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Extension Program on the Utilization of Cow Urine Waste into Biourine with the Addition of Pineapple Peel Bioactivator in Sumberpitu Village, Pasuruan Regency

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Abstract. Agriculture is one of the main business sectors used as the livelihood of the people of Sumberpitu village with dairy farming as an accompanying business unit. However, from the existing potential, there are several problems such as steps and expensive inorganic fertilizers. From the results of deepening the problem through interviews, it shows that farmers in Sumberpitu Village do not have any knowledge and skills to use cow urine as liquid organic fertilizer in their farming business. The purpose of this study is to conduct extension program on the use of cow urine waste as biourine with the addition of pineapple skin bioactivators and analyze behavior changes in aspects of knowledge, attitudes and skills of farmers in Sumberpitu village. The research method used in this study is the Level III action research method. The evaluation results show that extension services can increase farmers' knowledge from a percentage of pre-test scores of 50% to 82% in post-test scores, which can be categorized as very high. In the aspect of attitude, the percentage of pre-test scores of 48% increased to 76% in post-test scores and was included in the high category so as to show a positive attitude towards the extension program material delivered. While in the aspect of presentation skills, the post test score is 83%, which can be categorized as "very high". These results show that the extension program provided has proven effective in changing farmer behavior in increasing knowledge and attitudes as well as developing farmers' skills in utilizing cow urine waste as biourine with the addition of pineapple peel as a bioactivator.

Keywords: Biourine, Changes in farmer behavior, Extension

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INTRODUCTION

Based on the data obtained through the results of the identification of regional potential, it can be said that the agricultural sector is one of the business sectors used as the livelihood of the Sumberpitu village community. In addition, in the livestock sector, the average has a dairy cattle business with a total number of livestock of 2,597 heads. From the potential of farming in the area, there are several problems and obstacles faced, namely related to the high price of inorganic fertilizers which support the needs of farming. In general, farmers more often rely on inorganic fertilizers obtained through government subsidies. However, with the renewal of fertilizer subsidy rules and policies through MOA No. 10 of 2022 concerning redemption procedures and the highest retail price of subsidized fertilizers, the amount of fertilizer assistance to farmers has decreased. This is due to the increasing cost of making fertilizers and the impact of using inorganic fertilizers which are not always beneficial for agricultural land in a sustainable manner. Therefore, farmers are expected to look for other alternatives as a substitute for inorganic fertilizers, which is in line with the paradigm of agricultural development that leads to the concept of organic and environmentally friendly agriculture.

An alternative that can be pursued by farmers related to the availability of inorganic fertilizers is to process surrounding materials such as available livestock waste to be processed into fertilizer through a fermentation process. One of the livestock wastes available in Sumberpitu village is cow urine which can be processed into liquid organic fertilizer. According to Hadi (2020), one adult cow can produce about 15 liters of cow urine every day. Based on this, if accumulated with the number of cattle in Sumberpitu village, the total available cow urine waste is 38,955 liters per day.

Biourine is one of the liquid organic fertilizers made from urine that is fermented to increase the content of nutrients such as nitrogen, phosphorus and potassium and other micro nutrients. According to Nuraini and Asgianingrum (2017), cow urine can be utilized as cow biourine by incubating it first so that it can be decomposed. Biourine needs to be fermented so that it can be decomposed properly. The biourine fermentation process can be done by using pineapple peel as a starter because it contains bromelain enzyme which acts as a bioactivator in accelerating composting. With the bromelain enzyme available in pineapple peels, it can help accelerate the decomposition of organic matter and increase the nutrients of the resulting fertilizer and reduce unpleasant odors.

Based on the description of the problems and potential, the purpose of this research is analyze behavioral changes in the aspects of knowledge, attitudes and skills of farmers in Sumberpitu village about the utilization of cow urine waste as biourine with the addition of nana skin bioactivator. The counseling is necessary as one of the steps to disseminate innovations and the learning process for farmers in Sumberpitu Village.

THEORETICAL REVIEW

Liquid organic fertilizer is a fertilizer that is mostly or entirely composed of organic matter derived from plant or animal residues that can undergo solid or liquid engineering which is used to supply organic matter, in order to improve the physical, chemical, and biological properties of the soil. The advantages of liquid organic fertilizer are that it can quickly overcome nutrient deficiencies, does not remove nutrients and can provide nutrients quickly (Kementarian Pertanian, 2006).

Cow biourine is an alternative liquid organic fertilizer obtained from the fermentation process with the aim of enriching the nutrient content for plants. According to Hani & Geraldin (2016), the use of cow urine as an organic fertilizer is quite potential as a contributor of nutrients for plants such as N, P and K. When viewed from the aspect of nutrient content, cow urine liquid has a higher amount of nutrient content compared to its solid waste.

One of the materials that can be utilized as a bioactivator is pineapple peel. Bulkaini *et al* (2021), stated that pineapple peel contains 85.78% dry matter, 81.90% organic matter, 8.1% ash, 3.50% crude protein, 19.69% crude fiber, 3.49% crude fat. Furthermore, Saputri *et al* (2021) wrote that pineapple peel contains several bacteria, namely *Azobacter Sp*, *Rhizobium Sp*, *Azospirillum SP*, *Pseudomonas Sp*, and *Bacillus Sp*, which are bacteria with many benefits as bioactivators.

RESEARCH METHOD

This research was conducted in Sumberpitu Village, Tukur District, Pasuruan Regency. The research was conducted from January to March 2024. The method or type of research used is level III action research where at this level researchers conduct research to find problems, potential or initial conditions and then determine or develop actions and test these actions as an effort to solve problems and improve performance. Data collection techniques used at the research stage were structured interviews,

observation and documentation. Furthermore, the method of preparing the extension design is adjusted to the characteristics of the target. The technique of determining the sample was purposive sampling, so that the target of extension program was determined to be 20 people.

Data analysis of extension evaluation was conducted using quantitative and descriptive qualitative methods. Quantitative methods use scoring analysis techniques to determine specific values and can be used to conclude the level of success of extension program in the form of increased knowledge and attitudes and skills of extension program targets. While the qualitative method is to describe what things affect the changes in the behavior of extension targets.

RESULTS AND DISCUSSION

Description of Characteristics of Location and Target of Extension

Sumberpitu village is one of 12 villages in Tukur sub-district, Pasuruan, East Java province which has an area of 548 hectares. With the potential of the area oriented to the development of the agricultural sector cultivated and adapted to the specifications or conditions of the region in each hamlet. cultivated commodities include food crops, plantations, horticulture and livestock.

Based on productivity data, several agricultural commodities produced produce quite good yields. This achievement can certainly be improved to achieve higher production targets by improving cultivation methods including the use of superior seeds, the addition of organic fertilizers, and the use of biological agents both in an effort to enrich nutrients and handling pests and diseases in plants. In addition to increasing productivity, agricultural cultivation in Sumberpitu village is expected to lead to organic agriculture that is environmentally friendly and sustainable so that it has higher selling power.

The livestock sector is one of the accompanying business units or side business units after crop cultivation. The types of livestock kept in Sumberpitu village are most dominant in large ruminants, with a fairly large livestock population. The only type of large ruminant that dominates the livestock business of farming communities in Sumberpitu village is dairy cows because it is supported by an adequate rural environment and the availability of land area for planting various types of grasses as animal feed.

Implementation of Extension Design

1. Target Determination

The target of the extension program was determined based on the results of the identification of regional potential that had been carried out in Sumberpitu village. The target of this extension is farmers who are members of the Lawu III farmer group in Sumberpitu village. Considerations in determining the target of extension activities are by looking at problems related to organic fertilizer and cow dung waste that are not handled or utilized properly. This is because many farmers do not know how to process urine waste with fermentation techniques and natural bioactivators that can benefit plants.

The target of the extension program was set at 20 people who were then distributed based on the characteristics of age, education and farming experience. The complete data related to the characteristics of the extension targets are as follows:

Table 1. Characteristics and Potential of Extension Targets

Individual Characteristics	Category	Number of Individuals	Percentage (%)
Education	Elementary School	3	15
	Junior High School	8	40
	Senior High School	8	40
	Bachelor	1	5
Total		20	100
Age (years)	17 – 25	1	5
	26 – 35	6	30
	36 – 45	7	35
	46 – 55	6	30
	Total		20
Farming experience (years)	<10	7	35
	11-20	5	25
	>20	8	40
Total			100

Based on the data collected from the implementation of the identification of regional potential and data collection on membership data, it can be categorized that the age of the extension targets are in 4 age categories, namely the largest number is in the interval 36-45 years or the late adult group of 7 people with a presentation of 35%. While the lowest number of respondents was in the interval of 17-25 years or the late adult group as many as 1 person with a presentation of 5% of the total target presentation, which concluded that the entire target of extension program was in the productive age range.

Furthermore, the level of education shows that out of 20 samples of extension program targets, the largest number is at the junior high school (SMP) and senior high

school (SMA) education levels as many as 8 people with a presentation of 40% each. While the lowest number of respondents was in the college group as many as 1 person with a presentation of 5% of the total target sample. The level of education is very influential on the way of thinking and the ability to reason a knowledge so that it can affect a farmer in decision making. the level of education is also influential in the stage of application of technological innovation or material that is dissuluhkan, because the higher the level of education, the easier it is to absorb the extension material. This is supported by the opinion according to Dharmawati & Wirata (2016), that there is a relationship between the level of education and the level of knowledge, because it cannot be denied that the higher a person's education the higher they receive information and knowledge.

Based on the results of the deepening of the material conducted through interviews, several farmers who were selected as informants revealed that their farming experience began when they were still in school so that it became a hereditary thing that continues to be done until now. This certainly affects their knowledge and skills in running their farming business. Farmers who have experience in a field will more easily understand and analyze the knowledge needs that will be used to increase the income of their farming business.

2. Determination of Materials

The agricultural extension materials delivered to the extension targets in this study were then delivered through an applied review process by applying a demonstration plot model tailored to the needs of the extension targets on making cow biourine fertilizer and how to apply it. The application study itself is one of the trials of technology packages together with farmers in proving a technology package or innovation before it is used in their farming business.

3. Determination of Methods

The determination of extension methods is carried out through stages of consideration that are adjusted to several aspects of the characteristics of the extension target and review the suitability of the content of the issues raised as extension material so that the expected extension objectives can be achieved. Based on the stages of method selection that have been described, the suitable methods to be applied are anjangsana, application studies and plot demonstrations that are implemented in extension activities.

4. Determination of Media

The selection of audio-visual media aims to enable researchers to visualize to the extension targets the ways, steps and techniques of making cow biourine. The selection of audio-visual media has several advantages, namely the message it conveys is fast and easy to remember, provides a more realistic picture, develops the target's mind and the video can be repeated to add clarity.



Picture 1 : booklet



Picture 2 : video

5. Implementation of Extension Program

Extension activities are carried out as many as 3 meetings conducted at home or at the location of the target farmer's business with a predetermined implementation time agreed upon between the researcher and the target. The implementation must fulfill administrative files related to the LPM (Extension Preparation Sheet), synopsis, minutes and attendance list, as well as questionnaires that have been tested for validity and reliability as instrument measuring tools. After the implementation of extension program there is an evaluation related to these activities.



Picture 3 : Extension program activities



Picture 4 : Extension program activities

6. Evaluation of Extension Program Results

Evaluation of agricultural extension is a process in agricultural extension activities so that the program that has been carried out can be in accordance with the desired goals and expectations. The implementation of extension evaluation has several activity processes ranging from determining the type of evaluation, evaluation objectives, feasibility testing of evaluation instruments and data analysis of extension results. In this study, researchers used a summative evaluation type in measuring extension evaluation. Summative evaluation is one type of evaluation that is used after the activity or program has been completed. In essence, summative evaluation serves to directly measure the impact or impact of agricultural extension directly.

Evaluation of Knowledge Extension Program

Evaluation of the knowledge aspect of the extension target is carried out using scoring analysis with the Guttman Scale which is poured in the form of a multiple choice type questionnaire with correct or incorrect answer criteria. If the respondent's answer choice is correct, it gets a value of 1 and if the respondent's answer choice is wrong, it gets a value of 0, so that the total number of questions in the evaluation questionnaire if it can be answered correctly, each respondent will get a score of 12. The results of data collection are then distributed in the form of value criteria and presented in percentage with a range of values and value categorization, namely:

0-20% : Very Low

21-40% : Low

41-60% : Fair

61-80% : High

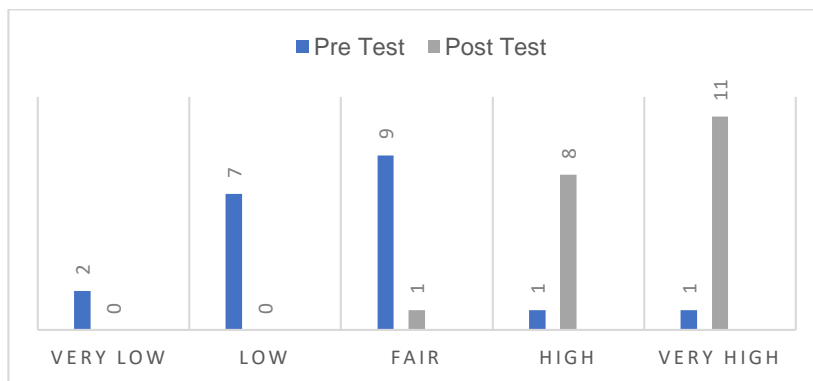
81-100% : Very High

The results of the measurement of knowledge aspect evaluation data obtained from the test results are distributed based on the following value criteria:

Table 2. Results of Respondent Score Categorization

Categorization	Criteria Score	Range	Pre Test (People)	Post Test (People)
Very Low	0-20%	(1-3)	2	-
Low	21-40%	(4-5)	7	-
Fair	41-60%	(6-7)	9	1
High	61-80%	(8-9)	1	8
Very High	81-100%	(10-12)	1	11
Total			20	20

Based on Table 2 regarding the results of measuring aspects of knowledge, attitudes and skills, it shows that there is an increase in the value of knowledge from before the implementation of extension program (pre test) to after the implementation of extension program (post test) which is shown from the number of respondents in each value category. As for visualizing the increase in knowledge value based on the number of respondents in each category, it is presented in a diagram.



It can be explained that at the time of the pre-extension program test, most of the respondents or targets of extension program had a level of knowledge, attitudes and skills in the moderate to low score category. A total of about 18 people consisting of 9 people scored in the moderate category and 7 people in the low score category and only 2 other people reached the high score category. This can be caused because the majority of the targets of the extension program do not have much knowledge about cow biourine and pineapple peel bioactivator which is the material of the extension program. Whereas during the test after the extension program, the scores obtained were better because the majority were in the high and very high categories.

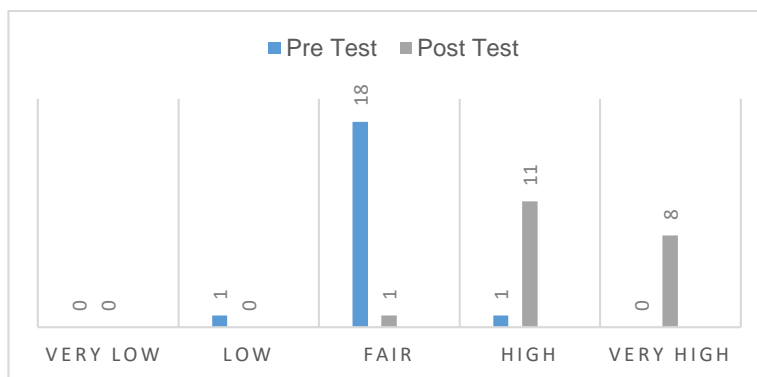
Knowledge is the most basic aspect of behavior that needs to be developed in every farmer because it has an important role in self-development through mindset. Behavioral

changes in the knowledge aspect can easily occur because the characteristics of the extension targets as recipients of information support extension activities. Based on the characteristics of the extension targets, it shows that all of the extension targets have taken formal education at least elementary school and are quite experienced in agriculture so that the absorption of the information provided is very quickly absorbed by the extension targets. This is supported by the opinion of Notoadmojo (2010), that the higher the level of education of a person, the easier it will be to accept, develop knowledge and technology.

The stimulus provided by researchers in the form of providing basic material about biourine fertilizer and how to make biourine fertilizer work is almost the same as how fertilizer is made in general. The provision of material is designed as creatively and adaptively as possible with the characteristics of farmers as evidenced by the use of booklets and videos as extension media so that farmers can easily understand the stimulus provided.

Evaluation of Attitude Extension program

The data analysis used to determine the level of attitude on the target is quantitative data analysis using a semantic differential scale questionnaire with a choice of 5 answers provided in the questionnaire. The statement uses a choice system of strongly agree, agree, moderately agree, disagree, disagree. As for visualizing the increase in attitude value based on the number of respondents in each category, it is presented in the form off a diagram as follows:



From the diagram, it can be explained that at the time of the pre-extension program most of the targets of extension program had an attitude level in the moderate to low score category. A total of about 18 people scored in the moderate category and 1 person in the low value category and only 1 other person reached the high value category. After

the extension program was implemented, the attitude of the extension targets was in the high category as many as 11 people and very high as many as 8 people. Overall, the percentage of pre-test values was 48% and the percentage of post-test values was 76%, which means that the value of attitude improvement after extension program is 28%.

Attitude is one of the most crucial aspects of behavior change because it determines a choice to adopt or not. At the stage of adoption of innovation, the attitude domain can be achieved if someone has gone through the decision stage. This is supported by the opinion of Azjen (2005), that attitude is a tendency to respond positively or negatively to an object, person or event.

The implementation of extension in the second stage was carried out by inviting the extension target to see firsthand how the process of applying biourine to experimental plants so as to increase the attractiveness of the extension target to the extension material delivered by the researcher. The researcher designed an extension model that was carried out using the plot demonstration method to prove directly to the extension target the benefits of the innovation delivered. With the application of the extension design, it proved successful in increasing the target's interest in the material presented with an overall score percentage after the implementation of the extension of 76% and is in the high value category. This is in line with the results of research conducted by Yuliana *et al* (2019), the perception of research targets on the use of liquid organic fertilizer (cow biourine) in chicory plants is classified as good.

Evaluation of Target Skills

Evaluation of skills is carried out to measure the level of skills, evaluation activities are carried out after the extension program event takes place. Researchers measured the skill level of respondents using a Rating Scale with a score of Skilled 3, Less Skilled 2 and Unskilled 1.

The most important aspect of behavior change is skill development because the skill aspect is closely related to a person's real action. Researchers designed the extension program to develop the skills of the extension targets as much as possible by applying the application of the application review method, which is one of the methods of testing jointly between extension targets and researchers to test a technology package or innovation before being applied to their farming business.

The application of this method can be said to be successful because it is able to invite all extension targets to practice making biourine directly, so that the extension targets can understand the manufacturing process to the correct application of the use of cow biourine. This is in line with the opinion of Khoir *et al.* (2020), in their research results stated that the skill indicator got the lowest score because farmers were not yet skilled in making or applying biourine so that follow-up must be done by conducting extension activities, demonstrations of methods and pilot plots.

Another factor of skill development of extension targets can occur due to the long farming experience of the extension targets. The majority of the extension targets have a fairly long farming experience in the range of 11-20 years so that farmers are accustomed to developing an innovation. The more experience gained by a farmer will make farmers skilled and trained in their business (Amron and Imran, 2009).

Furthermore, to calculate the presentation of improving aspects of knowledge, attitudes and skills of the extension target is carried out by scoring analysis. In the knowledge aspect, there was an increase of 32%, the attitude aspect of 28% and the skill aspect which only measured the level of 83%. This amount is obtained after calculating the overall average on the test before the extension and the test after the extension program.

Follow-up Plan

The follow-up plan is a form of recommendation that can be given to the target from the results of the implementation of extension program and evaluation of the extension design that has been carried out. Research activities on the use of cattle urine into cow biourine fertilizer with pineapple skin bioactivator need to be carried out sustainably when viewed from the enthusiastic targets and research achievements that have been obtained. Based on this, the follow-up plan of this study is:

1. Provide recommendations to the local agricultural extension office as a step of assistance for farmers in the use of organic waste that can be used as organic fertilizer.
2. Providing assistance to improve the quality of cow biourine fermentation by using other bioactivator ingredients available in the environment around farmers as a step to develop organic fertilizers and organic farming concepts in Sumbepitu Village.

CONCLUSION

Conclusion

1. The results of the determination of the extension design used in this study are:
Target: Lawu III farmer group Sumberpitu village, Tukur sub-district. Material: Making cow biourine with the addition of pineapple skin bioactivator and application to mustard plants. Method : Event, Study and Demonstration of plot
Media : Booklet, Video and Real Things. The results of the evaluation of the extension design showed a change in behavior in the form of increasing knowledge and attitudes and skills of farmers in the Lawu III farmer group of Sumberpitu village with the results of a percentage increase in aspects of pre-test knowledge by 50% and post-test by 82%.
2. Results of increasing knowledge by 32%. The measurement of attitude aspects by 48% increased to 76% after the implementation of extension program and for the measurement of skill aspects by 83%.

Suggestion

Based on the description of the conclusions above, the suggestions given are as follows:

1. There is further research related to the application of cow biourine with the addition of pineapple skin bioactivator to 78 other crops to determine the benefits and appropriate application doses in agricultural commodities cultivated by farmers.
2. There needs to be increased assistance from relevant agencies such as extension workers in the use of organic matter available in the farmer's business environment to be used as organic fertilizer that can be used in agricultural business activities.

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