DOI:

Economic Valuation of Food Crop Agricultural Activities in Bleberan Village, Playen Sub-District, Gunungkidul District In 2022

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ABSTRACT

Amid Indonesia's agricultural landscape, Bleberan Village and Playen sub-district face a pressing challenge – the diminishing availability of agricultural land. Recognizing agriculture's pivotal role in Indonesia, this research confronts the stark reality of land scarcity exacerbated by the adverse environmental impacts of modern farming practices. The study examines the causes of land degradation and discovers various variables while criticizing previous methods. A quantitative descriptive research method is used to explore the benefits of food crop farming and reveal their high economic value. The results underscore the multifaceted advantages of food crop cultivation, highlighting its vital role in the local economy. The significance of this research lies in its revelation of the critical importance of food crop farming in the face of diminishing agricultural land. The findings contribute valuable insights to the existing discourse on sustainable farm development and underscore the urgency of implementing specific strategies to counteract the challenges posed by land scarcity. As we navigate the complex intersection of economic, environmental, and agricultural concerns, this research serves as a beacon, illuminating the path toward a more resilient and sustainable future for Bleberan Village and the Playen sub-district.

KEYWORDS:

agriculture; community resilience; economic valuation; food crop farming; land degradation

INTRODUCTION

The agricultural sector significantly drives the Indonesian economy, with data from the Central Bureau of Statistics indicating a harvest area of 7,711,850 ha and production of 42,155,713 tons in 2021 (BPS, 2022). Due to Indonesia's extensive agricultural land, numerous parties are involved in breeding, care, harvesting, and marketing (Rozaki et al., 2020). However, agricultural land has decreased annually, threatening future food crop needs (Nasikh et al., 2021). According to IKP (2019), the Playen sub-district notably contributes to corn production in Gunung Kidul Regency, with a recorded corn planting area of 2,726 ha in 2019. Bleberan village alone has a potential corn area of 748 ha, yielding 300 ha of hybrid corn.

The agricultural sector significantly boosts the Indonesian economy, as evidenced by Central Bureau of Statistics data showing a harvest area of 7,711,850 ha and production of 42,155,713 tons in 2021 (BPS, 2022). Due to Indonesia's extensive agricultural land, community contributions are crucial, with numerous parties involved in breeding, caring for, harvesting, and marketing (Harianja et al., 2023). However, agricultural land availability has steadily decreased from 37.5 million hectares in 2015 to 36.5 million hectares in 2019, posing a serious threat to future food crop needs (Deptan, 2020).

Modern agriculture has significantly altered natural plant processes, relying on synthetic fertilizers, pesticides, and nutrient-intensive varieties to boost growth and yield (Sujianto et al., 2022). The Green Revolution, initiated in 1970, led to a remarkable 300% increase in crop production compared to the previous decade. Yet, it also brought negative environmental repercussions, such as diminished biodiversity and environmental quality (Hamdan et al., 2022). Key factors for successful agricultural endeavors include crop selection, land management,

Article History
Received: 16-Sep-2023 | 1st Revised: 12-Jan-2024 | 2nd Revised: 24-Feb-2024
Accepted: 24-Feb-2024 | Online: 28-Feb-2024

and timing (Fahmid et al., 2022). Participation in farming activities is influenced by various factors like real wages, land area under cultivation, income diversification, and institutional labor relations (Irawan, 2023).

Indonesia's agricultural history reveals weaknesses in its focus solely on farming, insufficient macro-policy support, and a centralized approach (Rudiarto et al., 2020). Land quality degradation stems from diverse sources, including industrial waste pollution, non-degradable waste accumulation like plastics, and topsoil depletion for brick-making, undermining sustainable production practices (Dharmawan et al., 2023). Economic valuation of natural resource management and environmental impacts is crucial for informed policy decisions and agricultural financial analysis (Saleh et al., 2020). This policy involves assessing both physical and monetary aspects of benefits and impacts, considering changes in productivity and environmental quality (Pirmana et al., 2021). Such valuation is especially pertinent in environmentally sustainable development initiatives, where economic considerations play a primary role despite the absence of market prices for environmental goods (Raihan et al., 2023).

Agricultural geography is one of the branches of geography included in the scope of human geography or human geography. Chi et al. (2022) reveal that agricultural geography studies similarities and differences in agrarian phenomena on the earth's surface with ecological and regional approaches in a spatial context. In addition, aspects related to location, distance, area, patterns, soil, climate and water availability on the earth's surface for agricultural purposes can also be studied in agricultural geography (Ustaoglu et al., 2021). This alignment is also supported by the statement of Younis et al. (2021), which explains that agricultural studies in agricultural geography are related to activities in the context of space, the location of agriculture as a whole and the activities within it, namely crops and livestock, the use of outputs and inputs needed for production, such as fields, labor, fertilizers and fertilization, seeds, pesticides, and others. Environmental services from agriculture include providing employment, preserving rural culture, providing groundwater, preventing erosion and conserving biodiversity (Luty et al., 2021). These services are often overlooked in the current market system (Noack & Schüler, 2020).

This study delves into the economic valuation of food crop agricultural activities in Bleberan Village, Playen sub-district, Gunung Kidul, aiming to provide quantitative insights for farmers and policymakers. By considering direct production and the potential use of agricultural waste for sustainable agriculture, this research integrates agricultural geography principles to offer a novel perspective on economic valuation. Through quantifying environmental services like employment generation and biodiversity conservation, the study contributes vital data for ecological economics and policy formulation, promoting sustainable agricultural practices in Indonesia and bridging the gap between economic considerations and environmental concerns.

METHODOLOGY

2. 1. Research Frameworks

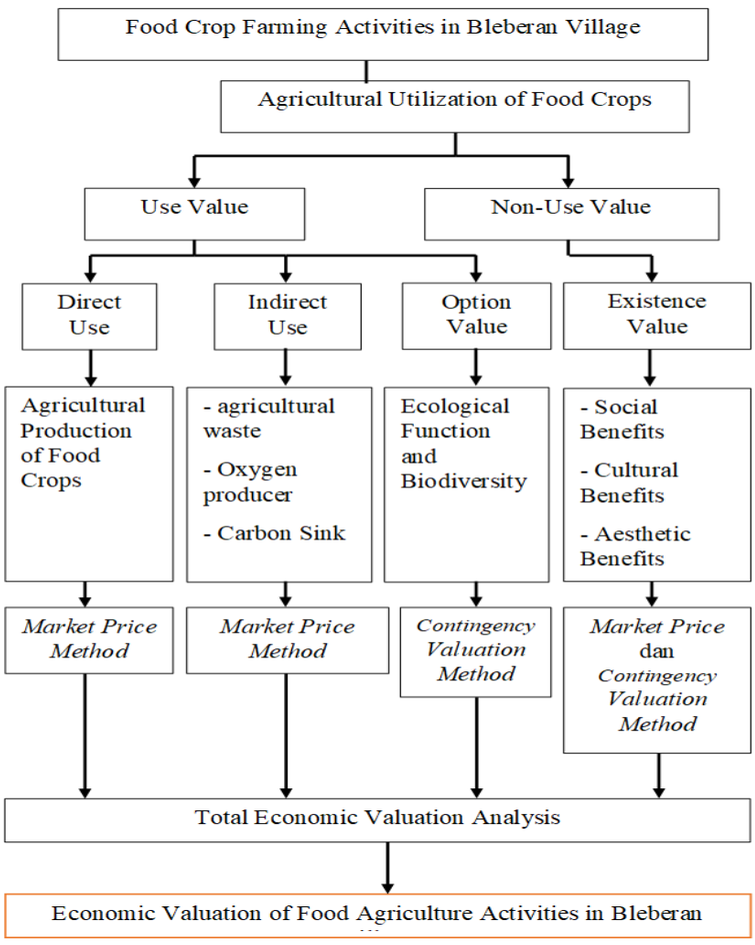

Figure 1. Research Framework Design

According to Song and Zhang (2021), the condition of food crops is thought to be related to the utilization of food crops that have been carried out, so a plan for the utilization of the next food crop is needed. Planning for the next crop can work well if seen from the influence of geographical conditions on local wisdom in agricultural management. Agricultural activities based on local wisdom will support food security. This statement is supported by the results of research by Ayu et al. (2020), which states that the agricultural production system carried out by farmers is the result of adaptation to the natural environment and farming experience that has been carried out for many years, through local wisdom, farmers have strategies to build family food security. If every family has food security, national food security will be realized.

The economic valuation of food crops is seen as having monetary value. It can also be said that agricultural land resources are components of ecosystems that provide goods and services that are beneficial to human needs and to find out how much total economic value is obtained or spent in the area so that agricultural land can continue to be utilized to produce value using total economic value analysis. This statement is supported by Usman et al. (2022), that "economic valuation aims to provide economic value to the resources used following the real value from the community's point of view, it is necessary to know the extent of the bias between the price that occurs and the real value that should be determined from the resources used as an integral component of each economy."

2. 2. Basic Research Method

Researchers use a quantitative descriptive research approach to examine the benefits of growing food crops and their total economic value (Gupta & Abbott, 2021). This research offers a quantitative exploration, revealing the intricate web of advantages woven by sustainable farming practices (Bhujel & Joshi, 2023). By employing a meticulous methodology, we uncover the nuanced economic significance of food crop cultivation, contributing to agricultural sustainability and economic resilience discourse in our evolving landscape.

2. 3. Research Schedule, Location, Populations, and Samples

The research was conducted in August 2022 in Bleberan Village, Playen Subdistrict, Gunungkidul Regency. The reason for choosing Bleberan Village as the object of research on the economic valuation of food crop farming activities is because Bleberan Village has a large agricultural land area, including forest land and rain-fed rice fields. The 87.5 ha land area availability drives 90% of Bleberan Village's population to pursue agriculture (BPS, 2022).

The research location of Bleberan Village will be more clearly presented on the map in **Figure 2** to know the condition of the area in more detail. Plantation areas and fields dominate the map of the research location in Bleberan Village. Dryland conditions and low rainfall mean rice farming only relies on rain-fed paddy fields. The main crops in Bleberan are corn and tubers because they are not dependent on the need for much water.

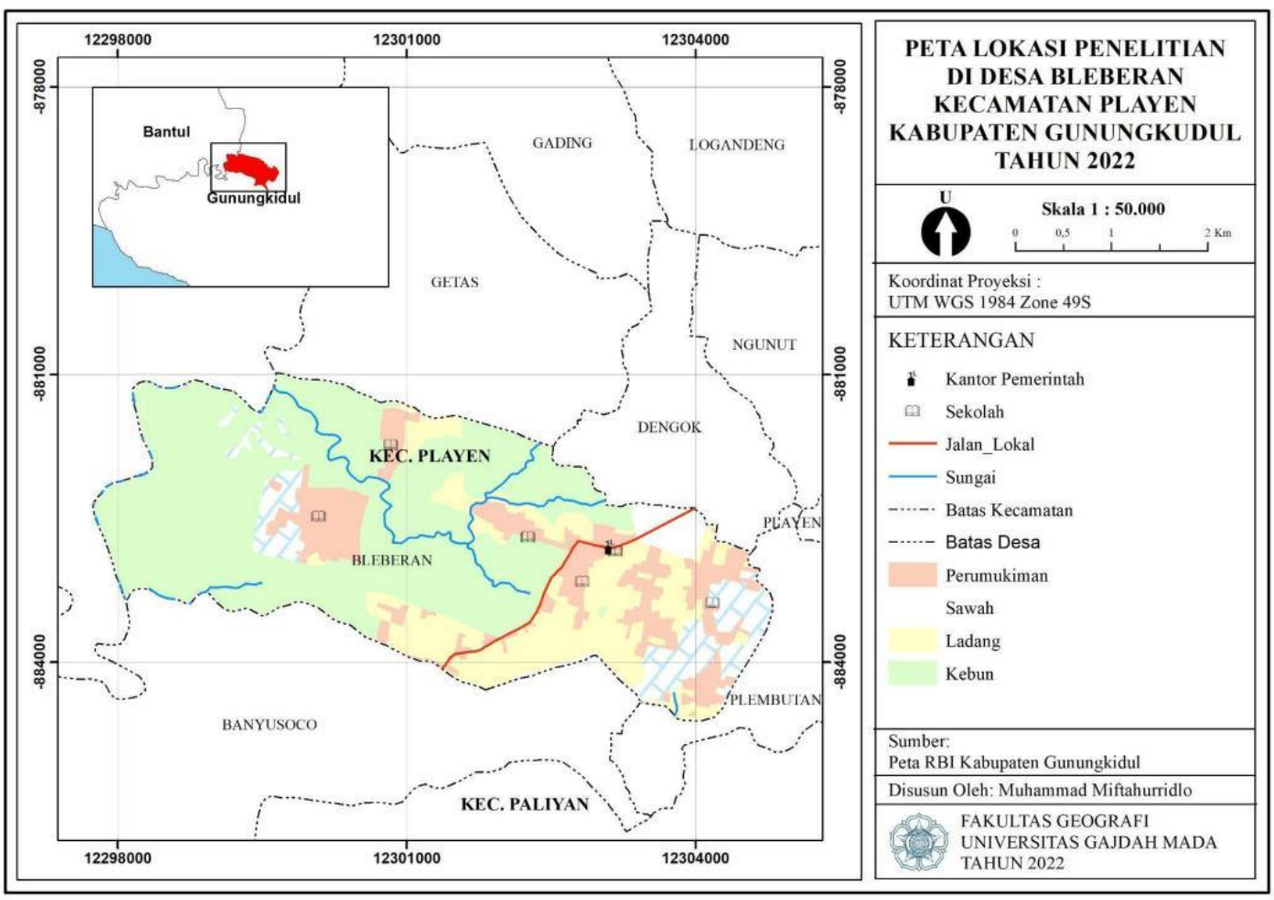

Figure 2. Research Location in Bleberan Village

The population in this study is people who own agricultural land in Bleberan Village, Playen Subdistrict, Gunung Kidul or who work as farmers, totaling 2,074 people (BPS, 2022). Using samples will produce the data needed more effectively and efficiently. Sampling was carried out using the proportional random sampling method in

which sampling was carried out randomly on members of the population without regard to levels or strata in the population. There was no need to focus on farmers with a lot of land or crops that grow a lot because every farmer with land could be used as an example. The number of respondents was determined as a sample using the Slovin formula. A sample of 96 respondents was taken from the results of these calculations. This study will take samples from all 11 hamlets in Bleberan Village. Each hamlet will take a sample of 8-11 people to be interviewed and data collected.

2. 4. Data Collection

The research was conducted by collecting a variety of data obtained directly from respondents as well as from the publications of government agencies. This study's data type consists of quantitative data with descriptions. Quantitative data in this research is expressed in numbers, for example, to calculate the value of direct benefits, indirect benefits, choice, and existence (Paul et al., 2020). This study's data sources consist of primary and secondary data. Primary data is obtained by researchers from interviews with respondents using a questionnaire (Alam, 2020). Secondary data is data obtained from the internet, previous research results, scientific journals, and literature on the part of related institutions or agencies.

The techniques used in data collection in this study are as follows. a) Observation, data collection by directly observing the object under study in Bleberan Village. b) Interview, which is data collection obtained through interviews with farmers in Bleberan Village using a questionnaire. c) Documentation, namely looking for data or variables regarding things or variables in the form of notes, books, inscriptions, and meeting minutes. This documentation method collected physical data and conditions in Bleberan Village, such as area, boundaries, population, and livelihoods.

2. 5. Data Analysis

Analysis of quantitative methods in this study is used to calculate the economic value of agricultural activities. The analysis used in the economic valuation of agricultural land resources (paddy fields) uses Total Economic Value. This quantification is done with a market value approach to benefits that have value in the market and indirect prices for benefits that do not yet have a market price. Kabil et al. (2022) have classified total economic value based on the process of benefits obtained. Total economic value (TEV) is the total value of the sum of use value and non-use value with the following formula.

TEV = UV + NUV = (DUV + IUV + OV) + (BV+EV) **... Equation (1)**

Description:

TEV = Total Economic Value
UV = Use Value
NUV = Non-Use Value
DUV = Direct Use Value
IUV = Indirect Use Value
OV = Option Value
EV = Existence Value
BV = Bequest Value

Direct use value is the value that can be used directly. Determination of the type of direct benefits can be seen based on the market price approach for marketable goods and services, such as food crop agricultural production. According to DiGiacomo et al. (2023), the measurement of direct benefit value based on market prices can be formulated as follows:

DUV = (MPC x PC) **... Equation (2)**

Description:

DUV = Direct Use Value
MPCi = Market price of the commodity (IDR)
PCi = Production of commodity i (Kg)
i = Commodity type (for example: rice, horticulture, etc.)

Indirect benefit value is the value of utilization based on the indirect function of the existence of paddy fields. One of the indirect functions is utilization of rice or horticultural waste, oxygen generation and carbon sequestration (Kumar et al., 2023). Estimation of carbon dioxide (CO_2) uptake is estimated using the following formula:

IUV = (utilization of rice or horticultural waste + oxygen generation + carbon sequestration) **... Equation (3)**

According to Sanjuán et al. (2020), estimation of carbon dioxide (CO_2) uptake is estimated using the following formula:

CO_2 = Cn × 3.67 **... Equation (4)**

Description:

CO_2 = Carbon dioxide uptake (Ton/Ha)
Cn = Carbon content per unit area (Ton/Ha)
3.67 = Equivalent number or conversion of element C to CO_2 (atomic mass C = 12 and O = 16, CO_2 (1×12) + (2×16) = 44; the conversion is (44:12) = 3.67)

According to Skattebo et al. (2020), estimation of oxygen production (O_2) uptake is estimated using the development formula of the CO_2 uptake formula as follows:

$$\mathbf{O_2 = CO_{2n} \times 0.73} \quad \textbf{... Equation (5)}$$

Description:

O_2 = Oxygen uptake (Ton/Ha)

CO_{2n} = CO_2 uptake per unit area (Ton/Ha)

0.73 = Equivalent number or elemental conversion of CO_2 to O_2 (atomic mass C = 12 and O = 16, CO_2 (1×12) + (2×16) = 44; the conversion is (32:44) = 0.73)

Option value refers to the direct and indirect uses that can be generated in the future (Costanza, 2020). This option value includes benefits that are stored or retained for future use when there is uncertainty about resource availability. The preferred benefit values analyzed in this study are ecological function and biodiversity (Zhou et al., 2020). Existence value is the value given by a person because of natural resources and the environment without using them (Guan et al., 2020). This value is based on the community's perceptions or assumptions from a social and cultural perspective. This study examines the social, cultural, and aesthetic values associated with agricultural land in Bleberan Village, employing the contingent valuation method to measure both the option and existence values. Unlike market-based approaches, contingent valuation gathers individuals' preferences directly, eliciting the values they assign to goods and services, particularly from farmers in this context.

RESULT AND DISCUSSION

3. 1. Direct Benefit Value

Direct benefit value is the value that can be used directly. Direct benefit value refers to the economic benefits derived directly from food crop farming, such as income, profit, and added value. In Bleberan Village, agricultural activities are conducted on an estimated land area of 87.5 hectares by approximately 2,074 farmers. The value of direct benefits is calculated based on the total value of agricultural production commodities multiplied by the local selling price. The study focuses on five agricultural commodities: rice, corn, peanuts, cassava, and soybeans. Data on food crop production in Bleberan Village was obtained from 100 farmers. The results of the economic valuation of food crop agricultural activities in Bleberan Village are presented in **Table 1**.

Table 1. Assessing the Value of Direct Benefits in Crop Farming Activities for Food Crops in Bleberan Village, Playen Sub-district

No	Commodity Type	Direct Benefit Value (IDR/year)	Percentage (%)
1	Rice	454,820,000	30.46
2	Corn	824,877,500	55.25
3	Peanut	21,780,000	1.46
4	Cassava	68,150,000	4.56
5	Soybean	130,710,000	8.27
Total		1,493,057,500	100.00

Source: Primary data (2022)

Based on the data presented in **Table 1**, it can be observed that rice (30.46%) and maize (55.25%) are the main food crop commodities that contribute most significantly to the value of direct benefits. This analysis is consistent with the important role of rice and maize as the main food crop commodities in many villages in Indonesia. Furthermore, peanuts (1.46%), cassava (4.56%), and soybeans (8.27%) also contributed positively to the economy in Bleberan Village, Playen Subdistrict, although the proportions were smaller than those of rice and corn. Further analysis will explain the role of each commodity and its implications for decision-making and policy development in the agricultural sector.

3. 1. 1. Rice

Rice (*Oryza Sativa*) is one of the main agricultural commodities in Indonesia. The results of the economic valuation analysis of farming activities on rice commodities in Bleberan Village, Playen Subdistrict, showed a direct benefit value of IDR 454,820,000 per year, representing around 30.46% of the total direct benefit value, with the help of 100 farmers who became respondents. This benefit value includes the income earned by farmers from grain sales. The selling price of unhulled rice in the Bleberan Village, Playen Sub-district's local market, is estimated at IDR 5,000/kg. Rice has a strategic role in food security and economic growth because it is the staple food for the people of Bleberan Village and most of the population of Indonesia. Stable and increasing rice production will contribute significantly to food sustainability and farmers' welfare (Paiman et al., 2020).

3. 1. 2. Corn

Corn (*Zea Mays*) is an agricultural commodity with a high direct benefit value. With the help of 100 farmers who became respondents, the results of the economic valuation analysis of farming activities on corn commodities in Bleberan Village, Playen Subdistrict, showed a direct benefit value of IDR 824,877,500 per year, representing around 55.25% of the total direct benefit value. The value of these benefits includes the income farmers earn from selling corn as human food, animal feed, and industrial raw materials. The selling price of corn in the Bleberan Village, Playen Sub-district's local market, is estimated at IDR 4,200/kg - 5,000/kg. In addition, corn can also be processed into derivative products such as corn flour, corn oil, and corn syrup.

Corn is crucial in sustainable agriculture because it adapts to diverse soil and climate conditions. In Bleberan Village, Playen Sub-district, corn is planted at the onset of the rainy season when soil moisture is optimal for growth. Employing an intercropping system further enhances land productivity in this community. Moreover, corn holds promise as a renewable energy source through bioethanol production. Increased corn production boosts food availability, diversifies agricultural products, and enhances farmers' income. These findings align with research by Suryani et al. (2019), underscoring corn's significance in improving productivity and production in agriculture.

3. 1. 3. Peanut

Peanut (*Arachis Hypogaea*) is an agricultural commodity with a significant value in the economic value of food agricultural activities in Bleberan Village, Playen Sub-district. However, the percentage is relatively small, 1.46% of the total. The direct benefit value of peanuts, amounting to IDR 21,780,000 per year, shows that peanuts still contribute as a food commodity and industrial raw material. These results were obtained from analyzing the economic valuation of agricultural activities in peanut commodities in Bleberan Village, Playen Sub-district, involving 100 respondent farmers. The value of benefits includes the income farmers obtain from selling peanuts as food, oil, and industrial raw materials.

Peanuts, rich in protein and fat, are vital for nutrition and energy. They also serve as effective cover crops, combating erosion and enhancing soil fertility. Optimizing their role in food diversification, agricultural activities, production, processing, and marketing can boost their economic value and benefit farmers. These practices align with the findings by Maftukhah et al. (2022), emphasizing fast-growing intercrops like peanuts in preventing erosion, improving yields, and enhancing soil fertility and water status.

3. 1. 4. Cassava

Cassava (*Manihot Esculenta*) has a direct benefit value of IDR 68,150,000 per year, or about 4.56% of the total direct benefit value. These results were obtained from an analysis of the economic valuation of agricultural activities on cassava commodities in Bleberan Village, Playen Subdistrict, involving 100 farmers who became respondents. The value of these benefits includes farmers' income from selling cassava tubers as food, flour, and industrial raw materials.

Cassava holds significant economic potential for village agriculture due to its resilience to poor soil, pests, and various climates. With high nutritional value and industrial versatility, it offers diverse benefits. Focusing on boosting productivity, enhancing varieties, and adopting suitable cultivation techniques can maximize the value of cassava. The analysis by Rozi et al. (2023)echoes these findings by emphasizing cassava's pivotal role in supporting programs, its substantial production potential, and its economic value in farming.

3. 1. 5. Soybean

Soybean farming in Bleberan Village, Playen Subdistrict, generates a direct benefit value of IDR 130,710,000 annually, contributing 8.27% to the total direct benefits. This income is derived from selling soybeans for food, oil, and industrial use. With their versatile applications in processed foods like tofu, tempeh, and soy milk, soybeans fulfill crucial protein needs. Increasing soybean productivity is vital for farmer welfare and is achievable through high-yield varieties, effective pest control, and modern agricultural techniques. The emphasis on high-yield varieties and optimal land use for successful farming, as highlighted by Krisdiana et al. (2021), aligns with the benefits of product diversification and value-added processing in enhancing direct benefits and market opportunities.

3. 2. Indirect Benefit Value

Indirect benefit values in food crop farming activities refer to impacts or benefits that are not directly visible but are closely related to the production and consumption of food crops. These benefit values usually involve environmental aspects, such as the utilization of crop waste, and health and social aspects that are long-term and have widespread impacts. Agricultural activities, including oxygen (O2) generation and carbon dioxide (CO2) sequestration, significantly impact the environment. Oxygen (O_2) generation and carbon dioxide (CO_2) sequestration have indirect benefits in maintaining ecosystem balance and reducing negative impacts on climate change. According to Peres et al. (2022), this can help in sustainable decision-making in agricultural development, including policies that support sustainable farming practices and holistic environmental protection.

The value of indirect benefits to be analyzed from agricultural activities in Bleberan Village, Playen Sub-district, includes indirect benefits from land as a producer of oxygen (O_2) and land as a carbon dioxide (CO_2) sink. **Table 2** presents data from calculating oxygen (O_2) and carbon dioxide (CO_2) emissions in the Bleberan Village.

Table 2. Calculation results of oxygen and carbon dioxide emissions in Bleberan Village

Land Type	Land Area (ha)	Total Land Area (ha)	CO_2 Emission (tons/ha)	O_2 emission (tons/ha)	CO_2 (tons)	O_2 (tons)
Rice paddy	13.7650	70.5270	18.35	13.40	1294.17	945.06
Moor	56.7620					

Source: Primary data (2022)

3. 2. 1. Carbon Dioxide Absorption

Agricultural land is crucial in reducing atmospheric carbon dioxide (CO_2) levels through photosynthesis and carbon storage in plants and soil. This process, known as carbon sequestration, helps mitigate climate change by decreasing greenhouse gas concentrations. Anwar (2022) estimates carbon dioxide absorption by multiplying land area by the absorption rate, which is calculated based on carbon stock in rice fields (5 tons/ha) and converted to CO_2 equivalent (3.67). This results in an absorption rate of 18.35 tons/ha. In Bleberan Village, Playen District, the estimated carbon dioxide absorption is 945.06 tons, calculated by multiplying the absorption rate (18.35 tons/ha) by the land area (70.52 ha). This estimation derives from Anwar's research, which values carbon dioxide absorption at IDR 69,194.37 per ton. Consequently, the economic benefit from carbon dioxide absorption on Bleberan Village land is estimated at IDR 89,549,308.

3. 2. 2. Oxygen Generation

Agricultural land is vital in oxygen generation through photosynthesis, which is crucial for human and ecosystem survival. Anwar (2022) estimates oxygen production by multiplying land area by oxygen productivity, calculated from carbon uptake and a conversion factor of 0.73. With carbon dioxide absorption at 18.35 tons/ha, Bleberan Village's oxygen productivity is estimated at 13.40 tons/ha. Multiplying this by the village's land area (70.52 ha) yields an estimated oxygen production of 1294.17 tons. Valued at IDR 927,000/ton, the economic benefit of oxygen production on village land is estimated at IDR 876,072,288. These estimates underscore the indirect benefits of agricultural land, which is vital for ecosystem balance and climate change mitigation. Additionally, crop waste in Bleberan Village offers further indirect benefits for the community. Understanding these indirect benefits highlights agriculture's significant contribution to environmental conservation and climate resilience.

Crop wastes like straw and corn leaves offer not just environmental benefits but also significant economic advantages. They serve as organic fertilizer, cutting production costs and enhancing land productivity. In Bleberan Village, Playen Subdistrict, these wastes are processed into organic fertilizer sold in "*kol*" units, open car bodies like L300 pickups. Priced at IDR 80,000 per cabbage, the village sells 70 cabbages annually, generating an indirect benefit value of IDR 5,600,000 yearly. This economic assessment highlights the potential of crop waste, particularly in enhancing agricultural sustainability and community income.

3. 3. Preferred Benefit Value

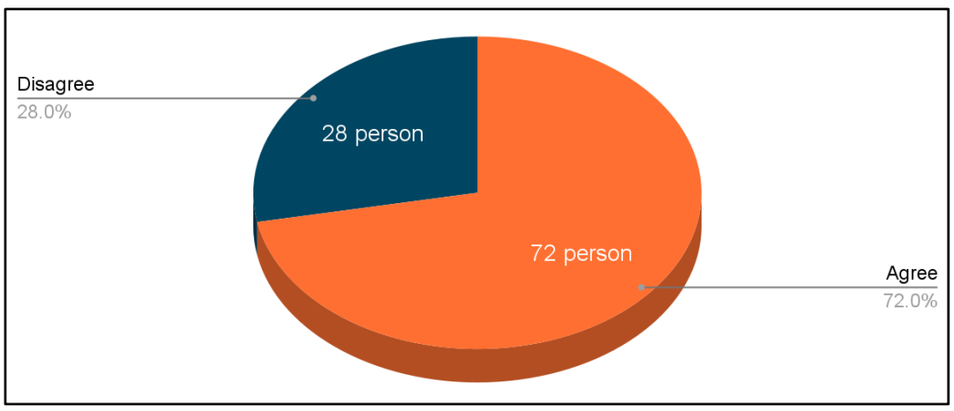

Figure 3. Ecological and biodiversity function payers

According to Amaruzaman et al. (2022) statement, the value of preferred benefits in food crop farming reflects the community's priorities, including environmental values, biodiversity, and product quality. In Bleberan Village, Playen Sub-district, this value is assessed based on ecological functions and biodiversity, determined through interviews with local farmers. The Willingness to Pay (WTP) approach gauges the community's willingness to invest in maintaining land conditions for sustainability. This approach indicates their recognition of the importance of preserving agricultural land for future generations. The Contingent Valuation Method (CVM) calculates the value of agricultural land options, gathering preferences directly from farmers rather than relying on market prices. This approach ensures that individuals' values for goods and services are accurately captured, facilitating informed decision-making for ecological conservation and sustainable farming practices in the village.

Figure 3 shows that 72% of respondents are willing to pay to preserve agricultural land for its ecological function and biodiversity, showing awareness of its potential. Conversely, 28% or 72 people don't see the land's potential for preservation. Interview data reveals a range of Willingness to Pay (WTP) values from IDR 5,000 to 100,000, with one respondent offering the highest and another the lowest WTP. The average monthly WTP value is IDR 39,070, totaling IDR 468,840 annually per farmer. To encourage land preservation, the local government in Bleberan Village, Playen Subdistrict, can implement programs promoting sustainable agricultural and environmentally friendly practices, like organic fertilizer. These initiatives aim to enhance the land's ecological value while supporting community efforts for its long-term conservation.

3. 4. Preferred Benefit Value

The existence benefit value of food crop agriculture refers to the intrinsic or existential benefits derived from the existence of agriculture and its sustainability. This value is not related to the direct use or consumption of agricultural products but rather the recognition of the importance of agriculture in maintaining the balance of ecosystems, biodiversity, and human life. The value of existence benefits in the form of social, cultural, and aesthetic benefits.

3.4.1. Existence Value as Social Benefits

The value of existence in social benefits from agricultural activities in Bleberan Village, Playen Sub-district, encompasses cooperation, community relations, and socio-economic development. Researchers will employ the Contingent Valuation Method (CVM) to quantify the economic value associated with these benefits, considering the absence of a clear market price. A survey with 100 respondents will assess their Willingness to Pay (WTP) to sustain and improve agricultural activities for social benefits. The analysis will estimate the average WTP and present the distribution of WTP in **Figure 4**. This analysis provides insights into the community's economic contribution to supporting agricultural efforts for social benefits.

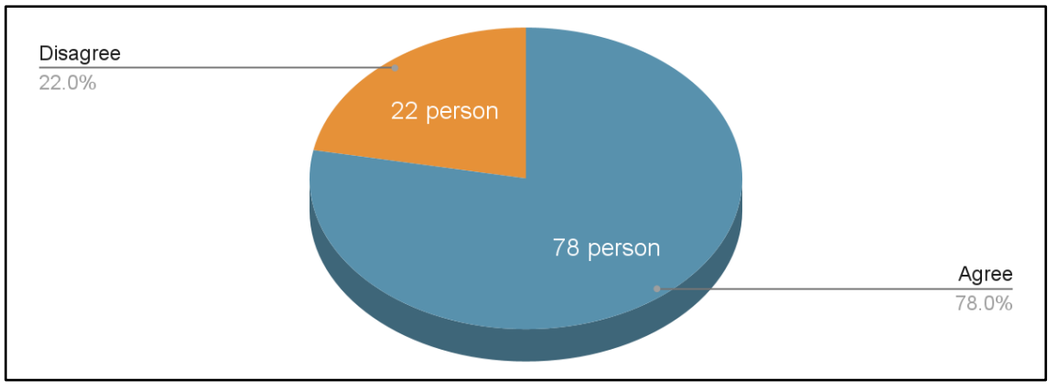

Figure 4. Payment for agricultural activities as social benefits graph

According to **Figure 4**, a survey of 100 respondents indicates that farmers in Bleberan Village are willing to pay an average of IDR 33,370 monthly to sustain food farming activities for social benefits. While individual responses varied from IDR 5,000 to 100,000 annually, 78% of respondents agreed to contribute, showing their recognition of agriculture's social value for future generations. Conversely, 22% declined to pay. These findings suggest an annual social benefit value of IDR 400,440 from agricultural activities in the village. Using the Contingent Valuation Method (CVM), this analysis sheds light on the economic support provided by farmers for these activities, indicating their understanding and appreciation of agriculture's importance (Kyriakopoulos & Sebos, 2023). Recognizing the farming community's preferences and willingness to pay is crucial for sustaining these benefits (Laksono et al., 2022). Such insights are a valuable foundation for policy decisions to foster sustainable agricultural development and enhance Bleberan Village residents' socio-economic well-being (Sitas et al., 2019).

3.4.2. Existence Value as a Cultural Benefit

The cultural benefit of food agriculture activities in Bleberan Village encompasses traditions, heritage, and local identity, contributing to the community's cultural fabric. Siankwilimba et al. (2023) research highlights this value as an indirect benefit of agricultural functions, emphasizing the interactions and sense of togetherness fostered among farmers. Utilizing the Contingent Valuation Method (CVM), this study assesses the economic value attributed to these cultural benefits. By surveying villagers' Willingness to Pay (WTP), researchers gauge the community's commitment to sustaining and supporting agricultural activities for cultural purposes. Statistical analysis of survey data aims to elucidate the economic significance of these cultural benefits, providing insights into the importance of farming practices. Through the CVM approach, researchers estimate the average WTP and present the distribution of WTP, facilitating an understanding of the economic contributions made by the community to preserve cultural aspects of food farming activities. These findings offer valuable insights for policymakers and stakeholders in fostering cultural preservation and sustainable agricultural development in Bleberan Village.

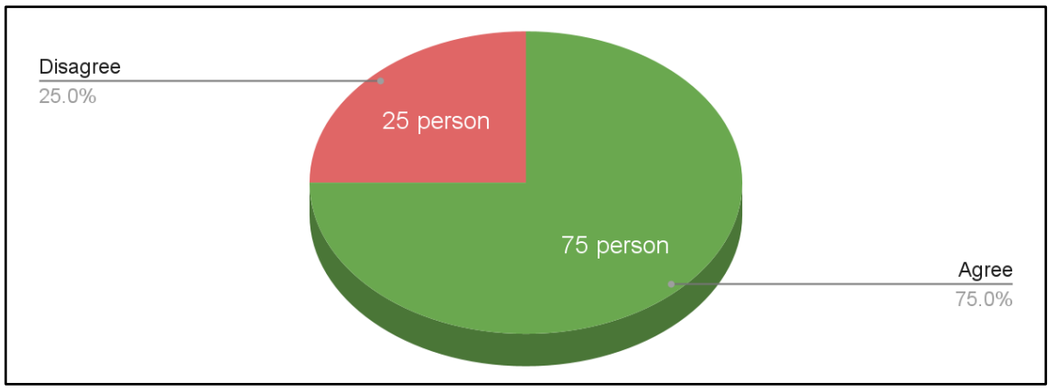

Figure 5. Payability for agricultural activities as cultural benefits

In **Figure 5**, findings from a survey of 100 respondents reveal an average Willingness to Pay (WTP) of IDR 15,011 per month among villagers in Bleberan Village, Playen Sub-district, for preserving food farming activities as a cultural benefit. Individual responses varied from IDR 5,000 to 100,000 annually, with 75% of respondents expressing willingness to contribute towards maintaining these activities for future generations. Conversely, 25% or 25 people declined to pay. This suggests an annual economic potential of IDR 180,135 for agricultural activities in the village, attributed to cultural benefits. Through Contingent Valuation Method (CVM) analysis, these insights deepen our understanding of the economic value that Bleberan Village residents place on agriculture's cultural significance. The research results of Octavia et al. (2022) state that such understanding serves as a vital foundation for policy decisions to foster sustainable agricultural development and preserve the community's cultural heritage.

3.4.3. Existence Value as Aesthetic Benefit

The aesthetic benefit of agricultural activities in Bleberan Village, Playen Sub-district, involves the community's appreciation of beauty, biodiversity, and cultural identity. The natural scenery and traditional farming practices contribute to this aesthetic value, distinct from economic aspects (Poerwoningsih et al., 2022). Unlike industrial activities, farming in the village doesn't generate air or noise pollution, preserving its aesthetic appeal for future generations.

This study focuses on assessing the indirect aesthetic benefit of food farming activities in Bleberan Village, Playen Sub-district, using the Contingent Valuation Method (CVM). CVM is chosen for its effectiveness in determining the economic value of goods or services without a clear market price (Sarma et al., 2020). Researchers will collect data through surveys to gauge people's preferences and Willingness to Pay (WTP) to sustain farming activities for their aesthetic value. Through CVM analysis, the collected data will be statistically examined to understand the relationship between the value of the aesthetic benefit and other relevant factors (Idris et al., 2022). This analysis will involve estimating the average WTP and presenting the distribution of WTP, providing insights into the economic significance of maintaining food farming activities for their aesthetic appeal. **Figure 6** illustrates this distribution, visualizing the community's contributions to preserving the aesthetic value of agricultural practices.

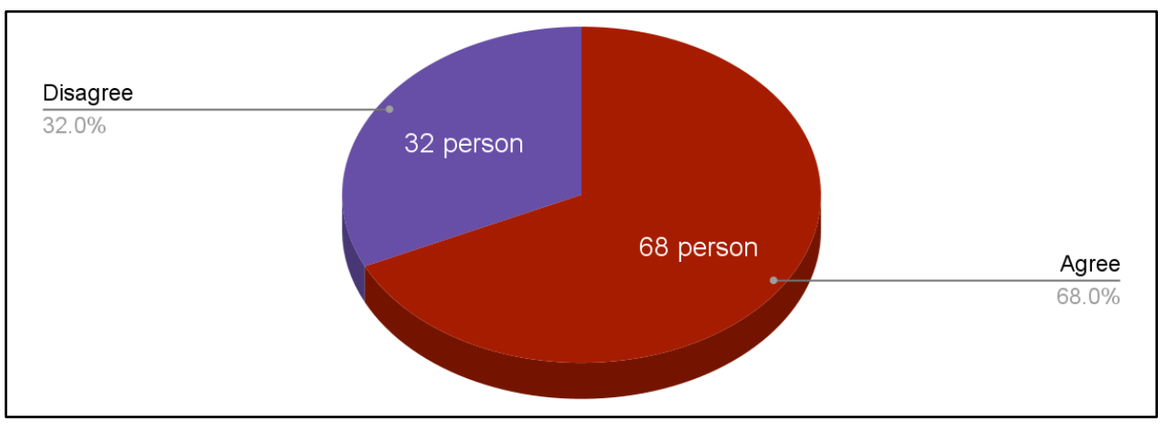

Figure 6. Graph of agriculture aesthetic benefits payability

According to **Figure 6**, a survey of 100 respondents in Bleberan Village, Playen Sub-district, revealed an average Willingness to Pay (WTP) of IDR 47,600 per month for sustaining food farming activities for their aesthetic benefits. While individual WTP varied from IDR 5,000 to 100,000 annually, 68% of respondents agreed to contribute to maintaining these activities for future generations, while 31% or 31 respondents declined. The survey suggests an annual economic potential of IDR 571,200 for the aesthetic benefits of agricultural activities in the village. The community's WTP highlights the significance of aesthetics in agriculture, encompassing an appreciation of natural beauty and environmental harmony. Through the Contingent Valuation Method (CVM), this study underscores the community's substantial economic valuation of food farming activities for their aesthetic contributions. At the same time, this aligns with Mundher et al. (2022) research, which emphasizes the importance of preserving agricultural practices for their beauty and aesthetic appeal.

3.4.4. Economic Valuation of Food Crop Farming Activities in Bleberan Village

This study utilizes the Total Economic Value (TEV) approach to analyze the economic significance of food crop farming activities in Bleberan Village, Playen Sub-district. TEV encompasses direct and indirect benefits, preferred benefits, and existence benefits. By evaluating various benefit values, the study aims to highlight the substantial economic contributions of the agricultural sector in the village and emphasize the importance of considering these values in decision-making for its development and sustainability.

Table 3. Distribution of total economic value of food crop farming activities in Bleberan Village, Playen Sub-district

No	Economic Value	Total (Rp)	Percentage (%)
1	Agricultural Commodity Results	1,493,057,500	60.55
2	As Oxygen Producer	876,072,288	35.53
3	As Carbon Dioxide Absorber	89,549,308	3.63
4	Utilization of Agricultural Commodity Waste	5,600,000	0.23
5	As an Ecological Function and Biodiversity Balancer	468,840	0.02
6	As Social Benefit	400,440	0.02
7	As a Cultural Benefit	180,135	0.01
8	As an Aesthetic Benefit	571,200	0.02
Total		**2,465,899,711**	**100.00**

Source: Primary data (2022)

The economic value derived from agricultural activities in Bleberan Village demonstrates the multifaceted contributions of farming to the local economy and community well-being. The majority of the economic value, around 60.55%, is attributed to the direct results of agricultural commodity production, highlighting the significance of crop yields in driving economic growth. This significant contribution underscores the importance of optimizing farm productivity and efficiency to maximize financial returns and support livelihoods in the village. These findings align with the research conducted by Pawlak & Kołodziejczak (2020), which emphasizes the pivotal role of agricultural commodity production in sustaining rural economies.

Moreover, the substantial economic value attributed to oxygen production and carbon dioxide absorption, accounting for 35.53% and 3.63%, respectively, underscores the crucial role of agricultural land in environmental sustainability. The production of oxygen and absorption of carbon dioxide contribute to ecosystem balance and mitigate the effects of climate change, demonstrating the intrinsic value of agricultural activities beyond economic returns. This inherent value aligns with the findings of Ulian et al. (2020), highlighting the environmental benefits associated with farming practices and the importance of preserving natural resources for future generations.

Furthermore, the utilization of agricultural commodity waste and the ecological, social, cultural, and aesthetic benefits derived from farm activities collectively contribute to the overall economic value of farming in the village. While these components represent a smaller percentage of the total economic value, they underscore the holistic impact of agriculture on community well-being, cultural identity, and environmental integrity. These findings are consistent with the research findings of Ulian et al. (2020), emphasizing the importance of considering multiple dimensions of value beyond purely economic metrics in agricultural planning and policy-making.

In conclusion, the comprehensive assessment of economic value derived from agricultural activities in Bleberan Village highlights the diverse contributions of farming to the local economy, environment, and community. By recognizing and quantifying the various dimensions of value associated with agriculture, policymakers and stakeholders can make informed decisions to promote sustainable agricultural development and enhance the community's overall well-being. These results align with the research findings of Deguine (2017), emphasizing the need for integrated approaches to agricultural management that prioritize economic, environmental, and social considerations.

CONCLUSION

In Bleberan Village, the intrinsic value of food crop farming extends beyond monetary gains, encompassing diverse facets. The tangible outcomes include the production of staple crops like rice, corn, soybeans, cassava, and peanuts, reflecting a substantial economic contribution. Moreover, the indirect benefits, such as the role of crops as oxygen producers, carbon dioxide absorbers, and the utilization of agricultural waste, further underscore the ecological importance of these activities. The community's willingness to pay for optional benefits, acknowledging the environmental functions and biodiversity maintained, signifies a communal commitment to sustainability. Additionally, the intangible benefits of agriculture, encompassing social, cultural, and aesthetic dimensions, highlight the multifaceted impact on community well-being. The total economic value of food crop agriculture in Bleberan Village reflects its profound potential to bolster the local economy. Government involvement in reducing non-urgent land conversions and subsidizing tools and materials to lower prices is crucial to agricultural stability. This holistic understanding elucidates the interconnectedness of economic, environmental, and community aspects, guiding future policies toward a balanced and sustainable agricultural landscape. As the research unveils the rich tapestry of benefits woven by food crop farming, future endeavors can explore nuanced environmental economic impacts, refine policies for optimal outcomes, and assess the evolving potential of sustainable agriculture in the village.

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