



The Effectiveness of the *Eco-Pentren* Program and the *SampahKita* App in Environmental Conservation at Islamic Boarding School

Sri Ira Suharwati¹, Fadolul Ghafur², Moh. Ihsan Zain³

¹State Islamic University of Madura, Pamekasan, Indonesia

²Mambaul Ulum Bata-Bata Islamic High School, Pamekasan, Indonesia

³Udayana University, Bali, Indonesia

Article Info

Article History:

Received 04 25, 2026

Revised 05 14, 2026

Accepted 05 20, 2026

Keywords:

Effectiveness;
Eco-Pentren;
SampahKita;
Environmental
Conservation,
Islamic boarding schools.

Abstract

The level of public awareness regarding environmental sustainability, particularly in waste management at Mambaul Ulum Bata-Bata, remains relatively low. The gap between theoretical understanding and practical application in the field is an issue that must be addressed. To address this issue, the *Eco-Pentren* program can be implemented, along with the use of the *SampahKita* app in partnership with the Hamdalah waste management service. This study employs a quantitative approach using data collection techniques such as pre-test and post-test assessments, as well as documentation. The study sample consists of 43 students/pupils from Mambaul Ulum Bata-Bata selected at random. Data were analyzed using frequency distributions with the aid of basic SPSS. The research results indicate that the implementation of the *Eco-Pentren* program and the *SampahKita* app proved effective at a rate of 72.1%. It was deemed effective due to changes in student behavior, including active participation in the "Clean Morning" and "Blessed Friday (School Cleanup)" programs as well as their practice of the 5R principles, maggot farming, active participation in scientific writing activities on environmental themes, and the formation of a special task force (LHB Task Force) whose members consist of administrators and religious instructors who address environmental issues in a structured manner.

[Tingkat kepedulian masyarakat terhadap kelestarian lingkungan terutama dalam pengelolaan sampah di Mambaul Ulum Bata-Bata tergolong masih rendah. Perbedaan pemahaman antara teori dan praktek di lapangan menjadi masalah yang harus di selesaikan. Untuk mengatasi masalah tersebut dapat dilaksanakan melalui program *Eco-Pentren* dan pemanfaatan aplikasi *SampahKita* yang bermitra dengan bang sampah Hamdalah. Penelitian ini menerapkan pendekatan kuantitatif dengan Teknik pengumpulan data berupa pretes-post tes serta dokumentasi. Sampel penelitian adalah 43 siswa/santri Mambaul Ulum Bata-Bata yang dipilih secara acak. Data dianalisis menggunakan distribusi frekuensi dengan bantuan SPSS sederhana. Hasil penelitian menjelaskan bahwa penerapan *Eco-Pentren* dan aplikasi *SampahKita* terbukti efektif dengan persentase 72,1%. Dikatakan efektif karena adanya perubahan perilaku siswa yang aktif dalam program kegiatan "Pagi Bersih" dan "Jum'at Berkah (Bersih-bersih Sekolah)" serta praktek dalam penerapan 5R, Budi daya Maggot, aktif ikut serta dalam kegiatan karya tulis ilmiah tema peduli lingkungan, dan terbentuknya kelembagaan khusus (Satgas LHB) dengan anggotanya berasal dari pengelola dan ustadz yang menangani isu lingkungan secara terstruktur.] © The Authors.

This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license.



*Corresponding Author:

Sri Ira Suharwati

Universitas Islam Negeri Madura

Jalan Raya Panglegur No.Km. 4, Barat, Ceguk, Kec. Tlanakan, Kabupaten Pamekasan

Email: sriirasuharwati@gmail.com

1. Introduction

Awareness of the importance of protecting the environment remains low, whether in urban areas, villages, or remote regions. Environmental awareness is a deep understanding of the connection between human actions and their impact on nature, which is then internalized as a value and guides daily behavior. This low level of awareness manifests in various behaviors, such as: a lack of effort to sort household waste, indifference toward the long-term impacts of littering, and minimal efforts to reduce consumption of items that have the potential to become waste. Classic literature in environmental psychology identifies that knowledge about environmental issues does not automatically transform individual behavior [1].

Changing consumption patterns, such as modern lifestyles driven by convenience, practicality, and a linear economy (take-make-dispose) have given rise to a *throwaway culture*. These changes have led to ever-growing mountains of waste, causing environmental pollution and threatening the balance of ecosystems. This issue is not merely a technical problem regarding how to collect and dispose of waste, but rather a reflection of a crisis in environmental awareness. While global concern for the environment is growing, the gap between attitudes and behavior (*attitude-behavior gap*) remains a major challenge in promoting a sustainable lifestyle [2].

The large population and diverse activities in Indonesia's major cities have led to challenges in urban infrastructure services, including waste management. The public often views waste as something that is no longer useful and considers the matter settled once it is disposed of in a trash bin. To date, the prevailing paradigm of waste management has been "collect, transport, and dispose" [3]. This perspective ignores the fact that waste does not disappear; it merely changes location, accumulates, and continues to have negative impacts over a very long period of time. The lack of understanding regarding the natural material cycle and the consequences of waste accumulation is no longer merely a technical issue, but rather a matter of behavior and values stemming from weak environmental awareness.

Normatively, waste management has a strong legal foundation, namely Law No. 18 of 2008 on Waste Management. This regulation stipulates that waste as a byproduct of human activities and natural processes must be managed comprehensively and sustainably. However, in practice, there remains a gap in the implementation of this regulation. Waste management is often limited to simply moving waste from its source to a Temporary Storage Site (TPS), transporting it, and then dumping it at a Final Disposal Site (TPA). This approach is ineffective and unsustainable; it merely shifts the problem from one location to another while ignoring the economic and environmental potential of the waste itself.

Efforts to address the environmental crisis cannot rely solely on technological and regulatory approaches; they must also address fundamental aspects, namely changing people's perspectives, attitudes, and behaviors toward nature. Education is one of the key efforts to foster environmental awareness, which will play a significant role in preventing environmental degradation and can even help repair existing damage and mitigate other negative environmental impacts. Environmental education is a means of raising individuals' awareness of environmentally friendly behavior so that ecosystem sustainability is maintained. Environmental education serves as a response to this urgent need. It is a process that teaches individuals to act in ways that promote responsible management of the environment and natural resources, while enhancing environmental awareness and ethics [4].

Mambaul Ulum Bata-Bata is one of the Islamic educational centers in Pamekasan with a large student population. The high volume of activity within the pesantren generates a significant amount of waste, both organic and inorganic. Waste management remains minimal, consisting primarily of disposal and burning, which poses a potential threat to environmental sustainability. Based on preliminary research at the Buq'atus Syabibah Polagan Galis Islamic Boarding School in Pamekasan, the main problems faced are the students' habit of littering, poor hygiene, and wasteful behavior, which pose challenges in creating a healthy and clean boarding school environment [5]. Improperly managed waste has the potential to cause environmental pollution and trigger disease outbreaks.

One approach that can be implemented to address this issue is through the Eco-Pontren program as part of efforts to increase the involvement of the younger generation and school communities in addressing sustainability challenges. Eco-Pontren is a pesantren-based waste management system that encourages students, administrators, and teachers to play an active role in it. In this system, waste is not only collected but also sorted and distributed, enabling the Islamic boarding school to derive economic value from the practice of saving waste. Additionally, waste management is streamlined through the use of the SampahKita app, which is equipped with modern features aligned with current technological advancements. Given these conditions, this study aims

to measure the effectiveness of the Eco-Pesantren program and the SampahKita app in environmental conservation efforts at Mambaul Ulum Bata-Bata. This study differs from previous research in that it employs a pretest-posttest design and incorporates digital technology (SampahKita) into waste management at Islamic boarding schools.

2. Method

This study employs a quantitative approach. Data collection methods include research instruments administered through initial socialization, pre-tests, and post-tests, as well as observation and documentation. The sample in this study consisted of 43 students/pupils from Mambaul Ulum Bata-Bata, selected at random. To determine the validity and reliability of the instrument, validity and reliability tests were conducted. The data analysis employed descriptive statistics using frequency distributions. By calculating the scoring (maximum and minimum scores), an interval was determined to assess the effectiveness of *the Eco-Pentren program* and the use of *the SampahKita app* by the respondents in preserving the environment, as follows. $i = \frac{R}{K}$.

3. Results

The classification of the effectiveness of *Eco-Pentren* and the *SampahKita app*, following calculations to determine the score intervals and the categories of effectiveness (effective or ineffective), is presented in Table 1.

Table 1 Classification of Effectiveness

No	Interval	Category
1	10–37.5	Not Effective
2	38.5–65	Effective

Based on the research results, *gain scores* ranging from 10 to 65 were obtained. The effectiveness of the *Eco-Pentren* program and the *SampahKita app* in promoting environmental sustainability in Mambaul Ulum Bata-Bata was determined by scoring the difference between the pretest and posttest results. Table 2 presents the frequency distribution of *the gain scores* for the effectiveness of *Eco-Pentren* and the *SampahKita app*.

Table 2. Frequency Distribution of the Effectiveness of *Eco-Pentren* and the *SampahKita App*

No	Interval	Category	Frequency	Percentage (%)
1	10–37.5	Ineffective	12	27.9
2	38.5–65	Effective	31	72.1
			43	100

Table 1 shows that the implementation of *Eco-Pentren* and the *SampahKita app* are effective in preserving the environment in Mambaul Ulum Bata-Bata. A total of 31 respondents were categorized as effective in their participation in the *Eco-Pentren* program and use of the *SampahKita app*, while 12 respondents were categorized as ineffective. The effectiveness of the program is evident in several activities, such as: the formation of an environmentally conscious student community (Figure 1), student activities in maggot farming (Figure 2), and their ability to write scientific papers.



Figure 1. Student Environmental Care Club



Figure 2. Maggot Farming

4. Discussion

MA Mambaul Ulum Bata-bata is the founding school of *Eco-Pentren*, which collaborates with Bank Sampah Hamdalah a waste management company through an existing application system in Pamekasan, with the aim of providing education on sustainability programs to preserve the environment. Bank Sampah Hamdalah is a waste management system that sorts waste into economically valuable and non-economically valuable categories, which are then processed and monitored through the *SampahKita* application system. The *SampahKita* application is a technology-based information system owned by Bank Sampah Hamdalah to facilitate access for customers and educational administrators to understand and manage waste through a digital platform accessible via the website <https://SampahKita.biz.id/>.

Technically, the *SampahKita* app's operational mechanism begins with the sorting of waste generated by schools or Islamic boarding schools. At this stage, the waste is separated and classified based on its composition, such as plastic, paper, metal, and organic waste. This sorting process is a crucial component of waste management through the waste bank system, as it determines the economic value of the waste deposited [6]. In practice, the *SampahKita* app serves as a digital platform that integrates the entire process of waste collection, recording, and management with a savings system for waste bank customers.

Once the waste classification process is complete, the waste is then transported to a collection center or waste bank unit, specifically Bank Sampah Hamdalah, which acts as an operational partner collaborating with MA Mambaul Ulum Bata-bata. At this stage, staff weigh the waste to determine the quantity and type of waste deposited by the school or Islamic boarding school. The data from the weighing is then recorded and entered into the *SampahKita* app's waste bank administration system as part of the digital transaction recording process. Through this system, each customer has an account or identity that allows them to monitor the amount of waste deposited and the economic value derived from the sale of that waste [7].

The data recorded in the app is then processed by the administrators of the Hamdalah Waste Bank to determine the conversion value of waste into savings balances. This value is based on the type and market price of recyclable waste materials. This savings system allows customers to derive economic benefits from waste management activities [8]. In practice, savings balances can be converted into various forms, such as cash savings, education savings, basic necessities (groceries), and even gold savings, in accordance with the mechanisms in place at the waste bank [9]. The app's function is not merely to serve as a tool for recording transactions; this platform also serves as a means of monitoring and managing environmental data. Through an integrated digital system, administrators can identify the volume of collected waste, the dominant waste categories, and the level of community or school participation in the waste management program.

The collaboration between conventional waste bank systems and digital platforms like *SampahKita* demonstrates a paradigm shift. This approach not only improves administrative efficiency but also strengthens community participation through data transparency and easy access to information. Thus, the use of the *SampahKita* app is an innovation supporting community-based waste management oriented toward the principles of the circular economy and environmental sustainability [10].

The *Eco-Pentren* system involves several key steps, namely: 1) an initial socialization phase through the provision of basic understanding regarding *Eco-Pentren*, which also consists of Pre-Test and Post-Test activities; 2) Technical Training through in-depth explanations regarding system standardization, workflows, and benefits. *Eco-Pentren* also adopts the principles of a waste bank in environmental conservation, namely by focusing on the application of the 3R principles (Reduce, Reuse, Recycle), which are then supplemented with Replace and Repair. The most important aspect of a waste bank is not its economic value, but its role as a vehicle for environmental education. The Dipo Waste Bank at Diponegoro University, for example, systematically implements these principles by involving the entire academic community. As a result, there has been an increase in the percentage of managed waste relative to the campus's inorganic waste generation, supported by growing awareness among campus residents [11].

4.1 Student Environmental Care Club

The effectiveness of the *Eco-Pentren* program and the *SampahKita* app is evident in the behavioral changes among the students. The implementation of *Eco-Pentren* and the *SampahKita* app has proven effective at MA Mambaul Ulum Bata-Bata. This is evidenced by the formation of an environmentally conscious student community serving as pioneers in maintaining and preserving the school environment through the "Clean Morning" and "Blessed Friday (School Cleanup)" programs,

as well as the practice of implementing the 5R principles. The Annuqayah Islamic Boarding School in Sumenep, Madura, has even managed to recycle waste into economically valuable products such as eco-paving blocks, liquid fertilizer, and accessories [12]. The Syekh Hasan Yamani Islamic Boarding School demonstrates that an intervention model integrating conventional educational approaches with Islamic values is effective in fostering pro-environmental behavior and establishing sustainable waste management within the boarding school [13]. The same study found that although its effectiveness was low, one of the waste banks actually had a high efficiency rate (>1). This means that the waste bank was able to produce a greater output than the input expended [14].

4.2 Maggot Farming

Maggot farming is also a method of waste management that utilizes waste as a protein source by integrating crops, livestock, and fish through the natural process of larval bioconversion—a process driven by decomposing organisms that feed on organic matter. In addition to its ability to reduce waste, the primary advantage of maggot farming lies in its byproducts, which hold economic value. Harvested maggots can be utilized as an alternative, protein-rich livestock feed. The implementation of maggot farming in Islamic boarding school environments has also yielded impressive results. The Darul Mushlihin Islamic Boarding School in Bantul, for example, successfully reduced its organic waste volume by up to 60% within the first two months of the program's implementation. Similar research also explains that processing organic waste to reduce the amount of waste around the environment as feed for BSF fly larvae. Additionally, it can also provide additional income for the students [15].

4.3 Scientific Paper

The *Eco-Pentren* program also produces scientific papers on environmental topics to support students' literacy and research skills, ensuring that every activity carried out is documented in a written record. These scientific papers even won third place in a national scientific writing competition. These activities demonstrate that the implementation of *Eco-Pentren* and the *SampahKita* app is not solely focused on waste management but also serves as a tool for education and the economic empowerment of students through the economic value of inorganic waste that can be saved. Khoirunnisa's (2020) research at the Ibnul Qoyyim Putri Islamic Boarding School found a strong connection between waste bank management and Islamic education. The waste bank serves as a medium to instill in students the understanding and practice of cleanliness values, which are an integral part of Islamic teachings [16].

Waste management is also carried out in the boarding school's kitchen area. Kitchen waste generated by the boarding school's kitchen which serves as a dining hall for thousands of male and female students naturally produces waste that must be managed effectively. The organic waste generated by the boarding school's activities is used as maggot feed and processed into organic compost. All of these activities are supervised and supported by the Bata-bata Environmental Task Force (LHB). The formation of this task force was motivated by an awareness of the importance of maintaining cleanliness, particularly among boarding school residents and students. The LHB members themselves consist of administrators and religious instructors within the Mambaul Ulum Bata-bata Islamic boarding school community. Research by Nurika et al. (2022) indicates that the mentoring program for establishing a waste bank system at the Nurul Jadid Islamic Boarding School successfully enabled the boarding school's management to independently develop the organizational structure and management workflow of the waste bank [17]. A similar study at the Aqwamu Qila Islamic Boarding School showed that a waste management program featuring three flagship initiatives (Waste Bank, Maggot Farming, and Compost Fertilizer) successfully increased the empowerment of partners and reduced the generation of organic and inorganic waste through continuous monitoring [18].

The well-managed *Eco-Pentren* and *SampahKita* programs contribute to the economic growth of the Islamic boarding school. Both processed waste and waste sold directly provide economic benefits in the form of savings. The forms of these savings are: a) Regular Savings; savings withdrawn once a month in the form of cash, b) Basic Necessities Savings; savings withdrawn once a month in the form of basic necessities (rice, cooking oil, groceries, phone credit, electricity, and so on), c) Education Savings; Savings withdrawn at the start of each semester, which can take the form of stationery, uniforms, shoes, and other school supplies; d) Gold Savings; Savings that can be converted into mini gold bars that can be directly claimed by the account holder. Students and residents of Islamic boarding schools who save sorted waste receive a savings book and the rupiah value of the saved waste [17]. Other research findings indicate that the implementation of eco-boarding school education can boost the boarding school's economy, develop students'

entrepreneurial skills, facilitate the growth of micro-enterprises, and raise awareness of the importance of economic sustainability through eco-boarding school education [19].

The implementation of the *Eco-Pesantren* program, integrated with the use of the *SampahKita* app, demonstrates a new approach to community-based environmental management in educational settings. Pesantren and educational institutions have great potential as centers for fostering environmentally friendly behavior because the daily activities of students and school communities take place collectively and sustainably. By utilizing digital technology in waste management, this program functions not only as a waste management system but also as an environmental education tool that builds ecological awareness in a practical and applicable way [20].

The existence of waste banks is one strategy that has proven effective in increasing community participation in community-based waste reduction and management. The waste bank model operates on the principle of the circular economy, which involves reusing waste as an economic resource through the processes of sorting, collection, and recycling. This approach shifts the community's perspective from viewing waste as worthless refuse to recognizing it as a resource with economic value [21]. The use of the *SampahKita* app in the Hamdalah Waste Bank program helps strengthen the management system through data digitization. Through this digitization, the process of recording waste transactions is conducted in a structured, transparent manner and is easily accessible to all waste bank customers. This differs from conventional systems, where transaction recording is typically done manually using passbooks or simple administrative records. Such methods often lead to various challenges, such as potential recording errors, limitations in data management, and difficulties in conducting a comprehensive program evaluation [22].

Through the *SampahKita* app, every waste weighing transaction is immediately recorded in a digital system linked to the customer's account. This makes it easy for users to track the amount of waste they have deposited and the economic value generated from the waste management process. This data transparency is a key factor in building public trust in the waste bank system, as customers can view every transaction directly through the app they use [23]. The use of digital applications in waste bank management also makes a significant contribution to environmental data management. Data obtained from waste collection activities can be processed to identify the most dominant types of waste, calculate the volume of waste successfully managed, and measure the level of community participation in environmental management programs. In the context of Islamic boarding schools or community-based educational institutions such as Mambaul Ulum Bata-Bata, the integration of the *Eco-Pentren* program and the *SampahKita* application has a significant impact on fostering an environmentally conscious character. Students not only gain theoretical knowledge about the importance of protecting the environment but are also directly involved in sustainable waste management practices. This involvement fosters positive behaviors such as sorting waste, reducing the use of single-use plastics, and reusing materials that still have practical value [7].

An environmental education approach that emphasizes hands on activities like this is considered more effective in fostering environmentally conscious behavior than purely theoretical teaching methods. When students are actively involved in environmental management activities, they are able to connect their daily actions with their consequences for ecosystem balance. This aligns with the concept of sustainable environmental education, which emphasizes the importance of experiential learning to foster long-term environmental awareness. Beyond educational aspects, the existence of the *SampahKita* app also promotes community economic empowerment. The savings system implemented in waste banks allows the economic value of the waste collected by customers to be converted into a balance that can be used for various needs. In some waste bank practices in Indonesia, this balance can even be exchanged for basic necessities, educational expenses, or long-term savings [24].

This waste management-based economic model is part of the circular economy concept, which is increasingly being implemented in global environmental management policies. The circular economy emphasizes the optimization of resource use by reducing waste, recycling materials, and extending the lifespan of products. By treating waste as an economic resource, waste bank programs indirectly help curb the exploitation of natural resources and reduce the volume of waste that ends up in landfills. Additionally, the integration of digital technology into waste management systems is part of the transition toward a smart environment. This concept refers to the use of information technology to improve the efficiency of environmental resource management through monitoring systems, data processing, and decision-making based on digital information. In this context, the *SampahKita* app can be viewed as one of the local innovations supporting the development of technology-based environmental management systems at the community level [25].

The success of implementing digital applications in waste management continues to be influenced by several supporting factors, such as the level of digital literacy particularly among students and residents of Islamic boarding schools the availability of technological infrastructure, and the commitment of program administrators to provide guidance to users. Without such support, the use of digital technology may not function optimally. Therefore, training and outreach programs regarding the use of the application are a crucial component in ensuring the sustainability of technology-based waste management systems[26]. From a program sustainability perspective, the integration of waste banks, digital applications, and environmental education within educational institutions such as Islamic boarding schools can serve as a replicable environmental management model across various regions. The combination of social, economic, and technological approaches enables the creation of a more effective and sustainable waste management system. Furthermore, the involvement of educational institutions is crucial in fostering a younger generation that is highly conscious of the importance of environmental conservation [27].

The implementation of the SampahKita app in the Hamdalah Waste Bank program not only impacts waste management from a technical perspective but also has broader implications in the fields of environmental education, community economic empowerment, and the strengthening of technology based environmental management systems. This integration of community-based approaches, digital technology, and environmental education represents a relevant innovation in addressing the increasingly complex challenges of waste management in the modern era.

5. Conclusion

The *Eco-Pentren* program at the Mambaul Ulum Bata-Bata Islamic Boarding School in Pamekasan has proven effective in enhancing environmental awareness and management, particularly regarding waste management. The use of the *SampahKita* app in partnership with the Hamdalah Waste Bank demonstrates that the boarding school has established a waste banking system that can serve as a foundation for future digital application development. Factors supporting the effectiveness of the *Eco-Pentren* program include: a) the establishment of a dedicated institutional body (LHB Task Force) to address environmental issues in a structured manner, b) the mass involvement of students in environmental cleanliness and conservation, and c) technological innovations such as the use of Mini Composters and the waste bank system. This research still requires further development; for example, the SampahKita app needs to be equipped with an offline mode and smart notifications, as many Islamic boarding schools have limited internet access.

References

- [1] A. Kollmuss and J. Agyeman, "Mind the Gap : Why do people act environmentally and what are the barriers to pro-environmental behavior ? Mind the Gap : why do people act environmentally and what are the barriers to," vol. 4622, 2010, doi: 10.1080/13504620220145401.
- [2] E. Mannoni, "' I ' m worried , but ' : Unpacking the gap between environmental concern and pro- - environmental behavior," no. August 2024, pp. 644–665, 2025, doi: 10.1111/spsr.12660.
- [3] K. Pengantar, "Pengelolaan sampah," 2011.
- [4] E. Thinking, *ENVIRONMENTAL EDUCATION IN THE 21ST CENTURY*.
- [5] K. Lingkungan, "No Title," pp. 1–2, 2021.
- [6] M. R. Ismiraj, A. Wulansari, Y. Setiadi, A. Pratama, and N. Mayasari, "Perceptions of Community-Based Waste Bank Operators and Customers on Its Establishment and Operationalization : Cases in Pangandaran , Indonesia," 2023.
- [7] A. Pariono, A. Y. Katili, and I. K. S. Arsana, "Pemberdayaan Masyarakat Melalui Edukasi Pengelolaan Sampah Berbasis 3R Dalam Upaya Mewujudkan Lingkungan Bersih dan Sehat di Desa Sidomukti , Kecamatan Mootilango , Kabupaten Gorontalo," vol. 1, pp. 100–119, 2025.
- [8] E. K. Purwendah and D. J. Wahyono, "Jurnal komunikasi hukum," vol. 8, no. 1, pp. 10–17, 2022.
- [9] B. Sampah, "Membangun Kepedulian Lingkungan Warga Kelurahan Bajak Melalui," vol. 04, no. 02, pp. 5–8, 2025.
- [10] A. Sanjaya *et al.*, "Pemanfaatan Bank Sampah dalam Kesejahteraan Masyarakat Desa Kersik Meningkatkan," vol. 7, no. 1, pp. 1–8, 2023.
- [11] J. I. Lingkungan *et al.*, "Implementasi Pengelolaan Sampah Melalui Bank Sampah Kampus Dipo Waste Bank Universitas Diponegoro Menuju Green Campus," vol. 23, no. 2, pp. 500–506, 2025, doi: 10.14710/jil.23.2.500-506.
- [12] K. M. K. Umam, "NU Online Jatim," 2025.
- [13] G. D. Dirawan, N. A. S. Taufiq, and A. Gafur, "Santri Bijak Sampah : Edukasi dan Implementasi Sistem Bank Sampah di Pesantren Syekh Hasan Yamani," vol. 6, no. 2, pp. 158–166, 2025.
- [14] T. I. Syafrani, C. Meidiana, and D. W. Adrianto, "Evaluasi kinerja bank sampah di kecamatan kepanjen kabupaten malang," vol. 15, no. 0341, pp. 291–300, 2026.\
- [15] P. Syekh *et al.*, "Pelatihan Pemanfaatan Maggot Black Soldier Fly (BSF) untuk Pengolahan Sampah Organik sebagai Alternatif Pakan Ternak pada Santri Pondok," vol. 3, no. 1, pp. 35–42, 2023.
- [16] F. A. Islam, P. Studi, P. Agama, and U. M. Yogyakarta, "EFEKTIVITAS PENGOLAHAN BANK SAMPAH (Studi Kasus di Pondok Pesantren Ibnul Qoyyim Putri)," 2020.
- [17] G. Nurika, N. Gakan, G. Wahyu, M. Putra, N. Novta, and D. Nafisah, "Manajemen Bank Sampah : Menjadikan Sampah Bernilai Ekonomi Bagi Masyarakat Pondok Pesantren," vol. 1, no. 1, pp. 81–88, 2022.
- [18] M. Zainudin, P. Utomo, A. Fitri, A. D. Ratri, and R. Pramudya, "Optimalisasi Pengelolaan Sampah Berbasis 3R untuk

- Mendukung Ekosistem Ekonomi Sirkular di Pondok Pesantren Aqwamu Qila," vol. 4, no. 2, pp. 112–118, 2025.
- [19] P. A. Prenduan and S. Madura, "Irfani Irfani," vol. 21, pp. 1053–1069, 2025.
- [20] M. Hajj-hassan and R. Chaker, "Environmental Education : A Systematic Review on the Use of Digital Tools for Fostering Sustainability Awareness," pp. 1–25, 2024.
- [21] M. Lingkungan, H. Dan, and K. Republik, "BERITA NEGARA," no. 752, 2021.
- [22] I. Rahmawati and A. B. Pratiwi, "COMMUNITY-BASED WASTE MANAGEMENT : A STUDY OF COMMUNITY PARTICIPATION FROM THE PERIPHERY OF BANYUMAS DISTRICT," vol. 11, no. 2, pp. 352–365, 2025, doi: 10.22373/al-ijtimaiyyah.v11i2.32434.
- [23] D. N. Pratiwi, Y. A. Pravasanti, M. W. Dewi, and I. Gustiani, "Pengelolaan bank sampah melalui Simbah (Sistem Informasi Bank Sampah) guna meningkatkan akuntabilitas dan transparansi," vol. 5, no. 4, pp. 753–761, 2025.
- [24] J. Saptary, W. Berry, L. C. Muthya, and Y. P. Lian, "Mengubah Sampah Menjadi Tabungan : Mengenal Konsep Bank Sampah Di Bank Sampah Mutiara Timor Kota Kupang," vol. 3, no. 4, pp. 75–80, 2024.
- [25] K. Bank and S. Desa, "Journal of Dinda," vol. 2, no. 2, pp. 97–102, 2022.
- [26] P. Studi *et al.*, "Digitalisasi bank sampah untuk mendukung smart waste management di kelurahan duri kepa," vol. 09, no. 01, pp. 282–298, 2026.
- [27] L. I. Burhan, "Inovasi Bank Sampah Digital Berbasis Ekonomi Sirkular untuk Meningkatkan Partisipasi dan Pemilahan Sampah : Sebuah Pendekatan Participatory Action Research," vol. 1, no. 4, pp. 9–21, 2025, doi: 10.63982/dharmabakti.edkat544.