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SOCIALIZATION OF RECYCLING OYSTER MUSHROOM BAGLOG WASTE INTO COMPOST FERTILIZER

(Sosialisasi Daur Ulang Limbah Kantung Jamur Tiram Menjadi Pupuk Kompos)

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Abstrak

Limbah baglog jamur tiram menjadi permasalahan lingkungan di banyak komunitas peri-urban, terutama ketika residu pascapanen dibuang tanpa pengelolaan yang memadai. Program pengabdian kepada masyarakat ini berfokus pada sosialisasi daur ulang limbah baglog jamur tiram menjadi pupuk kompos sebagai solusi partisipatif terhadap permasalahan sampah organik. Tujuan kegiatan ini adalah meningkatkan kesadaran lingkungan, keterampilan teknis, serta tanggung jawab kolektif masyarakat dalam mengelola limbah baglog melalui praktik pengomposan. Kegiatan pengabdian dilaksanakan di Kelurahan Harjasari, Bogor Selatan, dengan menggunakan pendekatan partisipatif–demonstratif yang menekankan perencanaan bersama, sosialisasi interaktif, dan praktik langsung pembuatan kompos. Subjek pengabdian melibatkan kader PKK, pelaku usaha mikro jamur tiram, perwakilan RT/RW, serta anggota bank sampah. Pengumpulan data dilakukan melalui observasi, dokumentasi kegiatan, dan evaluasi pascakegiatan menggunakan kuesioner skala Likert. Hasil kegiatan menunjukkan peningkatan yang signifikan pada capaian pembelajaran dan sikap lingkungan peserta. Kesadaran lingkungan meningkat dari 70% menjadi 90%, pemahaman materi pengomposan dari 50% menjadi 87%, dan keterampilan teknis dari 50% menjadi 84%, dengan indeks kepuasan peserta mencapai 88%. Selain itu, kegiatan ini mendorong perubahan perilaku, munculnya pemimpin lokal, serta inisiasi praktik pengomposan berbasis komunitas.

Abstract

The accumulation of oyster mushroom baglog waste poses an environmental challenge in many peri-urban communities, where post-harvest residues are often discarded without proper management. This community service program focused on the socialization of recycling oyster mushroom baglog waste into compost fertilizer as a practical and participatory solution to organic waste problems. The objective of the program was to enhance community awareness, technical skills, and collective responsibility in managing baglog waste through composting practices. The program was implemented in Kelurahan Harjasari, Bogor Selatan, using a participatory–demonstrative approach that emphasized joint planning, interactive socialization, and hands-on composting activities. Community members, including PKK cadres, oyster mushroom micro-enterprise actors,

neighborhood representatives, and waste bank members, were actively involved in all stages of the program. Data were collected through observation, documentation, and post-activity evaluation using a Likert-scale questionnaire. The results show significant improvements in participants' learning outcomes and environmental attitudes. Environmental awareness increased from 70% to 90%, understanding of composting materials from 50% to 87%, and technical skills from 50% to 84%, with an overall satisfaction index of 88%. The program also facilitated behavioral change, the emergence of local leadership, and the initiation of a community-based composting practice. These findings indicate that socialization-based composting programs can serve as an effective entry point for sustainable, community-driven organic waste management.

Key Words: Community Service, Socialization, Mushroom Baglog Waste, Compost Fertilizer, Community Empowerment

1. INTRODUCTION

The increasing scale of oyster mushroom (*Pleurotus ostreatus*) cultivation in Indonesia has generated a growing volume of spent mushroom substrate (SMS), commonly known as baglog waste. Although oyster mushroom farming is widely recognized as a low-cost and accessible agribusiness, the post-harvest phase produces large quantities of residual substrate that are often discarded without further treatment. In many peri-urban and rural communities, unmanaged baglog waste accumulates around production sites and residential areas, leading to odor problems, aesthetic degradation, and potential soil and water contamination. This situation illustrates how agricultural by-products, when not systematically managed, can shift from productive inputs into localized environmental burdens.

This challenge does not occur in isolation; rather, it reflects a broader national pattern in which organic waste dominates the waste stream while recovery practices remain limited. Specifically, organic waste constitutes a major proportion of municipal solid waste in Indonesia, yet management practices still rely heavily on disposal-oriented approaches instead of resource recovery. In fact, a comprehensive review of current and proposed food waste treatment technologies in Indonesia highlights that biological treatments such as composting and anaerobic digestion remain underutilized due to constraints in technical capacity, environmental literacy, and community engagement (Farahdiba et al. 2023). Therefore, the issue is not merely technological; it is also shaped by social and institutional readiness to adopt waste-to-resource practices.

From an agronomic and environmental standpoint, however, baglog waste should not be treated as worthless residue because its composition makes it suitable for organic recycling. Research on spent mushroom substrates indicates that their chemical properties can vary across cultivation cycles and composting stages, and such variability may influence nutrient release and mineral nitrogen transformation when applied to soils (Lou et al. 2017). Even so, the available evidence consistently supports its agricultural value: composted oyster mushroom baglog waste has been reported to enhance rice growth and productivity in acid sulfate soils, which are typically challenging environments for cultivation (Jumar et al. 2023). Accordingly, composting baglog waste represents a scientifically defensible strategy to turn an environmental problem into a productive soil input.

In line with this potential, some studies have focused on transforming baglog waste into commercially viable organic products. For example, research on commercial organic fertilizer production demonstrates that oyster mushroom baglog waste can be processed into standardized, marketable organic inputs, with emphasis on nutrient quality and feasibility for broader distribution (Hunaepi et al. 2018). Moreover, a wider review of spent mushroom substrate utilization maps diverse value-added pathways, including compost, soil conditioners, and other bio-based products, suggesting that SMS can serve as a strategic biomass resource within sustainable agricultural systems (Martín et al. 2023).

Nevertheless, despite the strength of these technical findings, the question of how communities can practically adopt these solutions remains less developed in the literature. Furthermore, the utilization of baglog waste has recently expanded beyond compost into renewable material and energy-oriented applications. A notable example is bio-pellet research showing that oyster mushroom baglog waste can be engineered into solid bio-materials, and that molasses-based adhesives can enhance pellet potential and functional performance (Augustina et al. 2025). While such innovations strengthen the case for baglog as a versatile resource, they also tend to be developed under controlled or semi-industrial conditions. As a result, their direct applicability to community settings where resources, tools, and technical expertise are limited may be constrained, thereby reinforcing the need for simpler, community-adaptable approaches such as composting.

At the same time, another strand of research frames baglog waste utilization in relation to entrepreneurship and the circular economy. On one hand, studies emphasize the importance of strengthening the independence of oyster mushroom entrepreneurs, particularly in managing production inputs such as seedlings, as a pathway to enhance small-scale business resilience (Hasanah, 2023). On the other hand, research highlights the business potential of utilizing oyster mushroom baglog waste via vermiculture in small-scale mushroom enterprises, framing waste conversion as an economic opportunity within a circular-economy model (Satwhikawara 2025). However, although these studies clarify how waste conversion can support business sustainability, they do not sufficiently explain how community members develop the knowledge, attitudes, and collective routines needed to manage waste at the neighborhood level.

Because adoption is fundamentally social, the role of socialization and community-based capacity building becomes crucial. Evidence from community service programs focusing on organic waste processing, such as socialization initiatives for converting organic waste into biogas, shows that structured, participatory engagement can increase awareness, participation, and acceptance of waste-to-resource practices when the local context is properly considered (Marhento et al. 2025). Importantly, compared to biogas systems that often require higher infrastructure and technical maintenance, composting baglog waste generally requires lower investment and simpler tools. Therefore, it is arguably more feasible as a first-step intervention in densely populated residential environments.

Despite these developments, a critical gap remains. The existing literature is relatively strong in demonstrating technical feasibility, agronomic performance, product innovation, and business potential. Yet, it is comparatively weak in explaining community-level pathways of adoption, especially how local residents interpret baglog waste problems, acquire composting skills through socialization, and sustain waste-recycling routines after a program ends. In other words, the missing link lies in the social mechanism that translates proven technical solutions into stable everyday practices in communities.

For this reason, the present community service program was designed to prioritize socialization as the core strategy for recycling oyster mushroom baglog waste into compost. By integrating environmental awareness sessions, participatory training, and practical demonstrations, the program aims not only to transfer technical skills but also to foster environmental responsibility and collective engagement. In doing so, the program complements technical and entrepreneurial studies by focusing on the social dimension of waste recovery, positioning baglog composting as both an environmental solution and a pathway for community empowerment.

2. IMPLEMENTATION And METHODS

This community service program, titled “Socialization of Recycling Oyster Mushroom Baglog Waste into Compost Fertilizer,” was conducted in Kelurahan Harjasari, Kecamatan Bogor Selatan, West Java, Indonesia, with the partner community primarily consisting of PKK cadres in the assisted area at Jl. Rulita, Harjasari, Bogor Selatan. The program used a participatory–demonstrative strategy, meaning that community members were positioned

as active partners throughout the process, starting from problem identification and joint planning, continuing through implementation, and ending with evaluation rather than being treated as passive recipients of information. Planning activities began with coordination meetings involving local stakeholders and community representatives to agree on the intervention priority, namely recycling oyster mushroom baglog waste into compost fertilizer, while also organizing the socialization mechanism, confirming the training schedule, and distributing responsibilities related to venue readiness, raw material preparation, and participant mobilization.

During implementation, the socialization component was delivered through interactive sessions combining short presentations, guided discussion, and direct practice. Participants—including PKK cadres, oyster mushroom MSME actors, neighborhood leaders (RT/RW), and waste bank members were involved in hands-on composting activities to strengthen practical competence and community ownership. The technical process emphasized composting oyster mushroom baglog waste using EM4 bioactivator as an appropriate technology application. In practice, participants collaboratively prepared and mixed materials, monitored composting indicators, and observed fermentation progress using simple tools such as a compost thermometer and litmus paper for pH observation. The composting method was designed for community feasibility, with compost maturation expected within approximately 21–28 days, supporting replication at household or neighborhood scale. Community organizing was also integrated into the sustainability strategy by encouraging peer learning and dissemination, where participants were invited to share the composting technique with other residents through local group activities supported by community structures.

To evaluate outcomes from the community perspective, the program applied a post-activity assessment using a closed-ended Likert-scale questionnaire that measured four domains: participants' understanding of the socialization materials, practical composting skills, attitudes and environmental awareness, and satisfaction toward the program. The instrument used a five-point scale from "strongly disagree" (1) to "strongly agree" (5), and all distributed questionnaires were collected to ensure complete data for descriptive analysis. The overall process from situation analysis to reflection and sustainability planning is summarized in Figure 1.

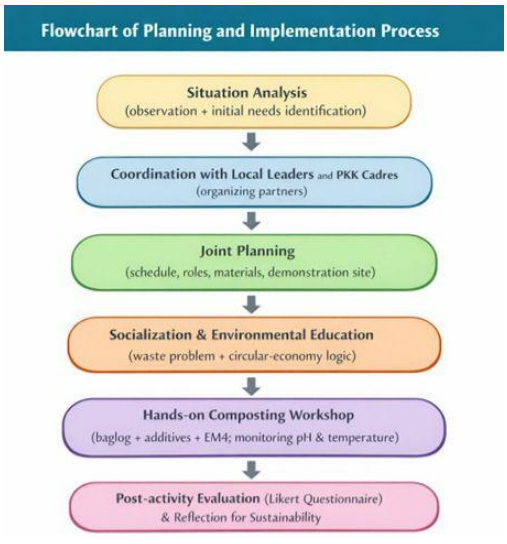

Figure 1. Flowchart of Planning and Implementation Process

3. RESULTS AND DISCUSSION

The community service program entitled "Socialization of Recycling Oyster Mushroom Baglog Waste into Compost Fertilizer" generated both technical and social outcomes within the assisted community in Kelurahan Harjasari, Bogor Selatan. The results demonstrate a progressive transformation process that began with awareness-building, continued through hands-on technical action, and culminated in early-stage social change at both individual and collective levels.

Dynamics of the Community Assistance Process

At the initial stage of the program, most participants demonstrated limited awareness of the environmental implications of unmanaged oyster mushroom baglog waste. Based on observations and preliminary discussions, baglog residues were commonly perceived as unavoidable production waste and were typically discarded in open areas, gardens, or drainage channels. During the socialization sessions, participants actively shared these everyday practices, indicating that the problem was widely experienced but had not previously been framed as a collective environmental issue.

As the program progressed, the dynamics of participation changed noticeably. Socialization activities supported by visual presentations and facilitator-led explanations enabled participants to recognize baglog waste as a shared problem with potential solutions. Figures 1 illustrate these stages of engagement, showing participants' focused attention during material delivery and their active involvement during discussion sessions. The dialogical interaction observed during these activities reflects a shift from passive attendance toward collective reflection and problem recognition.

Figure 2. Socialization Session on Recycling Oyster Mushroom Baglog Waste into Compost Fertilizer (Kelurahan Harjasari, Bogor Selatan).

Technical Actions and Hands-on Composting Practices

The hands-on composting workshop represented a critical turning point in the assistance process. Participants directly practiced recycling oyster mushroom baglog waste into compost using EM4 bioactivator and simple monitoring tools. Through collaborative material preparation, mixing, and fermentation observation, participants gained practical experience in managing moisture, odor, and compost maturity indicators. This technical action directly addressed the initial problem of baglog waste accumulation by offering a feasible solution applicable at the household and neighborhood scale.

The experiential learning approach reduced participants' perception that composting was complicated or resource-intensive. During the practice sessions, participants asked specific technical questions related to composting duration, material ratios, and compost quality, indicating increased confidence and ownership of the process.

Improvement in Knowledge, Skills, and Environmental Awareness

Quantitative evaluation using a post-activity Likert-scale questionnaire further confirms the effectiveness of the socialization and training activities. Table 1 presents the evaluation results across four dimensions: understanding of materials, technical composting skills, environmental awareness, and participant satisfaction.

Table 1. Post-Activity Evaluation Results

Evaluation Aspect	Likert Index (%)	Category
Understanding of composting materials	87%	Very Good
Technical composting skills	84%	Very Good
Environmental awareness and attitude	90%	Very Good
Participant satisfaction	88%	Very Good
Overall Average	**87.25%**	**Very Good**

The highest score was recorded for environmental awareness (90%), indicating that the socialization process was particularly effective in reshaping participants' perspectives on waste management. Although technical skills scored slightly lower (84%), they still fell within the "very good" category, suggesting that continued practice may further strengthen mastery. To visualize these outcomes, Figure 2 illustrates the distribution of Likert index scores across evaluation aspects.

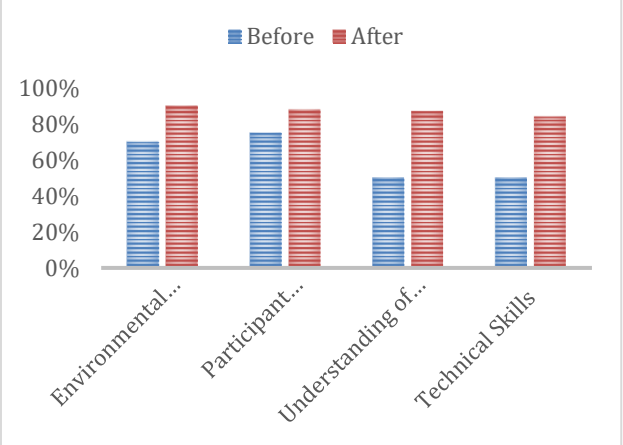

Figure 3. Likert Index Scores of Community Learning Before and After the Training

The figure compares participants' perceived learning outcomes before and after the socialization and hands-on composting training. The results show consistent improvement across all assessed dimensions. Environmental awareness increased from 70% (before) to 90% (after), while participant satisfaction rose from 75% to 88%. The most substantial gains were observed in cognitive and skill-related dimensions: understanding of materials increased from 50% to 87%, and technical skills improved from 50% to 84%. Overall, these patterns indicate that the program effectively strengthened both awareness and competence, with the largest impact occurring in participants' knowledge and practical ability, supporting the role of socialization combined with demonstration-based practice as a catalyst for behavioral change.

Beyond cognitive gains, the program resulted in observable behavioral change. Participants expressed a clear commitment to no longer discard baglog waste indiscriminately and to process it through composting instead. Several participants also reported intentions to apply composting practices to other types of household organic waste, indicating a broader environmental awareness beyond the immediate program focus. At the collective level, participants agreed to initiate an informal community-based composting group as a follow-up mechanism to sustain composting activities. Although still in its early stages, this group functions as a new local practice (pranata sosial) related to organic waste management, coordinating composting activities and peer learning among residents.

Indicators of Social Change

Overall, the results indicate early-stage social transformation, as summarized in Table 2.

Tabel 2. Indicators of Social Change

Dimension	Before Program	After Program
Perception of baglog waste	Considered useless waste	Recognized as recyclable resource
Waste management behavior	Disposed in open areas	Processed into compost
Community organization	No composting initiative	Informal composting group formed
Leadership	No identified coordinator	PKK cadres and RT/RW emerged as local leaders

These changes demonstrate that the program successfully facilitated a shift from individual disposal practices to collective environmental responsibility. While the transformation is still at an initial stage, the emergence of new behaviors, practices, and leadership structures suggests a positive trajectory toward sustainable, community-based waste management.

The findings of this community service program demonstrate that a socialization-based approach combined with hands-on practice can effectively initiate behavioral and social change in community-based organic waste management. The program progressed through clear stages, beginning with problem recognition, followed by collective learning and technical action, and culminating in early indicators of social transformation. This trajectory aligns with established models of community empowerment and pro-environmental behavior change, where awareness, perceived capability, and social norms interact to shape sustainable practices.

At the initial stage, the low baseline scores in understanding of materials and technical skills (both 50%) indicate that oyster mushroom baglog waste was previously perceived as an unavoidable residue rather than a resource. This condition is consistent with findings in broader waste-management literature, which emphasize that communities often lack conceptual framing to recognize organic waste as part of a circular economy (Farahdiba et al. 2023; Wilson et al. 2012). The sharp increase in post-training scores, understanding of materials rising to 87% and technical skills to 84% suggests that structured socialization successfully bridged this cognitive and practical gap.

From a behavioral perspective, these results are well explained by the Theory of Planned Behavior, which posits that behavioral change is driven by attitudes, subjective norms, and perceived behavioral control (Ajzen 1991). In this program, socialization activities strengthened positive attitudes toward composting, group-based learning

reinforced subjective norms, and hands-on practice increased perceived behavioral control. Similar patterns have been reported in studies of household composting and waste separation, where perceived competence is a decisive predictor of sustained participation (Bhutto et al. 2023; Kaiser, Hübner, and Bogner 2005).

The dominant improvement in environmental awareness from 70% before the program to 90% after indicates that the socialization phase functioned as a critical foundation for change. Awareness and attitudinal shifts often precede consistent technical application, particularly in community-based interventions (Barr, Gilg, and Ford 2005). This finding reinforces the argument that socialization should not be treated as a preliminary formality, but rather as a central mechanism for enabling long-term behavioral change. Without this stage, technical training alone is unlikely to be sustained. Technically, the use of appropriate technology, specifically EM4 bioactivator and simple monitoring tools, played an important role in reducing barriers to adoption. The report indicates that compost maturation could be achieved within approximately 21–28 days, which aligns with findings that accelerated biological processes increase user satisfaction and continuation rates in small-scale composting (Bernal, Alburquerque, and Moral 2009; de Bertoldi and Insam 2007). By making compost quality indicators visible (temperature, odor, pH), the program reduced uncertainty, a factor frequently cited as a reason for abandonment of composting practices (Zurbrügg et al. 2012).

In relation to spent mushroom substrate (SMS) utilization, the program's results complement existing technical and agronomic research. Studies have demonstrated that composted oyster mushroom baglog waste improves soil quality and crop productivity, supporting its functional value beyond waste reduction (Jumar et al., 2023; Lou et al., 2017). Other research highlights the potential of baglog waste for commercial organic fertilizer, bio-pellets, and circular-economy business models (Hunaepi et al., 2018; Augustina et al., 2025; Satwhikawara, 2025). However, these studies largely emphasize technical feasibility or economic potential, whereas the present program contributes by demonstrating how socialization enables community-level adoption of such innovations. Importantly, the results also indicate early-stage social transformation, not merely individual learning. The emergence of an informal community composting group and the spontaneous assumption of coordinating roles by PKK cadres and RT/RW representatives reflect the formation of new local social structures (pranata sosial). International studies on community composting consistently report that the presence of local leadership and collective organization is critical for sustaining initiatives beyond the project period (Marshall and Farahbakhsh 2013; Zurbrügg et al. 2012). The visual documentation included in the Results section further supports this interpretation, showing shared facilitation and active participation that reinforce collective ownership. Nevertheless, this program also has limitations that should be acknowledged. The evaluation relied primarily on self-reported measures collected immediately after the intervention, which may not fully capture long-term behavioral consistency. Previous studies caution that high post-training satisfaction and intention do not always translate into sustained practice without follow-up support (Barr et al., 2013; Tonglet et al., 2004). Therefore, future community service cycles should incorporate post-program monitoring to assess continuity of composting practices and the functionality of the emerging community group.

Overall, the discussion confirms that socialization-based recycling of oyster mushroom baglog waste into compost fertilizer is an effective entry point for community-

based environmental transformation. By integrating awareness-building, participatory practice, and local organizing, the program moves beyond technical instruction toward the establishment of sustainable social practices. This contribution strengthens the literature on community-based organic waste management by demonstrating that social mechanisms are as critical as technical solutions in achieving meaningful and lasting change

4. CONCLUSION

This community service program demonstrates that socialization-oriented intervention combined with participatory practice is an effective strategy for initiating community-based environmental change. Through a structured process of awareness-building, interactive learning, and hands-on composting activities, the program successfully transformed oyster mushroom baglog waste from a perceived production residue into a valued resource within the community. The observed improvements in knowledge, technical skills, environmental awareness, and participant satisfaction reflect not only learning outcomes but also the early formation of pro-environmental norms and collective responsibility. From a theoretical perspective, these findings support behavior-change frameworks that emphasize that attitude formation, perceived behavioral control, and social engagement are critical prerequisites for sustained environmental action.

Beyond individual learning, the program generated early indicators of social transformation at the community level. The emergence of informal community composting practices and local coordinators illustrates how socialization can catalyze the development of new local institutions (pranata sosial) that support sustainable behavior. This outcome reinforces the theoretical view that community empowerment and participatory organizing are central to translating technical solutions into everyday practice. Rather than functioning as a one-off training activity, the program positioned composting as a shared social process embedded in local routines and relationships, thereby increasing its potential for continuity. Based on these findings, several recommendations can be proposed. First, future community service programs should integrate follow-up monitoring and mentoring to assess the continuity of composting practices and strengthen emerging community groups. Second, collaboration with local government units or waste management institutions is recommended to formalize community composting initiatives and provide access to broader support networks. Third, replication of this model in other communities should maintain the socialization-first approach while adapting technical components to local conditions. Collectively, these recommendations underscore the importance of combining theoretical insight, community participation, and practical feasibility to achieve meaningful and sustainable social change in organic waste management.

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