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RESEARCH ARTICLE

Feasibility of Farming and Farmers' Decisions to Choose Intercropping Pattern for Corn Cassava

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ABSTRACT

Intercropping is an effective way to use increasingly limited agricultural land. An intercropping pattern is a planting pattern with more than one type of plant at a given time. The objectives of the study: (1) to find out the income of corn monoculture farming and cassava corn intercropping farming, (2) to find out what factors affect farmers' decisions in choosing cassava corn intercropping patterns. The method used in the survey. There are 2 populations, namely (1) 447 farmers with a corn-cassava intercropping pattern and 66 samples were obtained by simple random sampling using the formula (Suliyanto, 2009), (2) 45 corn farmers and all were taken to be used as samples of 45 samples by the census method. Data analysis: (1) income analysis and R/C Ratio, (2) logistic regression analysis. (1) Monoculture farming income Rp. 9,059,342.38 (R/C ratio 2.19) and cassava corn intercropping pattern Rp. 33,687,057.07 (R/C ratio 3.68), and (2) Logistic regression results: the variables of land area and farmer income have a significant influence on farmers' decisions in choosing cassava corn intercropping patterns. The income of cassava corn intercropping farming is more profitable than monoculture farming so that the income variables and land area have a significant influence on farmers' decision to choose cassava corn intercropping pattern.

1. INTRODUCTION

Corn and cassava are strategic food crop commodities in supporting the development of agriculture and the Indonesian economy, considering that these commodities have a multipurpose function, both for alternative energy, food, and feed (Zulkarnain et al., 2021); (Imron, 2010). Corn and cassava plants have not produced optimal production because the land has not been used optimally. Land use still tends to be monoculture in farming. Land optimization is an alternative to meet plant needs (Sifaunajah & Iskandari, 2021). Increasing the productivity of food crops with extensification is less effective, so it is necessary to farm with an intercropping pattern (A Amir & Rahmatiah, 2020).

The intercropping pattern is an effective way to use agricultural land that is increasingly limited. An intercropping pattern is a planting pattern with more than one type of plant at a given time (E. Setiawan, 2009) and strategies to increase land efficiency by carrying out planting patterns *intercropping* (Mardian et al., 2020) and Increase Broad Unity Productivity (Pambudi, 2008) which aims to get optimal production results by maintaining nutrients (I. Setiawan & Hartini, 2020), water, and sunlight as efficiently as possible for optimal production (E. Setiawan, 2009).

Land is an important natural resource for farmers for agricultural activities (Umanailo, 2019). The agricultural land used is inseparable from economic conditions. Increased economic growth has resulted in the agricultural sector growing rapidly by requiring large land. According to (Zulkarnain & Sukmayanto, 2019), the main reason why farmers choose farming is income. For farmers, income is an indicator of success in farming even though there are other indicators such as education, age, farming experience, land area, and family dependents (C. A. Putri et al., 2019). Therefore, farmers who use land by applying planting patterns need to pay attention to the impact of the regional economy (Sinaga et al., 2021).

The intercropping pattern is a strategy to increase land efficiency. The pattern of intercropping arranges the land so that more than one commodity is planted on the same land and at the same time (Mardian et al., 2020). Intercropping patterns are useful for increasing the productivity of wide unions (Hossain et al., 2017). Therefore, pOla Overlap is applied by farmers because it is to overcome several things, namely narrow land, overcoming crop failure and market fluctuations, meeting food needs, protecting and improving the quality of soil nutrients, and improving the welfare of farmers (Evizal & Prasmatiwi, 2021). In addition, the application of intercropping patterns can overcome the problems of low productivity and price fluctuations (Buana & Suwandari, 2020)

Land use is getting higher because the economic value of food commodities is different (Mardian et al., 2020). The area of land use for corn and cassava plants has a high economic value because the price of corn and cassava tends to be good. The intercropping pattern of cassava corn is one of the intercropping patterns that provides more benefits for the two plants. Land use with intercropping patterns causes more efficient use of resources, especially light, water, and nutrients more efficiently (Mardian et al., 2020)

The decision to choose a planting pattern made by farmers is something that has become a habit in Margosari Village, Metro Kibang District, East Lampung Regency, Lampung Province, the switch is carried out with a scheme that has been taken into account to get more benefits. Where Margosari Village, Metro Kibang District, East Lampung Regency, Lampung Province is the central area for cassava corn production. Farmers consider that farming of intercropping of sweet potato corn using limited land can be profitable and reduce production costs. The production factors used by farmers in the intercropping pattern of cassava corn are applied together so that there is a *joint cost* which has an impact on the suppression of production costs.

Margosari Village is one of the villages that carries out a cassava corn intercropping pattern in the Kibang metro district, East Lampung Regency. The cassava corn intercropping pattern is carried out with the aim of maximizing limited land use and reducing production costs, where the land ownership of each farmer on average is 0.66 ha which is included in the narrow land category so that farmers maximize land use to get better income. Based on the description of the problem, the objectives of the study are (1) to find out the income of corn monoculture farming and cassava corn intercropping farming, (2) to find out what factors affect farmers' decision to choose cassava corn intercropping patterns.

1. LITERATURE REVIEW

1.1. Farming Patterns

Farming patterns are classified based on farmland, namely wetland or paddy farming patterns and dryland farming patterns (Dyah, 2017). Some types of wetlands or rice fields that are affected by irrigation are rice fields with technical irrigation, rice fields with semi-technical irrigation, rice fields with simple irrigation, rainfed rice fields, tidal rice fields, and lebak rice fields (Wulandari & Jingga, 2017). Then, dry land or moorland has planting patterns such as corn - corn - mung beans, corn - cassava, gogo rice - corn - cassava, corn - peanuts - cassava, corn - rice gogo - soybeans - cassava, and corn - soybeans - beans (Amir Amir et al., 2021); (Kristiono et al., 2020). Therefore, the planting pattern requires good management so that it can be sustainable.

Farming patterns are methods applied by farmers to manage agricultural land in order to obtain optimal and sustainable results (Noer, 2011). The farming pattern refers to a combination of various agricultural activities carried out by farmers in one year starting from the selection of plant types, crop rotation, integration with livestock and non-agricultural activities carried out in one system (Indahyani & Maga, 2023). Farming patterns can increase the productivity of agricultural products with several things such as crop diversification, crop rotation, integration of crops and livestock, soil management, and agricultural technology (Ashari et al., 2016); (Rusdiana & Adawiyah, 2013). Adopt technologies such as irrigation, the use of superior seeds, and environmentally friendly pesticides to increase productivity. The types of farming patterns applied to support agricultural development are monoculture, polyculture, agroforestry, organic farming systems (Evizal & Prasmatiwi, 2021); (Sutrisno & Heryani, 2013).

The benefits of implementing good farming patterns will have an impact on sustainable agricultural development, namely increasing sustainability through diversification and crop rotation, maintaining soil fertility and reducing the risk of crop yield decline, reducing the risk of total crop failure due to bad weather, pests, or diseases, optimizing resources through the integration of crops and livestock, and increasing more stable and diverse incomes for farmers. Intercropping patterns are a determinant in sustainable cropping systems in annual crops (Hossain et al., 2017) and perennials (Cubillo, 2016). Overlapping patterns have various benefits both from ecology, economy and social (Lithourgidis et al., 2014).

1.2. Increasing Commodity Productivity

The five farming aims to increase agricultural production. The five ushatani consist of (Hidayat, 2021) namely irrigation, soil tillage, selection of superior seeds, fertilization, and pest eradication. In addition, steps to increase agricultural yields through farming (Darmawan et al., 2021) which consists of land cultivation, use of superior seeds, irrigation management, fertilization, pest and disease eradication, and harvest and post-harvest handling, and marketing.

The green revolution is carried out by the extensification and intensification of agriculture (Azahra et al., 2024). Extensification is carried out by land expansion, limited land leads to more development in intensification. Intensification is carried out by the application of sapta farming. Crop management systems can be influenced by components such as agroclimate, soil/land, plant type, technology, and socio-economics (Evizal & Prasmatiwi, 2021). The overlapping pattern is aimed at sustainable intensification because it can increase income and increase the stability of production by reducing production costs (Hossain et al., 2017)

1.3. Farming Success Factors

Farming as an organizational unit between labor, capital, and management that aims to increase production in the agricultural sector (Sadaruddin et al., 2017); (Boni, 2022). Production factors are factors that support the farming process so that production optimization can be achieved, as for these production factors (Thamrin & Ardilla, 2016); (Putra & Nasir, 2015) namely (a) fixed production factors are production factors whose amount cannot be changed if market conditions require changes in production levels, such as machinery and buildings, (b) variable production factors are production factors whose amount can be changed according to the amount of production produced, such as labor, raw materials and others.

Farming success factors in various conditions that affect the ability of farmers to achieve optimal and sustainable results in agricultural activities. The success factors of farming are divided into two parts, namely internal factors and external factors which both affect each other both directly and indirectly (Ali, 2017); (Sholikhah, 2021). Internal factors are factors that come from within the farmer while external factors are factors that come from outside the farmer. Internal factors that involve farmers in conducting their businesses consist of human resource competence, farmer entrepreneurial spirit, land ownership, and soil fertility. Meanwhile, external factors consist of climate/weather, transportation and communication facilities, fertilizers and pesticides, and government policies (Malta, 2016). The main production factor in a farmer's production is land. Land has the ability to provide different production at different levels of productivity (Dyah, 2017).

2. RESEARCH METHOD

The research location is in Margosari Village, Metro Kibang District, East Lampung Regency, Lampung Province. With the following considerations: (1) Pekalongan District is one of the center areas for corn and cassava production, (2) Margosari Village is an area that carries out many intercropping farming activities (Korlu Metro Kibang District, 2024).

Sampling techniques, there are 2 populations, namely (1) 447 farmers with a corn-cassava intercropping pattern and 66 samples were obtained by *simple random sampling* using the formula (Suliyanto, 2009), (2) 45 corn farmers and all were taken to be used as samples of 45 samples using the *census method.*

The research uses secondary data and primary data. Primary data was obtained directly from fruit crop rice farmers and paddy rice farmers who were designated as samplers or respondents with the help of questionnaires or questionnaires, interviews and field observations. Meanwhile, secondary data is obtained from a government agency or institution related to the research.

The analysis used consisted of revenue analysis and logistic regression analysis.

2.1. Revenue Analysis

Income analysis was used to determine the income of corn monoculture farming and cassava corn intercropping farming. Mathematically, the income analysis is as follows (Soekartawi, 2006).

Pd = TR – TC

Information:

Pd = Income from corn monoculture planting patterns and cassava corn intercropping (Rupiah)

TR = *Total Revenu* / Total Revenue (Rupiah)

TC = *Total Cost* / Total Cost (Rupiah)

2.2. Logistic regression analysis

Logistic regression analysis was used to determine the decision of farmers to switch from monoculture planting patterns to intercropping planting patterns. The derived logit model based on the logistic regression opportunity function can be written (Widarjono, 2016).

$$Zi = In \ \frac{Pi}{1 - Pi}$$

Zi. = α + β1X1 + β2X2 +.$β_{3X3}$ +β4X4 +β5X5 +β6X6 +β7X7 + μ

Information:

Pi	=	Farmers' decision to switch to Planting Patterns (1 = Intercropping Pattern and 0 = Monoculture Planting Pattern)		
α	=	Intercept		
β1… βi	=	Regression coefficients		
X1	=	Age	………................................	(Yr)
X2	=	Education Level	………................................	(Yr)
X3	=	Number of family dependents	………................................	(Org)
X4	=	Farming Experience	………………………………	(Yr)
X5	=	Land	……………………………...	(Ha)
X6	=	Income	………………………………	(Rp.)
X7	=	Distance from Location to Factory	……………………..................	(km)
μ	=	Bully		

The test was carried out to find out if the resulting logit model could explain the decision of farmers in choosing planting patterns. Logistics regression has the purpose of estimating the probability of a farmer's decision and the factors that significantly affect the farmer's decision to switch planting patterns from corn monocrop farming and cassava corn intercropping farming with overal model fit *test (hosmer and lameshow test value),* determination coefficient test (*R-Square*) test (*Negelkerke R Square value*), wald test/t test (Odds *Ratio value*).

3. RESULTS AND DISCUSSION

3.1. Revenue Analysis

3.1.1. Income from Farming Monoculture Corn Planting Pattern

Farming needs to be analyzed to find out whether a business is feasible or not. Income shows the amount of money obtained from the reduction of production costs which farmers then receive within a certain period of time in farming activities (Fatmawati, 2013). Revenue is obtained by subtracting revenue with total costs in 1 (one) time of the production process. The income of corn farming in Margosari Village, Metro Kibang District, East Lampung Regency, Lampung Province can be presented in Table 1.

Table 1. Analysis of Farming Income of Corn Monoculture Planting Pattern (0.64 ha), 2024

Description	Unit	Physical	Price (Rp)	Value (Rp)
Acceptance				
Productivity	Kg	5.317,78	3.136,67	16.680.096,30
Production Cost				
I. Cash Fees				
Seed	Kg	12,40	125.111,11	1.551.377,78
Urea Fertilizer	Kg	132,78	2.591,11	344.041,98
NPK-Phonska Fertilizer	Kg	100,00	2.995.56	299.555,56
KCL Fertilizer	Kg	41,00	11.900,00	487.900,00
Manure				
- Pure Waste	Kg	1.6000,00	573,33	917.333,33
-Husk	Kg	2.431,94	378,47	920.423,42
Total Manure				1.837.756,75
Plow Cost	Rp			639.333,33
Cost of Medicines				
-Herbicides	Rp			64.166,67
-Fungicide	Rp			69.583,70
-Insecticide	Rp			315.017,78
Total Medicines				448.768,15
Out-of-Family Labor Costs	HOK	12,03		936.222,20
Tax Fees	Rp			96.066,67
Total Cash Charges				**6.641.022,43**
II. Calculated costs				
Equipment Shrinkage	Rp			178.064,81
Labor Costs in the Family	HOK	10,54		801.666,67
Total costs are taken into account	**Rp**			**979.731,48**
Total Cost				**7.620.753,91**
Revenue on Cash Charges	Rp			10.039.073,87
Revenue on total costs	Rp			9.059.342,38
R/C Ratio				
I. R/C Ratio to cash expenses				2,51
II. R/C Ratio to total cost				2,19

Source: Primary Data (Processed), 2024

Table 1 shows that the revenue from corn farming is obtained at Rp. 16.680.096,30. The amount of revenue is usually influenced by the amount of production and the cost of corn farming activities. According to (Azwar et al., 2019) The high or low income of a farmer is influenced by the costs used in running the farm. Large revenue is a parameter for farmers' success in farming (Putri & Noor, 2018)

According to (Fatmawati, 2013) Production costs are the total costs incurred by farmers to manage their farms. Corn farmers incur a total cost in one corn production of Rp. 7.620.753,91, these costs are cash costs and are taken into account. In the cash cost, there are 9 components, namely seeds (23.36%), urea fertilizer (5.78%), NPK-Phonska fertilizer (4.51%), KCL fertilizer (7.35%), manure

(27.67%), Bjak (9.63%), pesticides (6.76%), workers outside the family (14.10%), and tax costs (1.45%). Of the 7 (Seven) components of the existing corn farming cash costs, manure costs, seed costs, and labor costs are included in the three largest costs in corn farming. The majority of corn farmer farming is carried out on a small area of land with an average land area of 0.64 ha, so the tax costs incurred by farmers are also not much of Rp. 96,066.67 per 1 year.

In addition to cash costs, the production cost structure in corn farming also has costs that are taken into account, namely equipment depreciation costs (18.17%) and labor costs in the family (81.83%). According to (Nuryanti & Kasim, 2017; Zulkarnain et al., 2020) The depreciation cost of the tool is the cost incurred by farmers in the use of the tool having an economic life of more than one year. The depreciation cost is calculated from the tools used to support corn farming, these tools include hoes, sickles, sprayers, sickles, and machetes

Revenue from cash costs for corn farming amounted to Rp. 10,039,073.87 with an R/C ratio of 2.51 which means that for every 1 rupiah of production costs used, farmers will get a profit of Rp. 2.51. Meanwhile, the income on the total cost received by farmers in corn farming in one season is Rp. 9,059,342.38 with an R/C ratio of 2.19 which means that for every 1 rupiah of production costs used, farmers will get a profit of Rp. 2.19. In line with research (Pamusu & Paelo, 2023); (Septiiadi & Nursan, 2021) with profits of Rp. 16,554,666/ha (R/C 3.33) and Rp. 28,233,520/ha (R/C 4.48), respectively.

3.1.2. Income from Farming Patterns of Intercropping of Sweet Potato Corn

The cassava corn intercropping pattern aims to maximize limited land use by utilizing production inputs optimally. In the cassava corn intercropping pattern, corn planting is planted earlier so that at the time of corn harvest it does not interfere with the cassava plant, where the cassava plant is planted after the corn plant is 1.5 (one and a half) months old, so that at the time of corn harvest it does not interfere with the growth of cassava plants. Income earned by farmers in 1 (one) time of the production process. The income of farming in the intercropping pattern of cassava corn in Margosari Village, Metro Kibang District, East Lampung Regency, Lampung Province can be presented in Table 2.

Table 2 shows that the total production costs incurred by farmers in the cassava corn intercropping pattern are Rp. 11,556,230.35, these costs include cash costs and calculated costs. According to (Damanik, 2014) Total production costs are all costs incurred by farmers in managing farming which are calculated in rupiah units in one production process. The cash cost for farming the cassava corn intercropping pattern is Rp. 10.468.918,59 which includes the cost of purchasing seeds (23.33%), the cost of purchasing fertilizers (38.36%), the cost of purchasing pesticides (5.16%), the cost of labor outside the family (25.29%), the cost of ploughing (6.66%), and the cost of taxes (1.20%). As for the costs that are taken into account, they include equipment depreciation costs (11.78%) and labor costs in the family (88.22%).

Table 2. Analysis of Farming Income of Intercropping Patterns of Cassava Corn (0.66 ha)

	Corn				Cassava			Total
Description	**Unit**	**Sum**	**Price**	**Total Value**	**Number**	**Price**	**Total Value**	**Overlap**
Acceptance								
Production	**Kg**	**6.316,67**	**2.993,94**	**18.911.717,17**	**18.790,45**	**1.454,55**	**27.331.570,25**	**46.243.287,42**
Production Cost								
I. Cash Fees								
Seed	Kg	13,50	129.545,45	1.748.863,64	72,94	9.515,15	694.029,38	2.442.893,02
Urea Fertilizer	Kg	231,82	2.584,85	599.214,88	126,52	2.598,48	328.747,70	927.962,58
KCL Fertilizer	Kg	-	-	-	50,00	12.000,00	600.000,00	600.000,00
Manure	Kg	5.169,70	370,83	1.917.095,96	-	-	-	1.917.095,96
NPK Fertilizer	Kg	109,09	3.000,00	327.272,73	81,06	3.000,00	243.181,82	570.454,55
Cost of Medicines								
-Herbicides				26.125,00			344.621,15	370.746,15
-Fungicide				94.515,15				94.515,15
-Insecticide				75.440,40				75.440,40

Out-of-Family Labor Costs	HOK	11,45		915.909,09	21,65		1.731.780,47	2.647.689,56
Plow Cost	Rp.							696.969,70
Tax	Rp.							125.151,52
Total cash costs	**Rp**			**5.704.436,85**			**3.942.360,53**	**10.468.918,59**
II. Calculated costs								
Equipment Shrinkage	Rp							245.985,57
Labor Costs in the Family	HOK	9,98		798.484,85	12,81		1.042.841,34	1.841.326,119
Total Costs are taken into account	**Rp**			798.484,85			1.042.841,34	**2.087.311,76**
Total Cost	**Rp**			**6.502.921,69**			**4.985.201,87**	**11.556.230,35**
Income								
Revenue on cash costs	Rp			13.207.280,33			23.389.209,71	35.774.368,83
Revenue on total costs	Rp			12.408.795,48			22.346.368,37	33.687.057,07
R/C Ratio								
R/C Ratio to Cash Expenses								4,42
R/C Ratio to total cost								3,68

Source: Primary Data (Processed), 2024

The cash cost in the cassava corn intercropping pattern that is incurred is the cost of purchasing fertilizer, this is because the use of fertilizer is intended for 2 (two) plants. The use of fertilizer is an indicator of the success of farming, both corn and cassava plants. The type of fertilizer used in the intercropping pattern is according to the needs of the plant. The types of fertilizers for corn plants are urea fertilizers, NPK-Phonska fertilizers, and manure, while for cassava plants are in the form of urea fertilizers, KCL fertilizers, and NPK-Phonska fertilizers. The use of fertilizer in intercropping patterns is very efficient because fertilizers are used together on different plants on the same land. In the intercropping pattern, the use of fertilizer in the research area is still below the average provision. Corn plants use 231.82 kg of urea fertilizer, 109.09 kg of NPK-Phonska fertilizer and 5,169.70 kg of manure while the government's stipulation of the use of fertilizer per ha is 300 kg of urea fertilizer, 100 kg of TSP fertilizer and 100 KCL fertilizer. Cassava plants use 126.52 kg of urea fertilizer, 50 kg of KCL fertilizer, and 81.06 kg of NPK-Phonska fertilizer while the government's stipulation of the use of fertilizer per ha is 200 kg of urea fertilizer, 200 kg of TSP fertilizer, and 150 KCL fertilizer

Before planting, the soil must be processed first which aims to increase soil nutrients so that plants can grow properly. Farmers cultivate land using plows with a plow cost of Rp. 696,696.70 per 0.66 ha. After the land ploughing is completed, basic fertilizer (compost/cage fertilizer) is applied. The application of the fertilizer is when the soil is being processed so that the fertilizer is absorbed evenly on the land so that the planted plants can absorb soil nutrients optimally.

In corn plants, KCL fertilizer is not used because it is not really needed by corn plants and the price of KCL fertilizer is quite expensive, but cassava plants need KCL fertilizer so that the tubers get enough nutrients so that they can enlarge the tubers of cassava plants. The use of fertilizer in intercropping patterns can be efficient because the use of basic fertilizer (manure) is carried out during land cultivation, in addition to the waste harvested from corn plants is used for organic fertilizer (Figure 1.) so as to reduce the use of chemical fertilizers.

Figure 1. Corn stalk waste becomes fertilizer for cassava plants

The income obtained by farmers is largely determined by the size or size of the land area cultivated by farmers (Zulkarnain et al., 2022). This is in line with (Walis et al., 2021)(Sufriadi & Hamid, 2021) which states that the larger the farmer's land, the greater the production obtained by the farmer. The high and low production of plants is inseparable from the type of seeds/seeds used. Superior seeds/seeds are quality seeds/seeds that will provide maximum production results. The average type of seed/seed used for corn plants is sumo corn, while cassava plants are spinach. The type of seed used by farmers has been used for a long time, this is because the production results are quite good. Good production is not necessarily supported by good prices, this applies to the law of demand for every commodity. Corn and cassava farmers harvest at the same time. The simultaneous harvest of cassava plants has a considerable impact on prices. At the time of the study, the price of cassava was quite good because many farmers postponed harvesting due to the dry season (not rain). Cassava farmers said that, when there was no rain and forced harvesting, many tubers were left in the soil because the soil was hard. The average production of corn farmers is 6,316.67 kg or 6.32 tons/0.66 ha at a price of Rp. 2,993.94, then the revenue is Rp. 18,911,717.17. Meanwhile, the average production of cassava is 18,790.45 or 18.79 tons/0.66 ha with a price of Rp. 1,454.55, then the revenue is Rp. 27,331,570.25. The production of each plant in the intercropping pattern is in accordance with the land area.

Farming in the intercropping pattern of cassava corn still requires pesticides. Pesticides in each crop have different intercropping patterns, where corn planting requires all types of pesticides, namely herbicides (gramoxone), fungicides (marsha and target), and insecticides (cruiser and emasel) while cassava plants are herbicides (gramoxone). Diseases of corn plants that often appear are mildew and ants, to treat them mildew use fungicides and to treat ants use insecticides. The name of the cassava does not have many obstacles in its cultivation, which disturbs the cassava plants that will affect the planting tubers, namely in the form of weeds, the weeds are eradicated using herbicides.

Income from cash costs for farming in the intercropping pattern of cassava corn amounted to Rp. 35,774,368.83 with an R/C ratio of 4.42 which means that for every 1 rupiah of production costs used, farmers will get a profit of Rp. 4.42. Meanwhile, the income for the total cost received by farmers in the intercropping pattern of corn and cassava in one season is Rp. 33,687,057.07 with an R/C ratio of 3.68 which means that for every 1 rupiah of production costs used, farmers will get a profit of Rp. 3.68.

Table 1 and Table 2 show that the average income of farmers in the intercropping pattern of maize and cassava is higher than the average income of farmers in the monoculture planting pattern of maize. The income of farmers in the intercropping pattern of corn and cassava is Rp. 33.687.057,00 and the income of farmers with corn monoculture planting patterns of Rp. 9.059.342,38. The difference is due to the higher selling and production prices of cassava corn intercropping patterns compared to corn monoculture planting patterns. In the cultivation of intercropping patterns, the production factors on limited and equal land are used. The amount of income earned by farmers is influenced by the number of costs incurred in farming (Safitri et al., 2022). This is in line with (Yusdi et al., 2019) which states that when the production costs used by farmers are small, the production of farmers will also be small, so this will affect farmers' income, and vice versa. Intercropping farming requires higher costs or capital compared to monoculture farming, this is because the use of production factors, especially fertilizers, is used in accordance with the plant's health.

3.2. Analysis of Factors Influencing Farmers' Decision to Choose Cassava Corn Intercropping Pattern

The factors that influenced the decision of farmers to choose the intercropping pattern of cassava corn in Margosari Village, Metro Kibang District, East Lampung Regency, Lampung Province were the age of the farmer (X_1), the level of farmer education (X_2), the number of farmer dependents (X_3), farming experience (X_4), land area (X_5), farmer income (X_6) and the distance from the location to the factory (X_7).

The model used in analyzing farmers' decisions in selecting the intercropping pattern of cassava corn is a binary logistic regression model with a variable bound to quantitative value and with a single value or binary category. The value category in choosing the planting pattern is with a score of 1 (one) in the category of choosing the intercropping pattern of cassava corn while the score of 0 (zero) in the category does not choose the intercropping pattern of cassava corn.

In the logistic regression model, it is divided into 2 (two) assessments, namely the assessment to see the magnitude of the influence of the independent variable (independent variable) on the dependent variable (independent variable) simultaneously (simultaneously) and the test to see the magnitude of the influence of the independent variable (independent variable) on the dependent variable (bound variable) individually (partially). Individual or percial testing in this case can use the Wald Test while simultaneous or simultaneous testing can be used with the Overal Model Fit Test.

3.3. Overal Model Fit Test

The Overal Model Fit *test* is a statistical test used to determine how much independent variables (independent variables) in logistic regression together affect dependent variables (bound variables) such as the F test in linear regression which is based on a statistical value of -2LL or an LR value (Ghozali, 2009). The Overal *Model Fit test value* can be seen in table 3.

Table 3. Hosmer and Lemeshow Test

Hosmer and Lemeshow Test			
Step	**Chi-square**	**Df**	**Sig.**
1	398,420	8	0,000

Source: Data processed by SPSS, 2024

Table 3 shows that the binary logistic regression model that has met the assumption of model feasibility is known by looking at the sig. feasibility value of the alpha logistic regression model 1% (0.000), which means that the logistic binary regression model is feasible to use because it has no difference from the predicted classification and the observed classification. In this case, independent variables (independent variables) such as farmer age (X_1), farmer education level (X_2), number of farmer dependents (X_3), farming experience (X_4), land area (X_5), farmer income (X_6) and distance from the location to the factory (X_7) simultaneously affect farmers' decisions in choosing cassava corn intercropping planting patterns.

3.4. Determination Coefficient Test (R-Square)

The R-Square (R2) test is used to measure the proportion of variants in a dependent variable which is then explained by an independent variable in logistic regression. The magnitude of a determination coefficient (R^2) is used to determine how much diversity a dependent variable can be explained by independent variables in the logistic regression model. The amount of the determination coefficient (R^2) ranges from 0 - 1. If the value of the determination coefficient (R^2) is close to 1, then the results of the logistic regression model are better. While the value of the determination coefficient (R^2) is close to 0, then the independent (free) variable as a whole cannot explain the dependent (bound) variable (Ghozali, 2009). The results of the determination coefficient value (R^2) with SPSS are presented in Table 4.

Table 4. R-Square Test (Coefficient of Determination)

Model Summary			
Step	**-2 Log likelihood**	**Cox & Snell R Square**	**Nagelkerke R Square**
1	49.201b	0.596	0.803

Source : Data processed by SPSS, 2024

Table 4 shows that the value of Nagelkerke's R Square (R^2) is 0.803 or 80.3%, meaning that the dependent variables are jointly explained as independent variables of farmer age (X_1), farmer's education level (X_2), number of farmer's dependents (X_3), farming experience (X_4), land area (X_5), farmer's income (X_6) and distance from the factory (X_7) by 80.3%. While the remaining 19.7% is explained by other variables that are not included in this research model.

3.5. Clasificasion Table

The decision to choose the cassava corn intercropping pattern is made by farmers to get more benefits from the land they own. The classifier chooses the planting pattern to predict the accuracy or suitability of the results obtained.

Table 5. Clasification Table of Factors Influencing Farmers' Decisions in Choosing an Intercropping Pattern

Classification Table[a,b]					
	Observed		Predicted		
			Choosing a planting pattern		Percentage Correct
			No intercropping pattern	Overlapping tame pattern	
Step 0	Choosing a planting pattern	No intercropping pattern	0	45	.0
		Intercropping pattern	0	65	100.0
	Overall Percentage				59.1
a. Constant is included in the model.					
b. The cut value is .500					

Source : Data processed by SPSS, 2024

Table 5 shows that the *Overall Percentage value* is 59.1. The Overall *Percentage Correct value* is 59.1%, which means that the ability of the logistic regression model used is quite good because it is able to estimate the accuracy of predictions in research or conditions that occur in the field with an accuracy level of 59.1%.

3.6. Wald Test

The Wald test is a t-test used to determine the influence of independent variables on dependent variables individually (partially) by comparing the results of a significance value (p-value) with alpha which is 1%, 5%, 10% where if the result of the p-value value is smaller than alpha then it shows that it has a significant influence of independent variables on the dependent variable partially (Ghozali, 2009).

The wald test or t test is used to determine the factors that significantly affect the decision of farmers to choose the intercropping pattern of cassava corn in Margosari Village, Metro Kibang District, East Lampung Regency, Lampung Province For more details, please see Table 6.

Table 6. Wald test of factors influencing the selection of cassava corn intercropping pattern

Variable	B	Sig.	Exp(B)
Age (X_1)	-0.043	0.468	0.958
Education (X_2)	-0.189	0.338	0.828
Family Dependents (X_3)	0.339	0.542	1.403
Farming Experience (X_4)	-0.036	0.496	0.964
Land area (X_5)	-8.681*	0.000	0.000
Revenue (X_6)	0.000*	0.000	1.000
Location Distance to Factory (x_7)	0.227	0.678	1.255
Y (1 = Intercropping pattern, 0 not intercropping pattern) Constant	-0.171	0.964	0.843

Source : Data processed by SPSS, 2024

Information:

*) = Trust level 1 %

**) = Trust level 5 %

***)   = Trust level 10 %

Table 6 shows that the logistical equation model of farmers' decision to choose the cassava corn intercropping pattern is:

Y = -0.171 – 0.043 X1 – 0.189X2 + 0.339 X3 – 0.036 X4 – 8.681 X5 + 0.001 X6 + 0.227 X7 + e

The logistical equation of the farmer's decision explains:

Based on table 6, it shows that the variables that have a real effect on farmers' decision to choose cassava corn intercropping patterns are the variables of land area (X_5), and income (X_6). As for other variables, namely farmer age (X_1), farmer education (X_2), number of farmer dependents (X_3), farming experience (X_4) and distance from the location to the factory (X_7) had no real effect.

The influence of each variable on farmers' decision to choose cassava corn intercropping patterns can be explained as follows:

Farmer's Age (X_1), The age variable of farmers did not have a real effect on the decision of farmers to choose the intercropping pattern of cassava corn. The farmer's age variable has an Exp coefficient (B), namely 0.958 and has a negative sign in the coefficient B. This means that for every change in the farmer's age of 1 year, the possibility of farmers choosing the intercropping pattern of cassava corn will be reduced by 0.958%. This shows that the younger the farmer, the greater the chance of farmers in choosing a cassava corn intercropping pattern when compared to a farmer who does not do cassava corn intercropping pattern. According to (Rahmasari et al., 2020) The younger the farmer's age, the more curious they will be, so that younger farmers will strive to adopt agricultural innovations.

Farmer Education Level (X_2), The variable of farmer education level has no real effect on farmers' decision to choose cassava corn intercropping pattern. In the variable of education level, farmers have an exp coefficient value (B) of 0.828 and a coefficient of B has a negative sign. This shows that every change in the level of farmer education by 1 level, the opportunity for farmers to choose intercropping patterns is reduced by 0.828%. According to (Effendy & Pratiwi, 2020), if someone has a higher level of education, it will be relatively faster in implementing the adoption of technological innovations, and vice versa if someone has a low level of education, then it will be difficult to carry out the adoption of technological innovations quickly.

Number of Farmer's Dependents (X_3), The variable of the number of farmers' dependents did not have a real effect on the decision of farmers to choose the intercropping pattern of cassava corn. The variable of the number of farmer dependents has an exp coefficient value (B), namely 1.403 and has a positive value in the coefficient B. This means that for every change in the number of dependents of 1 farmer, the opportunity of farmers in choosing the intercropping pattern of cassava corn will increase by 1.403%. According to (Mandang et al., 2020) The large number of dependents of farmer families will encourage farmers to do many things or activities that aim to find and increase income in their families. This is what makes the variable of the number of family dependents not have a real effect on farmers' decision-making to choose the intercropping pattern of cassava corn.

Land Area (X_4),The variable of land area has a significant influence on farmers' decision to choose the intercropping pattern of cassava corn. In the variable of land area, farmers have an exp coefficient (B), namely 0.000 and coefficient B has a negative value. This means that every change in the land area of 1 ha, the opportunity for farmers to choose the intercropping pattern of cassava corn is reduced by 0.000%. This shows that the land owned by farmers is decreasing because the land is used intercropping (land is used simultaneously at the same time), so the desire of farmers to choose the intercropping pattern of cassava corn is also increasing, in line with the research (Pratama et al., 2020) The variable of land area has a real effect on farmers' decisions in farming.

Farming Experience (X_5), the variable of farming experience did not have a real influence on farmers' decision to choose cassava corn intercropping patterns. The farming experience variable has an exp coefficient value (B) of 0.964 and a negative value of the coefficient B. This means that every change in a farmer's experience of farming for 1 year, the opportunity for farmers to choose a cassava corn intercropping pattern is reduced by 0.964%. It can be concluded that the longer the farming experience, the more it does not have a real influence on farmers' decisions in choosing cassava corn intercropping patterns. This opinion is also strengthened because there is no significant difference in farming experience between farmers who have carried out cassava corn tumangsari planting pattern activities and farmers who do not carry out monoculture planting pattern activities.

Farmer Income (X_6), Farmer income variables have a real influence on farmers' decisions to choose cassava corn intercropping patterns. The farmer income variable has an exp coefficient (B), namely 1.000 and has a positive value on the coefficient B. This means that for every change in income of 1 rupiah, the opportunity of farmers to choose the intercropping pattern of cassava corn will increase by 1,000%. According to (Zulkarnain & Sukmayanto, 2019) If the farmer's income generated on a certain crop has a greater profit, the opportunity for farmers to make decisions to cultivate the crop will also be greater, on the other hand, if the farmer's income obtained from a certain crop is smaller, the possibility of farmers choosing to farm the crop will be smaller.

The average income of farmers in the intercropping pattern of cassava corn is Rp.33,687,057.07 while the average income received by monoculture farmers is Rp. 9,059,342.38. This shows a very significant difference in income for cassava corn intercropping farming and corn monoculture farming. The amount of income earned by farmers from a cassava corn intercropping pattern is a consideration for farmers in choosing the planting pattern.

Location Distance to Factory (X_7), the variable of location distance to factory has an insignificant effect on farmers' decision to choose cassava corn intercropping pattern. The variable of location distance to the factory has an exp coefficient value (B) of 1,255 and a positive value in the coefficient B. This shows that the closer the location distance to the factory, the more opportunities farmers have in carrying out cassava corn intercropping planting pattern activities of 1,255%. It can be concluded that the closer the factory location is, it does not have a real influence on farmers' decisions in choosing cassava corn intercropping patterns.

4. CONCLUSION

The income of cassava corn intercropping pattern farming is greater than that of corn monoculture farming in Margosari Village, Metro Kibang District, East Lampung Regency. Then, the factors that affect farmers' decisions in choosing the intercropping pattern of cassava corn in Margosari Village, Metro Kibang District, East Lampung Regency are the land area and farmers' income. The suggestion in this study is that farmers can farm intercropping patterns with various crops because land use in simultaneous production inputs will provide maximum profits.

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