

Comparative Analysis of the Feasibility Inpari IR Nutri Zinc Paddy Farming with Other Varieties in Nanggulan Sub-district Kulon Progo District

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Abstract. This study aims to determine the average cost, revenue, income, and profit of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 Paddy farming and to determine of comparison the average of the feasibility of Inpari IR Nutri Zinc Paddy farming with Ciherang and Inpari 42 Paddy farming in Nanggulan Sub-district, Kulon Progo District. The sampling method is a cluster sampling method with a non-proportional for determining the number of respondents in Jatisarone Village, Nanggulan Sub-district, Kulon Progo District with a total sample of 60 farmers. The average cost per 1,000 m² of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 Paddy farming in Nanggulan Sub-district respectively is IDR 2,001,362, IDR 1,937,718, and IDR 2,024,216. The average revenue per 1,000 m² of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 Paddy farming respectively is IDR 2,179,575, IDR 2,545,940, and IDR 2,551,111. The average income per 1,000 m² of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 Paddy farming respectively is IDR 817,141, IDR 1,171,901, and IDR 1,176,587. The average profit per 1,000 m² of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 Paddy farming respectively is IDR 178,213, IDR 608,222, and IDR 526,895. The average feasibility of Inpari IR Nutri Zinc Paddy farming in terms of R/C, land productivity, labor productivity, and capital productivity are still lower than the feasibility of Ciherang and Inpari 42 Paddy farming.

1 Introduction

The provision of high-quality and sustainable paddy seeds of superior varieties can assist farmers to increase paddy production yields [1]. The high yielding of paddy varieties has superior characteristics and can assist farmers to reduce the risk of production failure, such as resistance to certain plant-disturbing organisms. In addition, high-yielding paddy varieties have high productivity potential numbers.

Inpari IR Nutri Zinc is a New Superior Variety (VUB) from the Indonesian Center for Paddy Research (BBPadi) in Sukamandi, West Java Province. The paddy variety was

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released in 2019 along with a Decree (SK) from the Minister of Agriculture. The superiorities of Inpari IR Nutri Zinc are in terms of productivity potential, pest and disease resistance, and Zn content in paddy. The paddy plant has potential productivity of 9.98 tons/ha. Moderately resistant to brown plant hopper biotypes 1 and 2, bacterial leaf blight of pathotype III, tungro inoculum Garut, and Purwakarta. It is also resistant to blast ras of 033, 073, and 133. In addition, Inpari IR Nutri Zinc has a high potential for Zn content which can reach 34.51 ppm with an average of 29.54 ppm [2]. The high content of Zn is used by the government as a stunting prevention program. From 2021 to 2024 the Ministry of Agriculture will expand the planting of Inpari IR Nutri Zinc [3]. Seeds of the variety have been spread to 17 provinces. One of them is the Province of the Special Region of Yogyakarta in Kulon Progo District.

Kulon Progo District is one of the districts a special location for accelerating stunting reduction [4]. The results of the Nutrition Status Monitoring (PSG) show that in 2017 stunting cases were 16.38%, while in 2018 there was a decrease in stunting cases with a total of 14.31% cases. The distribution of Inpari IR Nutri Zinc paddy in Kulon Progo District is one of the efforts to support the decrease in stunting cases in Kulon Progo District. The highest paddy producer in 2018 in Kulon Progo District, namely in Nanggulan Sub-district with total paddy production reaching 13.95 thousand tons [5]. The Sub-district also includes where the distribution of Inpari IR Nutri Zinc paddy cultivation.

Table 1. Paddy Production and Land Area in Kulon Progo District in Each Sub-district in 2018

Sub-district	Paddy Production (tons)	Land Area (ha)
Temon	11,374	1,741
Wates	9,098	1,397
Panjatan	11,858	1,838
Galur	13,065	2,042
Lendah	7,052	1,079
Sentolo	12,032	1,829
Pengasih	7,996	1,224
Kokap	897	137
Girimulyo	5,752	880
Nanggulan	13,951	2,185
Kalibawang	12,003	1,849
Samigaluh	9,989	1,500

Source: [5]

Paddy farming of Inpari IR Nutri Zinc variety has high prospects in terms of the potential advantages of productivity, nutrition, and pest resistance. However, in terms of feasibility, the paddy variety is not yet known. In addition, how is the comparison of the feasibility of Inpari IR Nutri Zinc paddy farming seen from the R/C, land productivity, labor productivity, and capital productivity with other varieties of paddy farming in Nanggulan Sub-district, namely Ciherang variety and Inpari 42 variety.

This study aims to determine the average cost, revenue, income, and profit of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming and to determine a comparison of the average feasibility of Inpari IR Nutri Zinc Paddy farming with Ciherang and Inpari 42 Paddy farming in Nanggulan Sub-district, Kulon Progo District.

The research results of Ismail et al. [6] in Blang Situngkoh Village, Pulo Aceh Sub-district, Aceh Besar District, the production of Ciherang paddy farming is 4.50 tons/ha or reaches 64.29% of the potential production of 7 tons/ha. The results of Susanti et al. [7] in Warujayeng Village, Tanjunganom Sub-district, Nganjuk District, the Ciherang paddy

farming produces a profit of 13,949,100 IDR/ha/season with R/C feasibility of 1.68/ha/season. Based on the research results of Nasution et al. [1], the net income and feasibility of Ciherang paddy farming are the highest among the 3 superior paddy varieties in Labuhanbatu District. The average net income is IDR 14,416,111/ha/season with R/C feasibility of 2.29/ha/planting season.

The results of Susanti et al. [7] in Warujayeng Village, Tanjunganom Sub-district, Nganjuk District, Inpari 42 paddy farming has a profit of 21,277,600 IDR/ha/season with R/C feasibility of 2.01/ha/season. The research results of Ismail et al. [6] in Blang Situngkoh Village, Pulo Aceh Sub-district, Aceh Besar Regency, the production of Inpari 42 paddy farming is 5.20 tons/ha or reaches 49.15% of the potential production of 10.58 tons/ha. In addition, the Inpari 42 paddy farming receives an income of IDR 23,400,000/ha with R/C feasibility of 1.22/ha.

Table 2. Paddy Plant Characteristics

Parameter	Inpari IR Nutri Zinc	Ciherang	Inpari 42
Plant age (days)	115	116-125	112
Height recommendation (mdpl)	0-600	0-500	0-600
Plant height (cm)	95	91-106	93
Plant shape	upright	upright	upright
Flag leaf	upright	upright	upright
Grain shape	slender	slender and long	slender
Grain color	straw yellow	clean yellow	straw yellow
Grain weight per 1,000 items (gram)	24.60	27-28	24.41
Productivity potential (tons/ha)	9.98	7	10.58
Average production (tons/ha)	6.21	5-7	7.11

Source: [2]

2 Method

The method used in this research is descriptive analysis. The descriptive analysis method aims to identify and describe trends and variations in the population, also creating new measures of key phenomena [8]. In this study, identification, and description of the identity of the respondent farmers, costs, revenues, incomes, and profits are carried out and determine the comparison of the farming feasibility of three paddy varieties. The research is carried out in Jatisarono Village, Nanggulan Sub-district, Kulon Progo District with the determination of the research location carry out purposively. The data used is data for one paddy planting season in Jatisarono Village in 2020, September-December

Table 3. Number of Farmers and Sample

No	Paddy Variety	Number of Farmers	Number of Respondents
1	Inpari IR Nutri Zinc	46	20
2	Ciherang	214	20
3	Inpari 42	68	20
Total		328	60

The total population based on the survey results is approximately 328 farmers. Sampling is done by probability sampling technique with the cluster sampling method. Determinations of the number of respondents are carried out in a non-proportional and obtain a sample of 60 farmers.

Primary data are obtained directly through interviews and observation. Interviews are conducted using a tool in the form of a questionnaire containing questions that asked respondents to obtain data.

The methods of analysis are carried out with a mathematical formula as follows:

2.1 Cost

$$TC = TEC + TIC \quad (1)$$

Statement:

TC = Total Cost (IDR)
TEC = Total Explicit Cost (IDR)
TIC = Total Implicit Cost (IDR)
[9]

2.2 Revenue

$$TR = Y \times Py \quad (2)$$

Statement:

TR = Total Revenue (IDR)
Y = Number of Production (kg)
Py = Price (IDR/kg)
[10]

2.3 Income/Net Revenue

$$NR = TR - TEC \quad (3)$$

Statement:

NR = Net Revenue/Income (IDR)
TR = Total Revenue (IDR)
TEC = Total Explicit Cost (IDR)
[9]

2.4 Profit

$$\pi = TR - TC \quad (4)$$

Statement:

Π = Profit (IDR)
TR = Total Revenue (IDR)
TC = Total Cost (IDR)
[9]

2.5 R/C

$$R/C = \frac{TR}{TC} \quad (5)$$

Statement:

TR = Total Revenue (IDR)
TC = Total Cost (IDR)
[10]

Provision:
 If $R/C < 1$, paddy farming is not feasible to cultivate
 If $R/C > 1$, paddy farming is feasible to cultivate
 If $R/C = 1$, paddy farming is at the break-even point

2.6 Land Productivity

$$\text{Land Productivity} = \frac{NR - TKDK \text{ Cost} - BMS}{\text{Land Area}} \quad (6)$$

Statement:

NR = Net Revenue/Income (IDR)
 TKDK Cost = Family Labor Cost (IDR)
 BMS = Own Capital Interest Cost (IDR)
 [9]

Provision:
 Land productivity < cost of renting land, paddy farming is not feasible to cultivate
 The land productivity \geq cost of renting land, paddy farming is feasible to cultivate.

2.7 Labor Productivity

$$\text{Labor Productivity} = \frac{NR - SLS - BMS}{HKO \text{ TKDK}} \quad (7)$$

Statement:

NR = Net Revenue/Income (IDR)
 SLS = Own Land Rent Cost (IDR)
 BMS = Own Capital Interest Cost (IDR)
 HKO TKDK = Number of Working Days of Family Labor (HKO)
 [9]

Provision:
 Labor productivity < farm labor wage per day, paddy farming is not feasible to cultivate
 Labor productivity \geq farm labor wage per day, paddy farming is feasible to cultivate.

2.8 Capital Productivity

$$\text{Capital Productivity} = \frac{NR - SLS - TKDK \text{ Cost}}{TEC} \times 100\% \quad (8)$$

Statement:

NR = Net Revenue/Income (IDR)
 SLS = Own Land Rent (IDR)
 Cost TKDK = Family Labor Cost (IDR)
 [9]

Provision:
 Capital productivity < loan interest, paddy farming is not feasible to cultivate
 Capital productivity \geq loan interest, paddy farming is feasible to cultivate.

The hypothesis of this study is suspected that there are differences in average income, profit, and feasibility between Inpari IR Nutri Zinc paddy farming, Ciherang paddy farming, and Inpari 42 paddy farming in terms of R/C, land productivity, labor productivity, and capital productivity in Nanggung Sub-district, Kulon Progo District. Therefore, the hypothesis test in this study using the SPSS application tool consists of 2 stages, namely the One Way Anova test then followed by the Least Significant Difference (LSD) test using a significance level of 10%.

3 Result and discussion

3.1 Farmer Identity

Table 4. Farmer Identity

Farmer Identity	Paddy Variety		
	Inpari IR Nutri Zinc	Ciherang	Inpari 42
Gender	95% Male, 5% Female	90% Male, 10% Female	85% Male, 15% Female
Average of Age (years old)	61.7	64.5	64.6
Education Level	55% Senior High School	55% Elementary School	40% Elementary School, 40% Senior High School
Average of Farming Experience (years)	32.85	37.05	32
the majority of family members	3	2	2
Average of Land area (m ²)	2,107.5	2,156	1,972,5

Table 4 shown based on gender, male farmers are mostly in Inpari IR Nutri Zinc paddy farming as much as 95 percent and female farmers are mostly in Inpari 42 paddy farming as much as 15 percent. Inpari IR Nutri Zinc paddy farming is mostly conducted by male farmers, so the energy devoted to farming tends to be greater.

The majority of farmers who cultivate Inpari IR Nutri Zinc are in the productive age group or the range of 15-64 years as much as 55 percent. So that the Inpari IR Nutri Zinc paddy farming tends to be maximally cultivated by farmers. This is because farmers who have a productive age have stronger physical abilities than farmers who have a non-productive age. Meanwhile, the majority of Ciherang and Inpari 42 paddy farmers are of non-productive age or more than 64 years. Respectively 65 percent and 55 percent.

The education level of Inpari IR Nutri Zinc paddy farmers in Nanggulan Sub-district is relatively high. Because the majority of farmers have a high school education level or equivalent as much as 55 percent and 10 percent of farmers with a college education level. Therefore, the mindset and attitude in making decisions in farming activities are good. While the majority of farmers who cultivate Ciherang paddy with an elementary education level of 55 percent and the majority of farmers who cultivate Inpari 42 paddy with an elementary and high school education level or equivalent are 40 percent respectively.

The majority of Inpari IR Nutri Zinc paddy farmers have farming experience for 44-53 years as much as 30 percent and the average experience of farmers is 32.85 years. However, the average farming experience for Inpari IR Nutri Zinc paddy farmers is still lower than the average farming experience for Ciherang paddy farmers, which is 37.05 years. Meanwhile, the average farming experience of Inpari 42 paddy farmers is 32 years.

The majority of Inpari IR Nutri Zinc paddy farmers have 3 family members as much as 35 percent. Meanwhile, the majority of Ciherang and Inpari 42 paddy farmers have 2 family members, 40 and 50 percent, respectively. Ciherang and Inpari 42 paddy farmers are old so that their children already have their own families and are no longer dependents. Meanwhile, Inpari IR Nutri Zinc paddy farmers are still in their productive age. Therefore, they still have more dependents than farmers who are old. That way, the income that can be set aside for farming capital is also less because the cost of living expenses tends to be

higher. However, the more members in the family, the better to support farming. This is because family members can also assist in the process of farming activities.

The average land area of Inpari IR Nutri Zinc paddy farmers in Nanggulan District is moderate at 2,107.5 m². Because the average land area of Inpari IR Nutri Zinc paddy farmers is between the Ciherang and Inpari 42 paddy farmers' average land area of 2,156 m² and 1,972.5 m², respectively.

The majority of Inpari IR Nutri Zinc paddy farmers use their land to cultivate paddy as much as 60 percent. The number of farmers who use leased land the most is Inpari 42 paddy farmers as much as 20 percent. Meanwhile, the number of farmers who use land with the production-sharing system the most is Ciherang paddy farmers as much as 40 percent.

The type of occupation other than farming conducted by the farmers of Inpari IR Nutri Zinc paddy, Ciherang paddy, and Inpari 42 paddy is mostly as a breeder. Manure produced from livestock can be used by farmers as fertilizer to support the growth of rice plants and can increase paddy production higher.

3.2 Explicit Cost

Explicit costs are costs that are incurred in real by farmers in farming activities. Explicit costs include costs for seeds, fertilizers, pesticides, non-family labor (TKLK), depreciation of equipment, land rental costs, production sharing, and other costs.

Table 5. Average Explicit Cost Per 1,000 m² Per Paddy Planting Season

Cost Type	Cost (IDR)		
	Inpari IR Nutri Zinc	Ciherang	Inpari 42
Seed	6,338	46,106	14,164
Solid Fertilizer	195,537	159,311	207,685
Liquid Fertilizer	11,976	3,256	11,067
Pesticide	3,798	11,703	7,164
Non-family Labor	623,432	398,274	584,697
Depreciation of Equipment	34,803	31,623	17,837
Land Rental	57,222	37,500	65,833
Production sharing	255,515	567,850	294,950
Other Costs	173,813	118,416	171,127
Total	1,362,434	1,374,039	1,374,524

Based on the results of the study, Table 5 shows that the highest average explicit cost in Inpari 42 paddy farming is 1,374,524 IDR. The average number of seeds used in Inpari IR Nutri Zinc paddy farming is 3.94 kg and the average cost of seeds in Inpari IR Nutri Zinc paddy farming is the lowest among the 2 other paddy varieties. Meanwhile, the use of seeds in Ciherang and Inpari 42 paddy farming is 4.44 kg and 5.58 kg, respectively. The government assists farmers in the form of Inpari IR Nutri Zinc seeds and Inpari 42 seeds through farmer groups. Therefore those farmers get cost relief in obtaining these seeds.

The average use of solid fertilizers in the Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming is 201,654 kg, 72,600 kg, and 190,662 kg, respectively. The highest average cost of solid fertilizer in Inpari 42 paddy farming is 207,685 IDR. Inpari IR Nutri Zinc paddy farming used more organic fertilizer, therefore the cost is lower. The average amount of use and cost of liquid fertilizer in Inpari IR Nutri Zinc paddy farming is higher than the Ciherang and Inpari 42 paddy farming, which is 488,062 mL with a cost of 11,976 IDR.

The average pesticide cost in Inpari IR Nutri Zinc paddy farming is lower than the average pesticide cost in Ciherang and Inpari 42 paddy farming. Farmers rarely use pesticides, so the average pesticide cost in pesticide use is relatively small. According to research by Ratri and Yuliawati [11], the cost of pesticides does not affect income significantly. In addition, the amount of use of pesticides is also not a factor that can significantly increase paddy production [12].

The average use of non-family labor (TKLK) in Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming is 8.76 HKO, 6.20 HKO, and 8.98 HKO, respectively. The number of HKO of TKLK in Inpari IR Nutri Zinc paddy farming is less than the number of HKO of TKLK in Inpari 42 paddy farming. But, the cost of TKLK in Inpari IR Nutri Zinc paddy farming is higher than the cost of TKLK in Inpari 42 paddy farming. This is because the wholesale wages paid by farmer respondents to workers are different. The wages paid ranged from 40,000 IDR to 110,000 IDR per HKO.

The average cost of equipment depreciation in Inpari IR Nutri Zinc paddy farming is higher than the average equipment depreciation cost in Ciherang and Inpari 42 paddy farming, which is 34,803 IDR.

The average cost of land rent in Inpari 42 paddy farming is higher than the average cost of land rent in Inpari IR Nutri Zinc and Ciherang paddy farming. There are 20 percent of Inpari 42 paddy farmers who use leased land. Meanwhile, the average cost of production sharing of Ciherang paddy farming is higher than the average cost of production sharing of Inpari IR Nutri Zinc and Inpari 42 paddy farming. There are 40 percent of Ciherang paddy farmers who use the land with a production sharing system.

The average other costs of Inpari IR Nutri Zinc paddy farming are higher than the average other costs of Ciherang and Inpari 42 paddy farming, which is 173,814 IDR. Other costs consist of milling cost, nonfamily labor (TKLK) consumption, land tax, gasoline, purchase of sacks, and sprayer rental.

3.3 Implicit Cost

Implicit costs are costs that are not real incurred by farmers. However, the implicit costs are still taken into account in the activities of farming. The implicit costs in this study consist of fertilizer, pesticide, family labor (TKDK) costs, the rental value of own land, and the cost of own capital interest.

The average cost of fertilizer in Inpari 42 paddy farming is higher than the average cost of fertilizer in Inpari IR Nutri Zinc and Ciherang paddy farming, which is 60,667 IDR. The fertilizer used by farmers is organic fertilizer from their livestock manure. Therefore, the fertilizer is included in the implicit cost.

Table 6. Average Implicit Cost Per 1,000 m² Per Paddy Planting Season

Cost Type	Cost (IDR)		
	Inpari IR Nutri Zinc	Ciherang	Inpari 42
Fertilizer	40,514	39,167	60,667
Pesticide	26,026	15,616	22,556
Family Labor (TKDK)	245,139	231,415	288,979
Rental of Own Land	300,000	250,000	250,000
Own Capital Interest	27,249	27,481	27,490
Total	638,928	563,679	649,692

The average cost of pesticides in Inpari IR Nutri Zinc paddy farming is higher than the average pesticide cost in Ciherang and Inpari 42 paddy farming. The pesticides included in

the implicit cost are organic pesticides obtained from government assistance channeled through the agricultural extension center (BPP) of Nanggulan Sub-district.

The average use of family labor in Inpari IR Nutri Zinc paddy farming is 4.09 HKO. The average use of family labor in Ciherang paddy farming is 3.91 HKO. The average use of family labor in Inpari 42 paddy farming is 4.98 HKO. Compared to the use of nonfamily labor (TKLK) in Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming which is 8.76 HKO, 6.20 HKO, and 8.98 HKO, respectively, the use of family labor in Nanggulan Sub-district is less than the use of non-family labor. In contrast to the results of the study of Milfitra et al. [13], the use of family labor in paddy farming is more than the use of non-family labor. The results of Ratri and Yuliawati's research [11], show that paddy farmers of Ciherang variety use more labor in the family, so the cost incurred is less than the cost of Mekongga paddy farmers who use more non-family labor.

The average rental value of own land in Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming is 300,000 IDR, 250,000 IDR, and 250,000 IDR per 1,000 m²/planting season, respectively. Value of own land in Inpari IR Nutri Zinc paddy farming is the highest because the number of Inpari IR Nutri Zinc paddy farmers who use their land is more than the number of Ciherang or Inpari 42 paddy farmers who use their land. The number of Inpari IR Nutri Zinc paddy farmers who use their land is 60 percent.

The average interest cost of own capital in Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming in Nanggulan District per 1,000 m²/planting season is 27,249 IDR, 27,481 IDR, and 27,490 IDR, respectively. The percentage of own capital interest is 2% per paddy planting season or using a loan interest rate of 6% per year. It can be seen that the highest interest cost of own capital is in Inpari 42 paddy farming, which is 27,490 IDR because the explicit cost in Inpari 42 paddy farming is higher than the explicit cost in Inpari IR Nutri Zinc and Ciherang paddy farming.

3.4 Total Cost, Revenue, Income, and Profit

Table 7. Average of Total Cost, Production, Revenue, Income, and Profit Per 1,000 m² Per Paddy Planting Season

Description	Paddy Variety		
	Inpari IR Nutri Zinc	Ciherang	Inpari 42
Explicit Cost (IDR)	1,362,434	1,374,039	1,374,524
Implicit Cost (IDR)	638,928	563,679	649,692
Total Cost (IDR)	2,001,362	1,937,718	2,024,216
Paddy Production Harvested Dry Grain (GKP) (kg)	499,421	607,540	595,97
Selling Price (IDR/kg)	4,364	4,191	4,281
Revenue (IDR)	2,179,575	2,545,940	2,551,111
Income (IDR)	817,141	1,171,901	1,176,587
Profit (IDR)	178,213	608,222	526,895

Total cost is the sum of the explicit cost and the implicit cost. In Table 6, it can be seen that the highest total cost is in Inpari 42 paddy farming is 2,024,216 IDR.

The result of study Arifin et al. [14], the total cost of rice farming reach 3,641,544.97 IDR/ha and income or profit reach 10,263,411.70 IDR/ha. According to Heryono et al. [15] in farmer group member, the cost of rice farming reach 12,691,000 IDR/ha and for the nonmember is 12,548,000 IDR/ha. Therefore, the total cost of paddy farming in Nanggulan Sub-district is classified as high.

Table 8. Paddy Production

Description	Paddy Production (tons/ha)		
	Inpari IR Nutri Zinc	Ciherang	Inpari 42
Production Potential in Milled Dry Grain (GKG)	9.98	7	10.58
Average Production in Milled Dry Grain (GKG)	6.21	5-7	7.11
Average Production in Milled Dry Grain (GKG) in Nanggulan Sub-district	4.03	4.91	4.81

The average production of Inpari IR Nutri Zinc paddy farming in Nanggulan District is still lower than the average production of Ciherang and Inpari 42 paddy farming. The result shows that the production of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming are still below the average yield and productivity potential according to the Indonesian Center for Paddy Research (BBPadi). The average yield of Inpari IR Nutri Zinc is 6.21 tons/ha GKG with a potential of 9.98 tons/ha GKG according to BBPadi. While the result of the study, the average production of Inpari IR Nutri Zinc paddy farming in Nanggulan Sub-district is 499.42 kg/1,000 m² GKP or 4.99 tons/ha GKP or equivalent to 4.03 tons/ha GKG. The average yield of Ciherang is 5-7 tons/ha GKG with a potential yield of 7 tons/ha GKG according to BBPadi. While the result of the study, the average production of Ciherang paddy farming in Nanggulan Sub-district is 607.54 kg/1,000 m² GKP or 6.07 tons/ha GKP or equivalent to 4,91 tons/ha GKG. The average yield of Inpari 42 is 7,11 tons/ha GKG with a potential yield of 10,58 tons/ha GKG according to BBPadi. Meanwhile, as a result of the study, the average production of Inpari 42 paddy farming in Nanggulan Sub-district is 595,97 kg/1.000m² GKP or 5.95 tons/ha GKP or equivalent to 4.81 tons/ha GKG. According to BPS [16], the conversion of GKP to GKG in DIY Province is 80.87 percent.



Fig. 1. Milled Dry Grain (GKG)

Statement Based on farmer respondents' and researchers' observations, the size of Inpari IR Nutri Zinc and Inpari 42 paddy grains is smaller than Ciherang paddy grains. In line with the results from BBPadi, the weight of 1,000 grains of Inpari IR Nutri Zinc is 24.60 grams. The weight of 1,000 grains of Ciherang is 27-28 grams. While the weight of 1,000 grains of Inpari 42 is 24.41 grams.

According to Sary et al. [17], major determinants significantly to increase paddy production in the wet season or the dry season include seeds, fertilizers, and hire labor. The

study result of Gözener [12], the production factors which have a positive sign coefficient are the used male labor amount, fertilizer amount, and seed amount.

Based on the results of the One Way Anova analysis test, the average income of the significant results is $0.149 > 0.10$, which means that there is no significant difference in the average income between Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming. While One Way Anova analysis test, the average profit of the significance $0.004 < 0.10$, which means that there is a significant difference in the average profit in the farming of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy.

Table 9. LSD Test Results of Average Profit

Description	Significance
LSD Test	
•Inpari IR Nutri Zinc-Ciherang	0.002
•Inpari IR Nutri Zinc-Inpari 42	0.010
•Inpari 42-Ciherang	0.538

Based on Table 9, the results of the LSD test of the difference in average profit shows that there is a significant difference in the average profit in Ciherang paddy farming with Inpari IR Nutri Zinc paddy farming and Inpari 42 paddy farming with Inpari IR Nutri Zinc paddy farming. This is because the results of the LSD test significance are smaller than 10% alpha.

3.5 Feasibility Analysis

Knowing the feasibility of farming in terms of R/C, land productivity, labor productivity, and capital productivity.

Table 10. Feasibility Analysis Per 1,000 m² Per Paddy Planting Season

Description	Paddy Variety		
	Inpari IR Nutri Zinc	Ciherang	Inpari 42
R/C	1,095	1,333	1,269
Land Productivity (IDR/m ²)	545	913	860
Labor Productivity (IDR/HKO)	179.362	326.812	371.715
Capital Productivity (%)	25,028	67,319	74,284

Based on Table 10 shows that the feasibility of Inpari IR Nutri Zinc paddy farming is still lower than the feasibility of Ciherang and Inpari 42 paddy farming in terms of R/C, land productivity, labor productivity, and capital productivity.

R/C on the three varieties of paddy farming is said to be feasible for cultivation. This is because the R/C result is more than one. This means that revenue obtained by farmers is more than the total cost incurred by farmers in paddy farming.

Based on Table 11, it is known that the significance of the One Way Anova test is $0,003 < 0,10$, which means that there is a difference in the average R/C in the paddy farming of Inpari IR Nutri Zinc, Ciherang, and Inpari 42. Judging from the results of the significance of the LSD test, there is a difference in the average R/C in the Ciherang paddy farming with Inpari IR Nutri Zinc paddy farming and Inpari 42 paddy farming with Inpari IR Nutri Zinc paddy farming. This is because the results of the LSD test significance are smaller than 10% alpha.

Table 11. One Way Anova Test Result and LSD Test Result of Average R/C

Description	Significance
One Way Anova Test	0.003
LSD Test	
•Inpari IR Nutri Zinc-Ciherang	0.001
•Inpari IR Nutri Zinc-Inpari 42	0.015
•Inpari 42-Ciherang	0.358

The cost of renting land in Nanggulan District is approximately 1,500,000 IDR per 1,000 m² per year or 500 IDR per m² per planting paddy season. Therefore, it can be said that land productivity in Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming is feasible to cultivate. This is because the average land productivity in the three varieties of paddy farming is more than the cost of renting land in Nanggulan District. This means that instead of renting own land by farmers to others, it is better to conduct paddy farming.

Table 12. One Way Anova Test Result and LSD Test Result of Average Land Productivity

Description	Significance
One Way Anova Test	0.086
LSD Test	
•Inpari IR Nutri Zinc-Ciherang	0.041
•Inpari IR Nutri Zinc-Inpari 42	0.079
•Inpari 42-Ciherang	0.764

Based on Table 12, it is known that the significance of the One Way Anova test is 0.086 < 0.10 which means that there is a difference in the average land productivity in Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming. Judging from the results of the LSD test significance, there is the difference significantly between in average land productivity in Ciherang paddy farming with Inpari IR Nutri Zinc paddy farming and Inpari 42 paddy farming with Inpari IR Nutri Zinc paddy farming. This is because the results of the LSD test significance are smaller than 10% alpha.

The wages of farm labor in Nanggulan Sub-district range from 40,000 IDR to 110,000 IDR. The results show that paddy farming of the three varieties which is seen from the labor productivity was feasible to conduct. This is because the labor productivity is higher than the wages of farm labor in the area. This means that paddy farming activities better be carried out by workers from the family.

Table 13. One Way Anova Test Result and LSD Test Result of Average Labor Productivity

Description	Significance
One Way Anova Test	0.089
LSD Test	
•Inpari IR Nutri Zinc-Ciherang	0.105
•Inpari IR Nutri Zinc-Inpari 42	0.036
•Inpari 42-Ciherang	0.618

Based on Table 13, it is known that the significance of the One Way Anova test is 0.089 < 0.10 which means that there is a difference in the average labor productivity in the Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming. Judging from the results of the LSD test significance, there is the difference significantly in the average labor productivity in Ciherang paddy farming with Inpari IR Nutri Zinc paddy farming. This is because the results of the LSD test significance are smaller than 10% alpha.

The percentage of the use loan interest rate is 6% per year or 2% per paddy planting season. Therefore, the capital productivity in the three varieties of paddy farming is feasible to conduct. This is because the capital productivity of the paddy farming of the three varieties is higher than the percentage of the loan interest rate in the area. If farmers borrow capital for paddy farming, farmers can return the loan capital from the income of farming. The results of the One Way Anova test show that the significance is $0.105 > 0.10$, which means that there is no difference significantly between in the average of capital productivity in Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming.

4 Conclusion and Recommendation

The average cost of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming per 1,000 m² per planting season in Nanggulan Sub-district is 2,001,362 IDR, 1,937,718 IDR, and 2,024,216 IDR, respectively. The average revenue of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming per 1,000 m² per planting season is 2,179,575 IDR, 2,545,940 IDR, and 2,551,111 IDR, respectively. The average income of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming per 1,000 m² per planting season is 817,141 IDR, 1,171,901 IDR, and 1,176,587 IDR, respectively. The average profit of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming per 1,000 m² per planting season is 178,213 IDR, 608,222 IDR, and 526,895 IDR, respectively.

Income, profit, and feasibility of Inpari IR Nutri Zinc paddy farming in terms of R/C, land productivity, labor productivity, and capital productivity are still lower than the feasibility of Ciherang and Inpari 42 paddy farming. Average of R/C per 1,000 m² per planting season of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming in Nanggulan District is 1,095, 1,333, and 1,269 respectively. The average land productivity of Inpari Rice IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming per m² per planting season in Nanggulan District is 545 IDR, IDR 913, and 860 IDR, respectively. The average labor productivity of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming in Nanggulan District is 179,362 IDR/HKO, 326,812 IDR/HKO, and 371,715 IDR/HKO, respectively. The average capital productivity of Inpari IR Nutri Zinc, Ciherang, and Inpari 42 paddy farming per 1,000 m² per planting season in Nanggulan District is 25.028%, 67.319%, and 74.284%, respectively.

Based on the study result, Inpari IR Nutri Zinc Paddy Farming has low feasibility, revenue, income, and profit, relatively because of low paddy production. Therefore the recommendation is optimizing significant inputs which can increase paddy production such as give more attention to the use of fertilizers, the use of the seed, and the use of labor to carry out paddy farming activities [18-21]. In addition, it is necessary to conduct a deeper study related to the environmental conditions needed by Inpari IR Nutri Zinc paddy plant to produce more such as the amount also kind of nutritions are needed by Inpari IR Nutri Zinc paddy plant and climate element factors those are matched to cultivate Inpari IR Nutri Zinc plant [22].

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