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Farmers' Behavior Towards the Risks of Sweet Corn Farming in Peat Lands

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ABSTRACT

In general, corn cultivation carries a number of risks, such as price and production risk. The risks will influence farmers' behavior in facing farming risks. The objectives of this research are: 1) to analyze the risk level of sweet corn farming on peatlands. 2) analyze farmers' behavior regarding the risks of sweet corn farming on peatlands. The research method used was purposive sampling, where samples were taken from 82 farmers in Rasau Jaya Satu Village. Data collection was carried out through interviews with questionnaires. The data analysis used is farming risk analysis using the coefficient of variation (CV) and farmer behavior towards risk using quadratic utility function analysis. The research results show that the production risk obtained is 0.11 < 0.5 and the income risk is 0.11, meaning that the farming risk faced by corn farmers is small. Overall, the majority of sweet corn farmers behaved in a risk-averse manner (risk averters) amounting to 52% or as many as 43 people while the remaining 48% or 39 people behaved boldly towards risks (risk takers).

Keywords: Behavior, Risk, Farming, Sweet Corn

INTRODUCTION

Corn farming in general is a business that has many risks, including production risk and price risk (Suhendra, 2020). Crop failure and extremely low sales prices for agricultural products are the two main issues that farmers deal with when it comes to production (Maulana 2019). Production problems relate to the nature of farming which is always dependent on nature, supported by risk factors which cause high opportunities for production failure, thereby accumulating the risk of low income received by farmers.

Based on data, corn production in Kubu Raya from 2020-2022 was fluctuative. In 2020 it was 2,525 tons, in 2021 as much as 5,052 tons and in 2022 3,742.9 tons (Food Security and Horticulture Service). It means that the price of corn in Kubu Raya Regency was also fluctuative. This is in line with the results of research by Amirul Fuadi et al., 2017. Factors that have a real influence on soybean prices are production level, quality, post-harvest handling and marketing distribution channels.

Every agricultural operation involves risk, which can have a good or negative influence depending on the outcome: profits or losses. Since risk is defined as the possibility that a negative occurrence would transpire as a result of an activity, it is more frequently employed in the context of decision making. The risk associated with a decision increases with the degree of uncertainty around the occurrence. The existence of risks will influence farmers' behavior in facing risks (Saputra et al., 2018). Farmers' behavior

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in facing risks will be the basis for farmers to make decisions regarding how much to allocate inputs to be used in their farming activities. The use of inputs by farmers in production activities will affect the amount of production produced and the level of income. The farmer's courage to accept risks greatly influences the sustainability of his farming business (Sinaga & Tarigan, 2020).

Risk attitude is logically related to an individual's financial ability to accept profits or losses. The part of the distribution function of the possible outcomes for alternative actions determines how decision risk preferences affect the selection of the intended course of action. According to Dhungana et al. (2004) the more risk averse farmers are, the greater the possibility that their business scale will be inefficient, it is thought that this is because they operate outside of an efficient size. In addition, as farmers take on greater risks, their businesses grow in size and become more efficient in terms of both prices and costs. Referring to the description of the problem, the objectives of this research are; 1) analyzing the risk level of sweet corn farming on peatlands. 2) analyzing farmers' behavior regarding the risks of sweet corn farming on peatlands.

METHODOLOGY

This research was conducted in Rasau Jaya Satu Village, Rasau Jaya District, Kubu Raya Regency. The selection of the research location was carried out purposively with the consideration that the location is a village as the center of an independent integrated city with the superior commodity of sweet corn (BMKG, 2022).

The primary data that was used was collected through questionnaire-assisted interviews straight from the original source. In the meanwhile, books, papers, and journals pertaining to the topic of this research were the sources of secondary data employed in this study.

Quantitative descriptive analysis is the data analysis method utilized to address the study's primary goal. The aim of this method is to create a systematic, factual and accurate description, picture or painting of the facts, properties and relationships between the phenomena being investigated. In this study, researchers used data from the third planting season of one year, because in this planting season farmers still remember their farming expenses. To determine the level of production risk and income risk from corn farming, use coefficient of variation (CV) analysis with the following calculations: Calculate revenue TR = P x Q

Annotation:

TR : Total corn farming revenue
P : Prices of agricultural products
Q : Number of farming products

Calculating production risks

$$CV = \frac{\sigma}{X_r}$$

Annotation:
CV : Coefficient of variation in corn production
σ : Standard deviation of corn production (Kg/MT)
Xr : Average Corn Production (Kg/MT)

Calculating income

$$PU = TR - Bte$$

Annotation:
PU : Corn farming income
TR : Total revenue from corn farming
Bte : Corn farming costs

Calculating income risk

$$CV = \frac{\sigma}{X_r}$$

CV : Coefficient of variation corn farming

σ : Standard deviation of corn farming (Kg/MT)
Xr : Average of Income (Kg/MT)

The second goal is to determine how farmers respond to corn price threats. The data analysis method used is quadratic utility function analysis with the help of the SPSS application. According to Soekartawi (1993), based on the Bernoulli principle and the Neumann Morgensters technique refined with neutral probability (50:50), the procedure carried out is as follows:

a. Determining the value of each certainty equivalent (CE) by determining the value of the results or outcomes of corn farming that will be obtained according to the farmer's estimates. This price is called the price in neutral conditions (does not contain risk). Then at the Neutral Price Level (THN) the highest possible price level is determined with a 50 percent chance of success and 50 percent failure. The highest price level is called the Optimistic Price Level (THO), while the lowest price level is called the Optimistic Price Level (THO), while the lowest price level is called the Pessimistic Price Level (THP), so that THN can be formulated as follows.

b.

$$THN = \frac{THO + THP}{2}$$

On the basis of this neutral pricing, farmers are bargained with to achieve price points where they are in a subjective balance, that is, when they are neutral or indifferent to the choice of engaging in other commercial ventures or corn farming.

c. The CE value determination scheme is explained as follows

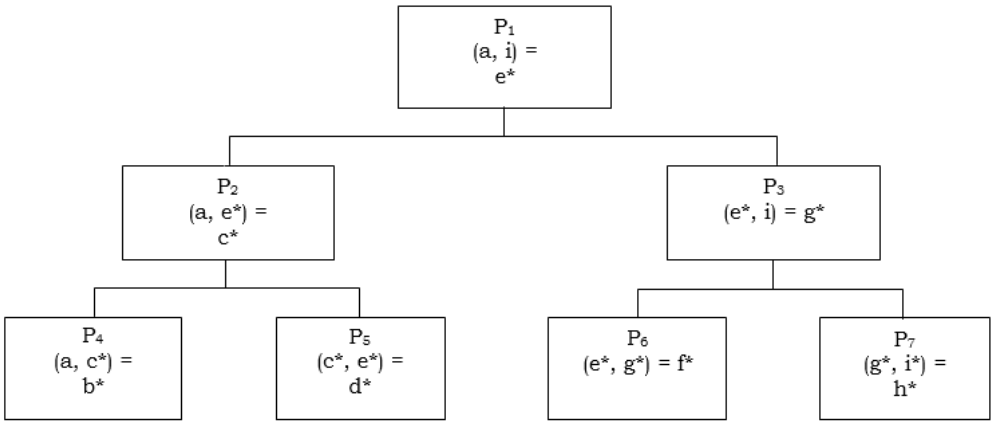


Figure 1.
Scheme for Determining the Certainty Equivalent (CE)

Annotation:
In the first interview process (P1) applies:
a = Pessimistic Price Level
I = Pessimistic Price Level
E = Neutral Price Level
e* = At CE Price

In this way, it is continuously carried out sequentially as in the scheme in Figure 1. to determine other CE values.

d. Making a scale with 9 points, because there are 9 CE values, namely from a to i. the starting point

(lowest) is given at point a with a value of 0 and the ending point (highest) at i with a value of 8. The utility scale of each CE can be described as follows.

e.

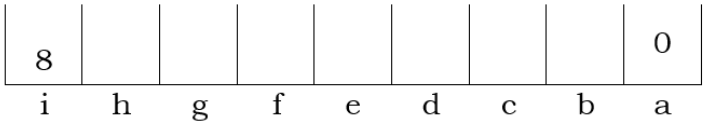


Figure 2.
Utility Scale for Each Certainty Equivalent (CE)

Annotation:
a – i : Balance Value (CE)
0 – 8 : Utility Scale

With a probability of 0.5 optimistic: 0.5 pessimistic, the CE value in each interview process can be translated into utility as in the following table.

Table 1
Utility Scale and Rupiah Value of Certainty Equivalent (CE)

No	Alternative Choice	CE	Utility Scale from CE
1	a	a*	0
2	i	i*	8
3	(a,i)	e*	0,5(0) + 0,5 (8) = 4
4	(a,e*)	c*	0,5(0) + 0,5 (4) = 2
5	(e*,i)	g*	0,5(4) + 0,5 (8) = 6
6	(a,c*)	h*	0,5(0) + 0,5 (2) = 1
7	(c*,e*)	d*	0,5(2) + 0,5 (4) = 3
8	(e*,g*)	f*	0,5(4) + 0,5 (6) = 5
9	(g*,i)	h*	0,5(6) + 0,5 (8) = 7

f. Estimation of the utility function which describes the relationship between the utility index and the independent variable of the CE rupiah value is as follows.

$$U = \tau 1 + \tau 2\, M + \tau 3\, M2$$

Annotation:
U = Utility index t in util units
M = CE value in rupiah
τ1 = Intercept
τ2 dan τ3 = It is aimed to find the utility function's coefficients

g. The large value of the utility function coefficient (τ3) indicates the existence of risk-averse behavior for corn farmers, with the following limitations:
If τ3 < 0, then corn farmers are risk averse (risk averter)
If τ3 = 0, then corn farmers are risk neutral.
If τ3 > 0, then corn farmers are risk takers.

h. To test whether corn farmers have a brave attitude towards risk or not, a hypothesis is proposed:
H0: τ3 = 0
H1: τ3 = 0

Hypothesis testing is carried out by looking at the results of the analysis carried out using the t-test as a hypothesis testing rule.
The decision-making criteria are as follows:
If t count ≤ t table, then H0 is rejected, meaning corn farmers have brave or risk-averse behavior
If t count > t table, then H0 is accepted, meaning corn farmers have neutral behavior towards risk.

FINDING AND DISCUSSION

Risk Level of Sweet Corn Farming on Peatlands

Production risks are risks originating from production activities such as crop failure, decreased productivity, pest and disease attacks, climate and weather changes, and so on (Siswani et al., 2022). The analytical technique used to analyze the production risk of sweet corn farming in Rasau Jaya Satu Village is shown in table 1.

Table 1.
Risk Level of Sweet Corn Farming Production

No	Description	Mark
1	Production Average	1838.415
2	Standard Deviation	215.19035
3	Coefficient of Variation	0,11

Source: Primary data, 2023

Table 2.
Risk Level of Sweet Corn Farming Income

No	Corn Farming Income	Rp/MT
1	Average Income	6,254,268
2	Standard Deviation	5.443.111
3	Coefficient of Variation	0,11

Source: Primary Data, 2023

Based on the calculations in table 4.7, the production risk of sweet corn farming has a coefficient of variation value of 0.1 or <0.5, meaning that the production risk faced by farmers is small. Even though the risks faced by farmers are small, farmers are still able to face several obstacles such as high rainfall, pest attacks and disease. This problem succeeded in causing farmers to experience crop failure and their production results were not optimal. The low risk faced by corn farmers can also lead to a decrease in production yields due to climate, weather, pest and disease attacks (Siswani, Sri et al., 2023). This decline in farmer production is also a big problem for farmers,

because apart from reducing farmer income, this risk also reduces the level of supply in the market. (Nurhudayah et al., 2018). Risks of Sweet Corn Farming Income on Peatlands income risk level analysis is a form of actual income deviation that occurs from the average income. Table 2 shows the results of calculations regarding income risk:

Based on table 2, it can be seen that the risk of sweet corn farming income has a coefficient of variation (CV) of 0.11 < 0.5. This means that for every rupiah of farming income received, there will be a risk or uncertainty of income of 0.11 rupiah. The results of this research show that the level of risk faced by farmers is still relatively small, so they are able to face any obstacles that occur. The greater the coefficient of variation a farmer has, the greater the level of income risk they will face (Dian et al., 2023). In general, the price level for sweet corn among farmers still varies greatly. The lowest price that farmers usually receive is Rp. 2,300/Kg and the highest price reaches Rp. 6,500/Kg. The price received by farmers is one of the factors in the size of the income earned by farmers. The greater the price received, the higher the farmer's income. Likewise, the lower the price received, the lower the farmer's income will be (Sukardi, 2020).

Farmers' Behavior Toward Farming Risks

Farmers' behavior towards risk consists of three types of behavior, namely the behavior of farmers who avoid risk (risk averter), farmers who are risk neutral (risk neutral), and the behavior of farmers who dare to risk (risk taker) (Saputra et al., 2018). The initial stage that is usually used to determine farmer behavior towards sweet corn farming regarding farming risks is to determine the CE (certainty equivalent) value of farming that the farmer will obtain based on the farmer's estimates. This price is also called the price in neutral conditions because the condition does not contain risk. Based on the Neutral Price Level (THN), the highest possible price level is determined with a 50% chance of success and 50% failure. The highest price level in this condition is called the Optimistic Price Level (THO), and the lowest price level is called the Pessimistic Price Level (THP) (Susanti et al., 2018).

The assessment of farmers' behavior when facing risks in their farming business can be seen through data on the acceptance of farmers' expectations. The preference value of all farmers can of course be measured through revenue data which will be tested using quadratic regression. This quadratic regression test is also carried out on each respondent, so that each respondent must have a different risk utility function. Testing is used to assess a risk with a utility function. Meanwhile, this quadratic regression test uses the utility scale as the dependent variable and the CE value is used as the independent variable so that it will produce a risk coefficient value to analyze farmer behavior in facing risk. If the risk coefficient value is equal to zero, then this shows that farmers in Rasau Jaya Satu Village have neutral behavior when facing risks. This shows that farmers are able to handle the risks that occur in their area so that they do not make changes to their production inputs. However, a positive risk coefficient indicates that farmers' behavior is braver in facing all risks, while a negative risk coefficient indicates that farmers are unable to face the risks that occur (Anggraini & Mardliyah, 2021). Therefore, the results of the analysis of variation values for all corn farmer behavior are shown in table 3.

Table 3.
Distribution of Farmer Behavior Regarding the Risks of Sweet Corn Farming

Farmer Behavior towards Risk	Number of Respondents (Person)	Percentage (%)
Risk Taker (Brave to take risk)	39	48%
Risk Neutral (Neutral)	0	0%
Risk Averter (Not Dare)	43	52%
Total	82	100%

Source: Primary Data, 2023

Statistical data shows that all calculated F values are significant, that is, they are greater than the F table values and have an R2 value that is close to 1, which indicates that there is a very significant relationship between the utility value and the revenue value. The results of this analysis also show that the statistical quality of the utility function estimates is very good for predicting the behavior of sweet corn farmers regarding the risks of their farming (Susanti et al., 2018)

Table 3 shows variations in the behavior of sweet corn farmers, there are 39 people (48%) who dare to face risks (risk takers). Meanwhile, the other 43 people (52%) did not dare to take risks. The results of the analysis show that the first hypothesis which assumes that the majority of farmers behave neutrally is rejected. This is shown in Appendix 12 that the majority of farmers have negative and positive M2 coefficients. In the estimation of the quadratic utility function, there were 39 farmers with a positive regression coefficient or positive t3 direction and as many as 43 farmers had a negative regression coefficient or negative t3 direction. Further statistical testing with the help of the t test, the significance of the negative regression coefficient value is not always real or not always significant.

Farmers who dare to take risks means that farmers expect the income generated to be higher than before. The farmers' courage in facing this risk is because corn is a superior product in Rasau Jaya Satu Village. Apart from that, the sweet corn production is always easy to market. The level of demand for sweet corn in the market will usually continue to increase during the third planting season, to be precise at the end of the year. The greater the demand in the market, the prices offered will also continue to increase. However, the prices offered by farmers often experience price fluctuations during certain planting seasons. Nevertheless, farmers prefer to continue to carry out their farming better

Most other farmers do not dare to face the risks of farming. What farmers who are risk averse (Risk Averter) do in farming is that they are reluctant to try innovative or experimental farming practices. They prefer to farm using traditional methods that have been carried out for generations, they also choose to avoid investments that have high risks or taking loans for farming capital. This is caused by fear of losses experienced by farmers and will affect household needs for the results of their farming. They prefer to maintain the security of their farming rather than take potential risks. This is in line with (Helmauni et al., 2022) which states that the majority of small farmers behave reluctantly or avoid risks (risk averters). Farmers who behave risk averse prefer to minimize the risks of their farming, they minimize the use of production inputs to minimize the costs incurred. They do not really expect high production and revenue, but rather that the production can be sold at an appropriate

price so that the income received is sufficient for basic needs.

CONCLUSION

As a conclusion, it is found that the determination the risk level of corn farming in Rasau Jaya Satu Village use Coefficient of Variation (CV) analysis. The results of the production risk analysis obtained were 0.11 < 0.5 and the income risk was 0.11, meaning that the farming risk faced by corn farmers was small. Overall, the majority of sweet corn farmers behaved in a risk-averse manner (risk averters) amounting to 52% or as many as 43 people while the remaining 48% or 39 people behaved boldly towards risks (risk takers).

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