



## SINGLE-USE DIAPER WASTE MANAGEMENT FOR ENVIRONMENTAL AWARENESS: A CASE STUDY IN CIAMBAR VILLAGE

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<p><b>Info Article</b></p> <p>Received : 02 Juli 2025</p> <p>Revised : 01 Agustus 2025</p> <p>Accepted : 03 September 2025</p> <p>Publication : 30 September 2025</p> <p><b>Keywords:</b> <i>Diaper Waste, Environmental Education, Recycling, Ciambar Village, Community Empowerment.</i></p> <p><b>Kata Kunci:</b> Limbah Popok, Edukasi Lingkungan, Daur Ulang, Desa Ciambar, Pemberdayaan Masyarakat.</p> <p><b>Licensed Under a Creative Commons Attribution 4.0 International License</b></p> 	<p><b>Abstract:</b> <i>This community service program aimed to increase awareness and skills of residents in managing disposable diaper waste in Ciambar Village, Sukabumi. The program was carried out in two main sessions: an educational session on the importance of maintaining a healthy environment and a practical session on recycling diapers into planting media. The method applied was a participatory approach involving 28 participants, consisting of PKK members, Posyandu cadres, and village officials, ensuring that the activities were truly aligned with community needs. During the educational session, participants gained understanding of the negative impacts of diaper waste on health and the environment if not properly managed. In the practical session, participants were directly engaged in processing diaper waste into environmentally friendly and useful planting media. The results of the program indicated improvements in participants' knowledge and skills, as well as the growth of collective awareness to reduce pollution. This program strengthens the community's role in preserving the environment while supporting the achievement of Sustainable Development Goals (SDGs) at the village level.</i></p> <p><b>Abstrak:</b> Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan kesadaran serta keterampilan warga dalam mengelola limbah popok sekali pakai di Desa Ciambar, Sukabumi. Program dilaksanakan melalui dua sesi utama, yaitu penyuluhan mengenai pentingnya menjaga lingkungan sehat dan praktik langsung daur ulang popok menjadi media tanam. Metode yang digunakan adalah pendekatan partisipatif dengan melibatkan 28 peserta yang terdiri atas anggota PKK, kader Posyandu, serta perangkat desa, sehingga kegiatan benar-benar sesuai dengan kebutuhan masyarakat. Selama penyuluhan, peserta memperoleh pemahaman tentang dampak negatif limbah popok terhadap kesehatan dan lingkungan apabila tidak dikelola dengan baik. Pada sesi praktik, peserta diajak secara langsung untuk memproses limbah popok menjadi media tanam yang ramah lingkungan dan bermanfaat. Hasil kegiatan menunjukkan peningkatan pengetahuan dan keterampilan peserta, serta tumbuhnya kesadaran kolektif untuk mengurangi pencemaran. Program ini memperkuat peran masyarakat dalam menjaga kelestarian lingkungan sekaligus mendukung tercapainya tujuan pembangunan berkelanjutan (SDGs) di tingkat desa.</p>
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## INTRODUCTION

The issue of household waste management, particularly the disposal of disposable diapers, remains a significant challenge in many regions across Indonesia. Although disposable diapers are considered essential for infant and elderly care, their environmental management has become increasingly complex. In both urban and rural areas, it is still common to find practices such as disposing of used diapers in rivers, drainage systems, or burning them in household yards. These methods contribute to environmental degradation and pose considerable health risks. The absorbent gels and plastic components in modern diapers can take hundreds of years to decompose, polluting both soil and water systems.

This situation is exacerbated by the lack of education on proper waste management, especially among grassroots communities. Public awareness remains limited, not due to apathy, but rather due to a lack of accessible information, inadequate access to environmentally friendly technologies, and the absence of continuous community support. In rural areas such as Ciambar Village in Sukabumi Regency, diaper waste has become a recurring topic of concern in community discussions. Many housewives express confusion regarding how to manage used diapers. While they are aware of the negative impacts, they often lack practical alternatives that can be readily implemented in their surroundings.

To address this challenge, community-based approaches are recognized as effective strategies for influencing behavior and fostering environmental awareness. When educational initiatives are delivered through familiar and trusted community platforms, both offline and online, the process of knowledge transfer becomes more engaging and impactful. A study by Melati and Na'im (2023) highlighted how digital communities of mothers, such as *mamaberclodi*, successfully encouraged shifts toward the use of cloth diapers and improved waste disposal practices through peer-to-peer education. This research underscores that ecological behavioral change often emerges not through top-down mandates but rather from grassroots efforts, when communities feel involved and are given the space to take initiative.

A similar finding was observed in Cape Town, South Africa, where a community-run pilot project in Langa developed an independent system for collecting and managing disposable diapers without relying on municipal services (Schenck et al., 2024). The initiative led to a significant reduction in indiscriminate diaper disposal, demonstrating that simple, locally driven interventions can have substantial long-term impacts.

Achieving the Sustainable Development Goals (SDGs) at the village level requires adaptive and sustainable strategies. A case study in Cibadak Village, Sukamakmur District, Bogor Regency, revealed that direct community involvement in empowerment programs can enhance collective environmental consciousness (Nurhayati et al.). In this context, higher education institutions play a pivotal role as facilitators, bridging community needs with research-based innovations. Participatory service programs not only build local capacity but also instill a sense of ownership over the proposed solutions. A similar approach can be adapted for diaper waste management in Ciambar Village, emphasizing collaboration among academic institutions, local authorities, and community members.

Meanwhile, the KUM-ITT program implemented in Ciambar Village has shown that entrepreneurship-based activities utilizing appropriate technology can serve as an effective means of strengthening local resources (Nurhayati et al., 2024). Through intensive training and mentoring, residents are encouraged to develop value-added products from household waste, including used diapers. This initiative not only addresses environmental concerns but also opens new economic opportunities at the household level. As a result, a productive and sustainable waste utilization ecosystem is established. With continuous support from educational institutions, the program holds strong potential for replication in other villages facing similar challenges.

Grounded in this conceptual framework, the Community Service (PkM) team from Trisakti University initiated an empowerment project in Ciambar Village under the Kegiatan Umum Mandiri – Inovasi Teknologi Terapan (KUM-ITT) scheme. The village was selected due to its urgent need for practical solutions to diaper waste management, coupled with residents' enthusiasm for social and empowerment activities. The program was designed not only to impart knowledge but also to equip villagers with practical skills for transforming used diapers into useful products. One of the innovations introduced involved mixing the absorbent gel from used diapers with soil to create planting media and water-retaining pots.

This initiative combined environmental health education with hands-on training in upcycling used diapers into plant containers. The goal extended beyond knowledge dissemination to creating tangible household-level action among the residents of Ciambar Village. The program engaged members of the Pemberdayaan dan Kesejahteraan Keluarga (PKK), Posyandu cadres, and village officials as active participants. Through this process, it is hoped that community members will acquire new

waste management skills and become agents of change in their surroundings. This activity represents a foundational step toward cultivating a community-based culture of environmental consciousness.

## METHOD

This community service program (PkM) adopted an educational and participatory approach by combining outreach sessions with hands-on practice. The program was titled "*From Education to Action: Enhancing Environmental Awareness through Diaper Recycling and Healthy Environmental Education in Ciambar Village, Sukabumi.*" The activity took place on July 9, 2025, in Ciambar Village, Ciambar Subdistrict, Sukabumi Regency, West Java.

A total of 28 participants took part in the activity, comprising representatives from the *Pemberdayaan dan Kesejahteraan Keluarga* (PKK) women's group, *Posyandu* health cadres, and village officials. Participants were purposively selected based on their active involvement in social and environmental management initiatives within the village. This selection also considered their strategic role in disseminating information and fostering environmental awareness within the broader community.

**Figure 1 Participants**



Source: Writers' documentation

The activity was divided into two main sessions. The first session consisted of an educational seminar on the importance of a healthy environment and the health and ecological risks posed by disposable diaper waste. The second session involved a hands-on workshop in which participants learned to recycle used diapers into flowerpots and planting media. This process utilized the absorbent gel material (commonly known as gel pampers) mixed with soil to enhance water retention capacity.

**Table 1 Community Service Activities by Session Type**

Session	Topic/Activity	Method
1	Healthy Environment Education and Diaper Waste Awareness	Interactive Outreach
2	Diaper Recycling into Plant Pots	Demonstration and Discussion

Source: Primary data

All activities were conducted offline (face-to-face) at the village hall, utilizing a combination of interactive lectures, group discussions, and practical demonstrations. Data collection was carried out through direct observation, documentation in the form of photos and videos, as well as informal interviews with several participants to assess their understanding and responses to the materials presented.

## RESULTS AND DISCUSSION

The community service activity conducted in Ciambar Village on July 9, 2025, received a positive response from residents. A total of 28 participants attended the program, comprising representatives from the PKK women's group, *Posyandu* health cadres, and village officials. The participation of women in this activity was particularly significant, as women have been shown to play a vital role in household-based environmental movements (Strumskyte et al., 2022). This initiative demonstrated that environmental education, when combined with hands-on practice, can effectively foster new awareness among community members. Throughout the event, participants displayed high levels of enthusiasm, especially during the practical session on diaper recycling.

The first session consisted of an educational outreach on the health and environmental hazards of diaper waste. The material was delivered in a visual and interactive format to ensure accessibility and comprehension across participants with diverse educational backgrounds. A study by Rachmanillah et al. (2022) found that communication tailored to local contexts is effective in enhancing public understanding of household environmental issues. This is supported by Nurhayati et al. (2024), who emphasize the importance of needs-based education in achieving the Sustainable Development Goals (SDGs) at the village level. The outcomes of this session indicated increased participant awareness regarding diaper waste—an issue previously perceived as trivial.

**Figure 2 & 3 Awareness Session on the Hazards of Diaper Waste**

Source: Writers' documentation

The second session consisted of a hands-on activity in which participants learned to recycle used diapers into planting pots. Residents were taught to utilize the absorbent gel (commonly referred to as gel pamper), mixed with soil, as a planting medium with high water retention capacity. This method was adapted from a similar approach developed by Budiarto et al. (2023), which integrates appropriate technology with community education. The activity not only offered a simple and low-cost solution but also introduced an applicable innovation for household implementation. Participants were encouraged to take home the products they created during the session as tangible evidence of the practical benefits of the activity.

**Figure 4 & 5 Hands-on Practice in Recycling Used Diaper Waste**

Source: Writers' Documentation

The process of creating planting pots from used diaper waste began with a cleaning stage. The used diapers were first soaked in clean water to soften the materials and remove any remaining waste. After the contaminants were removed, the absorbent gel (superabsorbent polymer) inside the diaper was separated and set aside, as it can be utilized as a component in fertilizer production. Meanwhile, the outer diaper layer or wrapping was thoroughly rinsed to eliminate any remaining gel, resulting in a clean base material ready for the next stage of processing.

The next step involved mixing the cleaned diaper material with a cement mixture. The cement was prepared with a specific composition to ensure the strength and durability of the final product. The cleaned diaper material was then incorporated into

the cement mixture until it was fully coated. This mixture was poured into molds, such as used containers, buckets, or old pots, and left to harden. After a complete drying and curing process, the diaper-based pots were ready for use as eco-friendly planting media, supporting the recycling of non-organic household waste.

Field observations revealed that residents' active participation stemmed not only from the interesting subject matter but also from the communicative approach employed by the PkM team. Research by Allison et al. (2024) explains that successful behavioral change related to waste management is strongly influenced by intrinsic motivation triggered through social interaction. Participants exchanged experiences and solutions to their household waste challenges, and some even proposed organizing follow-up training. This indicates the potential sustainability of the activity.

The outcomes of this initiative align with the findings of Schenck et al. (2024) in Cape Town, which showed that simple, community-based interventions can significantly reduce diaper waste. Residents of Ciambar Village, who previously burned diapers in their yards, have begun to consider sorting and repurposing used diapers. The engaging, non-patronizing, and hands-on approach of the educational process was key to the success of this activity. Such an intervention can serve as a replicable model for other rural areas in Indonesia.

This initiative is highly relevant to the Kuliah Usaha Mandiri Ilmu Teknologi Terapan (KUM-ITT) approach promoted by Trisakti University, which emphasizes the direct application of academic knowledge in community empowerment (Nurhayati et al., 2024). Student involvement in this community service program produced dual benefits: village residents gained new knowledge and skills, while students acquired valuable social experience and contextual learning. The intergenerational and interdisciplinary collaboration became a defining strength of the program.

**Figure 6. Stages of Processing Diaper Waste into Planting Media**



Source: Writers' documentation

This initiative was successful not only in its educational objectives but also in fostering dialogue among community members, academics, and local government. As residents' understanding of waste management increased, opportunities emerged for establishing a locally managed waste management system. The activity directly supports the achievement of the Sustainable Development Goals (SDGs), particularly Goal 12 (responsible consumption and production) and Goal 13 (climate action) at the village level. The program holds strong potential for replication, especially in areas facing similar challenges and constrained by limited resources.

## **CONCLUSION**

The community service activity conducted by the PkM team of Trisakti University in Ciambar Village has made a tangible contribution to increasing public awareness regarding the management of disposable diaper waste. Through an interactive educational approach and hands-on practice, residents not only gained a new understanding of the environmental impact of diaper waste but also acquired practical skills in recycling used diapers into planting media. The enthusiasm and active participation of the community demonstrated that participatory approaches are highly effective at the village level. These outcomes affirm that environmental education, when delivered in an applied and accessible manner, can significantly shift public perceptions of household waste. The model implemented in this activity aligns with the principles of sustainable development and holds strong potential as an alternative solution for other regions.

Based on field observations, it is strongly recommended that similar programs be carried out on a continuous basis, involving a broader range of community stakeholders, including schools and youth groups. The village government is encouraged to take a more active role by supporting local regulations on diaper waste management. Additionally, follow-up training on the utilization of both organic and inorganic waste can be developed as part of a broader green village agenda. Strengthening partnerships between higher education institutions, local governments, and community members is essential to ensure that the outcomes of such initiatives extend beyond one-time activities and evolve into collective, community-driven movements. Documenting and disseminating best practices from programs like this is also important to inspire other areas facing similar challenges.

This initiative has the potential to trigger independent community-driven efforts to establish waste management systems tailored to local characteristics and available resources. With the skills acquired through the training, residents of Ciambar Village are now equipped to continue diaper recycling practices in their households and serve as role models for other families. Furthermore, the activity opens up opportunities for developing recycled-waste-based products as a form of social entrepreneurship, an effort that not only benefits the environment but also generates economic value for the community. This reflects a concrete form of community empowerment through applied science and technology.

This PkM program has shown that environmental change does not always need to start from large-scale policies but can be initiated through small, concrete actions at the community level. With the right approach, simple innovations such as diaper recycling can serve as entry points toward fostering a culture of clean and healthy living. It is hoped that this program can serve as a replicable model of community service that integrates education and appropriate technology in various regions of Indonesia. Its success provides a strong foundation for the active engagement of academic institutions in delivering grounded, relevant, and sustainable solutions. Ciambar Village stands as evidence that communities can be key agents of change, when given space, knowledge, and trust.

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