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Farming Analysis of Five New Gogo Rice Varieties In Sub-Optimal Areas in Agrotechno Park (ATP) Area Gunungkidul, Yogyakarta

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Abstract.

This research try to analyze farming business of five new varieties of upland rice in sub-optimal areas in Gunungkidul, Yogyakarta namely Inpago 5, Inpago 8, Inpago 10 Inpari 42 Agrarian GSR, Inpari 43 Agrarian GSR. This research was conducted in the Farmers Group Makaryo, Nglanggeran, Patuk, Gunungkidul , Yogyakarta from February 2018 to June 2018. Five teen days seedlings with one seedling per hill was planted in *tajarwo* 4: 1, spaced of 25 x 12.5 x 50 cm, with 256,000 plant populations. The plot size was 2000 m2. Data were analyzed using t test. The productivity of superior rice varieties of Inpari 42 Agrarian GSR, Inpago 10 and Inpari 43 Agrarian GSR were higher than Inpago 5, Inpago 8 and Ciherang rice varieties. The five new superior varieties were feasible to be developed in Gunungkidul dry land with B/C ratio was 2.02 for Inpari 43, for Agrarian GSR was 2.90 and for Inpari was 42, respectively. Whereas, for the Ciherang rice varity, as a popular variety, only gave B/C ratio of 1.88. The highest incremental B/C ratio to Ciherang (%) was achieved by Inpari 42 GSR (54.25%), followed by Inpago 10 (47.34%), Inpago 5 (44.15%), Inpago 8 (40.42 %) and Inpari 43 GSR (7.45%), respectively. In the future, the superior varieties of Inpari 42 Agrarian GS(R, Inpari 43 Agrarian GSR and Inpago need to be developed in order to increase rice farming in Gunungkidul dry land. The objective of this study was to examine upland rice farming in an effort to accelerate the level of income farmers and support national food security.

Keywords: Gunungkidul, new upland rice, farm studies, superior varieties

1. Introduction

In Yogyakarta, the rice planting area is around 155,457 hectares consisting of 112,083 hectares of rice fields and 43,364 hectares of rainfed land (Dinas Pertanian DIY 2015). According to statistical data, more than 42% of rice needs in the Special Region of Yogyakarta are still supplied from Gunungkidul Regency. Therefore, to support the independence of the program to increase the productivity of upland rice in Gunungkidul District is very important because the upland harvested area of upland

rice is about 40,000 - 45,000 ha per year, with peat rice productivity of 4.45 tons ha^{-1} (BPS DIY 2015).

In the Gunungkidul dry land, high yielding upland rice varieties released by the Agency for Agricultural Research and Development have not developed much. Therefore, it is necessary to introduce a variety of Inpago varieties (inbred line rice). In an effort to achieve maximum results from the use of new improved varieties, the right growing environment is needed,so that the results and potential advantages can be realized. In addition to varieties production, support in the form of fertilization technology based on soil testing (PUTK) and planting systems is also important to increase the upland rice productivity potency in Gunungkidul (Suyamto, 2006; Sutaryo et al., 2016).

2. Methodology

The location of the study of the development of superior varieties of Inpago (Inbred upland rice) was in Dry Land Supports IP 200 in Gunungkidul D.I. Yogyakarta, covering an area of about 5 hectares belonging to the "Kumpul Makaryo" Farmers Group, Nglanggeran Village, Patuk Sub District, Gunungkidul Regency. The assessment was conducted on farm research by involving cooperating farmers.

The superior varieties developed were Inpago 5, Inpago 8, and Inpago 10, which are superior varieties with quite high yields from the results of the 2017 assessment. In addition to these three varieties, new superior varieties were developed in Inpari 42 GSR and Inpari 43 GSR which are varieties with amphibious properties (can be planted in dry land or in flooded land). Meanwhile Ciherang rice variety was also planted as comparison variety. The introduction of technology to be developed can be seen in Table 1.

Table 1. Development of upland rice varieties technology

Teknology Componen *)	Inpago 5	Inpago 8	Inpago 10	Inpari 42 GSR	Inpari 43 GSR	Ciherang
1. VUB	V	V	V	V	V	-
2.Labeled Seed	V	V	V	V	V	-
3.Population/ Tajarwo	V	V	V	V	V	V
4.Fertilization according to Soil Test Kits(PuTK)	V	V	V	V	V	V

*Note: *) source: Abdulrachman 2013*

The observed variables were:

a. The yield of the unhusked grain, i.e the weight of the unhulled rice harvested from the development plot was analyzed by the statistical method of the Gomez and Gomez t-Test (1995).
b. To obtain farm income, the following formula can be used (Soekartawi, 2000):
   Analysis of farm income: $\pi = TR - TC$,
   Revenue: $TR = P \times Q$,
   Total production: $TC = TFC + TVC$,
   Cost R / C ratio = TR / TC;
   B / C value (economic feasibility); and
   Incremental B/C ratio), with the following formula:
   B/C ratio = Benefit/Total input

Information:
B/C ratio of less than 1 means unprofitable
B/C ratio with a value of more than 1 means profitable

The incremental B / C ratio to comparative varieties was:

$$\frac{\text{B/C ratio of New Superior Varieties - BC ratio of comparable varieties}}{\text{B/C ratio of comparison varieties}} \times 100\%$$

(Soekartawi 1990)

3. Results And Discussion

Grain Results and Inpago Superior Variety Agronomic Characteristics

3.1. Sampling yield, and productivity conversion

In Table 2 we can see the yield of unhulled grain, productivity conversion and productivity conversion minus correction factors. The highest yield was achieved by Inpari 42 Agrarian GSR (6.1 kg), followed by Inpago 10 (5.9 kg), Inpari 43 Agritan GSR (5.9 kg), Inpago 5 (5.8 kg), Inpago 8 (5.7 kg) and Ciherang (4.5 kg). The grain productivity produced increased compared to the results of previous studies conducted in 2016 with Impago varieties 5, 6, and 8 only sampling productions from 3.80 to 4.40 kg (Srihartanto et al., 2016). Thus, the five VUBs can be developed on a broader scale.

Table 2. Sampling yields, productivity conversion, productivity conversion minus correction factors, Nglanggeran, Patuk, Gunungkidul 2018

No	Variety	Sampling yield (kg) GKP	Productivity convertion ha^{-1} (kg) GKP	Productivity convertion ha^{-1} (kg) GKP– correction factor 20% embankment
1.	Inpago 5	5,8	9.280	7.424 *
2.	Inpago 8	5,7	9.120	7.296 *
3.	Inpago 10	5,9	9.440	7.552 *
4.	Inpari 42 GSR	6,1	9.760	7.808 *
5.	Inpari 43 GSR	5,9	9.440	7.552 *
6.	Ciherang	4,5	7.220	5.776 *

*Note : * is a significant difference to Ciherang as a comparison variety in the t test at the 5% level*

In addition to this, the highest productivity conversion results were achieved by Inpari 42 Agrarian GSR (9,760 Kg GKP ha^{-1}), followed by Inpago 10 (9,440 Kg GKP ha^{-1}), Inpari 43 Agrarian GSR (9,440 kg GKP ha^{-1}), followed by Inpago 10 (9,440 Kg GKP ha^{-1}), Inpari 43 Agrarian GSR (9,440 kg GKP ha^{-1}), Inpago 5 (9,440 kg Kg ha^{-1}) 9,280 kg / ha GKP), Inpago 8 (9,120 kg ha^{-1}) and Ciherang (7,220 GKP ha^{-1}).

The results of the conversion of productivity after deducting the correction factor of 20% for the highest furrows were found in Inpari 42 Agrarian GSR (7,808 Kg GKP ha^{-1}), and followed by Inpago 10 (7,552 kg GKP ha $^{-1}$), Inpari 43 GSR (7,552 Kg GKP ha^{-1}), Inpago 5 (7,424 kg GKP ha^{-1}), Inpago 8 (7,296 kg GKP ha^{-1}), and Ciherang (5,776 Kg GKP ha^{-1}) (Table 2).

3.2. Analysis of farm business analysis

In Table 3 it can be seen that the results of the B/C ratio farming analysis showed that the five new superior varieties were feasible to be developed, with the B/C ratio ranges from 2.02 for Inpari 43 of GSR Agritrity to 2.90 for Inpari 42 of Agritrity of

GSR. Whereas, Ciherang rice variety as the popular variety only gave B/C ratio of 1.88. The B/C ratio achieved by these superior varieties provides good benefits; the condition is in accordance with the results of a study by Sularno et al. (2011).

Table 3. Analysis of Inpago superior varieties farming in Nglanggeran, Patuk, Gunungkidul, 2018

Description	Inpago 5	Inpago 8	Inpago 10	Inpari 42 GSR	Inpari 43 GSR	Ciherang
Land area (ha)	1,0	1,0	1,0	1,0	1,0	1,0
Production input (x Rp. 1000)	2.600	2.600	2.600	2.600	2.600	2.300
Labor (x Rp. 1000)	5.200	5.200	5.200	5.200	5.200	3.800
Others (xRp. 1000)	2.200	2.200	2.200	2.200	2.200	1.900
Total (*input*) (x Rp.1000)	10.000	10.000	10.000	10.000	10.000	8.000
Yield of grain (kg)	9.280	9.120	9.440	9.760	7.550	5.770
Selling price (Rp/kg GKP)	4.000	4.000	4.000	4.000	4.000	4.000
Revenue (xRp. 1000)	37.120	36.480	37.760	39.040	30.200	23.080
Benefits (x Rp. 1000)	27.120	26.480	27.760	29.040	20.200	15.080
B/C ratio	2,71	2,64	2,77	2,90	2,02	1,88
Incremental B/C ratio to Ciherang (%)	44,15	40,42	47,34	54,25	7,45	-

Source: primary data analysis, 2018

3. Conclusions And Suggestions

Conclusions

1. Inpari 42 superior varieties GSR, Inpago 10 and Inpari 43 Agrarian GSR provide higher productivity than other varieties.
2. The five new superior varieties were feasible to be developed, with B/C ratio ranging from 2.02 for Inpari 43, Agrarian GSR to 2.90, and for Inpari 42 Agrarian GSR. Whereas Ciherang as the popular variety only gave a B/C ratio of 1.88.
3. The highest Incremental B/C ratio to Ciherang (%) was achieved by Inpari 42 GSR (54.25%), followed by Inpago 10(47.34%), Inpago 5 (44,15%), Inpago 8(40.42%) and Inpari 43 GSR (7.45%), respectively.

Suggestion

In the future, new superior rice varieties of Inpari 42 Agrarian GSR, Inpari 43 Agrarian GSR and Inpago need to be developed more broadly in dry land to support IP 200 in Gunungkidul, and to increase rice yields in Gunungkidul dry land.

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