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Community Empowerment through the "Minim Sampah" Zero-Waste Program for Behavioral Change in Rural Waste Management in Cimalaka Village, Sumedang Regency

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ABSTRACT

Household waste management at the village level remains challenged by low waste segregation practices and limited behavioral change. This study aimed to promote a zero-waste lifestyle through the "Minim Sampah" program in Cimalaka Village, Sumedang Regency. A participatory education approach was applied, involving pre-test and post-test assessments, interactive lectures, focus group discussions, and household-level mentoring of 46 families. Results showed a significant increase in knowledge scores from 40 to 85. Approximately 80% of households adopted waste sorting practices, five composting units were established, and waste volume transported to disposal sites decreased by 10%. These findings indicate that behavior-based interventions integrated with zero-waste principles are effective in promoting independent waste management. This model is recommended for replication in similar rural settings.

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INTRODUCTION

The issue of waste management at the village level remains a challenge within the national environmental system. Globally, the World Bank's What a Waste 2.0 report emphasizes that without systemic changes at the local level, the increase in waste volume will exceed available management capacity (Kaza et al., 2018). In Indonesia, data from the Ministry of Environment and Forestry show that the main issues occur at the upstream stage, namely low waste sorting at the source and limited community-based processing facilities (KLHK, 2023). Although the 3R policy has been widely socialized, its implementation at the village level has not been optimal because it has not been integrated with institutional support and the use of simple technology (Dwibarto & Sa'adah, 2021).

Several studies show that a community-based waste management approach can increase citizen participation when accompanied by appropriate strategies and strengthening local institutions (Purba et al., 2019; Ratih et al., 2024). Additionally, the implementation of the zero-waste concept at the household level has proven effective in significantly reducing the volume of mixed waste (Rohmah et al., 2025). However, most studies still focus on the educational aspect or the establishment of waste banks without systematic measurement of outcomes, such as through pre-test and post-test methods combined with continuous evaluation (Afriani et al., 2024). Despite growing attention to community-based waste management, few studies integrate measurable behavioral evaluation, such as pre-test and post-test with continuous mentoring in rural settings.

In addition, the same problem can be seen in Cimalaka Village, where the issue does not only lie in the lack of a sorting habit at the household level but also in the non-integration of the waste management process from upstream to downstream. The "Minim Sampah" program is considered a social innovation in a pilot project format within the RT scope by integrating measurable education, sorting behavior with the use of three bins, and the utilization of simple composting facilities (Afriani et al., 2024).

Zero-waste management is a way of managing waste that aims to decrease the amount of waste generated at the source by implementing changes in consumption patterns, sorting, reusing, and proper recycling (Hapsari et al., 2024). This strategy focuses not only on end-of-life processing but also on prevention through active community participation and aligns with circular economy principles (Zaman, 2015). At the household level, separating organic, inorganic, and residual waste can minimize the amount of waste disposed of in landfills (Widiarti, 2012). Nevertheless, constraints such as limited sorting habits, lack of facilities, and weak monitoring systems are still found at the village level (Arisara et al., n.d.).

Community empowerment is a participative strategy where citizens are involved as subjects in the process of social and environmental change (Arisara, 2024). In waste management, this approach includes education, training, and evaluation through activities such as Focus Group Discussions (FGDs) to encourage active participation and sustainable practices (Supriadi et al., 2025).

Therefore, this study aims to evaluate the effectiveness of the "Minim Sampah" program in improving knowledge, attitudes, and behavior related to household waste management.

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METHOD

This study employed a pre-experimental one-group pre-test and post-test design to evaluate the effectiveness of the "Minim Sampah" program in improving community knowledge, attitudes, and behavior related to household waste management. The activity was conducted at Cimalaka Village Hall, Sumedang Regency, on January 26, 2026, involving 46 households. The intervention applied a participatory learning approach, positioning the community as active participants through interactive lectures, Focus Group Discussions (FGDs), question-and-answer sessions, and field mentoring.

The implementation consisted of several stages, including:

- The preparation stage involved situational analysis through observation and coordination with village officials and neighborhood leaders to identify waste management problems.
- Baseline measurement involved administering a pre-test questionnaire to assess initial knowledge, attitudes, and behavior related to waste management.
- Education intervention involved delivering materials on zero-waste concepts, 3R principles, and proper waste-sorting practices.
- Discussion and evaluation involved conducting FGDs to encourage participation and reflection, followed by a post-test to measure changes after the intervention.
- Mentoring and monitoring involved household visits and field observations to ensure the implementation of waste sorting and assess behavioral consistency.

The research instruments were developed to measure knowledge, attitudes, and behavior related to zero-waste-based waste management. The instruments were tested for validity and reliability to ensure the accuracy and consistency of the measurements. Data were analyzed using descriptive statistics by comparing pre-test and post-test results to identify changes after the intervention. Monitoring findings were also used as supporting data to evaluate the consistency of waste management practices at the household level.

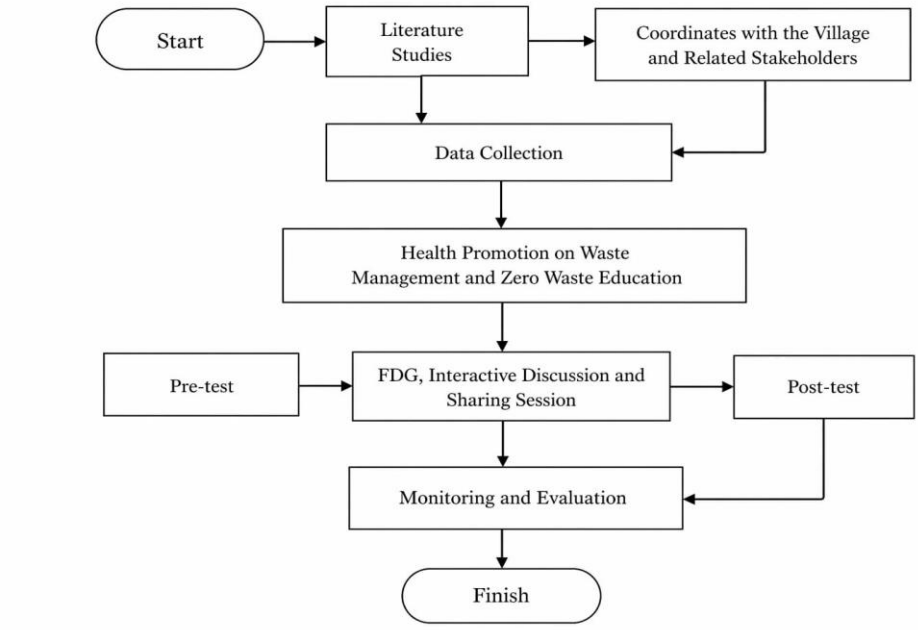

FIGURE 1. Flowchart

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RESULTS AND DISCUSSION

The “Minim Sampah” program was implemented in Cimalaka Village, Sumedang Regency, involving 46 households as participants. The intervention aimed to improve knowledge, attitudes, and behavior related to household waste management through a participatory educational approach combined with mentoring.

At the baseline stage, observations indicated that most households had not yet practiced waste segregation and still disposed of mixed waste directly to temporary disposal sites (TPS). This condition reflects low awareness of source-based waste management.

FIGURE 1. Educational session on zero-waste and waste sorting

FIGURE 2. Pre-test & Post-test Filling

Following the educational intervention, the results showed a significant improvement in community knowledge. The average pre-test score increased from 40 to 85 in the post-test, indicating enhanced understanding of zero-waste concepts, 3R principles, and waste sorting practices.

FIGURE 3. Focus Group Discussion (FGD)

Furthermore, interactive discussions through Focus Group Discussions (FGDs) encouraged participants to share experiences and build collective commitment toward a low-waste lifestyle.

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FIGURE 4. Household waste sorting implementation

Changes were also observed in attitudes and behavior. Approximately 80% of households began implementing waste segregation by providing separate bins for organic and inorganic waste. In addition, five composting units were successfully established and actively used by the community.

FIGURE 5. Monitoring and evaluation activities at the household level

Monitoring results further showed a reduction in waste sorting errors and early adoption of practices to reduce single-use plastics. Moreover, there was an estimated 10% decrease in the volume of waste disposed of at TPS, indicating initial success in source-based waste management.

TABEL 1. Frequency Distribution of Knowledge

Knowledge	Pre-test	Post-test
	40	85

TABEL 2. Frequency Distribution of Residents' Attitudes

Attitude	Pre-test	Post-test
	38	85

TABEL 3. Frequency Distribution of Residents' Behavior

Behavior	Pre-test	Post-test
	37	82

In conclusion to the outreach activity, a post-test was administered to assess any changes that had taken place concerning the participants' level of knowledge and attitudes. As can be seen from the

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comparison table, there has been an evident improvement in the level of knowledge and attitudes, with the average score of knowledge being raised from 40% (pre-test) to 85% (post-test).

The analysis above shows a consistent increase in the mean scores of knowledge, attitudes, and behavior after the implementation of the "Minim Sampah" program. The average knowledge score increased from 40 in the pre-test to 85 in the post-test, indicating a substantial improvement in participants' understanding of waste management concepts. Similarly, the attitude score improved from 38 to 85, reflecting a more positive perception toward adopting a low-waste lifestyle. Behavioral changes were also observed, with the average score increasing from 37 to 82, indicating the initial adoption of waste sorting and reduction practices at the household level.

These findings suggest that the program was effective in promoting behavioral change through the integration of education and continuous mentoring. The improvement in knowledge, attitudes, and behavior is consistent with previous studies showing that community-based education and zero-waste approaches can enhance awareness and encourage better waste management practices (Purba et al., 2019; Dwibarto & Sa'adah, 2021; Zaman, 2015; Widiarti, 2012). However, this study is limited by the relatively small sample size and short monitoring duration, which may not fully reflect long-term behavioral sustainability, indicating the need for further research with a broader scope and longer observation periods.

CONCLUSION AND RECOMMENDATIONS

The "Minim Sampah" program effectively improved community knowledge, attitudes, and behaviors in household waste management, as reflected by the increase in mean scores and observable changes in waste sorting and reduction practices at the household level. The integration of participatory education, behavioral evaluation, and continuous mentoring played a key role in supporting these improvements. However, sustained monitoring and improved infrastructure support are necessary to ensure long-term behavioral sustainability. This program demonstrates strong potential to be replicated in other rural communities with similar characteristics to support community-based sustainable waste management.

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