

The Use of Cotton Seed Husk Waste as Organic Compost to Support Sustainable Agriculture in Dalaka Village, Donggala Regency

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ABSTRACT

Masyarakat sebagai sumber ekonomi melalui pemanfaatan serat kapuk. Namun, kulit buah kapuk masih belum dimanfaatkan secara optimal dan umumnya dibuang atau dibakar sehingga berpotensi menimbulkan pencemaran lingkungan. Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan pengetahuan dan keterampilan masyarakat dalam mengolah limbah kulit kapuk menjadi kompos organik sebagai upaya mendukung pertanian berkelanjutan. Metode pelaksanaan kegiatan meliputi observasi potensi desa, koordinasi dengan pemerintah desa, sosialisasi, demonstrasi pembuatan kompos, diskusi, dan evaluasi kegiatan. Kegiatan diikuti oleh 27 peserta yang terdiri atas kelompok tani, masyarakat desa, dan pemuda desa. Hasil kegiatan menunjukkan bahwa 88,9% peserta memahami tahapan pembuatan kompos dan 77,8% peserta mampu mempraktikkan kembali proses pembuatan kompos secara mandiri. Selain itu, sebanyak 92,6% peserta menyatakan berminat menerapkan kompos organik pada lahan pertanian mereka. Kegiatan ini memberikan dampak positif terhadap peningkatan kesadaran masyarakat dalam pengelolaan limbah pertanian berbasis sumber daya lokal. Pemanfaatan limbah kulit kapuk sebagai kompos organik berpotensi menjadi solusi ramah lingkungan untuk mengurangi limbah organik sekaligus meningkatkan kesuburan tanah secara berkelanjutan.

The village of Dalaka in Donggala Regency has abundant potential for kapok cultivation, which the community utilises as an economic resource through the use of kapok fibre. However, kapok fruit husks are not yet being utilised to their full potential and are generally discarded or burnt, thereby posing a potential risk of environmental pollution. This community service initiative aims to enhance the community's knowledge and skills in processing kapok husk waste into organic compost as part of efforts to support sustainable agriculture. The implementation methods included assessing the village's potential, coordinating with the village government, awareness-raising sessions, compost-making demonstrations, discussions, and activity evaluation. The activity was attended by 27 participants comprising farmer groups, villagers, and local youth. The results showed that 88.9% of participants understood the stages of compost production and 77.8% were able to independently replicate the compost-making process. Furthermore, 92.6% of participants expressed an interest in applying organic compost to their farmland. This activity has had a positive impact on raising community awareness regarding the management of agricultural waste using local resources. The utilisation of cotton seed husk waste as organic compost has the potential to serve as an environmentally friendly solution to reduce organic waste whilst simultaneously enhancing soil

fertility in a sustainable manner.

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INTRODUCTION

The issue of organic waste remains a significant environmental challenge to this day, particularly in rural areas that rely on the agricultural and plantation sectors. Organic waste that is not properly managed can cause environmental pollution, degrade soil quality, and trigger public health issues due to uncontrolled decomposition (Cundari et al., 2019). Furthermore, the ever-increasing accumulation of organic waste also indicates that the utilisation of local resources based on a circular economy within the community is not yet optimal.

On the other hand, modern agricultural practices still rely heavily on the excessive use of chemical fertilisers. The long-term use of inorganic fertilisers can lead to a decline in soil organic matter content, damage to soil structure, and a reduction in the activity of microorganisms that play a vital role in maintaining soil fertility (Celik et al., 2004). These conditions pose a challenge to the sustainability of the agricultural sector, as the continuous decline in soil quality can impact land productivity in the long term. The concept of sustainable agriculture emphasises the importance of wise management of natural resources through the use of organic matter and a reduction in reliance on external inputs that have the potential to damage the environment (Pretty, 2008).

One measure that can be taken to support sustainable agriculture is the conversion of organic waste into compost. Compost is the product of the decomposition of organic matter, which can improve the physical, chemical and biological properties of the soil, thereby enhancing soil fertility naturally (Nurkhasanah et al., 2021). The use of compost is also known to increase soil organic matter content, improve water retention capacity, and support the activity of soil microorganisms that play a role in the nutrient cycle (Curtright et al., 2026). Other research indicates that the application of compost can improve soil quality and crop yields whilst reducing the negative environmental impact of organic waste (Ouelid Lhaj et al., 2026).

The village of Dalaka in Donggala Regency is one of the areas with considerable potential for kapok cultivation. Until now, the local community has utilised kapok fibre as a filling material for mattresses and pillows, which has economic value, whilst the kapok fruit husks have not yet been utilised to their full potential and tend to be discarded or burnt. In fact, kapok husk waste is an organic material with the potential to be processed into compost, as it contains organic matter that can decompose naturally. The use of agricultural waste as compost not only helps reduce environmental pollution but can also serve as a more environmentally friendly and economical alternative to organic fertilisers for the community (Suhastyo, 2017).

Based on the results of initial observations in Dalaka Village, it was found that the community's knowledge of converting organic waste into compost remains limited. The community generally lacks awareness of simple techniques for processing kapok husks into organic fertiliser that can be reused on agricultural land. This situation highlights the need for awareness-raising and training activities as a means of empowering the community in waste management based on local resources. Outreach activities and demonstrations of compost making have been shown to be effective in improving the community's knowledge, skills, and awareness of the importance of sustainable organic waste management (Shitophyta et al., 2021; Umam et al., 2026).

Therefore, this community service initiative was carried out through an awareness-raising campaign on the use of cotton seed husk waste as organic compost to support sustainable agriculture in Dalaka Village, Donggala Regency. It is hoped that this initiative will enhance the community's knowledge and skills in processing agricultural waste into useful, environmentally friendly products that support the sustainability of local agriculture.

METHOD

This community service initiative took place in Dalaka Village, Donggala Regency, in March 2026, targeting farmers' groups, villagers and local youth, with a total of 27 participants. The initiative employed several methods, including lectures, discussions and Q&A sessions, demonstrations, and an evaluation of the activities.

The lecture method was used to deliver material on sustainable agriculture, organic waste management, and the use of cotton seed husk waste as organic compost. The material was presented using visual aids to help participants better understand the content. The presentation slides provided an explanation of the importance of organic waste management based on local resources, as well as the

impact of excessive use of chemical fertilisers on soil conditions and the agricultural environment. In addition, participants were also given an understanding of the benefits of using organic compost to improve soil fertility in a sustainable manner. The presentation slides for the activity can be seen in Figure 1.

Figure 1. Presentation slide on the use of cotton seed husk waste as organic compost



Discussion and question-and-answer sessions were used to give participants the opportunity to raise questions and issues relating to agricultural waste management in their local area. This approach aimed to enhance participants' understanding of the material presented and to offer solutions to the challenges of organic waste management, which has not yet been utilised to its full potential by the community.

The demonstration method involved a hands-on demonstration of the stages involved in making compost using cotton seed hull waste. The materials used in this activity included cotton seed hull waste, soil, rice husks, EM4 and water. The composting process began with shredding the cotton seed hull waste, which was then mixed with the other materials and watered with an EM4 solution. The mixture was then left to ferment for 3–4 weeks until it became compost ready for use. Through this demonstration method, participants were able to understand the stages of compost production first-hand and were able to practise them independently.

The final stage involved an evaluation of the activities to assess the participants' level of understanding of the material and composting practices that had been taught. The evaluation was conducted through observation of participant engagement, a question-and-answer session, and an assessment of the participants' ability to explain the stages of composting. The evaluation results showed that 88.9% of participants understood the stages of composting and 77.8% were able to independently replicate the composting process. Furthermore, 92.6% of participants expressed an interest in applying organic compost to their farmland.

This community service initiative comprised a series of stages, beginning with a presentation and awareness-raising session on sustainable agriculture and the use of cotton seed husk waste as organic compost. Participants then took part in a discussion and a live demonstration of compost making. The final stage involved an evaluation of the activity to assess the participants' level of understanding of the material presented. The outline of the community service initiative is shown in Figure 2.



Figure 2. Community Service Scheme

RESULTS AND DISCUSSION

A community service activity on the use of cotton seed husk waste as organic compost was held in Dalaka Village, Donggala Regency, and attended by 27 participants comprising farmers' groups, villagers and local youth. The event went well and was met with great enthusiasm from the participants. The event began with a presentation on sustainable agriculture, organic waste management, and the use of cotton seed husk waste as environmentally friendly organic compost.

During the awareness-raising phase, participants were given an understanding of the importance of managing organic waste using local resources as a means of supporting sustainable agriculture. The material was presented using visual aids to help participants better understand the information provided. Participants were also given an explanation of the benefits of using organic compost to improve soil structure, increase the soil's organic matter content, and reduce reliance on chemical fertilisers. The presentation of the material can be seen in



Figure 3. Presentation of information on the utilisation of cotton seed husk waste

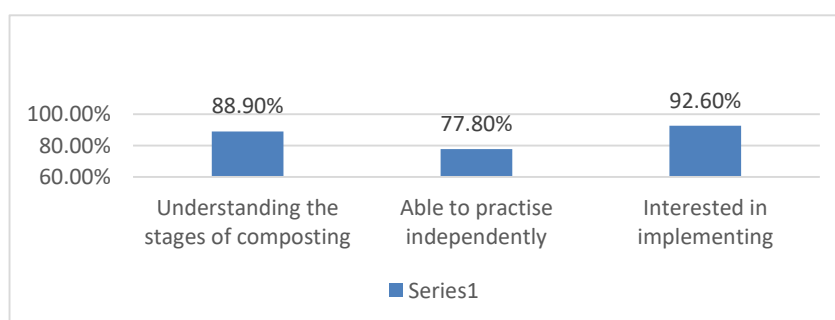
The session continued with a demonstration of compost making using cotton seed hull waste, soil, rice husks, EM4 and water. The demonstration was conducted in real time, covering the process from shredding the cotton seed hull waste and mixing the ingredients, to spraying the EM4 solution and the compost fermentation process. This hands-on approach provided participants with direct experience, enabling them to better understand the stages of compost production and to practise them independently. The demonstration and practical session with participants can be seen in Figure 4.



Figure 4. Demonstration and Practical Session on Organic Composting

Throughout the event, participants took an active part in every stage of the programme, particularly during the discussion sessions and the practical compost-making sessions. Most participants explained that, previously, cotton seed husk waste had simply been discarded or burnt as it was considered to have no practical use. Following the awareness-raising session and demonstration, participants began to understand that cotton seed husk waste can be reused to produce organic fertiliser that is beneficial for agricultural land.

Based on the results of the activity evaluation, there was an improvement in participants' understanding and skills regarding the use of cotton seed husk waste as organic compost. A total of



88.9% of participants understood the stages of compost production, 77.8% were able to replicate the composting process independently, and 92.6% expressed an interest in applying organic compost to their farmland. The results of the participant evaluation are shown in Figure 5.

Figure 5. Results of the Assessment of Participants' Understanding and Skills

The participants' improved understanding indicates that the methods of lectures, discussions and demonstrations used in this community engagement activity were effective in enhancing the community's knowledge of organic waste management. The results of this activity are consistent with the research by Shitophyta et al. (2021), which states that training and hands-on composting can improve the community's understanding of organic waste processing. Furthermore, Suhastyo (2017) also explains that composting demonstrations can improve the community's skills in utilising organic waste to produce valuable fertiliser.

The use of cotton seed hull waste as organic compost holds considerable potential for supporting sustainable agriculture. The use of organic compost is known to increase soil organic matter content, improve soil structure, and support the activity of soil microorganisms that play a role in maintaining soil fertility (Curtright et al., 2026). Other studies also indicate that the use of compost can improve soil quality and agricultural productivity whilst helping to reduce environmental pollution caused by the accumulation of organic waste (Ouelid Lhaj et al., 2026).

As well as benefiting the environment, the conversion of organic waste into compost also supports the implementation of the circular economy concept within the community. Waste that was previously left unused can be reprocessed into products that are both useful and of economic value. Pecorini et al. (2026) explain that the conversion of organic waste into compost is a key strategy in supporting sustainable agricultural development and environmentally friendly resource management.

Overall, this community engagement initiative has had a positive impact on improving the community's knowledge, skills and awareness regarding the importance of sustainable organic waste management. Through this initiative, the community has not only gained new knowledge about composting, but has also acquired practical skills that can be directly applied to their farmland.

CONCLUSION

This community service activity demonstrated that the utilization of cotton seed husk waste as organic compost can effectively improve community knowledge, skills, and awareness regarding sustainable agricultural practices in Dalaka Village, Donggala Regency. The findings revealed that most participants were able to understand the composting stages, independently practice the compost-making process, and showed strong interest in applying organic compost to their agricultural land. These results indicate that the combination of lectures, discussions, and hands-on demonstrations was effective in encouraging community participation and strengthening local capacity in organic waste management. Practically, the program provides an environmentally friendly solution for reducing agricultural waste while simultaneously improving soil fertility and decreasing dependence on chemical fertilizers through the use of locally available resources.

However, this study still has several limitations. The activity involved a relatively small number of participants and was conducted within a limited implementation period, so the long-term impact of compost application on soil quality and agricultural productivity could not yet be comprehensively evaluated. In addition, the study mainly focused on participants' understanding and practical skills without measuring the chemical characteristics of the produced compost or comparing crop yields before and after compost application. Therefore, future studies are recommended to involve larger participant groups, longer observation periods, and laboratory analysis of compost quality to obtain more comprehensive findings. Further research may also examine the economic benefits of compost production and its long-term contribution to sustainable agriculture and rural environmental management.

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