THE COMPARISON OF RICE (Oryza sativa L.) CULTIVATION IN POLYBAG TO CULTIVATION IN LOWLAND

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Keywords: polybag, rice, lowland, cultivation, productivity

 Purpose of the study: Rice (Oryza sativa L.) is the main food consumed by Indonesian people even in Asia. The various innovations in rice cultivation still being developed in order to increase the yield both in quality and quantity. In general, rice cultivation is planted in the lowland. The research aims to know the comparison the rice cultivation in a polybag to rice cultivation in the lowland.

Methodology: The size of polybag that used in the experiment is 40x40 cm with space 50 cm of each other. The experiment is conducted in Nganjuk, East Java, Indonesia. The variables studied are rice yield and rice varieties. The varieties used are Cierahang and Sertani 12.

Main Findings: The result showed that the yield of rice production includes the number of filled grains, total grain, panicle number in polybag more than in lowland. Rice cultivation produces 2 kg/m² in a polybag and 1 kg/m² in the lowland. The panicle number of rice in polybag is more than in lowland, i.e: 12 in a polybag and 6 in the lowland. For the rice variety, Cierahang and Sertani 12 have the same yield in a polybag. It is 2 kg/m².

Applications of this study: The rice cultivation in polybag has easy cultivation system and suitable for urban areas where agricultural land is limited. Besides, it can be the solution for decreasing agriculture land from time to time.

Novelty/Originality of this study: The novelty of this research is the use of polybag as the media of rice cultivation which is not commonly done in farming.

Keywords: polybag, rice, lowland, cultivation, productivity

INTRODUCTION

Rice (Oryza sativa L.) is the main food consumed by Indonesian people. It also the principal food for more than 50% of the world’s population (Jahan, Sarkar, & Paul, 2017). Therefore the Indonesia government give particular concern to rice cultivation in order to achieve food sufficiency. The fulfillment of rice always rises dealing with increasing the number of population (growth response) (Sari, Fie, & Made, 2017). The fulfillment of the needs of rice faces many obstacles. They are the phenomenon of global climate change which influences to the amount of yield produced by the crop and the distribution of foodstuff, the constriction of farmland which effected by the using of this area for non farming activity, and the high level of degradation of farm land that causes the lack of yield. Therefore, the new strategy in the fulfillment of foodstuff is function the constrict land optimally. If can be functioned optimally, the obstacle of fulfillment the foodstuff will be decreased.

The intensification of farming can be applied by using several methods. One of them is using polybag for the cultivating system. It is done to preserve and to optimalize the constrict land. The cultivating using polybag gives many benefit. Some horticultural plants such as fruits and vegetables have been developed by using polybag system, as the reseaches that had done by (Adu-Yeboah et al., 2015), (Abegre S. & C. Oti-Boateng, 2011), (Ongso, Kusumiyati, & Nurfiriana, 2017), etc. The limited number of researchers have been done the research of cultivating staple plants as rice, soy, corn, etc.

Therefore, we develop the cultivating of staple plants especially rice by polybag system. We expect the result of our research can be one of the alternative soluation for developing the farming in constrict and limited land wich suitable for urban areas.

LITERATURE REVIEW

The Experimental investigation of rice cultivation was performed by (Ginting, Damanik, Sitanggang, & Muluk, 2015). The purpose of the experiment are to know impact of shade, organic materials and varieties to the growth and production of upland rice. The result showed that number of tillers, panicles, and grains could be decreased by shade on upland rice varieties. The organic matter can increase the number of panicles, grains production of upland rice.

The other research about rice cultivation also was investigated by (Sarker, Uddin, Sarkar, Salam, & Hasan, 2017). The experiments were conducted in Bangladesh to investigate about water management and cultivars affect on yield, growth, and biomass production. The result showed that good water management increase rice production. There are five water management systems be used on their research.
The varieties of rice also affect amount of harvest. The investigation of productivity on several varieties of rice had been conducted by (Hambali & Lubis, 2015). The rice varieties used are Inpari 13, Cihang, Mentik Wangi, Mekongga, IPB 4S, and HipaJatim 2. The results showed that Inpari 13, Cihang and Mekongga have higher yield than other varieties.

Experimental studies were performed by (Hatta, 2011) on the impact of plant spacing types on growth, yield components, and yield of rice. The results showed that rice yield significantly affected by types of plant spacing. But, the types of plant spacing not influence panicle length, number of grains, and flowering period. The other research almost same with (Widayat & Purba, 2015) was conducted by (Hatta, 2011). The purpose of this research was to determine the impact of the combination of plant spacing and weeding frequency different on the rice productivity. The rice variety used is Cihang.

The impact of cropping, size of vesselland fertilizers on the growth and yield of rice was investigated by (Humaerah, 2013). The fertilizers used are compound fertilizers. The results of this experiment show that the conventional cropping systems give higher growth and yield of rice than the hydroponic system. The diameter of the vessel also affects the number of panicles.

The research about the effect of cropping system on growth and yield of rice production had been investigated by (Lita, Soekartomo, & Guritno, 2013). It have been implemented in Lowland of Sumbersekar, Dau Subdistrict, Malang. The results showed that planting method of SRI (system of rice intensification) and direct seeding planting with organic planting ribbon afford components growth and higher yield than conventional planting method.

METHODOLOGY

The research was conducted in Nganjuk, East Java, Indonesia on January to March 2018. The experiment steps includes a) polybag preparation; b) tools preparation; c) growth; d) maintenance; and yield. Polybag using bags of 40x40 cm with the space 50 cm of each other. Plant media consist of soil, compost, husk charcoal, organic fertilizier “manutta gold”. The comparation of soil to other material is 4 : 1. Fertilizer concentrations for one polybag experiments were applied 250 liter of water mix with 15ml of liquid fertilizer. Plant media could be used 3 until 7 days after grows the grass on it. The growing grass in the polybag indicates the existing of microorganism. So, the planting media is ready to be used for cultivating.

The rice varieties used are Cihang and Sertani 12. This varieties was popular varieties planted by farmer. Because of more taste, more shiny, and more white color. The maintenance includes irrigation, fertilizier, and pest controlling. The rice cultivation in polybag more controlled than in lowland. The yield was conducted after the color of grain was yellow, solid, not runny, and rather hard. It merely 3 months. The harvesting can be done after the plant have reached the ideal characteristic of harvest. They are: All off the grain are turn into yellow color; compact; and juice less.

FINDINGS / RESULTS

The Figure1 shown the rice planted in polybag. There was 3 steps of growth, i.e:

a) Rice began to produce
b) Rice was still in the process of ripening grain
c) Rice was ready to be harvested

![Rice cultivation in polybag](image1.png)

Figure1: Rice cultivation in polybag

DISCUSSION / ANALYSIS

The experiment result was described in Table 1. Table 1 shows that the yield of rice production include the amount of filled grains, total grain, panicle number in polybag more than in lowland. Rice cultivation produces 2 kg/m² in polybag and 1 kg/m² in lowland. The panicle number of rice in polybag is more than in lowland, i.e : 12 in polybag and 6 in lowland.
Table 1: Comparison yield in polybags and in lowland

<table>
<thead>
<tr>
<th>Media Plant</th>
<th>Varieties</th>
<th>Ciherang</th>
<th>Sertani 12</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Amount of filled grains (kg)</td>
<td>Total grain (tons Ha)</td>
<td>Panicle number</td>
</tr>
<tr>
<td>Polybags</td>
<td>2</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Lowland</td>
<td>1</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: Observation Analysis

The yield in polybag two time more than the yield of rice in lowland. The controlling includes the growth process, water intensity and pest management. The other special advantage from planting media is beside it gives more yield, the rice cultivating in polybag has easy system. Therefore, the rice cultivating need not large land as rice field in common but it can be done in the constrict are around the house. The impact is many people can plant rice for good yield eventhough they don’t have rice field. The method of planting/cultivating in polybag is suitable for urban areas where agricultural land is limited. Beside, it can be the solution for decreasing of agriculture land from time to time.

For the rice variety, Ciherang and Sertani 12 have the same yield in polybag. It is 2 kg/m². It is because this two varieties of rice have almost the same characteristic. Ciherang able to produce compact rice and sertani 12 has strong and long malai. These varieties are popular varieties planted by farmer. Beside the mentioned advantage before, they are more taste, more shiny and brighter.

CONCLUSION

Rice cultivation can be conducted in polybag media. The rice cultivation in polybag produce higher yield than rice cultivation in lowland. The yield in polybag two time more than the yield in lowland. The rice varieties used are Ciherang and Sertani 12.

LIMITATION AND STUDY FORWARD

The experiment was conducted and the results obtained were successful. However, more can be conducted to further improve the varieties of rice.

CONFLICT OF INTEREST AND ETHICAL STANDRADS

There is no conflict of interest with the present organisation and no unethical practices followed in doing the experiment.

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REFERENCES

