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Analysis of Income and Risk of Rice Seed Breeding Business in the Seed Independent Program in Lekopancing, Maros Regency, South Sulawesi, Indonesia

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Abstract

The seed breeding business is very dependent on nature such as weather, temperature, drought, floods, pest attacks, and disease. Apart from natural factors, risks can be caused by the farmers' activities. The seed Mandiri Program is a priority program of the South Sulawesi Provincial Government by providing free superior rice seeds. As one of the largest rice-producing provinces in Indonesia, this program was implemented to boost rice production. Rice seeds come from breeding results carried out at seed installations in South Sulawesi involving breeder farmers. The research aims to calculate the production and income of farmers from the rice seed breeding business in the Mandiri Seed Program, analyse the level of risk of the rice seed breeding business, and describe the efforts made to minimize the risks of the rice seed breeding business. Data analysis methods use descriptive analysis, income analysis, and business risk analysis. The research results show that: 1) the production of rice seeds from the Mandiri Seeds Program is 4,647.5 kg/farmer or 6,885.19 kg/per hectare and an average income of IDR 24,296,222 per farmer or IDR. 35,994,403.4 per hectare 2) the level of production, price, and income risk is included in the low-risk category 3) efforts made by farmers to minimize production, price, and income risks, namely protecting plants from pest and disease attacks, holding back sales until prices are stable, and reduce production costs.

Keywords: *Seed breeding, production risk, price risk, income risk.*

INTRODUCTION

Seeds are one of the factors that determine the success of plant cultivation and their role cannot be replaced by other factors, because seeds act as genetic carriers, especially for superior varieties (Director General of Food Crops, 2016). Farmers experience significant losses, both in terms of costs and time, due to the use of low-quality seeds. Therefore, although plant growth and production are greatly influenced by climatic conditions and farming methods, we must remember the importance of selecting the quality of the seeds to be used (Sutopo, 2014). The seed breeding business carried out by farmers is full of risks because farming activities have high risks. The success or failure of farming activities is very dependent on nature such as weather, pests and diseases, temperature, drought, and floods. Apart from natural factors, risks can be caused by the farmers' activities (Prabowo, 2021).

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In running their farming business, farmers are inseparable from all kinds of risks of failure in farming. Salim (1998) defines risk as uncertainty or uncertainty which may give rise to losses. Meanwhile, according to Silalahi (1997), risk is a deviation of actual results from expected results or results that are different from those expected. Widodo (2006) states that risks can originate from business cycles, seasonal fluctuations, inflation, climate, pests, disease, rupiah exchange rates, and technology. Sources of risk and uncertainty in the agricultural sector include production and technical risk, namely production risk due to the technical relationship between output and the level of input use, prices, finances, government policies, and individuals (Dahya, 2016). Risk is the possibility of loss (chance of loss). The risk of an investment can be defined as the probability that the expected level of profit will not be achieved or the possibility that the return received will deviate from what was expected.

The Seed Mandiri Program is one of the programs in South Sulawesi. As one of the largest rice-producing provinces in Indonesia, this program was implemented to boost rice production. These seeds are the result of breeding carried out at a seed installation in South Sulawesi involving captive farmers (Directorate General of Food Crops, 2016).

RESEARCH METHODS

This research was conducted in Lekopancing, Tanralili District, Maros Regency. The site selection is based on the consideration that the village is one of the implementing villages of the Seed Independent Program and has harvested. The research time was carried out for six months. Primary data were collected through interviews using questionnaires, and secondary data were obtained through literature review and field surveys. The population of captive farmers is 200 people, coming from 10 farmer groups. The research sample was 40 farmers, with simple random sampling.

Data Analysis

Production and income from the rice seed breeding business using income analysis. The analysis begins by calculating the amount of production, receipts, and production costs. Calculate the net income of a rice seed breeding business using the formula:

$\pi = TR - TC$

Information :

Pi: Net income from breeding business (Rp)

TR: Total farming income (Rp)

TC: Total farming costs (Rp)

Risk analysis is used to analyze production risk, cost risk, and income risk in the rice seed breeding business. The coefficient of variation is a measure of relative risk obtained by dividing the standard deviation by the expected value. Systematically, production risk, cost risk, and income risk can be written as follows (Sudjana, 2005):

a. Production risk: $CV = \quad \times 100\%$

b. Cost risk : $CV = \quad \times 100\%$

c. Income risk : $CV = \quad \times 100\%$

Information:

CV: Coefficient of variation

S: Standard savings

Q: Average production (Kg)

C: Average cost (Rp)

AND: Average income (Rp)

The greater the coefficient of variation (CV) value, the greater the risk captive farmers must bear. The way to find out the standard deviation can be using the formula (Sudjana, 2005):

$$S = \sqrt{\frac{\Sigma_{i=1}^{n} (xi - \bar{x})^2}{n-1}}$$

Where :

S : Standard deviation/standard deviation

X_i : Production/income data

$\bar{x}$: Average value of production/income

n : Number of samples

Based on this formula, the value of the coefficient of variation in production, costs, and prices, with the following criteria:

a. If CV$\leq$ 0.5 the seed breeding business has a risk of production, costs, and income in the low category

b. If CV > 0.5, the seed breeding business has production risks, costs, and income are in the high category.

Descriptive analysis is used to describe the efforts that farmers can make to minimize production risks, costs, and income in the rice seed breeding business during the implementation of the Independent Seed Program.

RESULT AND DISCUSSION

Identity Respoden

The identity of respondents is the inherent characteristics of farmers related to aspects of life, namely age, education, farming experience, and land area. Productive labor is at an age interval of 15 to 64 years, while if less or more than the interval will be classified as less productive labor but still included in the working age. Young respondents have greater and more innovative physical abilities than older respondents. Table 1 shows the average age of respondents 47 years, including productive age. This is in line with Novita (2016) research that farmers of productive age will more easily understand new things in farming so that they can increase production.

Table 1 Identity of Respondents Based on Age, 2023

No	Age (Year)	Total (Person)	Percentage (%)
1	Age (Year) :		
	• 32 – 41	7	17,5
	• 42 – 51	20	50,0
	• 52 – 61	13	32,5
2	Education :		
	• Not in School	1	2,5
	• ES	9	22,5

	•	JHS	11	27,5
	•	SHS	19	47,5
3	Farming Experience (Years):			
	•	10 – 17	21	52,5
	•	18 – 25	7	17,5
	•	26 – 33	12	30,0
4	Land Area (Ha) :			
	•	0,5 – 0,9	10	25
	•	1,0 – 1,4	25	62,5
	•	1,5 – 2,0	5	12,5

Source: Primary data analysis, 2023

Education can influence the way of thinking, especially in the decision-making process. Farmers who have a higher level of education accept innovation more quickly than those who have a lower level of education. When a farmer has good management, of course his orientation is to produce good production in terms of quantity and quality. The data in Table 1 shows that the respondents are quite educated.

According to Soekartawi (2005), one thing that farmers must have to achieve success in implementing innovation adoption is experience. In this study, farming experience was measured by the length of time a farmer has been involved in farming activities. Table 1 shows that the average respondent's farming experience is 19 years. Farmers are quite experienced as farmers, but they have only been working as breeders for 2 years. Susilowati (2010) stated that the larger the land owned, whether owned or not owned, the higher the farming income. The average respondent's land is 0.68 Ha.

Rice Seed Production

Production is rice seeds produced by seed breeding businesses implementing the Independent Seed Program in Maros Regency.

Table 2. Seed Production Produced by the Mandiri Seed Program Breeding Business, in Maros Regency.

No	Seed production (kg)	Number of people)	Percentage (%)
1	4.000 – 5.332	35	87,5
2	5.333 – 6.665	3	7,5
3	6.666 – 8.000	2	5,0
	Total	40	100
	Minimum : 4.000 kg		
	Maximum: 8,000 kg		
	Rate-rate : 4.647,5 kg/farmer		
	Average: 6.834,5 kg/ha		

Source: Primary data analysis, 2023

Based on the calculation results, it was found that the average amount of grain production produced by seed breeding businesses was 4,647.5 kg per farmer or 6,834.5 kg per ha.

The production obtained by respondents was higher compared to rice productivity in Maros Regency for the 2018-2022 period, namely 4.95 tonnes/ha (BPS, 2022)

Production cost

Farming production costs in the Seed Mandiri Program consist of variable costs, fixed costs, and total costs. The variable costs incurred by respondents were the purchase of Urea fertilizer, Phonska fertilizer, pesticides, and labour. Furthermore, the total costs (TC) can be detailed as follows in Table 3).

Table 3. Components of Fixed Costs and Variable Costs of Maros Regency Rice Seed Breeding Business.

No	Cost component	Average/farmer (0.68 Ha)	Average/Ha
1	Fixed Cost (FC)		
	Tool depreciation	1.363.028	2.019.300
	Land tax	10.000	14.814,81
2	Total Fixed Cost	1.373.028	2.034.115
3	Variable Cost (FC)		
	Urea Fertilizer	455.250	674.444,44
	Phonska Fertilizer	174.000	257.777,78
	Pesticide	294.250	435.925,93
	Labor	639.750	947.777,78
4	Total Variabel Cost	1.563.250	2.315.925,93
5	Total Cost (TC)	2.936.278	4.350.041,04
6	Reception	27.232.500	40.344.444
7	Net Income (6-5)	24.296.222	35.994.403,4

Source: Primary data analysis, 2023

Based on Table 17, it shows that the average fixed cost per respondent is IDR. 1,373,028/farmer or Rp. 2,034,115 per hectare. Meanwhile, the average variable cost per farmer is IDR. 1,563,250/farmer or IDR. 2,315,925.93/ha. So, the net income value of the seed breeding business (π) is obtained at IDR 24,296,222 per farmer or IDR 35,994,403.4 per hectare. This value is the net income for one planting season (4 months).

Risk Analysis of Rice Seed Breeding Business

Rice seed farmers in Lekopancing Village, Tanralili District, Maros Regency experience several kinds of risks in running their business. For this reason, so that potential losses can be minimized, captive farmers must know how much risk they face. The level of risk cannot be measured precisely because agricultural businesses are greatly influenced by natural factors. This research was carried out through several approaches.

Analysis of the level of risk in farming or seed breeding businesses in the research area was analysed using the coefficient of variation analysis. The results of the research will show the level of business risk experienced by farming or seed-breeding businesses that participate in the Mandiri Seed Program. Business risks are discussed based on production risk, cost risk, and income risk. Production risk analysis uses the coefficient of variation (CV), this risk is analysed using the coefficient of variance. A small coefficient of variation value indicates that the risk faced is small.

Table 4. Risk Level of Rice Seed Breeding Business in Maros Regency.

No	Types of Risk	Average value	Nilai KV	Category
1	Production risk	4.647,5	0,182	Low
2	Price risk	5.775,0	0,164	Low
3	Income risk	24.296.222,5	0,351	Low

Source: Primary data analysis, 2023

Based on Table 4, shows that the average production per hectare of rice seed breeding in the Mandiri Program in Lekopancing Village, Tanralili District, Maros Regency is 4,647.5 kg/farmer/season. The standard deviation value is 847.31. So the coefficient of variation obtained is 0.182. The coefficient of variation value is smaller than 0.5, so it is included in the low category. The results of the analysis show that the risk of rice seed production in the Mandiri Seed Program in Lekopancing Village, Tanralili District, Maros Regency is at a low-risk level.

Price risk is usually associated with the variability and uncertainty of the prices farmers receive and pay for production inputs. Source Important uncertainties in the agricultural sector are fluctuations in agricultural production and price fluctuations. Average output price rice seeds Rp. 5,775 Kg/season with a standard deviation value of IDR. 946.99/Kg. So the coefficient of variation in rice seed prices is 0.164, including the low-risk category.

Income risk analysis is analysed using the variance coefficient. A small coefficient of variation value indicates low variability in the average value of the distribution. Sunaverage income rice seed breeder Rp. 24,296,222.30 /Ha/Season. The standard value of the income division is 8,528,846. The coefficient of variation value for income risk is 0.351, including the low-risk category.

Efforts to Overcome the Risk of Rice Seed Breeding in the Mandiri Seed Program

Production Risk

Rice seed production in seed breeding businesses produces a production of 4,647.5 kg/farmer/season or 6,834.5 kg/ha/season. This production yield is quite a high yield considering the vulnerability of seed breeding farming to disturbances that can cause production failure. Based on research results on running a farming business, captive farmers still lack an understanding in running a farming business. Some of the problems faced by rice seed farmers in the independent program include climate and continuous rainfall resulting in various threats of pests and diseases that attack the plants. To overcome pest and disease attacks, farmers prepare medicines for the plants according to the intensity and type of pest attacks and plant diseases.

Anticipate price risks, both the price of production facilities and the selling price of rice seeds, that is, if there is a decline in prices, farmers will refrain from selling immediately until prices stabilize.

The income risk that captive farmers will face is in the low category. The average income received by farmers in a year is quite large, namely IDR 24,296,222.30. However, the level of income is also greatly influenced by production results. If the production results received by farmers are high, then the income they receive will also be high. Efforts to minimize income risk are to reduce production costs. The anticipation that farmers can take is to protect rice plants from pest attacks and plant diseases. Plant protection from pests and plant diseases must be a top priority in reducing risks to farmers' income.

CONCLUSIONS

Based on the research results and discussion, the conclusion that can be drawn is that the production of the Mandiri Seed Program rice seed breeding business is 4,647.5 kg/farmer or 6,885.19 kg/per hectare and earns an average income of IDR 24,296,222 per farmer or IDR. 35,994,403.4 per hectare. The level of production, price, and income risk is included in the low-risk category. Efforts made by farmers to minimize production risks, costs, and income include protecting plants from pest and disease attacks, holding back sales until prices are stable, and reducing production costs.

Based on the conclusions that have been presented, it is recommended that provide special assistance to captive farmers, to increase production and productivity and maintain food security. There is a need to increase knowledge and understanding for farmers in terms of managing farming. This can be done by providing counselling and assistance to farmers, especially in controlling pests and diseases that often attack plants.

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