Determinants of Food Security in Kulon Progo District

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Abstract. This study investigates the management of food resources in Kulon Progo Regency, emphasizing the optimization of environmental assets to bolster agricultural productivity and, consequently, food security. Utilizing observational, comparative, and interpretative methods, the research identifies crucial determinants of food security such as land area, harvest yield per hectare, climatic conditions, and the implementation of agricultural mechanization. The findings underscore the necessity of advancing agricultural practices through human resource development, the adoption of high-quality seeds, the enhancement of agricultural, fisheries, and livestock products, and the integration of high-tech mechanization. Strategies proposed to sustain and enhance the agricultural sector's growth include increasing productivity, diversifying local food sources, strengthening logistical reserves, and modernizing agricultural techniques. The study further highlights the significant impact of population dynamics on the demand for food crops, advocating for the use of population projections in forecasting the needs for strategic commodities. Through a comprehensive analysis of consumption data, the research offers insights into the consumption patterns in Kulon Progo, providing a basis for improving food distribution and availability. The implications of this research are vital for policymakers and stakeholders in formulating strategies to ensure food security in Kulon Progo Regency by leveraging local environmental resources and modern agricultural advancements.

Keywords : Food Security, Environmental Resources, Productivity

1 Introduction

Economic growth and development have an impact on the occurrence of environmental changes such as the decline in the quality of the natural environment and reduced quality of natural resources as a buffer for people's needs. Industrial growth that is quite high on one hand makes a positive contribution to the Indonesian economy, on the other hand industrial progress raises environmental problems if environmental compatibility and comfort factors are ignored. Therefore, the importance of management of economic programs that support sustainable environmental quality. The 2020-2024 Strategic Food and Nutrition policy states that there are four pillars of food security, namely availability, affordability, utilization and stability, which means that if the four pillars are not met then the country cannot still be said to be a country with good resilience. Food security indicators include food availability, access to food and food utilization as the main aspects supporting food security[1]This condition has not been achieved in many districts in Indonesia.

Improving the community's economy is one of the Kulon Progo regional government's policies to alleviate poverty. One of the government's missions currently being promoted is to develop rural areas which can be achieved through community empowerment. The Kulon Progo Regency Government is currently discussing the follow-up to the preparation of a Sustainable Food Agricultural Land (LP2B) map. This is considered to be able to secure the availability of

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local food needs Based on Law Number 18 of 2012 concerning Food, what is meant by food is everything that comes from biological sources of agricultural, plantation, forestry, fishery, animal husbandry, aquatic and water products, whether processed or not. processed which is intended as food or drink for human consumption, including food additives, food raw materials, and other materials used in the process of preparing, processing, and or making food or drink, while local food is food consumed by[2] the local community in accordance with potential and local wisdom. Furthermore, processed food or processed food is food or drink processed in a certain way or method with or without additives.

Food consumption is the amount of food and drink that a person eats and drinks in order to fulfill biological needs. We actually find a lot of local food around us, however often there is no interest in cultivating and consuming it. Local food is in the form of food ingredients, both primary and secondary commodities. According to the Food Security Agency of the Ministry of Agriculture, there are quite a lot of types of local food and they are being spread throughout the region. Some highly economical ones include: rice, corn, meat, eggs and fish. However, some local food is still in the form of food potential that has not been utilized by the community at large, including: sago, tubers, rabbit meat, and so on. In many areas, local food has not been cultivated intensively, either in cultivation or post-harvest. This, of course, depends on the policy of the regional government. For this reason, if the policy has been taken, socialization about the policy is very necessary. [3]

The research results state that several challenges towards food security include farmer institutions, human resources, production strengthening, and farmer welfare. Sumardjo in sharpens the importance of policy socialization. According to him, information is only a perception, while education regarding agricultural production is very important for food availability. Then education on how to process food crops is also very important and related to stocks of food crop commodities. District/city government has the authority to develop superior staple foods. This policy needs to be socialized not only among policy makers at the central, provincial and district/city levels, but also down to society at lower levels, both producers and consumers of food crops. [4]

In connection with the conditions faced and experienced by Kulon Progo Regency, there is a need for research on sustainable food through the efforts of the Food Estate program. Judging from its definition, Food Estate is a large-scale food business which is a series of activities carried out to utilize natural resources through human efforts by utilizing capital, technology and other resources to produce food products to meet human needs in an integrated manner including horticulture of food crops, plantations, even livestock in a certain very large area.

The condition of agricultural land in Kulon Progo Regency is presented in Table 1. Table 1 shows the types of land and land use for several years.

Table 1. Distribution of Land Use in Kulon Progo Regency (in hectares)

LAND TYPE	LAND USE	Land area 2016	Land area 2017	Land area 2021
Rice Fields	Irrigation	9,360	9,306	1,377
Rice Fields	Rainfed	1,006	948	670
Non-Paddy Land	Tegal/Garden	15,561	15,572	14,36
Non-Paddy Land	Plantation	590	590	136
Non-Paddy Land	Planted with trees/community forests	6,147	6,147	20795,1

Land Not Paddy Field	While not working	696	636	-
Land Not Paddy Field	Others (ponds, ponds, ponds, state forests, etc.)	11,939	11,939	203,2
Non-Agricultural Land	roads, residential areas, offices, rivers etc	13,328	13,489	10762,7

Source: BPS, several years

Table 1 presents data regarding the distribution of land use in Kulon Progo Regency in 2016, 2017 and 2021. 2016 and 2017 are the years when there was no international airport construction, while 2021 is the year when Kulon Progo already has infrastructure with the construction of an International Airport. Table 1 shows that in 2021 agricultural land will decrease. On the other hand, the use of state forests has increased significantly, this is used for agriculture as a replacement for land used for airport construction.

Table 2. Rainfall in Kulon Progo Regency in 2019- 2021

No	Month	2019		2020		2021	
		CH (mm)	HH (hari)	CH (mm)	HH (hari)	CH (mm)	HH (hari)
1.	January	4712	275	5588	30	5588	30
2.	February	3410	199	5673	284	5673	284
3.	March	6391	247	8003	312	8003	312
4.	April	911	78	2837	165	2837	165
5.	May	206	21	2360	191	2360	191
6.	June	16	8	461	63	461	63
7.	July	1	8	43	13	43	13
8.	August	7	7	188	41	188	41
9.	September	0	0	414	108	414	108
10.	October	0	0	2822	225	2822	225
11.	November	648	84	4462	263	4462	263
12.	December	2957	218	7642	335	7642	335
Total		**19,259.0**	**1,145.0**	**40,493.0**	**2,030.0**	**40,493.0**	**2,030.0**
Average/year		**1,604.9**	**95.4**	**3,374.4**	**169.2**	**3,374.4**	**169.2**

Geographical conditions in Kulon Progo Regency in terms of weather are also very influential on agricultural output. The following is an overview of rainfall conditions in Kulon Progo Regency. Rainfall in a geographical area is influenced by many factors, including the elevation or altitude of the place/area, the distance from water sources, mountain ranges and the area of land and water. Table 2 shows the rainfall in Kulon Progo district.

From the map of the condition of agricultural land in Kulon Progo Regency, it is necessary to study local food in Kulon Progo Regency which focuses on exploring potential, especially in terms of processed local food or processed food based on local food. In addition to looking at conditions and their potential, the study also looks at trends in the development of local food processing and efforts to improve their quality and image. Furthermore, the results of this study can function as a planning component and review in policy making regarding local food potential in Kulon Progo Regency

2 Purpose, Objectives And Objectives

2.1 Meaning

The purpose of this study is to analyze local food consumption in Kulon Progo district. This is necessary as an accurate plan that can show the current situation, characteristics and strategies for local food development.

2.2 Objective

Meanwhile, the objectives of the Analysis of Local Food Consumption in Kulon Progo Regency are:

a. Analyzing the potential (production and processing) of local food in Kulon Progo district
b. Analyzing local food production in Kulon Progo Regency
c. Analyzing the contribution of the agricultural sector to regional income in Kulon Progo Regency
d. Become the basis for government considerations in determining the direction of policies and programs to be implemented within the next 5 (five) years.

3 Theoretical Review

The paradigm of rural development has undergone significant changes. The old paradigm of rural development is very simple and closely related to the problem of modernizing the agricultural sector and taking direct benefits resulting from the modernization of the agricultural sector. In the end it was realized that completing rural development requires an approach from various aspects. Where inclusive village development is carried out by approaching many aspects such as economic and social, such as community involvement and political issues.

References used as a legal basis in the preparation, namely:

1. Law Number 41 of 2009 concerning Protection of Sustainable Food Agricultural Land;
2. Law Number 23 of 2014 concerning Regional Government;
3. Government Regulation Number 26 of 2006 concerning National Strategic Areas;
4. DIY Regional Regulation Number 10 of 2011 concerning Protection of Sustainable Food Agricultural Land;
5. DIY Regional Regulation Number 2 of 2010 concerning Regional Spatial Planning;

Other supporting regional regulations.

3.1 Productivity Change Techniques (Change of Productivity)

This technique uses the existing market value of a natural resource. By knowing the market price and quantity of natural resources, the total value of these natural resources can be known. The quantity of natural resources is seen as a factor of production. Changes in environmental quality change productivity and production costs which then change prices and output levels that can be observed and measured.

The implementation stages are the use of a direct approach and towards targets, determining changes in the quantity of natural resources produced for a certain period of time, certainty of change which is related to environmental changes that occur and multiplying changes in quantity by market prices.

3.2 Technique of Replacement Cost (Replacement Cost)

This technique generally identifies expenses for environmental improvement to reach/close to its original state. The calculated costs of replacing damaged natural resources and declining environmental quality or due to inappropriate natural resource management practices can be the basis for estimating the under-estimated benefits of a change.

The implementation stages are identifying natural resource functions that are lost due to changes in environmental quality, determining replacements for lost/disrupted natural resource functions, preparing physical data including market prices for each component needed in connection with replacement functions and calculating the amount of monetary value to create all functions and benefits. was replaced.

3.3 Prevention Cost Expenditure Techniques

If the value of environmental services cannot be estimated, then this approach, both actual expenditure and potential expenditure, can be used. Through this technique, environmental value is calculated based on things prepared by the community to make efforts to prevent environmental damage. The stages of its implementation are determining ways to prevent (minimizing impact) both physical preventive methods and behavior to avoid risks, estimating the labor and material costs needed as well as the investment costs needed for environmental impact recovery, identifying data and market prices for each data component that is needed and the sum of all expenditure values to carry out these prevention efforts.

4 Research Methods

This research method is a quantitative descriptive method. The data used is secondary data. Data collection instruments use documentation and observation.

The approach method is distinguished between a technical approach and a general approach. The technical approach needed in research in Kulon Progo Regency will be carried out using the following approach;

1. Observation, namely by conducting field studies to find the potential and problems being faced so that they can support the planning being handled.
2. Comparative, namely by making comparisons with various related aspects to obtain the characteristics of local food problems faced from upstream to downstream systems in Bantul Regency.
3. Interpretative, namely by interpreting the problems and potential faced by determining more concrete indications so that they can be used as a starting point for handling problems in local food conditions that are being faced.

4. Comparative, namely linking and combining various aspects and sources of problems to obtain a sustainable and integrated problem handling result, especially in relation to existing local food products.

5 Results And Discussion

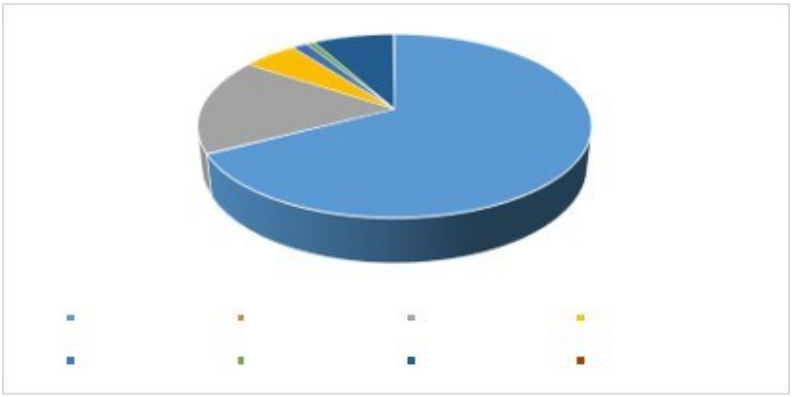
Food security in agriculture is supported by agricultural land. Agricultural land has an important position in meeting food needs. Agricultural land in Kulon Progo Regency is fertile land which is affected by volcanic conditions in several places. The role of defense land with food security is mutual need, meaning that if agricultural land is narrow then food security is also less and not of good quality and vice versa if agricultural land is wide then food security is very good farmers can grow various plants. In table 3, the area of agricultural land and various plants is presented. Rice plantation area has the largest land area among other types of agricultural crops.

Table 3. Agricultural Harvest Area

COMMODITY		Year					unit
		2018	2019	2020	2021	2022	
Food Crop Agriculture							
Paddy and secondary crops harvested area							
1	Paddy Field	18,201	19,310	19,009	18,547.42	19,365.31	Hektar
2	Gogo Rice	61	30	30	16.30	20.52	Hektar
3	Corn	3,671	5,080	4,795	3,784.60	2,474.97	Hektar
4	Soybeans	2,136	1,228	1,501	1,838.10	1,000.48	Hektar
5	Peanuts	687	461	430	370.30	250.71	Hektar
6	Green Beans	243	143	223	178.20	328.03	Hektar
7	Cassava	2,899	2,562	2,236	1,918.30	102.00	Hektar
8	Sweet Potatoes	31	52	32	37.90	20.92	Hektar

Source: data is processed

Judging from the contribution of land used, the area of rice plants from year to year has the largest land area shown in Figure 1.



Source: data is processed

Figure 1. Land Area

Production is yield according to product form of each vegetable, fruit, biopharmaceutical and ornamental plant taken based on the area harvested in the reporting month/quarter. where agricultural production is the activity of utilizing biological resources carried out by humans to produce food, industrial raw materials, or energy sources, as well as to manage the environment. According to [5], factors of production are all the sacrifices given to plants so that these plants are able to grow and produce well. Production factors determine the size of the production obtained. Production factors in agriculture consist of: Capital, labor, consumables, seeds and technology.

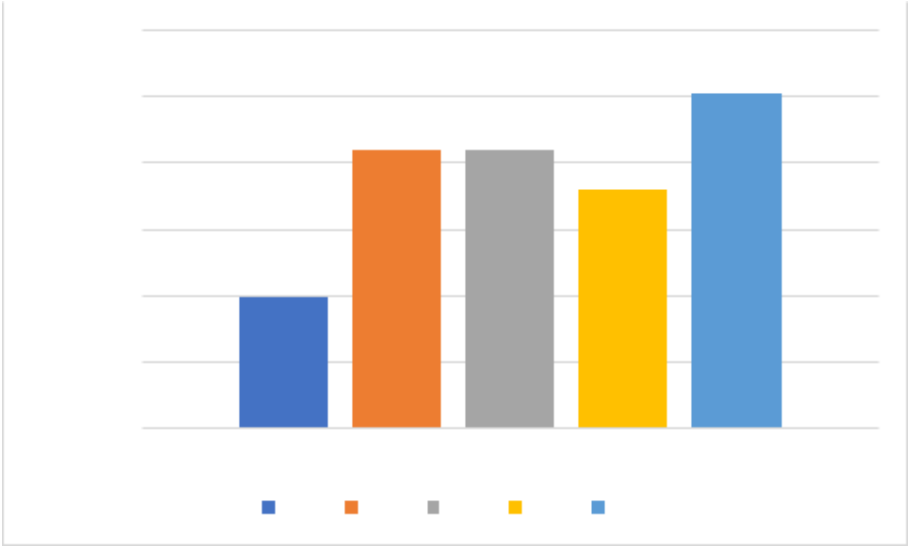
Cultivation of food crops consists of six stages, including land or land processing, planting, fertilizing, maintaining, pest control and harvesting. Production activities: farmers plant rice and produce rice. Distribution activities: cleaned rice is distributed to markets, supermarkets or shops. Consumption activities: people buy rice to meet their food needs..

Table 4. Food Crop Production (Ton)

Food Corp Agriculture		2020	2021	2022
1	Paddy Field	125,933.0	122,899.3	130,112.0
2	Gogo Rice	70.0	55	69
3	Corn	30,132.66	24,357.06	16,540.00
4	Soybeans	2,174	2,895	1,086
5	Peanuts	633	547	373

6	Green Beans	123	99	184
7	Cassava	56,837	39,631	36,723
8	Sweet Potatoes	375	491.88	283.64

Source: data is processed



Data source: Food Agriculture Service and BPS Kulon Progo Regency, 2023

Figure 2. Paddy Field Production

Table 4 shows agricultural production in Kulon Progo district. where the largest production is rice. This happens because the area of rice plants is ranked first compared to other agricultural food crops. From 2018 to 2022 rice will be the choice for farmers in production. This is because the rice commodity is a basic crop whose availability must be maintained. The increase in rice production in Kulon Progo is explained in Figure 2.

The agricultural sector needs to continue to be developed because it is still growing positively at a time when other sectors are experiencing contractions. Policies and partnerships that support the agricultural sector to support food security, as well as improve the welfare of farmers, planters and livestock breeders, need to continue to be encouraged.

The agricultural sector is a very strategic and important component of the national economy, as it produces a large part of the country's gross domestic product, provides a large proportion of export earnings and employs millions of people. The role of the agricultural sector in relation to community food security is a source of livelihood and a source of foreign exchange for the country through exports. Most Indonesian people make a living as farmers. Agriculture or agriculture is the primary sector in the Indonesian economy.

Besides that Improving the standard of living of farmers through increasing farmers' income is an important issue. Expanding employment opportunities in the agricultural sector in

the context of income distribution. Increase exports while reducing imports of agricultural products.

Table 5 shows the contribution of the agricultural sector to the GDP of Kulon Progo Regency from 2018 to 2021. The table shows that from 2018 food crops are an economic sector that contributes to the formation of the gross regional income of Kulon Progo Regency.

Table 5. Contribution of the agricultural sector to GDP of Kulon Progo Regency

Indicator	2018	2019	2020	2021	Unit
The contribution of the agricultural/plantation sector to GRDP					
a. Total GRDP Contribution from the agricultural/plantation sector	14.13	12.74	16.81	16.97	%
b. Total GDP	1458.29	1531.58	1602.53	643.2 8	iliar rupiah
Sector contribution					
agriculture (food crops and horticulture) to GRDP	27.51	4.12	7.76	8.26	%
a. Total contribution of the agricultural sector (food crops and horticulture)	401.32	495.49	904.36	912.74	iliar rupiah

Data source: Food Agriculture Service and BPS Kulon Progo Regency, 2023

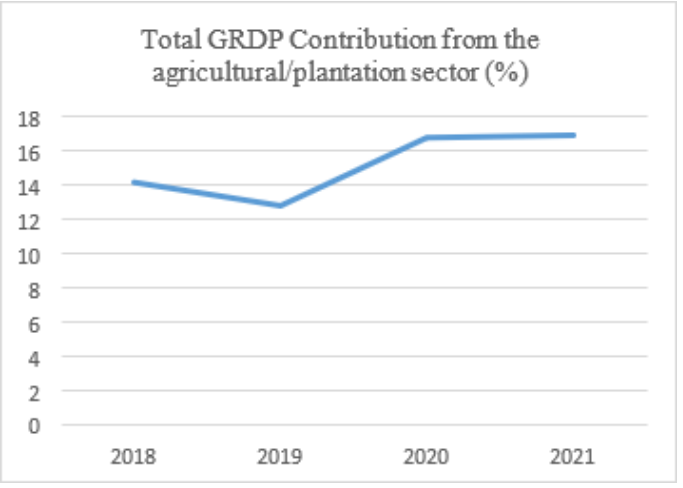


Figure 3. Contribution from Agricultural Sector

6 Conclusion

Agriculture is the activity of utilizing biological resources carried out by humans to produce food, industrial materials or energy sources, as well as to manage the environment. What can be done so that the agricultural sector can progress and develop? In the future, the use of the modern agricultural sector must be managed. Factors that support modern agriculture are Human Resources (HR), high quality seeds, quality agricultural fisheries and livestock products, as well as high-tech mechanization. For this reason, there are several strategies to continue to maintain positive growth in the agricultural sector as follows:

1. Increase productivity. Food crops as the main needs of the community must continue to increase their productivity
2. Local food diversification.
3. Strengthening logistical reserves.
4. Agricultural modernization.

Population projections are important data for the activity of compiling prognoses of important and strategic items in a region. This is because the main factor in demand for important goods which is the subject of this research is strongly influenced by population. The assumption is that there is a positive relationship between population and demand for various food crop products. In examining consumption data, comparisons can be obtained so that a ratio is obtained to determine the relative position of consumption levels in Kulon Progo Regency.

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