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THE TRAINING IN TEMPERATURE AND HUMIDITY CONDITIONING EQUIPMENT UTILIZATION FOR THE OYSTER MUSHROOM CULTIVATION BUSINESS AT PONGANGAN GUNUNGPATI

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Abstract

Oyster mushroom farming is a business practice for six SMEs in the Pongangan Gunungpati region. The fact that the production tools still in use are basic presents one of the main challenges to oyster mushroom cultivation. The production scale for fresh oyster mushrooms is still quite limited, and it has not been able to satisfy market demand. Additionally, production standards and good crop management have not been adopted. Among MSME members, production management and marketing management are still conducted independently, so that the circulation of fresh mushroom production and marketing is not optimal. Changes in climate and seasons are difficult to foresee and have a propensity to occur, and the popular perception that mushroom cultivation is difficult and can only be done in the highlands contributes to the low level of interest in mushroom farming. The inability of mushroom farmers to condition the mushroom house in accordance with applicable regulations and the absence of technology capable of maintaining stable temperature and humidity in the mushroom house area. Currently, mushroom growers in the Pongangan subdistrict still utilize a rudimentary irrigation mechanism and manually water their crops each morning and evening. The objective of the performed service activities is to use appropriate technology to condition the air's temperature and humidity to match the natural circumstances of oyster mushrooms.

Keywords: Appropriate Technology, Oyster Mushrooms, Temperature and Humidity, Mushroom Cultivation.

INTRODUCTION

The production of oyster mushrooms (Pleurotus ostreatus) is a lucrative agricultural venture. Oyster mushroom is a fairly common and simple to cultivate mushroom species. (Rasta et al., 2018). Mushrooms are quite inexpensive in comparison to other mushroom varieties, therefore they serve as a dependable alternative food source. Even though the cost is fairly low, the nutritional value is comparable to that of other mushroom kinds. (Alfyandi, 2020). Enough antioxidants are present to contribute to anti-cancer and anti-aging effects. Keep the health of the brain is another function. The majority of the supply for the oyster mushroom industry in

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Central Java comes from highland areas. With a domination of 22.78% of all manufacturing materials, Semarang Regency is the largest provider. Temanggung, Brebes, Banyumas, and Karangnyar Regencies have considerable supplies of oyster mushrooms. The following graph illustrates the possibilities for mushroom cultivation in Central Java. (Disbun Jateng, 2017).

Figure 1. Graph of Mushroom Production in Central Java (Statistik Hortikultura 2016, Provinsi Jawa Tengah)

Increasing mushroom demand is a result of the expanding variety of mushroom uses in the food and industrial sectors. This led to the intensification of mushroom plant treatment. Thus, mushroom production increased in 2016 compared to 2015 and prior years. Even while mushroom production has increased, mushroom farming has declined among farmers. Only advanced and experienced farmers continue to cultivate mushrooms. In a sense, intensive planting increases yield and is unaffected by a decline in harvested area. The following is a description of mushroom cultivation in Central Java.(Disbun Jateng, 2017)

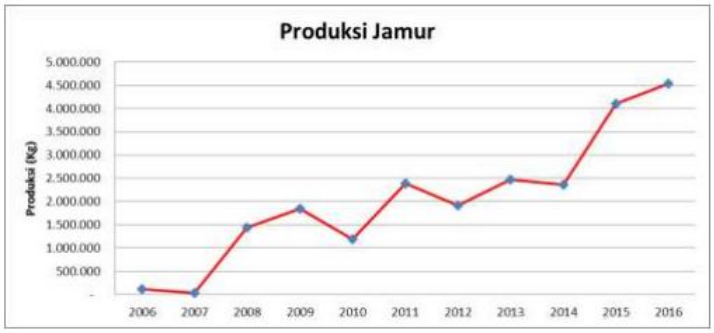

Figure 2. Central Java Mushroom Production Pattern (Statistik Hortikultura 2016, Provinsi Jawa Tengah)

Nutritional content Every 100 grams of oyster mushrooms has 19-35% protein with 9 types of amino acids; Fat 1.7 - 2.2% is composed of 72% unsaturated fatty acids, making it suitable for those with hypercholesterolemia and other lipid metabolic problems to consume.(Nasution, 2016) In addition to vitamins D and C, oyster mushrooms include carbohydrates, thiamine, riboflavin, and niacin, as well as the minerals K, P, Na, Ca, Mg, as well as Zn, Fe, Mn, Co, and Pb. Metal microelement concentrations are so low that they are safe for daily consumption.(Sumarmi, 2006)

Figure 3. Oyster Mushroom

In spite of the fact that the mushrooms have been cooked, riboflavin, nicotinic acid, pantothenic acid, and biotin (Vitamin B) are still well conserved, according to a study from Massachusetts University. The results of research from Beta Glucan Health Center stated that oyster mushrooms (Pleurotus ostreatus) contain Pleuran compounds (in Japan, oyster mushrooms are called Hiratake as medicinal mushrooms), contain proteins (19-30 percent), carbohydrates (50-60 percent), amino acids, vit B1 (thiamin), B2 (riboflavin), B3 (Niacin), B5 (panthothenic acid), B7 (biotin), Vit C and minerals Calcium, Iron, Mg, Phosphorus, K, P, S, Zn. (Achmad et al., 2009)

The Pongangan sub-district of the Gerai KOPIMI, an integrated movement of cooperative communities and microbusinesses, was created in 2020.. Based on the Mayor's Decree No. 518/1255 of December 16, 2019, this movement was established, and its management structure was subsequently lowered to the village level. The Pongangan sub-district has 22 MSMEs dispersed throughout 4 RW zones that are KOPIMI outlets. The 22 members were grouped into 4 MSME groups, including media production groups, cultivator groups, dry food processors, and wet food processors. The local populace recognizes the Pongangan village as a producer of fresh oyster mushrooms, oyster mushroom seeds, and mushroom baglogs.

The success of mushroom cultivation is determined by stable conditions of temperature and humidity. Water is typically sprayed with a hand sprayer in the morning and evening in standard oyster mushroom production to maintain temperature and humidity (Suharjo, 2015) in (Waluyo et al., 2019)

Farmers have made numerous attempts to preserve these circumstances, including the use of a timer for regular watering, but this has not been sufficient to resolve the issue. Utilizing a timer equipped with temperature and humidity sensors is another method farmers employ to address this issue. This device operates so that if the sensor detects high temperature and low humidity, the relay will activate the pompo sprayer to spray until the temperature and humidity are optimal. The use of this equipment causes excessive watering if the weather is hot, resulting in damp circumstances for the mushrooms and a reduction in their quality. Additionally, it can cause the baglog medium to rot quickly.(Sukur et al., 2019).[5]

The irrigation of oyster mushrooms is crucial, and farmers typically water their crops two to three times every day..(Nasution, 2016) After harvesting, morning irrigation occurs. Typically, oyster mushrooms are watered during the day when the temperature is not excessively high. It might be either 1:00 or 2:00. So that the room is not excessively warm while

we water the plants. Watering may or may not be performed in the afternoon. This is dependent upon weather conditions. During the wet season, it is not required to water oyster mushrooms in the afternoon. Because it will cause the cultivated oyster mushrooms to get highly damp, lowering their quality.

Figure 4. Harvesting Oyster Mushrooms

Utilizing proper technologies to control temperature and humidity in accordance with oyster mushroom's natural circumstances.

1. Educating MSMEs on how to use the Internet Network to communicate with fellow mushroom farmers around the archipelago who are members of the Indonesian Mushroom Farmers Forum (PJN).
2. Utilizing proper technologies to regulate the temperature and humidity in the region of the mushroom farm

Educating oyster mushroom farmers in the Pongangan village to apply management of mushroom farms in accordance with the applicable operational operational standards (SOP) from the agriculture service.

IMPLEMENTATION METHOD

A participatory action study methodology was used to carry out the implementation of this PKM. The creation of new knowledge in the context of addressing problems or enhancing problem solving in real-world situations are examples of follow-up research. (Sabaruddin, 2019)[6]. Activities for participatory action research are a systematic way of working, at least in that they are done in a specific order. Every iteration involves a different set of events and actions, such as problem identification, data collecting, feedback gathering, feedback analysis, and action. (Selener, 1997) [7].

In order to achieve the best outcomes, the sequence of participatory action research method activities is then coordinated with the overall PKM activity plan. In order for the various phases of implementing PKM activities to be organized as follows :

1. Commence planning for the deployment of PKM

2. KOPIMI Outlet Partners in Pongan Village, Gunungpati District, Semarang: Identification and Situation Analysis
3. KOPIMI Partner Outlets' findings about problem identification are documented.
4. Create a partner problem-solving strategy.
5. Partner discussions and agreement on the solution strategy
6. Getting ready to satisfy the needs and implement PKM
8. Procurement of Kumbung Temperature and Humidity Conditioning Technology, and procurement of baglog (planting media) production equipment
9. Documented Training Module (Oyster Mushroom Cultivation Training Module and Planting Media Creation Module)
10. Implementation of training
11. Installation of Temperature and Humidity Conditioning Technology
12. Operational Assistance of Temperature and Humidity Conditioning Technology, Baglog Press Tool Operations
13. Monitoring and Evaluation of PKM Activities
14. Documentation of results and Reporting
15. PKM finished

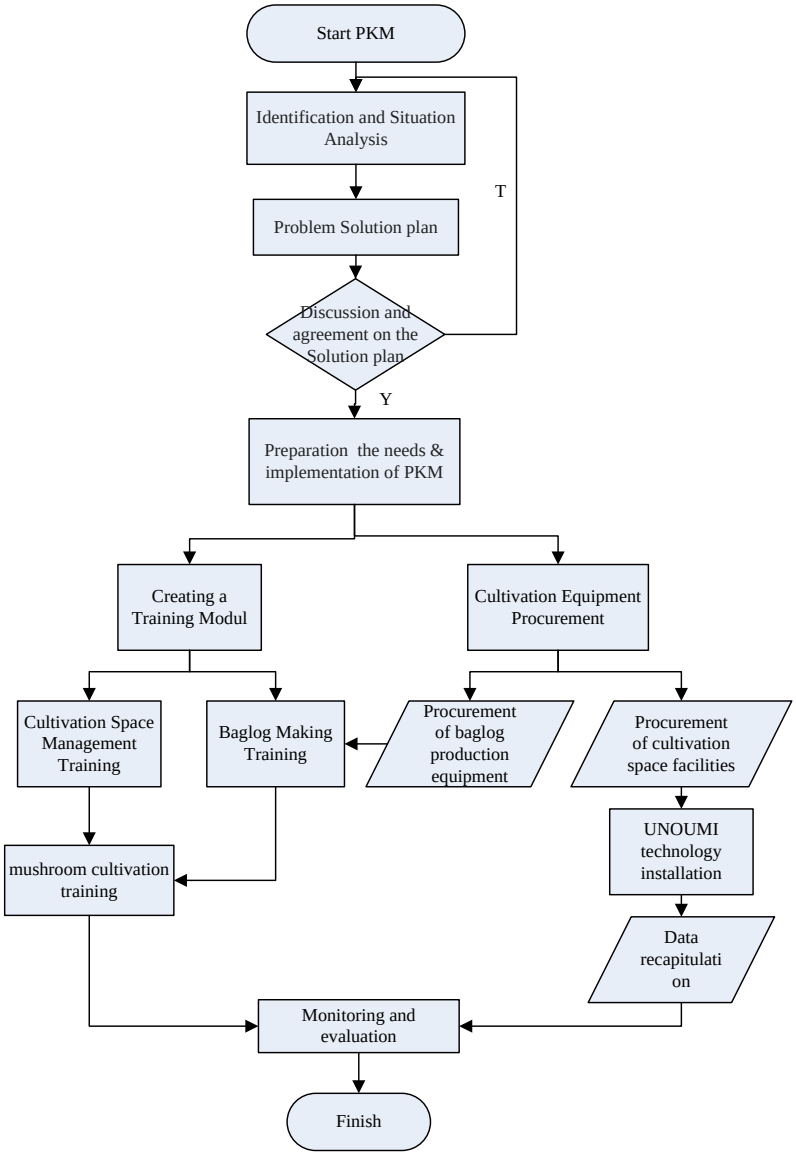

Figure 5. PKM Implementation Method

RESULTS AND DISCUSSION

The community service team's initial task was to conduct a FGD for the creation of the Proposal Plan and the PKM Needs Plan. In order to pass the 2022 PKM proposal, create the RAB based on the budget obtained, construct PKM activity plans, schedule visits to MSME Partners, and prepare job desks with the team, this activity aims to coordinate with them.

According to the findings of the team's visits to its mushroom farmer partners, who are members of the UMKM Gerai Kopimi, Gunungpati sub-district, there are many challenges facing the mushroom farmers in the area, including an unstable climate and weather conditions that prevent crop yields from being stable depending on the season and weather conditions in addition to mushroom therapy. Mushroom farmers in this location require a tool or machine that may be used to maintain the temperature and humidity in the mushroom house. In addition, partners require a media press (baglog) to expedite the process of creating mushroom media.

Figure 6. Photos of PKM activities

Create tools that are suited to partners' needs based on the findings of the team's needs research. The team created the baglog mushroom press tool, the micro controller algorithm, the tool installation design, the Arduino coding program, and the coding trial as part of the tool design process. The outcomes of this activity will later be applied by collaborators to assist in resolving issues that arise in order to boost agricultural productivity.

In order to satisfy the application of relevant technology that will be applied to partners, it is necessary to fulfill the demand for appropriate technology. This is done through PKM activities such as buying and procuring goods and tools. The team bought supplies and implements that are necessary to use the micro controller tools that they developed and created.

Figure 7. Temperature and Humidity Conditioning Equipment

This action aims to replace or upgrade older media while increasing capacity. The performance of the temperature and humidity conditioning device that will be used with this PKM program will be assessed through the purchase of new media. By comparing harvest data obtained before to utilizing the equipment, the quantity and quality of fresh mushrooms will serve as the foundation for evaluating the tool's effectiveness.

Figure 8. Delivery of Equipment

Tools for controlling temperature and humidity are being provided for the production of mushrooms and will then be used by partners. A set of RO pumps, water filters, and a microcontroller to regulate humidity and temperature in the cultivation area are among the instruments delivered. In addition to these tools, this activity will involve the installation and application testing of additional tools.

In this training session, participants will receive information on procedures for creating mushroom media (baglog), how to determine the composition of the materials to be used, the process of mixing ingredients, and the process of packing items into plastic media. After the media is put into the plastic, the participants will be taught about the process of sterilizing baglog media, how to inoculate (planting seeds) into the media.

CONCLUSION

PKM activities are conducted in the oyster mushroom house using temperature and humidity conditioning technologies. The assembly of the tool to the hull is the first step in the process. The usage of temperature and humidity conditioning tools is then taught to Partners through mentoring and training. The event went off without a hitch, thanks to the assistance of local mushroom farmers who are Kopimi Stall UMKM members in the Pontangan, Gunungpati region.

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