ANALYSIS OF SUPERIOR COMMODITY PRODUCTION, FOOD ACCESS, AND INSTITUTIONAL ROLES TOWARDS SUSTAINABLE FOOD SECURITY IN SUNGAI PENUH CITY

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ABSTRACT

This study aims to analyze the influence of superior commodity production, food access, and institutional roles on sustainable food security in Sungai Banyak City, an agricultural city in Jambi Province, 59.2% of which is the Kerinci Seblat National Park (TNKS). With its hilly topography and limited urban land area, efforts to achieve food security face unique challenges. The research method uses a quantitative approach with the Two-Stage Least Squares (TSLS) analysis tool through E-Views software. Primary data were obtained from questionnaires to 396 respondents spread across 8 sub-districts, supported by secondary data from the Central Statistics Agency and the local Food Security Office. The results showed that simultaneously, the three independent variables had a significant effect and were able to explain 83.83% of the variation in sustainable food security (R-squared = 0.8383). Partially, institutional roles had the most dominant influence (coefficient 0.162), followed by superior commodity production (0.126), and food access (0.045). The leading commodity of lowland rice serves as the backbone of local food security, while food access is improved through affordable market programs and food kiosks. Institutions play a key role through programs such as the Food Brigade, the Food Reserves Regulation, and the Bagizi Food Kitchen (MBG). It was concluded that achieving sustainable food security in Sungai Banyak City requires an integrated approach that strengthens institutional capacity, optimizes production of leading commodities on limited land, and ensures stable and affordable food access for all.

Keywords: Production; Superior Commodities; Food Access; Institutional Role; Sustainable Food Security

1. Introduction

Food security is a global issue that affects a country's economic growth and political stability (1) (2). FAO defines food security as a condition in which every individual has sufficient access to food for a healthy and active life (3) (4). In Indonesia, Law No. 18 of 2012 emphasizes that food safety includes availability, affordability, utilization, and nutritional aspects. The main challenges towards food security include population growth, shrinking agricultural land, dependence on imports, and low adoption of agricultural technology. Therefore, food policy needs to be directed at increasing domestic production, distribution efficiency, and the use of agricultural technology (5) (6). Sungai Banyak City is a city located in Jambi Province with an area of 391.50 KM² and a population of 101,716 people. Based on the National Food Agency report, the Food Security Index in Sungai Banyak City fluctuated from 2018 to

2023, ranging from 59.92 to 83.14, ranking between 53 and 68 of all cities and districts in Indonesia and in priority group 5 (resistant) (7). One of Sungai Banyak City's leading commodities, especially food crops, is paddy rice with an average production area of 5,392 hectares and a production volume of 33,423.10 tons. Based on statistical data, Sungai Banyak City is one of the rice production areas in Jambi Province (8). However, the amount of productive land in this city continues to decrease every year due to the conversion of paddy fields into residential areas. This condition will affect the amount of food crop production which will ultimately affect the ability to meet food needs (9). This is the basis for the need to conduct research on the analysis of superior commodity production, food access, and the role of institutions towards sustainable food security in Sungai Banyak City. The purpose of this study is to analyze the existing conditions of superior commodity production, food access and institutional roles as well as food security in Sungai Banyak City and to analyze the production of superior commodities, food access and institutional roles towards sustainable food security in Sungai Banyak City.

2. Materials and Methods

The preparation phase of this research began with gathering information through literature studies and field pre-surveys related to issues related to the production of superior commodities, food access, and the role of institutions towards sustainable food security in Sungai Banyak City. Furthermore, the researcher developed a research design, including the selection of quantitative and qualitative methods, sampling techniques, and data collection instruments such as interviews and questionnaires. Research Location and Timeline: This research will be conducted in Sungai Banyak City, one of the rice production centers in Jambi Province. The research will begin in May 2025 and continue until December 2025. During this period, data will be collected to analyze issues related to the production of superior commodities, food access, and the role of institutions towards sustainable food security in Sungai Banyak City.

Population and Sample: The population in this study consists of farmers. Based on statistical data from Sungai Banyak City, the number of farmers in Sungai Banyak City is 44,428 (43.68% of the total population). To determine the sample, this study selected farmers from the 44,428 population using the Slovin formula. The purposive sampling method used was to select 396 respondents, deemed representative of farmers with characteristics relevant to this study. A full sampling method was used for government agencies, including the Sungai Banyak Food Security Agency and the Sungai Banyak City Food Crops, Horticulture, and Plantation Agency.

Data Sources and Data Collection Techniques: The data used in this study consisted of primary data obtained directly through interviews and questionnaires. A survey method was used to collect data from respondents. During the data collection process, interviews were conducted to obtain in-depth information on superior commodity production, food access, and the role of institutions in achieving sustainable food security for further analysis.

Implementation Stage: Researchers collected primary data from farmers and relevant agencies on superior commodity production, food access, and the role of institutions in achieving sustainable food security in Sungai Banyak City through in-depth interviews and questionnaires. The questionnaire consisted of closed-ended, open-ended, and multiple-choice questions. Closed-ended questions used a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to quantitatively measure

respondents' perceptions. Open-ended questions were used to gain deeper insights, while multiple-choice questions collected concrete information such as income, land area, and agricultural production. After respondents were selected, questionnaires were distributed through face-to-face interviews with enumerators or self-administered questionnaires with guidance from the research team. To increase response rates, enumerators provided clear instructions. The final stage was data verification and processing, ensuring there were no missing data or inconsistent answers before analysis using Eviews .

3. Results and Discussion

The Geographical Location of Sungai Banyak City is between 1010 14'32"E to 1010 27'31"E and 020 01'40"S to 020 14'54"S. With a total area of 39,150 ha, consisting of TNKS covering an area of 23,177.6 ha (59.2%) and cultivated residential land covering an area of 15,972.4 ha (48.8%), Sungai Banyak City is a city in Jambi Province, Indonesia. This city was formed based on the Republic of Indonesia Law number 25 of 2008, which is a division of Kerinci Regency and its ratification was carried out by the Minister of Home Affairs, on October 8, 2009. The population of Sungai Banyak City in mid-2024 was 101,716 people, with a density of 260 people/km2 and directly borders Pesisir Selatan Regency, West Sumatra. Sungai Banyak City has a total area of 39,150 ha, 59.2% or 23,177.6 ha is the Kerinci Seblat National Park area, while around 40.8% or 15,972.4 ha is just an effective urban area. This city area has a hilly topography, located in the Bukit Barisan area and tropical forests with an altitude of 650 – 1200 m above sea level, with a land slope area of between 0 – 20% of around 6,300 ha, an undulating land area with a slope of between 5 – 150% of around 1,295 ha, a steep undulating land area with a slope of between 16 – 400% of around 4,345 ha, and a very steep undulating land area with a slope of more than 400% of around 1,295 ha. The boundaries of Sungai Banyak City include:
North : Depati Tujuh
East : East Warm Water, West Kerinci Lake, Sitinjau Laut, and Tanah Cogok
South : Around the Lake
West : Basa Ampek Balai Tapan, West Sumatra
Sungai Banyak City has 8 sub-districts, 4 urban villages, and 65 villages (out of a total of 141 sub-districts, 163 urban villages, and 1,399 villages in Jambi). In 2017, the population was 103,511, with an area of 391.50 km² and a population density of 264 people per km².

Table 1. Types of Employment Sectors in Sungai Banyak City by Gender

Business Field	**Resident Work According to Business Field and Gender in Sungai Penuh City 2023**					
	Man (Soul)	**Percentage (%)**	**Woman (Soul)**	**Percentage (%)**	**Number (of Souls)**	**Percentage (%)**
Agriculture	6317	24.29	3345	20.62	9662	22.88
Manufacturing	4982	19.16	1067	6.58	6049	14.33
Other Services	14705	56.55	11809	72.80	26514	62.79
Amount	**26004**	**100.00**	**16221**	**100.00**	**42225**	**100.00**

Source: Central Statistics Agency of Sungai Penuh City, 2025

Based on the table above, it is known that the percentage of the population of Sungai Penuh City who work in the agricultural sector is 9,662 people or 22.88% of the total population.

Existing conditions of superior commodity production, food access and institutional roles as well as food security in Sungai Penuh City.

1. Featured Commodities

Sungai Penuh City is an agricultural region, with the majority of its population dependent on the agricultural sector for their livelihood. Based on statistical data on food crop production, the leading commodity in Sungai Penuh City is paddy rice, with 36,502 tons produced in 2024 on a land area of 3,555 hectares. The following table shows the production results of Sungai Penuh City's food crops for 2020-2021.

Table 2. Food Commodity Production Results in Sungai Penuh City 2020-2024 (Tons)

No	Commodity Type	2020	2021	2022	2023	2024
1.	Paddy Fields	40,943	33,413	35,881	28,866	36,502
2.	Dryland Rice	-	390	-	-	-
3.	Corn	429	513	421	325	493
4.	Cassava	129	225	287	321	332
5.	Sweet potato	115	214	198	224	241
6.	Nuts	67	84	76	78	82

Source: Sungai Penuh City Food Security Service, 2025

From the data in the table, it is known that based on the results of food crop production in Sungai Penuh City in 2020-2025, the superior food crop commodity in Sungai Penuh City is lowland rice, which is the staple food of the people in Sungai Penuh City. The superior commodity of Sungai Penuh City has an important link to sustainable food security because it supports agricultural diversification, maintains the balance of the agricultural ecosystem, and absorbs labor, thereby increasing farmers' incomes. Increasing the production and development of this commodity through appropriate programs and policies will strengthen the foundation of sustainable regional food security. The development of diverse superior commodities helps farmers not only rely on one type of product, but also creates a more varied agricultural pattern. This diversification can also increase local food diversity. Superior commodities have high economic value and market demand, so they can increase farmers' incomes. Stable income will strengthen farmers' ability to meet their own and their families' food needs, which are the pillars of food security (1) (2) (3) .

The development and increased production of this superior commodity aligns with the national food security program, as mentioned in the support for increased corn production in Jambi. This demonstrates the region's commitment to contributing to food security. With proper development, the cultivation of this commodity can maintain ecosystem balance through the implementation of sustainable agricultural practices, such as crop rotation and the use of organic fertilizers, which support long-term soil and environmental health. Cultivation of this superior commodity creates jobs and absorbs labor, particularly in the agricultural sector, thereby improving the quality of life and strengthening food security structures at the family and community levels.

2. Food Access

Food access in Sungai Penuh City is closely linked to sustainable food security through various local government efforts to increase food availability, such as optimizing swamp land and maintaining affordability and price stability through affordable food and food kiosks. Food availability and access are essential foundations for achieving sustainable local food security, which ultimately supports food sovereignty more broadly. Sustainable food security is achieved when everyone has physical, social, and economic access to sufficient, safe, and nutritious food that meets the nutritional needs for an active and healthy life. Food access is one of the four pillars of food security, alongside availability, utilization, and stability. Environmental and natural resource sustainability are prerequisites for long-term food security, meaning food management must consider ecological and social aspects for future generations. Sungai Penuh City's efforts in Food Access include:

1. Optimization of Swamp Land:
   - The Sungai Penuh City Government, through the Food Crops, Horticulture and Plantation Service (DTPHP), is encouraging the optimization of swamp land to increase agricultural production sustainably.
   - Collaboration with the Sumatra VI Jambi River Basin Center was carried out to build irrigation, so that swamp land can be used more productively.
2. Maintaining Affordability and Price Stability:
   - Cheap Food Market Operation: The Food Security Agency regularly holds cheap food distributions to suppress price increases for basic necessities and help the community.
   - Food Kiosk Preparation: The city government is preparing a food kiosk system that will distribute food directly from the main distributor to the community, so that prices are more affordable and stable.
3. Increasing Food Production:
   - The Sungai Penuh City Government is committed to supporting food self-sufficiency through various strategies, including the formation of a Food Brigade and the use of the latest agricultural technology.

With these efforts, Sungai Penuh City is trying to ensure that the community has access to sufficient, affordable and stable food, which is an integral part of achieving sustainable food security (4) (5) .

3. Institutional Role

In the Institutional Role of Sungai Penuh City, it plays an active role in realizing sustainable food security through various programs and strategies, such as local government support, the establishment of a Food Brigade for agricultural modernization, human resource development, land optimization, technology use, and increasing coordination and synergy between various elements such as farmers and related agencies to ensure the availability of sufficient, diverse, and affordable food in a sustainable manner.

- Regional Government (Sungai Penuh City Government):

Through the Deputy Mayor, the city government expressed its readiness to support and realize national ideals, including food sovereignty and self-sufficiency.

- Food Brigade **:**

Formed as the vanguard in agricultural modernization efforts, focusing on increasing food production, land optimization, technology utilization, and encouraging food independence at the village level.

- Ministry of Agriculture and related agencies:

Providing support in the form of programs and training to accelerate the realization of national food self-sufficiency, including through training and capacity building for farmers.

- Food Crops, Horticulture and Plantation Service (TPHP) of Sungai Penuh City,:

Play a key role in building a sustainable food security system by increasing the capacity of farmers and farming communities to be more resilient and adaptive.

Linkages to Sustainable Food Security

- Sungai Penuh City Food Security Service:

An institution focused on increasing agricultural productivity through the use of modern technology and land optimization to meet food needs. The use of agricultural machinery (Alsintan) and the latest agricultural technology is part of a strategy to accelerate food self-sufficiency and increase production efficiency.

- Department of Agricultural Extension

Sustainable food security supported by institutions also contributes to improving human development by ensuring the availability of healthy and nutritious food, as well as addressing the problem of poverty (6) (7) .

Cooperation and synergy between elements such as the government, farmer groups, and agricultural agencies are crucial to achieving food self-sufficiency targets and addressing existing challenges, including climate change. Institutions are committed to promoting food independence at the local level, which is an integral part of sustainable national food security (8) .

4. Food Security in Sungai Penuh City

Sustainable food security in Sungai Penuh City is being pursued through various programs and regulations, such as the establishment of a Regional Regulation on the Management of Food Reserves, the development of a food kiosk program for price stabilization, the review of Meal Bagizi (MBG) kitchens to strengthen the local economy and locally based food, and support for agriculture and fisheries to increase productivity and local food independence. The Sungai Penuh City Government has established a Regional Regulation on the Management of Food Reserves to ensure regional food availability and reduce dependence on food from outside the region. The city government plans to set up food kiosks to reduce prices and distribute food directly from main distributors, making it more affordable for the community. This program aims to strengthen locally based food security and support the community economy by utilizing food from villages, as well as creating new jobs. This program includes increasing the productivity of the agricultural and fisheries sectors, which are the backbone of food security.

The objectives and benefits of this activity include increasing the capacity of Sungai Penuh City to achieve food self-sufficiency and reduce dependence on external resources. Ensuring stable and affordable food prices for the community. Encouraging a locally-based economy, creating new jobs, and improving community well-being. Ensuring the availability and consumption of diverse, healthy, and locally appropriate food, including through nutrition programs.

The role of local governments in this regard includes preparing the regulations and administration necessary to implement food security programs. Monitoring the quality of food distributed through programs like the MBG to ensure its nutritional value and hygiene. Collaborating with the central and provincial governments to support and implement national strategic food programs.

Food demand in Indonesia continues to increase along with the growing population. However, the Indonesian food crop sector is currently facing challenges in increasing food production. The most fundamental problem in increasing food production is the shrinking agricultural land due to land conversion. Therefore, in 2009, the government, together with the House of Representatives (DPR), passed Law No. 41 of 2009 concerning the Protection of Sustainable Food Agricultural Land (PLP2B) (10) (2) .

Analysis of superior commodity production, food access and institutional roles towards sustainable food security in Sungai Penuh City

To analyze the production of superior commodities, food access, and institutional roles towards sustainable food security in Sungai Penuh City, a questionnaire was prepared and distributed to 396 respondents across eight sub-districts in Sungai Penuh City. Respondent characteristics based on gender, age group, and education level are presented in the following table:

Table 3. Respondent Characteristics by Gender

No	Gender	Respondents (People)	Percentage (%)
1.	Man	249	62.88
2.	Woman	147	37.12
Amount		**396**	**100**

Source: Processed Data, 2025

Table 4. Distribution of Respondents by Age Group

No	Age Group (Years)	Respondents (People)	Percentage (%)
1.	15-20	43	10.86
2.	21-25	74	18.69
3.	26-30	67	16.92
4.	31-35	89	22.47
5.	36-40	45	11.36
6.	>40	78	19.70
Amount		**396**	**100**

Source: Processed Data, 2025

Table 5. Respondent Characteristics by Education Level

No.	Level of education	Respondents (People)	Percentage (%)
1.	No school	28	7.07
2.	Elementary School or Equivalent	87	21.97
3.	Junior High School or Equivalent	86	21.72
4.	High School or Equivalent	67	16.92
5.	Diploma	78	19.70
6.	Bachelor	39	9.85
7.	Postgraduate	11	2.78
Amount		**396**	**100**

Source: Processed Data, 2025

For analysis of superior commodity production, food access and institutional roles towards sustainable food security in Sungai Penuh City using e-views as follows:

Dependent Variable: Y
Method: Two-Stage Least Squares
Date: 09/23/25 Time: 10:34
Sample: 1,396
Included observations: 396
Instrument specification: Y1 Y2 Y3 Y4 Y5 Y6 X1_1 X1_2 X1_3 X1_4 X1_5 X1_6 X2_1 X2_2 X2_3 X2_4 X3_5 X3_6
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.09609	1.654273	13.96147	0.0000
X1	0.125885	0.050051	2.515129	0.0123
X2	0.045012	0.050171	-0.897189	0.3702
X3	0.162357	0.050211	-3.233485	0.0013

R-squared	0.838270	Mean dependent var	21.35606
Adjusted R-squared	0.915570	SD dependent var	2.595417
SE of regression	2.554251	Sum squared residual	2557,486
F-statistic	5.278283	Durbin-Watson stat	3.068909
Prob(F-statistic)	0.001407	Second-Stage SSR	2557,486
J-statistic	392,0000	Instrument rank	10
Prob(J-statistic)	0.000000		

From the table above, the following equation is obtained:
Y = 23.0960908253 + 0.125884721709*X1 + 0.0450124307721*X2 + 0.162357167004*X3
From the equation above, it can be assumed as follows:

- The constant value of 23.09609 means that if the superior commodities, food access and institutional roles have a value of 0 or are constant, then sustainable food security in Sungai Penuh is 23.09609 units.
- The coefficient X1 has a value of 0.125885, meaning that if the superior commodity increases by 1 unit, sustainable food security in Sungai Penuh City will increase by 0.125885 units, assuming food access and institutional roles have constant values.
- The X2 coefficient is 0.045012, meaning that if food access increases by 1 unit, sustainable food security in Sungai Penuh City will increase by 0.045012 units, assuming that superior commodities and institutional roles are constant.
- The X3 coefficient is 0.162357, meaning that if the institutional role increases by

1 unit, sustainable food security in Sungai Penuh City will increase by 0.162357 units, assuming that superior commodities and food access have constant values.

R-squared: 0.83827 means that the magnitude of the influence of superior commodities, food access and the role of institutions on sustainable food security is 83.827%, the remaining 16.173% is influenced by other variables not examined in this study. Superior commodities, food access, and the role of institutions have a positive influence on sustainable food security because superior commodities increase food availability and local independence, food access ensures the availability and affordability of food, and institutions play a role in innovation, distribution, empowerment, and risk management to create a stable and resilient food system (11) (12) (13) **.** The Influence of Superior Commodities.

- Increasing Food Availability:

The development of superior regional commodities encourages increased local food production, which contributes to sufficient food availability and strengthens community food independence.

- Increase Income and Welfare:

Focusing on superior commodities can increase farmers' income and community welfare, which in turn can improve economic capacity to support food security.

The Impact of Food Access

- Availability and Affordability:

Good food access means sufficient food availability and affordable prices for all levels of society, thereby reducing the risk of hunger and social inequality.

- Infrastructure and Policy Improvements:

Increased access to food is often supported by improved infrastructure and supportive economic policies, which allow food to be distributed more equitably.

The Influence of Institutional Roles

- Innovation and Technology:

Agricultural institutions, such as research centers and extension agencies, play a role in introducing new innovations and technologies to increase food productivity, such as developing superior crop varieties that are resistant to climate change.

- Efficient Food Distribution:

Farmer cooperatives and farmer associations act as a link between producers and consumers, so that food distribution can be more efficient and equitable, and reduce dependence on middlemen.

- Farmer Empowerment:

Farmer groups and cooperatives provide vital support to smallholder farmers in accessing capital, technology, and markets, which strengthens their food production capacity.

- Risk Management:

Financial institutions and government policies can help farmers manage risk through insurance systems and other protection programs, which increase resilience to the threat of food crises. Sustainable food security in Sungai Penuh City is focused on increasing access and affordability of food by optimizing the distribution system through food kiosks and the Cheap Food Movement , as well as ensuring stable food availability through various programs such as distributing rice food aid to beneficiaries. These efforts aim to maintain stable food prices and improve community welfare, so that people have sufficient access to nutritious and affordable food. (14) (15)

4. Limitations and Future Directions

Model only covers three core variables (production , access , institutions), so that Not yet accommodate factor other important things such as impact change climate , dynamics price national , or culture consumption community , which also participates form resilience food (reflected from remainder variance 16.17%). Developing a model with add variables new like vulnerability climate , index diversification food and inequality economics . More analytical methods complex like SEM (Structural Equation Modeling) can used For explore connection causal between more variables complicated .

5. Conclusion

Commodity The superior (especially paddy rice) is foundation main availability food , although wide land effective urban limited (40.8% of the total area) and topography hilly , paddy rice commodities remain become contributor production food largest (36,502 tons in 2024). Development commodities This No only support diversification food and income farmers , but also become a strategic base For reach independence and sovereignty food local.Production Superior Commodities , Food Access, and Institutional Roles in a way together have a significant influence to Sustainable Food Security in Sungai Penuh City .

Analysis results show that third variables the capable explains 83.83% of the variation in resilience food sustainable (R-squared = 0.8383). This is indicates that effort improvement resilience food must done through approach integrated which includes aspect production , distribution / access , and institutions . Of the three variable , Institutional Role (X3) has the greatest influence to Sustainable Food Security . Coefficient regression For role institutional (0.162) more tall compared to commodities featured (0.126) and access food (0.045). This confirms that effectiveness of programs and policies food is very dependent on capacity institutional , including coordination , regulation , outreach , and empowerment . Formation of the Food Brigade, preparation Food Reserves Regional Regulation , as well as synergy between agencies (DTPHP, Food Security Agency) and groups farmer become factor key in push resilience sustainable food .

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