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Introduction of Rats Pest Control Using Trap Barrier System (TBS) in Farmer Group

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Abstract

Rats are the main agricultural pests and one of the causes of crop failure for farmers, especially in Pademawu Village. Farmers generally apply pest control methods using poisons that can pollute the agricultural environment. Therefore, this study offers the application of the Trap Barrier System (TBS) to overcome the rat pest problem. The service aims to increase partners' insight into implementing rat pest control using TBS, which is conducted through outreach and training. The method used is descriptive-quantitative, namely data collection through filling out questionnaires including knowledge skills, level of interest, posttest, and pretest for partner knowledge evaluation. The assessment shows that the skills and insights of the farmers are in a good category after carrying out the activities. Farmers also show interest in participating in the activities by actively asking and listening during the discussion. TBS has been proven to be able to reduce the level of rat attacks on rice by up to 80%, so farmers are interested in using the TBS trap system. Even so, the TBS system cannot break the life cycle of rats, and further guidance is needed regarding sustainable cropping and cultivation patterns to overcome the problem.

Keywords: Farmer; Rat; Rice; Trap.

Introduction

The Suka Makmur Farmer Group in Pademawu Timur Village, Pademawu District, Pamekasan Regency, East Java, was formed in 2013 and operates in the wetland agriculture sector. The dominant wetland agricultural commodity cultivated is rice. Rice cultivation is carried out until the third season every year. This generates a quite promising income for farmers, so other commodities that are adaptive and capable of producing alternative incomes need to be developed by farmer groups. One of the efforts to optimize land can be done by eradicating rats, which are the main problem for farmer groups.

Rat pest attacks often worry farmers and even cause crop failure. Damage caused by rat pest attacks ranks first compared to other pests, with an average rate of damage to rice plants reaching 20% per year (BPPP, 2015). It includes field rats, can

damage all rice growing stages, from seeding to harvesting and even post-harvesting in storage sheds. The most severe attacks occur when rats attack plants in the generative phase, namely rice in the milk-ripening phase until it is ready for harvest (Siregar *et al*., 2020). Field rat pest attacks on rice are increasing along with the increased population of field mice. The field rat population increased in the third planting period. According to Harahap *et al*. (2022), the planting index three times a year tends to increase the number of rats in each planting season. It is because such an area becomes the only food center for rats while the surrounding lands are not planted (Arifandi *et al*., 2021). Thus, it is crucial to do field rat pest control.

The control of field rats is relatively more difficult due to their different biological and ecological characteristics compared to other rice pests. Imadoeddin *et al.* (2022) explained in their study that rat attacks occurred in Pamekasan, and severe attacks occurred in Tlanakan sub-district, Galis, including Pademawu, which is a neighbor of Galis sub-district. Rat pest problems are found in almost all rice-producing areas, including in Pademawu District, East Pademawu Village, which is currently experiencing rat pest attacks since some farmers plant until the third planting season or plant rice three times a year.

Based on preliminary observations of farmers, rat control, which has often been practiced by gropyokan (rat hunting straight from its hole), involves laying fruit with a strong smell and poisonous bait, but these efforts were fruitless and unsustainable. Farmers' knowledge and skills related to natural rat pest control are still very limited. Based on this background, rat pest control training activities are needed to implement the Trap barrier system (TBS). It is a rat control technique based on the principle of traps (bubu) and the generative phase of paddy rice plants made in paddy fields (Sekarweni *et al*., 2019). The TBS technique is known to be quite effective in catching mice when the time is right (Supriyadi & Yanuartono, 2019). This activity aims to: 1) Provide training to partners (farmer groups) regarding the application of TBS on rice-planted land up to the third phase; 2) Analyze changes in partners' knowledge regarding the implementation of TBS; and 3) Evaluate the implementation of TBS that is applied to farmer's land in East Pademawu Village, Pamekasan Regency, East Java.

Research Method

Location

Community service activities were carried out in Pademawu Timur Village. Prior to the activity event, the service team sent a service permit letter to the local village head for permission to carry out the service activity. The target farmer group has been determined from the results of a survey in East Pademawu Village with the provisions that the farmer group is a group of farmers who mostly grow rice and have problems with invading rats.

Methods

Implementation of Service Activities

This community service activity was carried out for two days. The first day was filled with making and installing TBS and mouse traps (Figure 1). On the second day, it is the implementation of activities and evaluation of partner understanding. Testing the effectiveness of traps is carried out by farmers independently after community service activities are completed.

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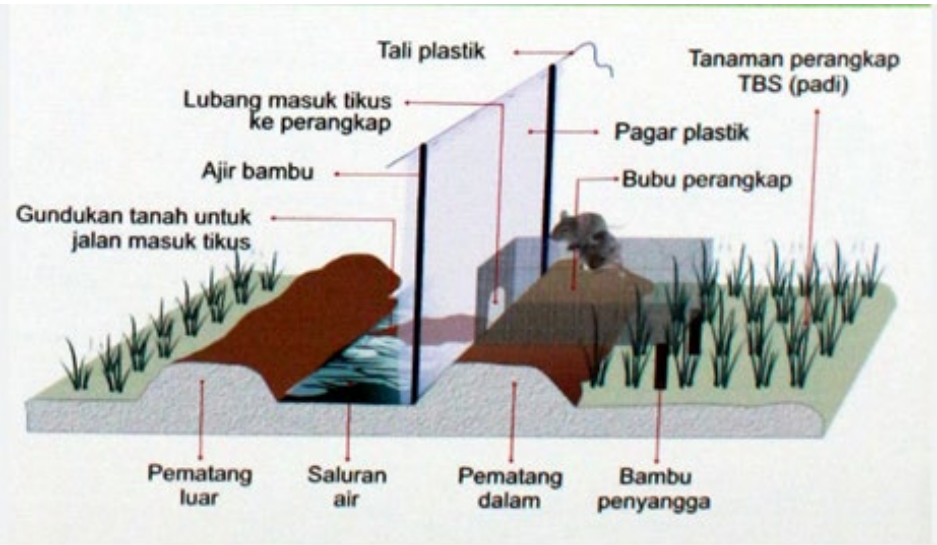

Figure 1. TBS Installation Scheme (side view)

Scope of Activities

This community service activity provides knowledge on making TBS and how to make mouse traps, as well as their applications. Furthermore, the installation of TBS and traps for rats in rice fields that are being planted with rice in the generative phase is an application of this activity. This activity is implemented in the Suka Makmur farmer group, Pademawu Timur Village, which is now planting rice up to three times a year. August and September become months of the generative phase, which is the center of attention for field rats since there are no rice plants around it.

Data Analysis

The data analysis used in this study is a quantitative descriptive analysis. The stages of collecting data and information on the Prosperous Farmers group partners are carried out by distributing questionnaires and conducting direct assessments whose scores have been determined. The number of samples used was 10 people. Data collected from partner participants includes Pretest/Posttest Results, Interest Level, and Training Skill Level. Variables skill, posttest, and pretest are measured using a Likert scale with intervals 1-5 (Taluke *et al*., 2019), with the following scores and criteria:

- Score 5 : very precise
- Score 4 : less precise
- Socre 3 : precise
- Score 2 : not precise
- Score 1 : very imprecise

The maximum score is 5 (assuming 100%) and the minimum score is 1 (assuming 20%), so based on these calculations (Wahab *et al*., 2021), the class categories in this study are as follows:

- Class interval 84%-100% : very high
- Class interval 68%-83% : high
- Class interval 52%-67% : medium
- Class interval 36%-51% : low
- Class interval 20%-35% : very low

The last stage of the assessment is the attitude of the participants towards the socialization and training material, measured by distributing questionnaires, which are then determined based on a Likert scale, namely poor (K) = 1-5, Enough (C) = 6-10, and Good (B) = 11 -15.

Results & Discussion

TBS Manufacturing and Installation

The TBS specifications used are as follows: the area of the paddy field planted with rice in the third growing season is 160 m2 with a length of 40 m and a width of 40 m. Paddy fields with rice plants in the generative phase were tightly fenced with 100 cm-high silver-black mulch (the bottom of the mulch was patched with wet soil). Supports in the form of bamboo were placed outside and inside the fence to protect it from the strong wind in August so that the black mulch plastic fence would not collapse. Traps were installed on four sides of the mulch plastic fence: the north, west, south, and east sides of the paddy fields as shown by the arrows in Figure 2. Meanwhile, the practice of installing TBS with farmer groups is presented in Figure 3.

Figure 2. TBS Placement Points at Locations of Fostered Partner

Figure 3. The Practice of Installing TBS with Farmers

Trap Making

Traps (bubu) are made of strong ram wire (using a coarse sand sieve) in the shape of a cube with sides 20 cm wide and 40 cm long, respectively. At the front of the trap, a rat entrance is installed in the form of a 3-inch pipe, the inside of which is cut sharp and covered with mica plastic in the hope that the rats that enter will pass through the mica plastic so that they cannot get out again trapped in the trap. Catching rats with TBS is quite effective; it is able to catch 1 to 8 rats every day. Baldwin *et al*., (2022)

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in their study showed that two rats were trapped every day with the same method. This matter showed that the application of the TBS method in Pademawu Village was quite effective in reducing rat pests. The rats caught in the TBS are mostly male and range in age from juvenile rats to adults. This result is similar to that of Triwidodo *et al*., (2020), who found that the age structure of rats from the generative rice stage to the fallow period is dominated by young rats. This must be watched out for in relation to efforts to control rats in the next generative phase of rice, because these rats are ready to mate and reproduce. The sex of the rats trapped in the TBS is also the same as the study by Siregar *et al*., (2021), namely male dominance. The shape and model of the trap can be seen in Figure 4.

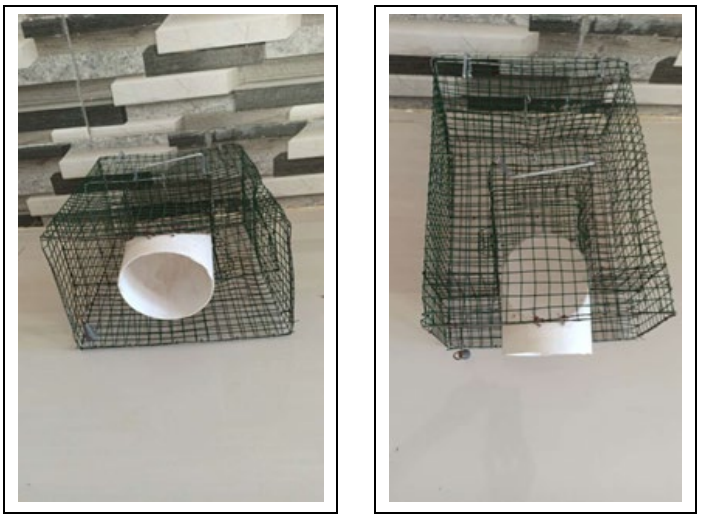

Figure 5. Bubu or mousetrap

Activity i=Implementation

This community service activity was carried out by the Suka Makmur farmer group in East Pademawu Village. TBS is applied in the third planting season of rice fields, where the installation of TBS on rice starts at 60 dap, namely when rice panicles or rice will begin to appear in the generative phase. Observations were made after the TBS was installed. The graph of the observed number of rat catches can be seen in Figure 6.

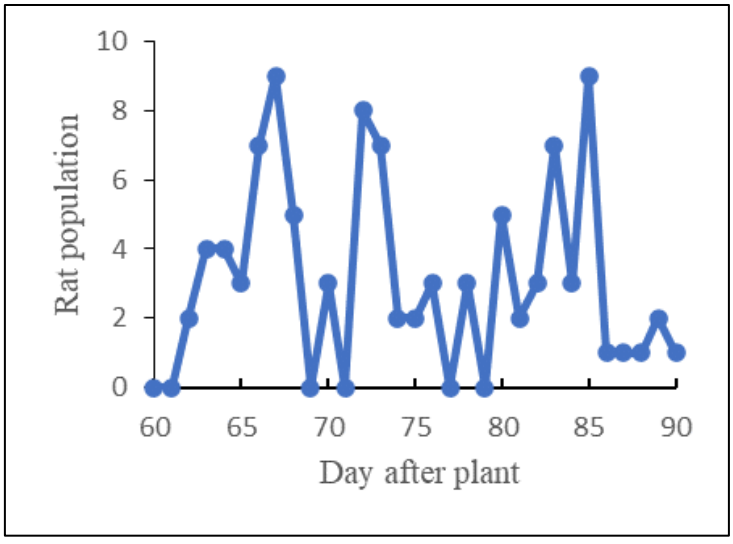

Figure 6. Rat Population after TBS Installation

From Figure 6, it can be concluded that the average daily rat attack is 3.6, or about 4 rats per day, and the catch of rats every day is around 4 rats. In the data above, rat pests mostly attack rice aged 67 and 85 dap.

This is evidenced by the most daily rat catches on days 8 and 26, namely rats caught as many as 9. Based on these graphs, it can also be concluded that rat attacks can be suppressed. The graph that was originally going up will go down again the next day due to trapped rats.

Evaluate Partner's Level of Understanding and Capabilities. The next activity in the extension activity is an evaluation of partners' understanding of the service program regarding the Trap Barrier System (TBS) technology. The initial obstacle experienced by the team was that the technology provided was unfamiliar and new to the participants, so it was necessary to increase the number of discussions to make it easier for participants to understand the material and activities presented. Counseling takes place through material understanding and Focus Group Discussion (FGD). This is done to make it easier for partners to understand the results of the practice of making TBS. Counseling was given directly by the resource person from the service team,. In this activity, the farmer groups were very enthusiastic about asking questions and getting answers from the speakers. Increased understanding of farmer groups (partners) is measured by giving a pretest and posttest regarding understanding of the use of TBS. The questions were given on TBS technology, techniques for making and setting traps, and the purpose and benefits of this activity. From the table, it can be concluded that there was an increase of 45% after the activity was carried out. Participants felt that they had gained knowledge and began to understand the benefits of installing TBS and traps in their paddy fields. The majority of Suka Makmur farmers are rice farmers, and rats are their main problem. They have made various efforts to reduce tick attacks in their land. Mice have a variety of nesting patterns, so their attack patterns are difficult to read. With the presence of TBS, rats are forced to go through several paths that are deliberately made, and traps are installed so that rats are easily entangled. The second activity is hands-on practice in the field, namely making TBS and traps as well as installing them. At this stage, the team practices and assesses how participants can put into practice what the team has done so that the results of improving the skills of the participants can be obtained. The participants' abilities began to increase after being given training related to the manufacture and installation of TBS and traps. The basic problem is how farmers install TBS because the land is wet. Farmers Suka Makmur are new to the TBS system and setting traps. Previously, farmers only tried to set traps, but this was not effective because rats could pass through gaps and other routes.

The next assessment is to measure the extent to which participants are enthusiastic and interested in participating in this activity by giving a questionnaire to indicate whether they agree or disagree with this activity. The results showed that 80% were enthusiastic after seeing how TBS was able to reduce the level of rat attacks on their rice. One of the participants felt very grateful for the technology that was conveyed to them so they didn't have to worry about planting rice again. Another assessment that is carried out is to measure behavior during the process of activity. They paid attention and listened to the resource person carefully, so that the team gave a Good score (B) with a score of "12". The results of the increase in pretest and posttest scores as well as skills before/after the activity are presented in Figure 7. The pretest results obtained were 54%, which were categorized into the medium interval class. Meanwhile, the skills of participants before counseling was carried out were 42%, which was included in the low-class category. There was a significant increase in posttest and skill after counseling (82% and 78%) that were categorized as high-class. This indicates that training can increase the knowledge and skills of the participants. TBS is known to be able to reduce rat attacks, but this technology is quite expensive and has not been able to break the life cycle of rat pests. Further assistance is needed to integrate sustainable agricultural cultivation and the application of TBS for local farmers.

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Figure 7. Analysis of Capacity Building of the Suka Makmur Farmer Group

Conclusions

Evaluation of farmers' understanding of the application of TBS technology showed results of 82%. The assessment shows the skills and insights obtained by the farmers are in a good category after carrying out the activities. The participants also showed interest in participating in the activities shown by actively asking and listening during the discussion. Even so, the TBS system cannot break the life cycle of rats, and further guidance is needed regarding sustainable cropping and cultivation patterns to overcome this in the farmers' environment in East Pademawu Village.

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