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Improvement of Household Mothers' Healthy Behavior Toward Waste through the Implementation of Community-Scale Incinerator Technology

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ABSTRACT

Kasihan District in Bantul Regency is a densely populated area that produces an average of 0.6 kg of household waste per person per day. The low level of waste-sorting practices and the limited availability of residual-waste processing facilities contributed to the growing burden on temporary disposal sites (TPS) and the Piyungan landfill. The Environmental Health Model Village (DPKL) of Soragan was established as a clean and healthy environment model, yet it had not been equipped with adequate waste-processing technology. This community service program aims to improve healthy waste-management behaviors among housewives and to reduce the volume of residual waste through education and the application of a community-scale incinerator technology (Soragan Insor). The program was implemented through five stages: socialization, training on healthy behavior and waste sorting, construction and operation of a one-ton-per-day incinerator, mentoring and evaluation, and the establishment of the DPKL Soragan Community Waste Management Team. The results indicated an increase in community awareness, improved waste-sorting practices, and the effectiveness of the incinerator technology in reducing waste volume by 70–80% per day. Evaluation of 25 participants showed that the capacity for communal waste management was in the very good category, with an average score of 4.22, particularly in knowledge (4.25) and environmental awareness (4.40). This program demonstrated that integrating healthy-behavior education, community participation, and appropriate technology effectively improved environmental quality, strengthened community self-reliance, and supported the achievement of SDGs 3 and 11 at the local level.

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INTRODUCTION

Kasihan District in Bantul Regency is a densely populated area that generates an average of 0.6 kg of household waste per person per day (Isni & Mustanginah, 2023). Most of this waste has not been sorted into organic, inorganic, and residual categories, which places a significant burden on temporary disposal sites and the Piyungan landfill (Pambudi, 2025). As the primary managers of household cleanliness, housewives play a central role in waste reduction efforts at the source (Asteria & Haryanto, 2021). However, the community's level of knowledge and awareness regarding waste sorting remained low, further constrained by the limited availability of residual-waste processing facilities at the neighborhood level (Venugopal, 2024).

The Environmental Health Model Village (DPKL) of Soragan was established to serve as an example of a clean and healthy environment in Kasihan District. Although the community had been active in sanitation activities, DPKL had not yet possessed adequate waste-processing technology. The main issues included suboptimal waste-sorting behavior and the absence of appropriate technology for managing residual waste. Therefore, an intervention was needed in the form of healthy-behavior education and the application of community-scale incinerator technology to improve waste-management efficiency and environmental quality. This program also supported the achievement of Sustainable Development Goals (SDGs) point 3 on healthy living and point 11 on sustainable settlements, and aligned. An incinerator was defined as a waste-burning device that operated using high-temperature thermal processes to significantly reduce waste volume, decrease potential pollution, and minimize health risks (National Research Council et al., 2000; Thompson & Anthony, 2005; Zakaria et al., 2022). This technology worked by oxidizing waste materials so that their mass and volume decreased, leaving only a small amount of solid residue in the form of ash (Cheremisinoff, 2013; Joseph et al., 2018; Santoleri et al., 2000).

The construction of the Soragan Insor incinerator emerged as a concrete solution initiated by the local community. Insor was designed as a high-temperature waste-burning facility capable of significantly reducing waste volume. According to the head of the management team, the incinerator had the capacity to hold up to two tons of waste per day before incineration. Its operational process emphasized the importance of household-level waste sorting. Dry waste was processed through incineration, while wet waste was mixed with ash from the burning process to reduce odors and prevent the spread of flies and diseases (Ramadhani et al., 2025). The main objective of this community service program was to improve healthy waste-management behavior among housewives while simultaneously reducing the volume of residual waste through the implementation of community-scale incinerator technology in the Environmental Health Model Village (DPKL), Soragan, Kasihan District, Bantul Regency. Thus, the program was not only oriented toward solving technical waste-management problems but also toward cultivating environmentally conscious behavior within the community.

METHOD

Stage 1: Program Socialization

This stage was carried out at the Soragan Hamlet Hall together with DPKL administrators, village officials, and residents. It aimed to introduce the program objectives, explain the benefits of the incinerator, and collect baseline data for evaluation.

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Stage 2: Training on Healthy Behavior and Waste Segregation

Residents, particularly housewives, participated in training that included interactive counseling sessions, hands-on practice in household waste segregation, and organic composting activities. Educational materials were distributed to support self-learning at the household level.

Stage 3: Implementation of Community-Scale Incinerator Technology

The service team constructed a community incinerator with a capacity of one ton per day at an agreed-upon location. Technical training on operation and maintenance was provided to residents appointed as operators. The incinerator was equipped with a chimney system with water injection and a bioindicator filtration pond.

Stage 4: Mentoring and Evaluation

The team provided mentoring during the operational period of the incinerator through home visits and monthly meetings. Evaluation was conducted using questionnaires to measure improvements in the management capacity of the community partner (DPKL Soragan).

Stage 5: Program Sustainability

A Community Waste Management Team of DPKL Soragan was established to oversee incinerator operations, monitor waste segregation, and develop compost production. The team coordinated with the PKK and village authorities to ensure program sustainability.

RESULTS AND DISCUSSION

The implementation of the community service program in Soragan Village was carried out participatively through five main stages, including socialization, healthy behavior training, the application of community-scale incinerator technology, mentoring and evaluation, and program sustainability planning. This participatory approach was chosen to ensure the active involvement of residents in every stage so that the program not only produced technical solutions but also built collective awareness regarding the importance of community-based waste management.

The first stage, Program Socialization, was conducted at the Soragan Hamlet Hall involving DPKL administrators, village officials, and community representatives. At this stage, the service team introduced the program objectives, the environmental benefits of the incinerator technology, and the planned implementation strategy. The socialization also served as an open discussion forum between residents and the service team to identify actual issues, including waste disposal habits, land availability, and potential community participation. The initial data from this stage served as the baseline for evaluating the program's effectiveness in the final stage. This activity successfully fostered a sense of ownership among residents, which became an important foundation for ensuring the program's sustainability.

The second stage was Healthy Behavior and Waste Segregation Training. This training focused on improving the community's capacity to manage household waste at the source. Participants, particularly 25 housewives, received counseling on the importance of separating organic and inorganic waste, along with hands-on practice in waste segregation in their homes. In addition, the training included simple

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organic composting using kitchen waste. The training materials were delivered interactively through face-to-face sessions to ensure clarity and ease of understanding, as illustrated in Figure 1.

FIGURE 1. Direct Education on Communal Household Waste Management in Soragan

The education on communal household waste management in Soragan was carried out using an integrated approach that emphasized the active participation of residents in every stage. Residents were educated to separate waste at the household level according to its types, namely organic and inorganic waste. Organic waste was processed into compost using simple composters that had been provided, while inorganic waste was collected and delivered to the Waste Bank for further processing and for its economic value. Meanwhile, residual waste that could not be utilized was handled through the Soragan Incinerator technology (Inc-Sor), which served as a local innovation in environmentally friendly household waste management. The third stage was the Implementation of Community Incinerator Technology (Soragan Insor). During this stage, the service team and the community jointly built an incinerator with a capacity of one ton per day at a location determined through community deliberation. The technology was designed with attention to safety and environmental aspects and was equipped with an air-injected chimney and a bio-indicator filtration pond to reduce emissions and monitor environmental impacts, as illustrated in Figure 2.

FIGURE 2. Implementation of the Community Incinerator Technology (Soragan Insor)

Technical training on the operation and maintenance of the incinerator was provided to five residents appointed as operators, focusing on combustion procedures, cleaning routines, and ash residue management. Once operational, the incinerator proved capable of reducing waste volume by 70–80% per day. The remaining ash was utilized to cover wet waste and accelerate the decomposition process, thereby reducing odors and lowering fly populations in the surrounding environment. The fourth stage was Mentoring and Evaluation. The community service team conducted routine home visits to monitor the implementation of waste segregation and the operation of the incinerator. Evaluation activities were carried out through daily logbook entries by the operators, monthly meetings with DPKL administrators,

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and surveys on community healthy behavior. The evaluation results showed increased consistency in waste segregation practices and a reduction in the volume of waste disposed of at the Temporary Disposal Site (TPS). In addition, the environment surrounding the incinerator site became cleaner and odor-free, while community participation remained high. This mentoring stage also strengthened the community's management capacity, particularly in collective decision-making and resolving technical issues in the field.

The results of the questionnaire completed by 25 participants indicated that the capacity of DPKL Soragan partners in communal household waste management was categorized as very good, with an overall average score of 4.22. The knowledge aspect received a high score (4.25), indicating that most respondents had understood waste types, composting processes, the Waste Bank system, and the operational mechanisms of the incinerator (INC-SOR). Environmental attitudes and awareness also showed excellent results (4.40), reflecting strong responsibility, commitment, and pride in the communal waste management activities in Soragan. In terms of technical and managerial skills, respondents demonstrated good ability (4.05), particularly in waste segregation, compost management, and organizing waste collection schedules. However, several challenges were identified regarding the use of simple tools and the financial record-keeping of the Waste Bank. The institutional and collaboration aspect received the lowest score (3.85), highlighting the need to strengthen team coordination, the regularity of evaluation meetings, and more organized documentation systems.

Meanwhile, the program-impact aspect obtained the highest score (4.45), indicating that the community service activities successfully enhanced management capacity, teamwork, and the spirit of independence among DPKL members. Overall, the program significantly improved the communal waste management capacity of DPKL Soragan. Improvements were evident in residents' knowledge, attitudes, and technical skills. Nevertheless, the sustainability of the program would require attention to institutional strengthening and internal management to further enhance DPKL's independence. Future efforts would need to include advanced training, administrative mentoring, and additional support for waste processing facilities to enable DPKL to become a more professional and sustainable model of community-based waste management. The final stage was Program Sustainability, during which the Community Waste Management Team of DPKL Soragan was established, with the composition as follows.

SURAT KEPUTUSAN
KETUA DPKL (DESA PERCONTOHAN KESEHATAN LINGKUNGAN)
PEDUKUHAN III SORAGAN

NOMOR: 03/SK/DPKL-SRG/XI/2025
TENTANG
PENGANGKATAN PENGURUS DPKL (DESA PERCONTOHAN KESEHATAN LINGKUNGAN) SEBAGAI PENGELOLA SAMPAH RUMAH TANGGA KOMUNAL DI LINGKUNGAN PEDUKUHAN III SORAGAN NGESTIHARJO KASIHAN BANTUL
PERIODE 2025 – 2029

KEDUA:
Susunan Pengurus DPKL Pedukuhan III Soragan sebagaimana tercantum dalam Lampiran Surat Keputusan ini merupakan bagian yang tidak terpisahkan dari keputusan ini.
KETIGA:
Pengurus DPKL bertugas:
1. Melaksanakan kegiatan edukasi dan sosialisasi pengelolaan sampah kepada warga;
2. Melakukan pengumpulan, pemilahan, pengolahan, dan penyaluran sampah rumah tangga komunal;
3. Mengelola hasil sampah organik menjadi kompos dan mendistribusikan ke warga;
4. Mengelola hasil sampah anorganik melalui Bank Sampah;
5. Melaksanakan penetapan, penarikan retribusi pengelolaan sampah rumah tangga bagi warga pelanggan;
6. Melakukan kerja sama dengan pihak luar untuk mendukung keberlanjutan program lingkungan di Pedukuhan Soragan.
KEEMPAT:
Segala biaya yang timbul akibat pelaksanaan keputusan ini dibebankan pada dana swadaya masyarakat dan/atau sumber dana sah lainnya yang tidak mengikat.
KELIMA:
Keputusan ini mulai berlaku sejak tanggal ditetapkan, dengan ketentuan apabila di kemudian hari terdapat kekeliruan akan diadakan perbaikan sebagaimana mestinya.

Ditetapkan di : Soragan
Pada tanggal : 1 November 2025
Ketua DPKL Pedukuhan III Soragan
H. Arif Widodo, S.S.

Tembusan:
1. Kepala Dukuh Soragan
2. Ketua RT se-Pedukuhan III Soragan
3. Arsip

Lampiran
SUSUNAN PENGURUS DPKL "SORAGAN bersih"
PERIODE 2025 - 2029

Penasehat	:	1. Wahono 2. H. Shobirin Aly, S.Pd.
Ketua	:	H. Arif Widodo, S.S.
Sekretaris	:	Pedmoko Broto Susanto, S.Si.
Bendahara	:	Kaslan
Sie. Pembangunan	:	1. Sugiman 2. Siswanto
Sie. Humas & Pubdok	:	1. Shinta Qurnia Dewi, S.E. 2. Suparman 3. Erni Bambang
Sie. Retribusi & Sosial	:	1. Kartono 2. Agus Sembodo 3. Suheryanto 4. Trio Harsono 5. Supriyanta 6. Gatot 7. Hj. Muji AW.
Sie. Teknis Ops.	:	1. Tokare 2. Miglyo Slamet 3. Sarjiyati

Bantul, 1 November 2025
Ketua
H. Arif Widodo, S.S.

FIGURE 3. Official Decree of the Community Waste Management Team of DPKL Soragan

The final stage was Program Sustainability, which was realized through the establishment of the Community Waste Management Team of DPKL Soragan. This team was formed to ensure that community-based waste management activities could continue to operate consistently, systematically, and sustainably after the mentoring program ended. The organizational structure was arranged to

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ensure that each management function had clear responsibilities. For the 2025–2029 period, the organizational structure of DPKL "Soragan Bersih" consisted of advisory members, core administrators, and several operational divisions. The advisory positions were held by Wahono and H. Shabirin Aly, S.Pd., who provided strategic guidance for the implementation of the program. The core administrative team consisted of H. Arif Widodo, S.S., as Chairperson, Padmoko Broto Susanto, S.SI. as Secretary, and Kaslan as Treasurer. To support field operations, several divisions were established with more specific duties. The Development Division, staffed by Sugiman and Siswanto, was responsible for infrastructure and facilities related to waste management. The Public Relations and Publication–Documentation Division included Shinta Qumia Dewi, S.E., Suparman, and Erni Bambang, who managed public communication and activity documentation. The Retribution and Social Division consisted of Kartono, Agus Sembodo, Suharyanto, Trio Harsona, Supriyanta, Gatot, and Hj. Muji AW., who handled waste collection fees and environmental social activities. Meanwhile, the Technical Operations Division, filled by Tohare, Mugiyo Slamet, and Sarjiyati, served as the frontline team responsible for the operational aspects of waste management on-site.

With this complete organizational structure and clear division of tasks, the program was expected to run continuously and deliver tangible benefits for the cleanliness and environmental independence of Soragan. The team was responsible for overseeing the operation of the incinerator, ensuring that waste segregation practices were properly implemented, and developing follow-up activities such as organic compost production. The team also collaborated with the PKK and the village government to secure administrative support and long-term funding. As the program progressed, the waste management activities in Soragan became an inspiration for other hamlets in Kasihan Subdistrict to adopt a similar model. This demonstrated that community-based participatory interventions could yield real, sustainable, and widespread impacts. Overall, the program successfully integrated technical, social, and educational aspects into a unified waste management system. The use of a simple yet effective incinerator technology, combined with a community empowerment approach, created an efficient and environmentally friendly management model. The outcomes also showed increased ecological awareness and social solidarity among Soragan residents. This success was expected to be replicated in other areas of Bantul Regency as a best practice for community-based waste management that supported the achievement of SDG points 3 and 11.

CONCLUSION

The community service program at DPKL Soragan successfully increased the abilities and awareness of residents—particularly housewives—in managing household waste at the communal level. Through healthy behavior training, waste-sorting practice, and continuous assistance, the community demonstrated more consistent and responsible behavior toward environmental cleanliness. The implementation of the community incinerator technology (Soragan Insor) proved effective in reducing the volume of residual waste by 70–80% per day and in overcoming issues related to odor and waste accumulation in the surrounding area. The evaluation results obtained through questionnaires showed that the improvement in partner capacity was categorized as very good, with an average score of 4.22, particularly in aspects of knowledge, environmental attitudes, and technical skills. Although several challenges emerged in the institutional aspect, the establishment of the DPKL Soragan Community Waste Management Team ensured the sustainability of the program through a clear organizational structure, effective task distribution, and support from village authorities and community organizations. Overall, the program successfully integrated technical, social, and educational components into a single integrated waste management system that could serve as a model for developing clean environments in other regions. The program's success demonstrates that community-based waste management with participatory approaches

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and appropriate technology strengthened community self-reliance, improved quality of life, and directly contributed to achieving SDGs related to health and sustainable settlements.

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