

Implementation of Low-Smoke Waste Incineration and Information Banner Media on Waste Decomposition in Lubuk Gung Village

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Abstract: Waste has become an ongoing problem in Lubuk Gung Village, Semidang Gumay Subdistrict, largely due to the community's habit of open waste burning, which produces thick smoke and negatively affects both health and the surrounding environment. In response to this condition, students of KKN 177 Period 108 carried out two main activities as part of waste management efforts, namely the implementation of a low-smoke waste burning tool and the installation of an information banner explaining the decomposition time of various types of waste along with instructions on how to build the low-smoke burning tool. The activity began with the construction of a simple burning device designed to reduce the amount of smoke produced during waste burning, followed by the installation of banners in strategic locations within the village so that residents could easily access information on the decomposition time of organic and inorganic waste, as well as understand how to use the low-smoke burning tool independently. This activity is expected to reduce the negative impact of conventional waste burning and provide the community with practical knowledge on more environmentally friendly waste management.

Introduction

Waste is an environmental problem that remains a major challenge in various regions, including rural areas. While often considered an urban issue, waste management in rural areas also requires serious attention, given limited infrastructure, minimal public education, and the lack of an organized waste management system. One village facing this challenge is Lubuk Gung Village, Semidang Gumay District.

Lubuk Gung Village is a village where the majority of residents depend on the plantation sector for their livelihood. Gardening is the community's primary livelihood, so residents spend most of their time tending their gardens. The village's geographical location, dominated by plantations, also influences people's lifestyles, including how they manage their daily household waste.

Based on observations made by KKN 177 students from Period 108 during their time on-site, the visible condition of waste in Lubuk Gung Village does not show piles of trash scattered along the roads or in residential areas. However, the real problem lies in the pattern of household waste management, which is still far from ideal. The most prominent habit is the action of residents who routinely burn trash right in front of or around their respective homes. This burning is generally carried out without regard for wind direction, distance from residential areas, or the appropriate burning time, resulting in thick smoke that spreads throughout the village. This condition not only disrupts the comfort of local residents but also has the potential to cause health problems, particularly to the respiratory tract, especially for children, the elderly, and residents with a history of respiratory diseases such as asthma.

In addition to the open burning of waste, another equally serious problem was identified: the lack of a centralized waste disposal site (TPS) in Lubuk Gung Village. Residents have lacked a single, clear point of reference for collective household waste disposal. This lack of facilities has led residents to resort to shortcuts in waste management, including dumping certain household waste, such as diapers, into rivers and on quiet, rarely traveled roads. This behavior has had widespread negative impacts, ranging from river pollution that has the potential to impact water quality and the surrounding ecosystem, to disrupting the aesthetics of the village environment, and even becoming a source of disease if allowed to accumulate over a long period of time.

These issues demonstrate that the waste problem in Lubuk Gung Village is not caused by the large volume of waste, but rather by the lack of an organized waste management system and a lack of public awareness of the long-term impacts of burning and littering. Without appropriate intervention or solutions, these practices have the potential to persist and lead to a decline in environmental quality and long-term health of the village community.

In response to this situation, students from the 177th Community Service Program (KKN) Period 108, stationed in Lubuk Gung Village, are striving to make a real contribution through the implementation of a work program focused on waste management. This work program is not designed to drastically change community habits, but rather to provide practical solutions that can be immediately implemented according to existing conditions and habits in the community. There are two main programs implemented: the implementation of a smoke-free waste incinerator and the installation of information banners regarding the length of time for waste decomposition and the procedures for making such a device.

The first program, the implementation of a smoke-free waste incinerator, was motivated by a habit residents find difficult to break quickly: open burning of waste. Rather than banning this habit, the KKN students sought to provide a solution in the form of a simple incinerator that could reduce the volume of smoke produced, thereby minimizing the impact of air pollution without having to completely change community habits. This device is designed with simple materials and is easy for residents to apply, so it can be used independently and sustainably after the KKN program ends.

The second program, namely the installation of information banners, aims to provide visual education to the public about two important things: first, information about the length of time it takes for various types of waste to decompose, both organic and inorganic, so that the public can better understand the long-term impacts of carelessly disposed waste, including waste such as baby diapers that require a very long time to decompose. Second, this banner also contains procedures for making a low-smoke waste incinerator, so that the information provided is not only theoretical, but also applicable and can be directly practiced by residents independently.

Through these two work programs, KKN 177 Period 108 students hope to provide a positive and sustainable impact for Lubuk Gung Village, especially in terms of reducing smoke from burning waste and creating collective awareness in the community about the importance of a single waste collection point that can be managed together in the future. With the existence of applicable solutions that are in accordance with the real conditions of this community, it is hoped that the problem of indiscriminate waste burning and waste disposal into rivers and inappropriate areas can gradually decrease, so that the environmental quality of Lubuk Gung Village can be better, healthier, and more sustainable in the future.

Method

The construction and installation of a smoke-free waste incinerator and information banners were carried out on Monday, July 27, 2026. The project began in the morning and progressed gradually until the entire project was completed. The project location was located next to the Lubuk Gung Village office in Semidang Gumay District. This location was chosen because the area around the village office is central, easily accessible, and frequently used by residents from various hamlets, allowing for more equitable utilization of the equipment and information banners by the community.

The primary target of this activity is the entire community of Lubuk Gung Village, particularly those who have a habit of openly burning household waste around their homes, as well as those who lack an understanding of the decomposition time of various types of waste. The implementation of this activity also involves several parties, including:

1. KKN 177 students from Period 108 as the main person in charge of the program
2. The youth organization of Lubuk Gung Village helped with the process of collecting materials, casting, and installing tools and banners.

The involvement of this youth organization is a form of active participation of village youth in supporting student work programs, as well as a means of transferring knowledge so that local youth can directly understand the process of making a smoke-free waste incinerator.

In its implementation, there are several tools and materials used, namely:

1. Used drums with a diameter of 60 cm as the main container for burning waste with minimal smoke
2. Sand obtained directly from the nearest quarry location as the basic material for the casting mixture
3. Cement as an adhesive in the casting process
4. Enough water to dissolve the cement and sand mixture
5. Bamboo as a banner support pole
6. A previously designed banner containing information on the length of time it takes for waste to decompose and the procedure for making a low-smoke incinerator.
7. Other supporting equipment such as hoes, buckets, and simple concrete mixers

The process of implementing the activity takes place through the following stages:

1. The preparation stage is carried out in the morning by taking sand directly from the nearest quarry, then taking it to the implementation location next to the village office.
2. The casting stage, namely mixing cement, sand and water to form a casting mixture which is then poured at a predetermined point to form a permanent base as a base for the waste incinerator.
3. The stage of placing the combustion tool, where the 60 cm diameter drum is placed directly on top of the cast base that has been completed.
4. The banner installation stage, namely installing bamboo as a support pole right at the back of the trash can, so that the banner can be clearly seen by residents who want to use the burning tool.

All of these stages were carried out with the involvement of several members of the Lubuk Gung Village youth organization, allowing the process to proceed more quickly and strengthening the relationship between the KKN students and the village youth. Ultimately, the smoke-free incinerator and an information banner were placed side by side in the area next to the Lubuk Gung Village office, allowing the community to gain a firsthand understanding of the tool's construction process and information on the waste decomposition time.

Results and Discussion

After going through a series of processes, from material collection and casting to installation, the construction of a smoke-free waste incinerator and information banner in Lubuk Gung Village was completed according to the previously prepared plan. All stages of the activity took place in one day, on Monday, July 27, 2026, from sand collection at the quarry in the morning to the final installation of the equipment and banner, which was completed that same day.

The waste incinerator, which uses a 60 cm diameter used drum, is now securely installed on a specially constructed permanent cast base next to the Lubuk Gung Village office. Made from a mixture of cement, sand, and water, the cast base serves as a sturdy base, ensuring the drum's position is not

easily shifted or toppled, even after repeated use by the community. From a construction perspective, the drum's placement on this permanent cast base also conveys the impression that the device is not merely a temporary facility, but rather a facility designed for long-term use by the village residents.



Picture 1 Literacy Class

Based on direct observations after the device was first used, the process of burning waste using the drum produces significantly less smoke compared to the habit of residents burning waste openly in their yards. The smoke that comes out of the drum tends to be more concentrated upwards and does not spread horizontally to surrounding settlements as is usually the case with open waste burning in open fields. In addition, this trash can also functions well as a burning container, experiencing no significant problems such as leaks, cracks in the drum, or damage to the cast base after the installation process is complete.

In terms of location, the equipment's location right next to the Lubuk Gung Village office has proven to provide easy access for residents. This location is relatively easy for residents to reach from various directions, considering that the village office is generally a center of activity and is frequently passed by residents, both for administrative purposes and simply passing through in their daily activities. This clear location also supports the equipment's function as a single incineration point that is widely recognized by residents, in accordance with the initial goal of this work program, namely to create a more centralized waste collection or incineration point for the village community.

In addition to the incinerator, the previously designed information banner was also successfully installed properly using bamboo poles placed directly behind the trash can. The banner was installed with attention to the strength of the bamboo poles to ensure they could withstand various weather conditions, considering the location is in an open area directly exposed to the hot sun and wind. This banner contains two main types of information, namely the length of time it takes for various types of waste to decompose, from organic waste such as food scraps and leaves, to inorganic waste such as plastic and baby diapers which require a much longer decomposition time, as well as the procedure for making a simple, smoke-free waste incinerator that can be imitated by residents in other locations.

The information on this banner was compiled through a rigorous data search and verification process. This ensures that what is presented to the public is not simply general information that may not be accurate, but rather data that has been verified based on reliable sources. This is crucial, as the banner will be a visual source of information read directly by the public without any verbal explanation from the students, so data accuracy is a matter of serious concern.



Picture 2 Banners and Trash Burning

Overall, the final results of this activity indicate that both work programs, namely the smoke-free waste incinerator and the information banner, have been successfully implemented according to the initial plan, both in terms of physical construction, tool function, and information delivery to the community. However, these results are still achievements in the initial stages of implementation, so the overall success of the program, especially in terms of long-term changes in community behavior, still requires time and further processes to be fully evaluated.

Compared to conditions prior to the implementation of this work program, significant changes are evident, although the team has not yet systematically documented the initial conditions. Previously, residents of Lubuk Gung Village were accustomed to burning household waste openly in front of their homes without a clear burning point, resulting in smoke spreading in various directions and disrupting the activities of nearby residents. After the smoke-free waste incinerator was installed and put into use, the smoke produced began to appear thinner than before. This is an early indication that the device is quite effective in reducing smoke volume, although it has not yet been quantitatively measured using an air quality meter or similar.

In terms of community response, the enthusiasm shown by residents was quite high from the casting process until the installation of the equipment. Several residents passing by the village office also watched the equipment construction process, some even directly asked the students and youth organizations who were assisting at the time how the equipment worked. This enthusiasm was also evident in the response of youth organizations members who actively helped throughout the process, from collecting sand from the quarry to installing bamboo banner supports. Their voluntary involvement is an indicator that this work program has been well received by the community, not just a formality program by KKN students.



Picture 3 Banner Casting Process

However, it must be acknowledged that the results obtained from this activity are still preliminary and based on direct field observations, not standardized scientific measurements. The perceived reduction in smoke is more qualitative, based on visual observations and the experiences of local residents, rather than on specific measurements of smoke levels or airborne particles. Therefore, the long-term effectiveness of this tool still needs further monitoring, particularly to determine whether

residents will actually use it consistently after the KKN period ends, or whether it is simply used in the initial phase out of curiosity.

Regarding the information banners that have been installed, their presence is expected to be a long-term educational resource for the community, especially regarding the length of time it takes for waste to decompose, which many residents may not be aware of. Information about the decomposition of waste such as baby diapers, which takes a very long time to decompose, is expected to be one of the points that raises residents' awareness to no longer throw this type of waste into rivers or other inappropriate areas. However, the extent to which these banners are truly read and understood by the community still requires further evaluation, given the limited timeframe for the KKN implementation that does not allow the team to conduct long-term monitoring.

Overall, the results of this work program demonstrate that a simple solution in the form of a smoke-free waste incinerator and information banners has had an initial positive impact on the waste problem in Lubuk Gung Village, particularly in terms of reducing smoke and providing a more centralized incineration point. Although the results cannot yet be measured quantitatively and are temporary, this program has at least opened the first step towards changing community habits in managing household waste, and provides a clear picture that applicable and community-appropriate solutions can be well-received if implemented directly and involving the participation of local residents.

Conclusion

Based on the implementation of the work program carried out by KKN 177 students of Period 108 in Lubuk Gung Village, Semidang Gumay District, it can be concluded that the initial objective of this activity, namely reducing the volume of smoke caused by the habit of open burning of waste and creating a centralized waste collection or incineration point for the community, has been achieved although it is still in the initial stage. The smoke-free waste incinerator made using a 60 cm diameter drum and placed on a permanent cast stand next to the Lubuk Gung Village office has proven to be able to reduce the volume of smoke produced compared to the open burning of waste that has been carried out by residents in front of their respective homes. The existence of a clear and easily accessible incineration point has also addressed the problem of the lack of a centralized waste disposal site which was previously one of the root problems in the village. In addition, information banners installed next to the incinerator also contribute to the educational objective of this activity, namely providing knowledge to the community about the length of time for decomposition of various types of waste and the procedures for making a smoke-free incinerator independently, so that this information can continue to be accessed by residents even after the KKN period has ended.

However, it is recognized that the results achieved in this activity are still preliminary and have not been quantitatively measured, so follow-up steps are needed to ensure the benefits of this program can be felt more optimally and sustainably. It is recommended that the village government can take an active role in maintaining and ensuring the continued use of this smoke-free waste incinerator, considering that the device will only provide long-term benefits if it is used consistently by the community. Furthermore, regular evaluations of the device's effectiveness, both in terms of smoke reduction and the level of utilization by residents, are needed to determine the extent to which this program truly changes community waste management habits. Considering that this program has only been implemented at one point around the village office, Lubuk Gung Village is also advised to consider adding similar incinerator points in other hamlets if the results of this program are deemed beneficial, so that the benefits can be felt more evenly by a wider range of residents. It is also hoped that the information contained in the banners will be continuously maintained and updated periodically, considering that the banners play an important role as a long-term educational medium for the community, especially the younger generation who will continue the waste management habits in this village in the future.

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