Study of “PATBO SUPER” technology innovation promoting the improvement of cropping index and productivity of rainfed rice in West Java Province

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Abstract. The innovation technology studied was water-efficient rice cultivation based on specific organic rainfed rice fields (Patbo Super). The research was conducted in Keboncau Village, West Java Province. The research was conducted on a 14 hectares of rainfed rice field during the Dry Season from July to December 2018. The objectives of the study were: to analyze the performance of the “Patbo Super” and to analyze the level of farmers perceptions of the “Patbo Super”. Data were collected through observation, direct measurements and interviews. Data analysis was carried out descriptively. The results reported that the "Patbo Super" technology could increase the Rainfed Rice Cropping Index from 200 to 300; Technically, the performance of rainfed lowland rice cultivation Patbo Super is relatively good with an average rice yield of 7.29 t/ha. Patbo Super is economically profitable and if seen from the value of its farming efficiency it is feasible to be developed with an RC ratio of > 1; and The majority of farmers gave a positive respond to the "Patbo Super", technology package because it provides benefits, did not interfere with the culture of local farmers, was in accordance with land conditions and farmers' socio-economic capacities and was easy to implement.

1. Introduction
The increase in food needs due to population growth needs to be anticipated. When the population increases, rice consumption will increase and consequently the need for rice must be increased. To achieve the high demand for rice, it must be supported by rice production, where rice production is influenced by agricultural productivity and agricultural land area. On the other hand, rice production continues to decline. In 2014, the harvested area for paddy decreased slightly compared to 2013, which was followed by a decrease in production [1]. The harvested area decreased 2.53 percent and rice production decreased 3.76 percent. The productivity per hectare has decreased to 58.82 quintals per hectare. For lowland rice, the harvested area has decreased by 2.35 percent with a decrease in production of 4.09 percent [1]. The decline in production was due to a decrease in planting area due to land conversion and crop failure or puso due to flooding, pests and diseases.

The conversion of productive agricultural land, especially technically irrigated rice fields to non-agricultural land, has taken place and is difficult to avoid as a result of the rapid pace of development, among others being used for housing, industry, infrastructure facilities for international airport development and others. in 2016 the area of rice fields was 8.18 million ha. In 2017 it decreased to 7.75
million ha and in 2018 decreased to 7.1 million ha from the previous year [2]. This shows that the conversion of paddy fields to non-agricultural land is increasing every year.

The problems caused by the conversion of paddy fields to non-rice fields need to be seen not only based on their impact on rice production, but also need to be seen from a broader perspective. The impact of loss of productive agricultural land is permanent loss of agricultural products, so that if this condition is not controlled, it is certain that the continuity and increase in production will continue to decrease and in the end will threaten the instability of food security. Therefore, in order to maintain rice self-sufficiency, efforts must be made to continue to use alternative land such as rainfed rice fields which have not been optimally utilized.

Rainfed lowland areas are generally infertile (nutrient poor), often experience drought, and farmers do not have sufficient capital, so that this agroecosystem is also known as a resource-poor area [3,4]. The productivity of rainfed lowland rice is still low, ranging from 1.8 - 3.1 t/ha [5], around 2.0 - 3.5 t/ha [6], less than 2 t/ha [7]. Furthermore, it was reported that water availability is a major obstacle in rainfed lowland rice farming so that generally it is only planted once a year [8].

One of the technological innovations that can be used to increase the cropping index and productivity of rainfed lowland rice is Patbo Super. PATBO stands for Controlled Aerobic Rice based on Organic Ingredients, which is a rice cultivation technology package with the main basis of water management and the use of organic matter to increase the cropping index and productivity of rainfed lowland rice. The objectives of the study were: (1) To analyze the performance of the Patbo Super innovation technology in supporting the improvement of the cropping index and productivity of rainfed lowland rice; (2) To know farmers' perceptions of the Patbo Super innovation technology.

2. Methodology
The research was carried out in Keboncau Village, Ujungjaya District, Sumedang Regency, West Java Province in the form of demfarm on 14 rainfed fields belonging to farmers during the dry season (DS II) from July to July. December 2018. The number of farmers involved in this study was 30 people.

Site selection is based on the following considerations: (1) Ujungjaya Subdistrict has a rice field area of about 2,637 ha, of which 963 ha is rainfed, including in Kebon Cau village an area of 119.7 ha; (2) Rainfed lowland is only planted with rice 2 times a year with the following cropping pattern: Paddy - Paddy - Fallow; (3) The source of irrigation water only relies on rain water. There is potential for irrigation water in the form of surface water, namely, the Cimanuk river, but it has not been used by farmers to irrigate existing rainfed fields; (4) Rice straw has not been used as organic fertilizer, most of the straw from the remaining rice harvest is burned directly in the rice field; (5) The average rice productivity, namely: 5.0 - 5.5 t/ha; and (6) Rat pests are often an obstacle in rice farming.

The innovation technology studied, namely, water-efficient rice cultivation based on specific organic rainfed rice fields (Patbo Super) consists of 5 components as follows:

(1) The use of new superior varieties of rice consists of: Inpago 9, Inpari 30, 32, 33, 39, 42 and 43 varieties.

(2) Water management at the macro and micro levels.
   (a) Macro-level water management, namely raising river water by pumping and flowing it to the rice fields using piping.
   (b) Water management at the micro level is a water saturated irrigation system by using a tool made of 35 cm pipe with a hole in the wall.
      • There is no inundation during the rice planting period from planting to harvest
      • To keep the water at the level available according to the needs of the plants, monitoring is carried out by looking at the water level in the pipe.
      • As long as water is still stagnant in the pipe, the need for water to meet water loss through evapotranspiration (ET-plant) is considered sufficient. The water requirement for plants is the need for water to fulfill the evapotranspiration or consumptive use of the plant minus effective rainfall [9].
• If the water level in the pipe is less than 5 cm, the rice field will immediately be flooded with water.

(3) Utilization of rice straw as organic fertilizer using a decomposer to accelerate decomposition, then crushed using a hand tractor.

(4) Weed control with pre-grown herbicide with active ingredient ethyl pyrazosulfuron 10% applied after the last tillage and mechanically with Power Weeder.

(5) Use of Agricultural Machinery namely: hand tractors, power weeder, and combine harvester.

(6) Rat control by placing owl houses in the middle of rice fields as supporting technology.

(7) Prior to conducting field research, a farmer meeting was held to formulate cropping patterns and planting times before harvesting the 1st planting season.

The types of data collected in this study consisted of: (1) Rainfall data during the study, obtained from the nearest climate station; (2) Data on rice plant growth (plant height and number of tillers); rice yield and yield components (total grain and panicle length, 1000 grain weight, filled grain, and empty grain; types and levels of pest attack, collected through direct observation and measurement in the field; and (4) Economic data in the form of components of production costs, production, input and output prices of rice farming, rice selling prices, and farmer perceptions data on the Patbo Super technology, were collected through surveys and interviews.

Data growth and productivity of rice, the level of pest attack were analyzed descriptively and tabulated in the form of tables, graphs and pictures.

To find out the feasibility of farming, it is calculated using the Revenue Cost Ratio analysis [10] with the formula:

\[ \text{RC ratio} = \frac{TR}{TC} \]

Where: TR = Total Revenue (IDR); TC = Total Cost (IDR); R/C = Comparison between total revenue and total cost. If R/C = 1 means that the farming is not profitable and does not lose or break even, then if R/C < 1 indicates that the farming is not feasible to be cultivated, and if R/C > 1 then the farming is feasible to be developed.

The perceptions of farmers to the Patbo Super innovation technology were analyzed using the Likert scale as a guideline for interpretation with a score of 1 (strongly disagree), score 2 (disagree), score 3 (doubt), score 4 (agree), and score 5 (Strongly agree). Scores 3, 4, and 5 are in the positive category and scores 1 and 2 are in the negative category. Likert scale is a type of scale that has high reliability in ordering humans based on the intensity of certain attitudes. A higher score indicates a higher attitude level or intensity than a lower score [11].

3. Results and discussion

3.1. Time planning and cropping patterns

The cropping pattern is a planting effort on a plot of land by regulating the layout and sequence of plants for a certain period of time including the tillage period and the non-planting period for a certain period. A good cropping pattern will produce good production by maximizing the availability of available water to meet the water needs of the cropping pattern itself [12]. In Indonesia, which has a tropical climate, usually the cropping pattern is arranged for one year by paying attention to rainfall, especially in areas or land that are completely dependent on rainfall.

Farmers at the research locations are often late in cultivating land and planting rice. On the other hand, the source of irrigation water is limited because it only relies on rainwater. This condition resulted in rice plants in the 2nd planting season often experiencing drought, especially in the primordia phase because it entered the dry season. Drought has a serious impact on rice plant growth, especially in the generative phase [13]; which can reduce rice yields and grain quality [14].

Therefore, prior to carrying out the field research, a meeting was held with local farmer groups and extension workers before the 1st harvest season to arrange and agree on cropping patterns and planting...
times. By holding these meetings, there will be no more delays in land cultivation and rice planting, so that rice planting can be carried out 3 times a year according to plan.

3.2. Rice plant pests
As stated in the previous description, the research was carried out in the 3rd planting season covering an area of 14 hectares in a rainfed lowland area of 963 ha under fallow conditions. In these conditions it will result in an increase in the population of pests and diseases of rice plants, especially rats, due to migration from fallow fields in the vicinity. In this condition the rats will migrate from fallow fields that are not planted with rice to fields that are still being planted Rice [15].

Based on the results of observations, it is reported that the level of rat attack is only 2% - 3.02%, including the low criteria [17], which in their research defined four categories of rat attack, namely, mild (<20%), moderate (20 - 50%), heavy (50 - 80%), and puso (> 80%) [16]. This shows that the use of the Owl House (RUBUHA) is effective in controlling rat pests and strongly supports the increase in the rice cropping index in rainfed rice fields.

3.3. Agronomic growth of rice plants
The results of observations on plant growth reported that the seven rice varieties planted showed different numbers of tillers and plant heights. The average measurement results for the number of tillers and plant height are presented in Table 1.

Table 1. Number of tillers and height of rainfed lowland rice with Patbo Super technology package, in Kebon Cau Village, Unjung Jaya District, Sumedang. the 2nd Dry Season of 2018

| Varietas | Number of Tillers (tillers per holl) | Plant Height (cm) |
|----------|-------------------------------------|-------------------|
|          | 30 DAP  | 60 DAP  | 90 DAP  | 30 DAP  | 60 DAP  | 90 DAP  |
| Inpago 9 | 14.02   | 19.76   | 29.84   | 52.64   | 92.04   | 102.26  |
| Inpari 30| 17.22   | 22.94   | 29.78   | 40.62   | 60.74   | 96.64   |
| Inpari 32| 20.86   | 24.26   | 36.08   | 41.72   | 65.78   | 90.02   |
| Inpari 33| 21.02   | 22.68   | 32.32   | 48.58   | 67.12   | 89.68   |
| Inpari 39| 22.22   | 22.46   | 30.98   | 40.36   | 69.56   | 90.08   |
| Inpari 42| 23.24   | 26.74   | 32.22   | 48.56   | 85.86   | 97.14   |
| Inpari 43| 20.82   | 23.52   | 35.24   | 45.86   | 84.74   | 90.90   |

In Table 2, it can be seen that the Inpago 9 and Inpari 32 varieties gave the highest number of tillers at the age of 90 days after planting (DAP), namely 29.84 tillers per hill and 36.08 tillers per hill. Meanwhile, the highest plant height was given by Inpago 9 and Inpari 42 varieties, namely 102.26 cm and 97.14 cm, respectively. Based on these data, it shows that the resulting plant height is shorter than the description. Based on the description of rice, the New Superior Variety plant height of the Inpari type ranges from 100-120 cm [17]. The difference in the number of tillers and plant height is not only an expression of genetic factors, but also due to differences in the level of farm management. However, all varieties planted showed good and fertile growth. This shows that the irrigation system with "Patbo super" technology has no effect on plant height growth because of the availability of sufficient water for plant height growth. In line with the research results of [18] that inundation height has no significant effect on plant height.

3.4. Yields and components of rice yields
The results of the study reported that the application of the Patbo Super technology provided different yield and yield components for the varieties planted. Data on yield components and rainfed rice fields using the Patbo Super technology are presented in Table 2.

In Table 2, it can be seen that the Patbo Super technology package provides rice yields between 6.75 - 8.40 t/ha for all varieties planted, which is higher than the yield of rice cultivated by farmers before the study with the inpari 32 variety, namely, amounting to 5.0 - 5.5 t/ha. The highest yields were shown by Inpago and Inpari 42 varieties respectively 8.40 t/ha and 8.0 t/ha. Farmers in the research locations
have not yet utilized rice straw as the closest source of organic matter and its benefits have been proven. Some are burned, piled on embankments, or used as animal feed. The burning of straw will cause loss of organic C, nutrients N, P, K, Ca, Mg, Na and Si [19]. Meanwhile, the use of composted rice straw in situ can improve the physical properties of chemical soil and soil biology and increase rice yields [20][21].

The results of this study indicate that the water-saturated irrigation system without inundation on the Patbo Super technology does not reduce rice yields. In line with a research results which indicated that decreasing inundation height from 2.5 cm above the soil surface to 2.5 cm below the soil surface did not significantly reduce yield and yield components of rice [22]; the yield component is more influenced by the variety than the inundation height [23].

Table 2. Components of yield and yield of rainfed lowland rice with Super Patbo technology package, in Kebon Cau Village, Unjung Jaya District, Sumedang Regency. 2nd Dry Season. 2018

| Variety | Long panicle (cm) | Number of grain fill per panicle (grain) | The number of empty grains per panicle (grain) | Weight of 1000 grains (grams) | Productivity (t/ha) |
|---------|------------------|----------------------------------------|-----------------------------------------------|-------------------------------|---------------------|
| Inpago 9 | 28.88            | 123.2                                  | 86.4                                          | 23.81                         | 8.40                |
| Inpali 30 | 23.94         | 98.2                                   | 20.8                                          | 26.63                         | 6.75                |
| Inpali 32 | 21.56          | 100.2                                  | 27.2                                          | 26.91                         | 7.05                |
| Inpali 33 | 25.62          | 100.0                                  | 30.0                                          | 27.86                         | 7.60                |
| Inpali 39 | 24.76          | 100.0                                  | 32.0                                          | 25.62                         | 7.20                |
| Inpali 42 | 24.30          | 111.0                                  | 61.4                                          | 24.53                         | 8.00                |
| Inpali 43 | 23.40          | 113.2                                  | 51.8                                          | 20.59                         | 7.56                |

3.5. Analysis of farming

Farming income is the difference between the yield value and production costs from the application of the technology package used. The production cost which is analyzed consists of the cost of production facilities and the outpouring of labor.

Based on the results of farming analysis, it is reported that the Patbo Super technology package is economically profitable and if it is seen from the farming efficiency value it is feasible to be developed with an RC ratio value > 1. The detailed results of the Patbo Super technology package farming analysis is presented in Table 3.

Table 3. Analysis of rice farming using Patbo Super technology on rainfed lowland, Ujungjaya Village, Ujungjaya District, Sumedang Regency, 2nd Dry Season. 2018

| Description        | Value (Rp) |
|--------------------|------------|
| Means of production| 4,285,000  |
| Labor              | 11,600,000 |
| Total Production Cost | 15,885,000 |
| Revenue (rice yield) | 30,400,000 |
| Benefit            | 14,515,000 |
| RC Ratio           | 1.91       |

3.6. Farmers' perceptions of Patbo-Super innovative technology

Perception is a person's observation about objects, events, or relationships obtained by inferring information and interpreting messages [24] Meanwhile, according to [25] perception is a view or attitude towards something that fosters motivation, encouragement, strength and pressure that causes someone to do or not do something. Perception arises after farmers apply technology to their farming and can further influence the technology adoption process. The perception in this study is the opinion or view of
the respondent farmers on the nature or characteristics of the Patbo Super innovation technology. The observed characteristics or characteristics of the Patbo Super innovation technology are: relative advantage, compatibility, complexity, triability and observability.

3.6.1. Relative advantage
Relative advantages of an innovation are not only in terms of financial benefits, but also in terms of social (prestige), liking (taste and discomfort), technical and practicality (easy and difficult to implement) [26]. Relative advantage is the extent to which an innovation is considered better or worse than the usual methods used by farmers, the higher the level of relative profit, the faster the technology is adopted by farmers [27]. These relative advantages include the level of economic profitability, low costs, comfort, savings in time and effort and incentives. An innovation will be adopted quickly if the innovation provides better benefits than the existing technology. The farmers' perceptions of the relative advantage (Relative Advantage) of the Patbo Super innovation technology are presented in Table 4.

### Table 4. Farmers' perceptions of the relative advantage of the Patbo Super innovation technology

| Nature of the Patbo Super technology                                      | Positive perceptions (%) | Negative perception (%) |
|--------------------------------------------------------------------------|--------------------------|-------------------------|
| Relative Advantage                                                       |                          |                         |
| ▪ The benefits of Patbo Super have not been felt by farmers               | 63.0                     | 37.0                    |
| ▪ Patbo Super technology will increase rice production                    | 88.9                     | 11.1                    |
| ▪ The labor cost of composting straw does not burden the farmers          | 59.3                     | 40.7                    |
| ▪ Patbo Super can increase the rice cropping index                        | 96.3                     | 3.7                     |
| **TOTAL**                                                                | **76.9**                 | **23.1**                |

In Table 4, it can be seen that the majority of farmers (76.9%) gave a positive perception of the relative advantages of the Patbo Super innovation technology. Meanwhile, the number of respondent farmers gave negative perceptions of the advantages of applying the Patbo Super technology, only 23.1%. As many as 96.3% of farmers agree that applying the innovative Patbo Super technology can increase the cropping index of rainfed lowland rice. Furthermore, 88.9% of farmers agreed that by implementing the Patbo Super rice yields would increase.

As many as 40.7% of respondent farmers thought that by applying the Patbo Super there was an increase in production costs, namely processing rice straw into organic fertilizer. The habit of farmers at the study site for rice straw is thrown away or burned. However, most of the respondent farmers (59.3%) considered that the additional production costs were not burdensome. Farmers think that the excess costs are still considered reasonable because the return of straw to the soil will increase soil fertility and rice yields will increase.

3.6.2. Compatibility
Compatibility is whether the innovation has properties that are in accordance with existing values, previous experiences, and the needs of the recipient [27]. An innovation will be adopted more quickly if it has compatibility with socio-cultural values and beliefs or norms in the community environment. The higher the level of conformity with the values that exist in society, the faster the innovation will be accepted. Ideas which do not conform to the salient features of the social system will not be adopted as quickly as the appropriate ideas. Farmers' perceptions of the compatibility of the Patbo Super innovation technology are presented in Table 5.
Table 5. Farmers’ perceptions of the suitability of the Patbo Super innovation technology

| Nature of the Patbo Super technology | Positive perception (%) | Negative perceptions (%) |
|-------------------------------------|-------------------------|--------------------------|
| Compatibility                       |                         |                          |
| ▪ Accepted and developed because according to the wishes of the farmers | 51.9                    | 48.1                     |
| ▪ Can be developed, because it can be done by local planting services | 88.9                    | 11.1                     |
| ▪ Adaptive to local rice fields     | 59.3                    | 40.7                     |
| ▪ Does not disturb the culture of local farmers | 81.5                    | 18.5                     |
| ▪ Super Patbo is not much different from the farmer’s way | 77.8                    | 22.2                     |
| **TOTAL**                           | **71.9**                | **28.1**                 |

In Table 5, it can be seen that as many as 71.9% of respondent farmers gave a positive perception of the suitability of the Patbo Super technology. Most of the respondent farmers (51.9%) thought that the Patbo Super could be developed because it was according to the wishes of the farmers, namely, it could save water usage and thus reduce production costs. Furthermore, 81.5% agreed that the Patbo Super was considered appropriate and did not interfere with the local culture because it was not much different from the method of rice cultivation which was usually done by farmers and was able to be carried out by local planting services. As many as 48.1% of respondent farmers gave negative perceptions and considered that the Patbo Super disturbed their usual planting patterns and timing. Usually during the third planting season (DS II), the paddy fields are not planted with rice (fallow) or planted with secondary crops, but by applying the Patbo Super technology, there are 3 rice plants planted in one year.

3.6.3. Complexity
The level of complexity of innovation is the perceived difficulty of an innovation to be understood or carried out by its adopters [26]. The higher the level of complexity of the innovation, the more difficult it is for farmers to accept the innovation. Farmers’ perceptions of the Patbo Super technology based on the level of complexity are presented in Table 6.

Table 6. Farmers’ Perceptions of the Complexity of Patbo Super Innovation Technology

| Nature of the Patbo Super technology | Positive perception (%) | Negative perceptions (%) |
|-------------------------------------|-------------------------|--------------------------|
| Complexity                          |                         |                          |
| ▪ Patbo Super requires special expertise in its application | 74.1                    | 25.9                     |
| ▪ Difficulty in making the perimeter and worm channels | 11.1                    | 88.9                     |
| ▪ Difficulty composting straw       | 11.1                    | 88.9                     |
| ▪ Difficulty planting               | 14.8                    | 85.2                     |
| ▪ Difficulties in the application of biological fertilizers | 18.5                    | 81.5                     |
| ▪ Difficulty in providing irrigation water | 51.9                    | 48.1                     |
| ▪ The Patbo Super tech pack is technically difficult to implement | 22.2                    | 77.8                     |
| **TOTAL**                           | **29.1**                | **70.9**                 |

In Table 6 it can be seen that most of the respondent farmers, namely 70.9%, considered that the application of the Patbo Super innovation technology was not difficult because it could be done. Only a small proportion of respondent farmers (29.1%) stated that the Patbo Super innovation technology was still complicated in its application. However, as many as 74.1% of farmer respondents thought that the Patbo Super needed special expertise in its application. Especially in composting straw using microbes
directly on the ground, and managing water with indicators of inundation height in pipes is still difficult. This is understandable because the new innovative Patbo Super technology is underway, and they are not used to it. Therefore, extension activities related to the Patbo Super technology need to be intensified by conducting theoretical technical guidance in the room and in practice in the field, so that farmers better understand the advantages and advantages of the Patbo Super technology.

3.6.4. Triability
The level of ease to try (Triability) is the level at which an innovation can be tried on a small scale [28]. New ideas that can be tested will usually be adopted faster than innovation that cannot be tested first. The higher the level of ease with which an innovation can be demonstrated or tried, the easier it will be for farmers to accept the innovation.

Farmers will believe more in an innovation when the innovation can be tried or may have been tried by other farmers and has had a success rate. Farmers' perceptions of the Triability of the Patbo Super innovation technology are presented in Table 7.

Table 7. Farmers' perceptions of the triability of the Patbo Super technology package

| Nature of the Patbo Super technology | Positive perception (%) | Negative perceptions (%) |
|--------------------------------------|-------------------------|-------------------------|
| Triability                           |                         |                         |
| ▪ Supporting technology is easy to obtain | 51.9                   | 48.1                    |
| ▪ Labor is easy to get / available    | 59.3                   | 40.7                    |
| ▪ Source of Patbo Super tech pack information available | 59.3                   | 40.7                    |
| ▪ Researchers and extension agents are ready to assist | 96.3                   | 3.7                     |
| ▪ Can be practiced because land resources support | 85.2                   | 14.8                    |
| **TOTAL**                            | **70.4**                | **29.6**                |

Based on Table 7, the majority of farmers (70.4%) stated that the Patbo Super technology package was easy to practice because supporting technology was easy to obtain, labor, especially planting services, was still available, and the availability of suitable land resources. For the use of biological fertilizers and bio decomposers, farmers take advantage of access to information sources available at the extension agent, pest and disease observer, and AIAT Researchers who have a relationship with access to biological fertilizers. In addition, the convenience of farmers in practicing the Patbo Super technology is due to direct guidance from AIAT extension workers, technicians and researchers.

3.6.5. Observability
Observability is the level at which a technological innovation can be observed or accessed by others. According to [26] the level of ease with which an innovation can be seen is the degree to which the results of the innovation can be seen or felt by potential users (potential adopter). The higher the level of observation, the easier the innovation will be accepted by the community. Farmers' perceptions of the observability of the Patbo Super innovation technology are presented in Table 8.

In Table 8, it can be seen, from the observability side, the transfer of Patbo Super technology through farm media has been responded positively by as many as 80% of respondent farmers. This shows that the extension media is considered effective in conveying technological information to farmers, because in addition to being implemented directly on farmers’ land, 100% of respondents also stated that the location chosen was very strategic, easy to reach and could be seen directly by other farmers (non-cooperator farmers) in around the study location, because the location is right beside the main road. Patbo Super technology can be observed, because farmers participate and practice directly on their own land so they can feel and get experience. In addition, ease of observation is also supported by active communication between officers (extension agents, researchers and technicians) and farmers.
Table 8. Farmers’ perceptions of the observability of the Patbo Super technology package

| Nature of the Patbo Super technology | Positive perception (%) | Negative perception (%) |
|-------------------------------------|-------------------------|-------------------------|
| Observability                       |                         |                         |
| Easy to observe because farmers participate in its implementation | 51.9                    | 48.1                    |
| Easy to observe because the Patbo Super research location is easy to reach by farmers. | 100.0                   | -                       |
| Easy to observe because it is implemented on farmer's land. | 100.0                   | -                       |
| Easy to observe because farmers practice direct | 55.6                    | 44.4                    |
| Easy to observe because there is communication between officers and farmers | 92.6                    | 7.4                     |
| TOTAL                               | 80.0                    | 20.0                    |

4. Conclusions
The application of the innovative Patbo Super technology which is supported by rat pest control using owls has been able to increase the rice cropping index in rainfed rice fields in Kebon Cau Village Ujungjaya District from 200 to 300. To increase the rice cropping index in rainfed rice fields, it is necessary to plan the cropping pattern and planting time since the 1st planting season. Technically, the performance of rainfed lowland rice cultivation Patbo Super is relatively good with an average rice yield of 7.29 t/ha. The innovative technology "Patbo Super" when viewed from the efficiency value of the farming is feasible to be developed with RC values obtained >1. The majority of farmers gave a positive response to the innovative technology Patbo Super, because it provides benefits, did not interfere with local farmers 'culture, is in accordance with land conditions and farmers' socio-economic capacities and was easy to implement.

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