, productive, and active human resources. This is achieved by ensuring that the food supply is diverse, nutritious, balanced, and safe. The objective of the aforementioned study, conducted by Sagugurat et al. in 2019, is to predict worldwide food shortages and irregularities in climate patterns.

In order to ensure the efficacy of the initial food diversification initiative, it is imperative that the community is engaged in a collaborative and individualistic manner. The community's active participation in decision-making is crucial to achieving food security. It is recommended that the community engage in activities aimed at increasing food security, and that the results of these activities be monitored and evaluated through community participation. Food storage facilities and business units resulting from food diversification programs should be utilized to maximize the benefits of these efforts (Azhari et al., 2013). The government, as an institution responsible for regulating city government activities related to food security, has two primary responsibilities. These include the initiation, facilitation, and management of the implementation of food security measures in Batam City, in accordance with national food security goals, policies, and strategies. This document serves as a directive for municipal governments to execute the necessary duties pertaining to the domain of food security. It has been recommended that local governments take an active role in addressing food insecurity in disadvantaged communities. This can be achieved through measures such as increasing the availability and reserves of food, improving distribution and access, promoting consumption diversity, and enhancing food security for locally sourced produce (Hardono, 2014).

Third Several processing technologies have been assembled and tested in an effort to facilitate the advancement of food diversification initiatives. In the establishment of the processing technology, due consideration is given to the development base and application orientation, as well as the accessibility of raw materials. It is imperative that an adequate supply of food commodities, including grains and tubers, be made available to the public due to their high level of consumption. This is necessary to ensure that they meet the required standards of acceptability, as stated by Rachman and Ariani in 2016. The food diversification initiative aims to decrease reliance on rice consumption and enhance the consumption of other locally available sources of carbohydrates. The augmentation of non-rice indigenous food resources and the amplification of Micro, Small, and Medium Enterprises (MSMEs) engaged in the food industry as providers of sustenance. The consumption of a diverse range of foods is considered a favorable dietary practice. It has been determined that the fulfillment of both macro and micro nutrient requirements can be achieved through the consumption of a diverse range of wholesome, proportionate, and secure food items. The attainment of optimal health is contingent upon the fulfillment of nutritional requirements. According to Ariani (2010a), the implementation of Government Regulation no. 68 in 2002 has resulted in the regulation of diversification programs related to Food Security.

According to the aforementioned description, it is deemed imperative to maintain the policy of promoting diversified food consumption. The implementation of a diversified food consumption policy is associated with positive outcomes beyond the enhancement of human resources quality. In addition to the impetus for food diversification,

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there exist various impediments to this goal, including but not limited to limited land availability, restricted access to food and resources, and inadequate infrastructure and facilities. It has been observed that certain categories of land may not be conducive to the cultivation of crops intended for human consumption. The conversion of paddy fields to non-rice crops poses a challenge due to the interconnectivity of these fields with drainage and dry (upland) land, which necessitates investment in erosion control measures. The current irrigation system's inflexible architecture and water distribution system are impeding the diversification of food crop production. The current circumstances present a challenge in the distribution of high-quality water for non-rice cultivation, resulting in a situation where farmers are compelled to engage in rice monoculture exclusively. In light of the current circumstances, it is imperative to make technological investments to facilitate the expansion of food crop agriculture. Specifically, financial investments are required to bolster the distribution, distribution, and drainage systems, as per Budhi's recommendations in 2010.

It is anticipated that the consumption of rice will experience a decline in the event that local carbohydrate sources, inclusive of both rice and non-rice alternatives, gain increased popularity. This is attributed to the diverse range of products that these sources offer, coupled with the robust marketing strategies that they are subjected to. The facilitation of public access to local food products, both rice and non-rice, is recommended to be implemented subsequent to the execution of food diversification initiatives. Prior to the expansion of regional food micro, small, and medium enterprises (MSMEs) to enhance accessibility, several measures must be implemented. The recommendation is to facilitate market accessibility. The development of Micro, Small, and Medium Enterprises (MSMEs) must be accompanied by the expansion of market access, in addition to efforts to enhance production. It has been reported that one of the measures taken to expand market access is the collaboration with the market to enhance the sales of MSME and farmer products, as well as to facilitate the procurement of local food ingredients for consumers (Demak Regency Agriculture & Food Service, n.d.).

The provision of food that meets the criteria of being of sufficient quality, safe for consumption, and evenly distributed is of growing importance in tandem with the progress of societal civilization. This is necessary to fulfill the requirements of a life that is advanced, independent, peaceful, and prosperous both physically and spiritually. The attainment of a nation's self-sufficiency is a crucial strategic objective in fostering the development of robust, dynamic, and industrious human capital. It is recommended that the food consumption diversification program be promoted due to the potential negative impact of relying solely on rice consumption on food security, particularly with regards to the stability aspect of food adequacy, as noted by Fadhla and Tarmizi (2015).

Food accessibility is defined as the capacity of fishing households to acquire sustenance through the utilization of their resources, encompassing physical, financial, and social means. The present report highlights that the physical access to food can be determined by two key factors, namely the availability of food in markets or stalls and the proximity of markets. As per the findings of Pasira et al. (2018), the assessment of economic access is based on the income and expenditure of the respondents. On the other hand, social access is evaluated by taking into account the barter and food assistance received by the individuals. The present report highlights the limited availability of food barns in the Riau Archipelago, particularly in Batam City, with respect to grain commodities. The primary reason for this scarcity is attributed to the unsuitable land or soil conditions for rice cultivation, owing to the presence of bauxite content. According to Kepripedia (2021), the agricultural sector in Batam City is limited to the cultivation of crops such as corn, cassava, soybeans, peanuts, chilies, as well as various vegetables and fruits. As per the directive of the Minister of Agriculture of Batam City, the Riau Archipelago has been designated as an organic food production center. The aim is to enhance the value of farmers by establishing a modern agricultural plot spanning 10 to 20 hectares of rice fields. This will lead to a reduction in production costs and enable the production of organic rice, vegetables, and fruits for export purposes.

As per the directives of the central government, regional officials at the provincial and district/city levels have been advised to closely monitor the availability of food in their respective regions. This measure has been taken to ensure that no individual within the region suffers from food insecurity. The government's decision to prioritize food

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security is in alignment with the 17 Sustainable Development Goals (SDGs). In response to the central government's acknowledgement of the significance of maintaining national food security, it has been mandated that officials at the provincial, district, and city levels undertake the responsibility of monitoring regional food availability to ensure that no individual is subjected to food scarcity. It is imperative to enhance regional food security prior to embarking on the development of national food security. In accordance with legal requirements, it is imperative to ensure significant coordination among various stakeholders, including regional leaders who bear the responsibility of catering to the food requirements of their populace (S. Bambang, 2021).

Conclusions

The study's findings suggest that the primary impetus behind the food diversification program is to enhance the effectiveness of food storage by engaging the community in various aspects of the program, including implementation, decision-making, monitoring, and utilization of key outcomes. The government plays a facilitative role in the program by providing access and necessary infrastructure to ensure its smooth operation. The limiting factors are attributed to the insufficient land area for cultivating rice, which is caused by unfavorable geographical conditions.

The implementation of a food consumption diversification program has been found to yield several benefits. These include the strengthening of food security, as well as the establishment of the region as a food storage location for the entire population. Additionally, the program has been found to increase the income of farmers and the food agro-industry, while also saving foreign exchange. Finally, the program aims to increase human resources. The implementation of diversified food consumption has resulted in an increase in the populace's food accessibility. This measure is anticipated to have a positive impact on the domestic social fabric and the national economy. The diversification of food consumption is contingent upon the involvement of governmental entities, both at the national and local levels. In order to facilitate the provision of distinctive and innovative group coaching and empowerment services that can enhance the overall welfare of the group, it is imperative that empowerment initiatives are executed in a just and all-encompassing manner. It is recommended that the food consumption diversification program be transformed into a collaborative effort that includes all stakeholders, including the government, private sector, non-governmental organizations, and the community.

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