# Technology for using wood saw waste in the development of oyster mushrooms in Karangsari Village, Sapuran, Wonosobo, Central Java

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**Abstract.** Karangsari Village is one of the sawmill center villages, with 18 sawmills. From these factories, there is approximately 22 tons of sawdust waste every day. To this day, this waste has not been utilized and is simply thrown away, left to rot into organic fertilizer naturally. One use of sawmill waste is to develop oyster mushroom baglog. Oyster mushrooms are one of the agricultural commodities that are suitable for growth and development in Karangsari Village. The purpose of this community empowerment is to introduce and initiate oyster mushroom cultivation to the Karangsari Village community as well as mentoring the Mutiara Karangsari Village-Owned Enterprise. The methods that will be used are socialization, training, demonstrations, and mentoring. Implementation of activities in 2024 in Karangsari Village, Sapuran District, Wonosobo Regency, Central Java. The results of community empowerment show that increasing public knowledge by 95% about the potential for using saw waste to develop oyster mushroom cultivation. Increasing community capacity by 80% regarding oyster mushroom cultivation techniques. Increasing community skills by 60% in creating oyster mushroom cultivation demonstration plots. Increasing public understanding by 75% in managing and analyzing the benefits of oyster mushrooms cultivation. The level of satisfaction and evaluation of community service activities through the use of saw waste to develop oyster mushroom cultivation in Karangsari Village is in the very satisfactory category.

## 1 Introduction

One of the communities in Wonosobo Regency, Central Java's Sapuran District, is Karangsari Village. The total area of Karangsari Village is 4.19 km². Karangsari, Silemud,

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Sukosreno, Karangluas, and Garungan are the five hamlets that make up Karangsari Village. Karangsari Village has a population of 2320 people and 767 families. Of the number of Family Heads, 22.8% (175 families) are poor or pre-prosperous families. Karangsari Village has created various programs to alleviate poverty but the success rate is still relatively low. One of Karangsari Village's efforts to increase community income is to form a Village-Owned Enterprise (BUMDes).

The Karangsari Village Government created BUMDes Mutiara Karangsari, a village-owned enterprise, in response to this development. It is anticipated that this village-owned enterprise will be able to collaborate with different community potentials and support a variety of village-owned business units. As a result, it will be able to strengthen the local economy in Karangsari Village. which includes programs: development of the Opak MSME economy, Goat Farming and tour packages (river tubing, rest areas and ATV motorbike tracks). The current use of the rest area is only as a place to rest and meet and already has a food stall. However, the rest area does not yet have products that can be purchased and taken home by visitors. The tourism village institution itself has been registered with the Ministry of Law and Human Rights, No: AHU-04644.AH.01.33. 2023.

As a tourist village, one of the programs that must be implemented immediately is independent community waste management. This is based on the concept of a tourist village that is being developed, namely nature and environmental tourism, so environmental cleanliness is the main requirement for developing a tourist village. The institution of the Waste Charity Cadre is quite good, there is an organizational structure, regular meetings and programs that are running well. Until now, the economic development program initiated by BUMDes has not developed well. There needs to be an initiation of a new business that can increase family income, have an impact on improving community welfare and is in accordance with the existing natural potential.

Karangsari Village has been confirmed as a Tourism Village with natural potential. As a tourism village, the most important thing is environmental cleanliness. The existence of sawmill waste is a separate problem in the development of tourism villages. So the village government hopes that the existence of sawmill businesses can support tourism village businesses by utilizing natural potential. The existence of sawmill waste is expected to be utilized so that it does not become waste that will interfere with the development of tourism village businesses. As one of the sawmill centers, currently in Karangsari Village there are 18 sawmills. From these factories, every day there is approximately 22 tons of sawdust waste. So far, this waste has not been utilized and has just been thrown away, without knowing the great potential of sawdust waste for oyster mushroom cultivation [1-3].

The oyster mushroom, or Pleurotus ostreatus, is a commonly consumed edible mushroom that is grown all over the world for its distinct flavor, scent, and taste [4]. Among the agricultural products that can grow and develop well in Asia are mushrooms because of their high yield capacity, low production technology, ease of access to substrates, and tolerance to temperature [5]. Oyster mushrooms are a type of wood mushroom that is easiest to cultivate because they have a high ability to adapt to the environment [6]. The average daily temperature is 27° -29° C and humidity ranges from 70 - 80%, so it is very suitable for the growth of oyster mushrooms. Cultivating oyster mushrooms only requires a relatively short maintenance period so that farmers can still work on agricultural land, make opak products or raise goats.

Oyster mushrooms have a fairly high nutritional content, namely carbohydrates, protein, fat, crude fiber, Ca, Fe, thiamine, riboflavin [7]. Although mushrooms are a healthy food source that can be extremely helpful in giving people all over the world access to reasonably priced sources of proteins, vitamins, and minerals, growing them calls for a great deal of specialized knowledge and training in order to properly adjust a number of environmental factors [8]. Low-K mushrooms can be successfully grown using agro-wastes [9].

Mushroom consumption has skyrocketed in recent years worldwide [10]. In addition, local and export market demand is still wide open with a long shelf life needed for export to distant areas [11]. However, current oyster mushroom production is still unable to meet market demand. This is because not many people know how to cultivate oyster mushrooms. Therefore, assistance is needed for the community in Karangsari Village in an effort to improve community skills in oyster mushroom cultivation techniques. Based on this background, the purpose of this community empowerment is to introduce and initiate oyster mushroom cultivation to the Karangsari Village community and provide assistance to the Mutiara Karangsari Village-Owned Enterprise.

## 2 Methodology

According to Sany (2019), it is revealed that the empowerment method in one place in one community is different from another place, in another community, depending on the conditions of the place. The implementation method in this empowerment activity is adjusted to the expected change target. Implementation of service activities is carried out using the Participatory Rural Appraisal (PRA) method through several stages of activities, namely socialization, training, demonstration, and mentoring activities. Implementation of activities in 2024 in Karangsari Village, Sapuran District, Wonosobo Regency, Central Java.

Socialization → Training → Demonstration → Mentoring → Evaluation

**Fig. 1.** Methods of implementing community empowerment programs

## 3 Results and Discussion

The community empowerment program in Karangsari Village, Sapuran, Wonosobo, has a target group, especially the management and members of BUMDes Mutiara Karangsari. Some of the community service activities provided to the community are in the form of socialization of the potential sawdust waste, training of oyster mushroom cultivation, making a demonstration plot for oyster mushroom cultivation, assistance in managing oyster mushroom cultivation, and evaluation of community empowerment activities.

### 3.1 Socialization of the potential sawdust waste

Socialization is the initial activity in the community service program in Karangsari Village. The community empowerment program implementation team provided socialization or explanations to the Karangsari Village community, especially the Mutiara Karangsari BUMDes administrators in the classroom with the material to be presented including:
1. Potential of sawdust waste for the development of oyster mushroom baglog
2. Economic potential and nutritional content of oyster mushrooms
3. Feasibility of oyster mushroom cultivation business
4. Discussion and Q&A Based on the socialization activities that have been carried out, there has been an increase in public knowledge of the potential of sawdust waste for the development of oyster mushroom cultivation, which is 95%. This is in accordance with the opinion of Nurgesang & Dzikrullah, that socialization or extension activities can increase the knowledge and insight of oyster mushroom farmers. Universities act as resource persons who deliver socialization materials to the beneficiary community. In addition, the socialization activity also provides information to increase community motivation, especially BUMDes administrators in advancing the economy of Karangsari

Village. At the end of the socialization activity, all participants were given the willingness to sign a letter of commitment in implementing the oyster mushroom cultivation development program from start to finish.

### 3.2 Training of oyster mushroom cultivation

Oyster mushroom cultivation training activities were carried out by visiting the oyster mushroom industry at Pesona Jamur Klangon. Pesona Jamur Klangon is a mushroom industry located in Bantul Regency, DIY with various types of mushrooms, especially oyster mushrooms. The training activity was carried out with a resource person, Mr. Rokijan, as the owner of the Pesona Jamur Klangon business. The training activity aims to improve the community's ability to cultivate oyster mushrooms by 80%. The training activities attended by the Mutiara Karangsari BUMDes management are:

1. Training in making baglogs manually and mechanically.
2. Training in oyster mushroom cultivation including maintenance, harvesting, and post-harvest.
3. Tour of the mushroom house and Q&A discussion.

**Fig. 2.** Oyster mushroom cultivation training activity by the management of BUMDes Mutiara Karangsari at Pesona Jamur Klangon, Bantul, DIY

### 3.3 Making a demonstration plot for oyster mushroom cultivation

The oyster mushroom cultivation demonstration plot is a pilot project implemented by BUMDes Mutiara Karangsari. The establishment of this oyster mushroom cultivation demonstration plot was carried out after the community underwent training and industrial visits at Pesona Jamur Klangon, Bantul, DIY. A temperature range of 20 to 35 degrees Celsius is thought to be ideal for good growing [12]. Humidity and temperature are other important considerations. The process of building the demonstration plot began with the construction of a mushroom house or oyster mushroom house measuring 4x8 meters. The next stage is the construction of bamboo racks for oyster mushroom bags ready to be cultivated as many as 1,000 bags. In order to boost mushroom productivity and cost efficiency, the cylindrical baglog growing method is more beneficial than the wooden tray cultivation method [13]. Small- to medium-sized production units are used to grow the majority of cultivated mushrooms [14].

In the first month, the oyster mushroom bags can grow well, so that in the second and third months the oyster mushrooms can be harvested. The oyster mushroom harvest is sold to the surrounding community and several processed foods are made from mushrooms such as mushroom chips. The increase in community skills by 60% in making oyster mushroom cultivation demonstration plots.

**Fig. 3.** Oyster mushroom cultivation owned by BUMDes Mutiara Karangsari

## 3.4 Assistance in managing oyster mushroom cultivation

Community assistance is carried out during the implementation of the community service program. Community assistance aims to improve good management of oyster mushroom cultivation, especially improving human resources. Increase community understanding by 75% in managing and analyzing the benefits of oyster mushroom cultivation. In the assistance activities, the community empowerment implementation team collaborated with Mr. Rokijan as the owner of the Pesona Jamur Klangon business to supervise and provide input on oyster mushroom cultivation carried out by BUMDes Mutiara Karangsari. In mentoring activities, we routinely provide input on developments and problems that occur during the community empowerment program. Some of the assistance provided includes:

1. Selection of mushroom house or oyster mushroom location
2. Design and layout of mushroom house or oyster mushroom house
3. Assistance in watering mushroom bags
4. Assistance in pest and disease risks in oyster mushroom cultivation
5. Assistance in harvesting and post-harvesting
6. Assistance in maintaining mushroom house or oyster mushroom house
7. Assistance in recording oyster mushroom production and sales

Evaluation of community empowerment activities
Program evaluation is conducted on communities that have participated in the entire series of activities, starting from socialization, training to technical assistance. Indicators and benchmarks for success are by knowing the increase in knowledge, skills, and motivation of the community. The criteria for success are by comparing the level of knowledge and skills before and after the activity takes place. Program evaluation is conducted by analyzing the assessment of the beneficiary community towards the empowerment program through several indicators as follows.

**Table 1.** Evaluation score for the implementation of community service.

| Indicator | Score | Category |
|---|---|---|
| Socialization | 4.43 | Very satisfied |
| Training | 4.56 | Very satisfied |

| | | |
|---|---|---|
| Demonstration & implementation | 4.53 | Very satisfied |
| Mentoring activities | 4.46 | Very satisfied |
| **Total score** | **4.48** | **Very satisfied** |

*Information:
1,00 – 1,80 = Very Dissatisfied
1,81 – 2,60 = Not satisfied
2,61 – 3,40 = Neutral
3,41 – 4,20 = Satisfied
4,21 – 5,00 = Very Satisfied

Based on Table 1, it is known that the evaluation score for the implementation of the community empowerment program is 4.48 with a very satisfied category. Assessment of community satisfaction with the empowerment program is also needed. This aims to determine the extent to which the implementation process of the community empowerment program is felt. Based on Table 2, it is known that the community satisfaction score for the empowerment program that has been carried out is 4.46 with a very satisfied category.

**Table 2.** Community satisfaction score with program implementation.

| Indicator | Score | Category |
|---|---|---|
| Program suitability | 4.54 | Very satisfied |
| Program implementation | 4.50 | Very satisfied |
| Solution to problem | 4.38 | Very satisfied |
| Accuracy of appropriate technology | 4.42 | Very satisfied |
| Process & accuracy of empowerment methods | 4.48 | Very satisfied |
| Success confidence | 4.58 | Very satisfied |
| Value-added | 4.33 | Very satisfied |
| **Total score** | **4.46** | **Very satisfied** |

*Information:
1,00 – 1,80 = Very Dissatisfied
1,81 – 2,60 = Not satisfied
2,61 – 3,40 = Neutral
3,41 – 4,20 = Satisfied
4,21 – 5,00 = Very Satisfied

## 4 Conclusions

Based on the results of the discussion that have been presented previously, it can be concluded that:

1. Increasing public knowledge by 95% about the potential for using saw waste to develop oyster mushroom cultivation.

2. Increasing community capacity by 80% regarding oyster mushroom cultivation techniques
3. Increasing community skills by 60% in creating oyster mushroom cultivation demonstration plots
4. Increasing public understanding by 75% in managing and analyzing the benefits of oyster mushrooms cultivation
5. The level of satisfaction and evaluation of community service activities through the use of saw waste to develop oyster mushroom cultivation in Karangsari Village is in the very satisfactory category.

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## References

1. M. Yamauchi, M. Sakamoto, M. Yamada, H. Hara, S.M. Taib, S. Rezania, F.H.M. Hanafi, JKSUS, **31**, 490-494 (2019)
2. F.A. Zakil, R.M. Isa, M.S.M. Sueb, R. Isha, MT, **57**, 1329-1337 (2022)
3. M. Hultberg, H. Asp, K.J. Bergstrand, O. Golovko, WM, **155**, 1-7 (2023)
4. P.V. Devi, J. Islam, P. Narzary, D. Sharma, F. Sultana, JFF, **4**, 335-342 (2024)
5. R.S. Jarial, K. Jarial, J.N. Bhatia, H, **10** (2024)
6. E. Dorr, M. Koegler, B. Gabrielle, C. Aubry, JoCP, **288** (2021)
7. R. Rosmiah, I.S. Aminah, H. Hawalid, D. Dasir, IJoCE, **1**, 31-35 (2020)
8. A. Souag, A. Elewi, A. Hajhamed, R. Khankan, S. Duman, A. Ahmed, SAT, **8** (2024)
9. K. Nakakubo, K. Kariyazono, T. Watari, F. Yagi, K. Kuroda, M. Yamada, M. Yamauchi, ETI, **32** (2023)
10. D.P. Guragain, B. Shrestha, I. Bajracharya, JAFR, **15** (2024)
11. J.S. Ryu, M.K. Kim, C.H. Im, P.G. Shin, SH, **193**, 121-126 (2015)
12. A.A. Boukary, A.B. Olou, M. Piepenbring, N.S. Yorou, JAFR, **18** (2024)
13. W.A.W. Mahari, W. Peng, W.L. Nam, H. Yang, X.Y. Lee, Y.K. Lee, S.S. Lam, JHM, **400** (2020)
14. G.H. Ban, B.K. Kim, S.R. Kim, M.S. Rhee, S.A. Kim, IJFM, **382**, (2022)