



## IMPROVING WASTE MANAGEMENT AND MAGGOT CULTIVATION CAPABILITIES AT PONDOK PESANTREN AS SALAFY AL ASROR SEMARANG

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### ABSTRAK

Pondok pesantren merupakan lembaga pendidikan yang diharapkan dapat berkontribusi dalam pendidikan lingkungan, khususnya dalam mengatasi masalah sampah. Survei oleh Tim Pengabdian FEB UNNES mengenai pengelolaan sampah di Pondok Pesantren As Salafy Al Asror menunjukkan beberapa permasalahan dalam pengelolaan sampah di antaranya belum optimalnya pengelolaan sampah sementara, dan pengolahan sampah organik yang potensial untuk diolah kembali. Metode pelaksanaan dalam kegiatan ini adalah pelatihan dan pendampingan. Metode pelatihan dilaksanakan melalui pelatihan pengelolaan sampah bagi tim kebersihan dan santri dan pelatihan budidaya maggot. Kegiatan pengabdian telah dilaksanakan pada tanggal 18 Mei 2024 di SMK Al Asror dengan peserta 20 santri putra dan 10 warga sekitar. Narasumber kegiatan adalah ketua tim pengabdian, pengasuh pondok, dan praktisi dari Komunitas Nol Sampah (Komunals) Kota Semarang. Kegiatan dilaksanakan dalam bentuk pelatihan dengan dua sesi materi yaitu pengelolaan sampah dan budidaya maggot. Kegiatan dibuka oleh pengasuh pondok, KH. Al Mamnuhin Kholid. Materi pertama disampaikan oleh Drs. Fachrurrozie, M.Si. yang menegaskan pentingnya mengelola sampah agar berdampak positif bagi lingkungan sekitar. Materi kedua disampaikan oleh Dr. Inaya Sari Melati, M.Pd. dan Luthfan Faladias. Berdasarkan hasil pre-test dan post-test yang dilaksanakan, dapat dinyatakan terdapat peningkatan signifikan pengetahuan peserta dalam pengelolaan sampah dan budidaya maggot.

### ABSTRACT

Pondok pesantren are educational institutions that are expected to contribute to environmental education, especially in overcoming the waste problems. A survey by the FEB UNNES Service Team regarding waste management at the Pondok Pesantren As Salafy Al Asror showed several problems in waste management, including not yet optimal management of temporary waste, and processing of organic waste that has the potential to be reprocessed. The implementation method is training and coaching. Training methods are implemented through waste management training for cleaning teams and santri and maggot cultivation training as well as providing adequate work safety equipment. The service activity was carried out on May 18 2024 at Al Asror Vocational School with 20 male students and 10 surrounding residents. The speakers for the activity were the service team leader, kiai, and practitioners from the Semarang City Zero Waste Community (Komunals). The activity was carried out in the form of training with two material sessions, namely waste management and maggot cultivation. The activity was opened by the cottage caretaker, KH. Al Mamnuhin Kholid. The first material was delivered by Drs. Fachrurrozie, M.Si. which emphasizes the importance of managing waste so that it can have a positive impact on the surrounding environment. The second material was delivered by Dr. Inaya Sari Melati, M.Pd. and Luthfan Faladias. Based on the results of the pre-test and post-test that have been carried out, it can be stated that there has been a significant increase in participants' knowledge in waste management and maggot cultivation.

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## **INTRODUCTION**

Pondok pesantren are informal educational institutions that are very unique and typical of Indonesia. Pondok pesantren are unique Islamic educational institutions and have indigenous Indonesian values (Arifin & Anisah, 2019). Pondok pesantren have a long history in the archipelago because they have influenced the development of Islam as a place to learn about Islam in more depth (Susilo & Wulansari, 2020). Pondok pesantren are traditional Islamic educational institutions in Indonesia, which have an important connection with the traditions of scientific teaching in the motherland (Irawan, 2022). One of the great traditions in Indonesia is the tradition of Islamic teaching (education) in pesantren (Novrizal & Faujih, 2022). A researcher stated that Islamic boarding schools have been born since the Wali Songo era (Abdurrahman, 2020). Pondok pesantren are unique Islamic educational institutions and seem to be managed traditionally. However, Islamic boarding schools have developed in various forms (Nurkhin et al., 2024). Pondok pesantren existed before Indonesia's independence and have had an impact on the development of Islam and the development of education in general.

Pesantren re independent educational institutions initiated, managed and developed by kiai. In the era of globalization, the role of Islamic religious education in Islamic boarding schools greatly influences various aspects of life (Susilo & Wulansari, 2020). Indonesian people are increasingly aware of the importance of pondok pesantren as a model of Islamic education, even though they are born from past traditions. Pondok pesantren are traditional Islamic educational institutions that aim to understand, appreciate and

practice Islamic teachings by emphasizing the importance of religious morals as a guide to life in society (Novrizal & Faujih, 2022).

Article 3 paragraph 1 of Law Number 18 of 2019 concerning Pesantren states that the aim of holding pondok pesantren is to form individuals who excel in various fields who understand and practice the values of their religious teachings and/or become religious experts who are faithful, devout, have noble character, are knowledgeable, independent, mutual assistance, balance and moderation as well as improving the quality of life of the community which is empowered in meeting the educational needs of citizens and the social welfare of society. Students within the pondok pesantren framework are known as santri. Santri who study at pondok pesantren will be formed into individuals who understand religious knowledge and will be able to improve the quality of life of diverse communities. Santri with the knowledge and competencies they possess will be able to influence society after they complete their studies at the Islamic boarding school.

Waste management is an important thing that must be mastered by society in general. Pondok pesantren are one of the parties that produce household waste, so pondok pesantren should contribute to waste management. The government has issued Government Regulation of the Republic of Indonesia Number 81 of 2012 concerning Management of Household Waste and Waste Similar to Household Waste. This emphasizes the importance of the ability to manage waste for the community (Inayah & Suprpto, 2017). Data from the National Waste Management Information System (SIPSN) of the Ministry of Environment and Forestry (KLHK) shows that in 2022 the volume of landfilled waste

in Indonesia will reach 19.3 million tonnes. As much as 41.1% is food waste, 18.3% is plastic waste, and the rest is wood/twig/leaf waste. Household waste heaps are the largest supplier (39.2%) of this amount of waste (Nurika et al., 2022). In 2025, it is predicted that there will be around 285 million solid waste in Indonesia as a result of the increasing population (Rimantho et al., 2022).

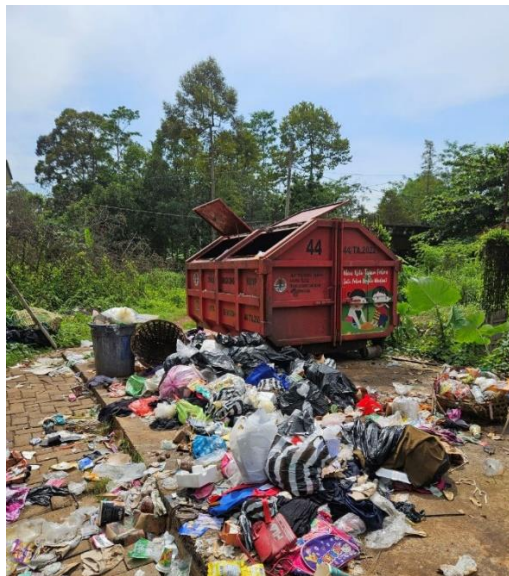
The role of pondok pesantren in waste management includes creating a clean and healthy pesantren environment (Kurniawan et al., 2022). Pondok pesantren are expected to contribute to environmental education, especially in overcoming the waste problems they cause (Nurika et al., 2022). It was further explained that the role of pondok pesantren is also expected in sustainable development (Aulia et al., 2018). Therefore, the Ministry of Religion of the Republic of Indonesia initiated the eco-pesantren program as a form of environmental education in pondok pesantren (Pudjiastuti et al., 2021). Waste management can be used as a form of character education in pondok pesantren (Inayah & Suprpto, 2017). Processing plastic waste using pyrolysis technology has proven to be a conservation and environmental lesson in pondok pesantren (Kasim et al., 2018). Waste management is an important part of forming students' character to love cleanliness, love the environment and preserve nature. In addition, considering the importance of waste management, one pesantren has developed an information system (Faid & Jasri, 2017).

Pondok pesantren also produce quite a bit of household waste. The waste produced has the potential to be recycled so that waste management becomes better (Pramadita et al., 2021). Non-organic waste produced in pesantren can also be

processed into economically valuable products (Yusuf & Saifudin, 2021). Waste bank activities can be carried out as an effort to improve waste management to make it more economically valuable in pondok pesantren (Nurika et al., 2022). The maggot cultivation process and the composting process for organic waste are forms of waste management that can be carried out in pesantren to increase santri' awareness of the importance of managing waste (Windi et al., 2023). Waste management in pesantren can also increase santri' creativity (Utama et al., 2023). Waste management technology can also be used as a forum for increasing santri entrepreneurship (Zaman et al., 2022). However, there are problems in waste management in pesantren. Apart from the smell it causes, santri' awareness of managing waste is still relatively low. Santri still do not care about their personal health and the environment (Zaman et al., 2021).

There are many pondok pesantren within the Universitas Negeri Semarang (UNNES) which are managed both modernly and traditionally. Many pesantren only manage santri from university students, but there are also pesantren that manage santri from university students and school students. Pondok Pesantren Putra Putri As Salafy Al Asror (hereinafter referred to as Pondok Pesantren Al Asror) is one of the largest pesantren in Patemon Gunungpati Village, Semarang City. The number of students is not less than 1000 people. There are formal schools located within the pesantren environment, such as PAUD, MI, MTs, MA, and SMK. Pondok Pesantren Al Asror has been established since the 1980s and is a Pesantren Salafiah that organizes madrasah diniyah and the study of the Yellow Book (kitab kuning).

The FEB UNNES Community Service Team has carried out survey activities to obtain data and information regarding waste management at Pondok Pesantren Al Asror. Figure 1 shows the temporary waste storage area in the Putri cottage before being transported by vehicles to the final disposal site (TPA) in the Gunungpati area. From Figure 1, it can be seen that waste is still not managed well even though there are containers ready for transport. There is still a lot of rubbish scattered around with various types of rubbish. There are small trash cans that are used to transport rubbish from the rooms of female and male students. There were also remnants of rubbish that had been burned previously.



**Figure 1.**

Temporary waste disposal site at Pondok Putri Al Asror Semarang

Based on an interview with the cottage manager, Mr. Giyanto, it was explained that there was only one cleaning officer who was a resident of the cottage area and devoted himself to managing waste. Even though the amount of waste produced from cottages and schools is not small. A cleaning team is needed that understands how to

arrange existing waste so that it is better managed before it is taken to the landfill. It was further explained that many students' clothes were actually still suitable for use but were simply thrown away. Cleaners usually use these clothes to be reused by residents who need them. Waste of various types is put together without being separated into organic and non-organic waste. Not infrequently, plastic waste is burned to reduce the amount of waste which is sometimes abundant.

From the initial information, the service team then conducted further interviews with the caregiver, KH. Al Mamnuhin Kholid or usually called Gus Nuhin. The information obtained shows that waste management is an important problem facing the cottage and has not been resolved properly. As the number of santri increases, the amount of waste will also increase significantly. Waste from the cottage kitchen and leftover food from santri is one of the problems in waste management. Usually there are residents who take kitchen scraps to use as animal feed. Other information indicates that santri' awareness of disposing of rubbish in its place is still relatively low. Pondok pesantren has provided quite a lot of rubbish bins in the cottage area, but students still throw rubbish carelessly. The proof is that there is a lot of plastic waste left over from snacks scattered around the pesantren environment. Pondok pesantren has received assistance with trash cans from the Semarang City Environmental Service but they cannot yet be used to sort and separate organic and non-organic waste.

The community service team also received information from the boarding school administrators that the santri' awareness of protecting the environment was still relatively low. Santri carelessly throw rubbish carelessly. Many

santri did not pick up clothes which were being dried in the sun and then fell strewn around. Santri are lazy about washing again and let their clothes become trash even though the clothes are still very suitable for use. Apart from that, the problem of sandal waste is also quite large. If one of the sandals is lost or cannot be found, then the sandal becomes rubbish and is thrown away. Not surprisingly, there is a lot of trashed sandals in pesantren. Trash from detergent packets, shampoo, soap, and the like is also often found in water drains. Santri do not throw it in the trash bins provided properly. Other information shows that regarding health aspects, Islamic boarding schools have regularly held education in collaboration with the Sekaran Community Health Center to provide understanding about healthy lifestyles and also the behavior of throwing rubbish in the right place.

The results of a survey at the temporary waste disposal site at the pondok putra showed that there were volunteer santri who helped handle waste management. Unfortunately, these santri do not wear proper protective equipment as cleaning and waste management personnel. There was an incident where a santri injured his leg because he stepped on glass trash. This means that volunteers have not paid attention to work safety aspects. These volunteer santri usually regularly manage the waste to be thrown into the landfill or simply burn the waste.

The description of waste management problems at the partner (Pondok Pesantren Al Asror) indicates that there are several priority waste management problems that must receive attention to be resolved. First, regarding santri' awareness of waste and environmental issues. This is important to reduce the amount of rubbish scattered around, increase awareness of disposing

of rubbish in its place, maintaining the health of santri and the environment, and so on. Second, regarding temporary waste management in pesantren. A special team is needed that is able to manage waste properly before the waste is transported to the landfill. Work safety equipment is also needed for the waste management team to be safer in carrying out their duties and obligations. And finally, regarding the management of kitchen waste and food waste which can be further utilized before being taken by residents as animal feed.

The main targets in service activities are santri. Increasing abilities in waste management will provide additional knowledge and skills for santri. So that their understanding, knowledge, skills and behavior regarding waste management can have a big impact on the community in their area of origin and increase public awareness about sustainability, especially waste management.

## **METHOD**

The implementation method for this community service activity is training and mentoring. Table 1 shows details of the activity implementation plan. The training consists of two activities, namely temporary waste management training and maggot cultivation training. Waste management training will be carried out by the service team by providing material on how to manage temporary waste better. Mentoring will be provided as a form of follow-up to training activities. The use of work safety equipment will also be provided to activity targets to provide an understanding of the importance of using adequate work safety equipment. Accidents can be minimized when managing waste temporarily by wearing a mask, head covering and both shoes. Maggot cultivation training will present resource persons who are experts and have good experience.

The resource person for the activity was Dr. Inaya Sari Melati, M.Pd. who is a lecturer at FEB UNNES and has provided maggot cultivation training to the public. He has proven experience and understanding.

**Table 1.** Method of Implementing Waste Management Service Activities at Pondok Pesantren Al Asror

No.	Solution	Participation
1.	1) Waste management training for santri and cleaning teams/volunteers. 2) Provision of adequate work safety equipment.	A minimum of 20 male santri will be the cleaning team/volunteers who manage the waste temporarily.
2.	Maggot Cultivation Training for santri and cleaning teams/volunteers.	A minimum of 20 male santri will be the cleaning team/volunteers.

Evaluation activities for the implementation of service activities are also carried out, which include evaluating the implementation of each service program up to a comprehensive evaluation of the implementation of service activities. Evaluation indicators consist of (1) successful implementation of service activities; (2) evaluation of increasing understanding and competence in temporary waste management; and (3) evaluation of increasing understanding and skills in maggot cultivation.

## RESULTS AND DISCUSSIONS

Community service activities were carried out in two sessions on Saturday, May 18 2024 in the Al Asror Vocational School Classroom. The activity was attended by 20 male santri of Pondok Pesantren As Salafy Al Asror and 10 residents around pesantren (Patemon sub-district). Present as a resource person besides the service team was Mrs. Inaya Sari Melati, M.Pd. from FEB UNNES and Mr. Luthfan Faladias from Komunals Semarang City who is active in activities caring for waste management and maggot cultivation. The activity begins with an introductory report from the service team (Figure 2). The activity continued with remarks and prayers by the caretaker of the Pondok Pesantren Al Asror, KH. Al Mamnuhin Kholid and group photos (Figures 3 and 4).



**Figure 2.**

Service Team Provides Introductory Report

KH. Al Mamnuhin Kholid or who is usually called Gus Nuhin, the caretaker of the cottage, gave a speech and emphasized that this service activity is very important, especially regarding waste management and maggot cultivation. Leftover food in the hut can be used for maggot cultivation and can be an economically valuable solution. It is hoped that students or residents can take this activity seriously. Then it was emphasized again in the closing remarks at the

end of the activity. The maggot cultivation pilot will have a significant impact on activity participants, starting with a visit to the maggot cultivation site by Komunals in Cepoko Gunungpati.



Figure 3.

Gus Nuhin provides a Welcome speech and Direction



Figure 4.

Photo with Kiai, Service Team, Speaker, and Activity Participants

The description of the service activities is as follows.

**1. Waste management training activities for santri and local residents (cottage cleaning volunteers)**

The service team has given a pre-test to participants before delivering the material. The pre-test is intended to determine participants' understanding of waste and its management. In the waste management material, participants complete 8 question items with details of the sub-material;

knowledge of waste and waste (3 questions), varieties and types of waste (2 questions), and waste management regulations (3 questions). The pre-test results show that most participants still have to improve their understanding of waste and the regulations governing waste in Indonesia and the city of Semarang (See table 2). Participants' knowledge about rubbish and waste is in the good category, as many as 70% of the answers are correct. As many as 45% of the answers were correct in the sub-material variety and types of waste. And only 42% of the answers were correct in the waste management regulation sub-material.

Table 2. Waste Management Material Pre-test Results

Materials	Correct answer		Wrong answer	
	Amount	%	Amount	%
Knowledge of waste and waste (3 questions)	42	70	18	30
Variety and types of waste (2 questions)	18	45	22	55
Waste management regulations (3 questions)	25	42	35	58

After the pre-test, the service activities continued with opening activities and delivering material. The head of the service team, Drs. Fachrurrozie, M.Sc. became a speaker in the first session with a focus on waste management. He said that waste generation data in 2023 shows that

Semarang City is the highest waste producer in Central Java, followed by Brebes Regency and Grobogan Regency. Waste generation per day can reach 1,183.29 tons or 431,534.65 tons per year. Household waste is the largest producer of waste based on waste sources. And food waste is the highest composition based on the type of waste. The material continues with an explanation of the phenomenon of unmanaged waste and the impacts it causes. The speaker also gave examples of successful waste management and the positive effects of this success. The resource person emphasized the importance of managing waste as well as possible to have a positive impact on the surrounding environment. The phenomenon of waste management volunteers going viral on social media is a real example of good practice and can be used as an example for society. Activity participants listened to the material presentation well and enthusiastically. The speaker uses the question and answer method to invite participants to be actively involved in understanding the material presented.



**Figure 5.**

Head of Community Service Delivers Waste Management Material



**Figure 6.**

Participants Listen to the Material Carefully

## 2. Maggot Cultivation Training for santri and local residents (cottage cleaning volunteers)

Maggot cultivation training was chosen because it can increase students' knowledge and skills in maggot cultivation which has many advantages. Maggot itself has a high protein value for animal feed so it can be a solution for breeders as an economical alternative feed (Khotmi et al., 2023). The economic value resulting from cultivating BSF fly maggots is the production of animal feed specifically for poultry and fish which has a high selling value on the market (Aji et al., 2023). Innovation in processing organic waste by utilizing BSF maggot larvae is able to integrate the agriculture, livestock, fisheries and environmental sectors (Andrio et al., 2022).

Participants also took a pre-test before this second activity. Participants' understanding of maggot cultivation is still low. Training activities are very important to provide knowledge and skills regarding maggots and its cultivation. Table 3 shows the results of the pre-test with material regarding knowledge of BSF flies and their cycles, maggot food sources, and maggot cultivation media. The pre-test results indicated that the participants' understanding was only 60% regarding the BSF routine and its cycles. As many as 45% of the answers were correct in the sub-



material on types of waste, maggot food sources, and 40% of the answers were correct in the sub-material on maggot cultivation media. Thus, maggot cultivation training is very important to carry out with the aim of increasing the understanding and skills of service activity participants in maggot cultivation.

**Tabel 3.** Hasil Pre-test Materi budidaya maggot

Materials	Correct answer		Wrong answer	
	Amount	%	Amount	%
Knowledge of BSF flies and their cycles (2 question items)	24	60	16	40
Variety and types of food waste that can become maggot food (2 question items)	18	45	22	55
Maggot cultivation media (1 question item)	8	40	12	60

The speaker in the second session was the founder of Komunals who has been actively involved in waste management and maggot cultivation activities. The first speaker (Mrs. Inaya) delivered basic material on maggot cultivation, starting with the phenomenon of food waste and regarding the BSF cycle from flies, eggs, larvae, and so on. The next explanation concerns the

economic side of maggot cultivation. The material is shown in Figure 7. The presenter shows examples of flies, larvae and others to the participants to provide a clear picture. Participants listened carefully and were very enthusiastic. The speaker also invited participants to provide responses regarding their initial knowledge about maggots. Some participants did not know what maggots were and how they were cultivated. Participants are more familiar with the term "short". There are no activity participants who are familiar with maggot cultivation.



**Figure 7.**

BSF fly, Maggot, and Pupa



**Figure 8.**

Mrs. Inaya Sari Melati Presented Maggot Cultivation Material

The next material was delivered by Mr. Luthfan Faladias (shown in Figure 9) regarding examples of maggot cultivation, how and what is needed. The resource person conveyed his experience so far in maggot cultivation. The media needed for maggot cultivation is quite a lot and needs to be prepared well. Maggot cultivation can

be done anywhere by making the right medium so that BSF flies can live and lay eggs, then the eggs can hatch in a place that has been prepared for maggot growth and development. The life cycle of BSF flies must be well understood, including food waste that can be consumed by maggots. The next explanation is the challenges and opportunities of maggot cultivation.



**Figure 9.**

Mr. Luthfan Faladias Presented Maggot Cultivation Material and Experiences

The service activity ended with the distribution of door prizes by resource persons and cottage caregivers and post-test activities. Gus Nuhin reiterated the benefits of this service activity and hopes that it can be continued with a visit to the Communals site as a trigger for pioneering maggot cultivation at Pondok Pesantren Al Asror. Food waste in the hut is available and can be used as a food source for maggots. Assistance from the communal team and service team is still needed so that the maggot cultivation pilot can be successful.



**Figure 10.**

Peserta Menerima Kaos Doorprise dari Narasumber

The results of the post-test material on waste management and maggot cultivation are presented in Table 4. The average score obtained by the participants shows that there was an increase from pre-test to post-test. Knowledge of waste and abundance is a sub-material that has experienced a significant increase. Participants were able to differentiate between waste and overflow. Knowledge about BSF flies and their cycles has also increased significantly. Participants still have difficulty understanding waste management regulations. Not many participants were able to explain the latest regulations if people commit violations in waste management. Then participants were able to explain the various media that can be used for maggot cultivation.

**Table 4.** Comparison Results of Pre-test and Post-test Material on Waste Management and Maggot Cultivation

Materials	Average Score		Description
	Pre-test	Post-test	
Knowledge of rubbish and waste	70	95	Improved

Materials	Average Score		Description
	Pre-test	Post-test	
Variety and type of waste	45	60	Improved
Waste management regulations	42	50	Improved
Knowledge of BSF flies and their cycles	60	93	Improved
Various and types of food waste that can become maggot food	45	50	Improved
Maggot cultivation media	40	85	Improved
<b>Average Score</b>	<b>54.5</b>	<b>74.0</b>	<b>Improved</b>

## CONCLUSION

Community service activities regarding waste management and maggot cultivation have been carried out well in Pondok Pesantren As Salafy Al Asror environment in Semarang. A total of 20 male santri and 10 Patemon residents were involved in service activities. The service team was the speaker for the activity with the sub-material on waste management and the founder of Komunals Semarang explained the sub-material on maggot cultivation. Participants enthusiastically participated in the activity until it was finished. The post-test results also indicated that there was a significant increase in participants' knowledge regarding waste management and maggot cultivation. Strong service partner support is a factor in the success of implementing service

activities. Pondok Pesantren Al Asror is a service partner of FEB UNNES with a variety of activities that have been carried out. The sustainability of the program can be realized by carrying out the following activities to develop the entrepreneurial spirit of students by pioneering maggot cultivation.

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