

Empowering Sustainable Schools: The Impact of Eco-Green Assistance on Enhancing School Community Participation in the Adiwiyata Program

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Abstract

The Adiwiyata program requires a structured service method to encourage sustainable environmental practices in schools. This community service activity aimed to enhance environmental awareness, improve waste management skills, and strengthen green school culture at SD Plus IGM Palembang. The program involved 31 participants, consisting of teachers and students, and applied a participatory service method through six stages: needs analysis, socialization, training, application of appropriate technology, mentoring, and evaluation. Needs analysis was conducted through observation and interviews to identify school conditions and environmental challenges. Training activities included hands-on demonstrations of biopore hole construction and guided implementation of a “Digital Waste Bank” application as an appropriate technology for waste management. Mentoring was carried out to ensure participants’ engagement and continuity of practice. Program evaluation employed a mixed-method approach using pre-test and post-test instruments to measure changes in participants’ knowledge, attitudes, and skills, supported by observation and interviews to assess behavioral changes and program effectiveness. The results showed an increase in participants’ competencies, with the average score improving from 74.68 to 96.6 and an N-Gain value of 0.90 (high category). The activity contributed to improved environmental awareness and more systematic waste management practices within the school environment. Tangible outputs included functional biopore holes and an operational Digital Waste Bank system. This service model supports the achievement of Sustainable Development Goals (SDGs) 4 and 13 and can be adopted by other schools in developing sustainable green school initiatives.

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INTRODUCTION

The SDGs are a global agenda agreed upon by United Nations (UN) member states in 2015, with the aim of addressing various global challenges such as poverty, inequality, climate change, and environmental degradation. The Government of Indonesia is committed to supporting the achievement of the 17 SDGs through various national programs, including in the education sector. One of the important focuses in the SDGs is Goal 13, which is "Handling Climate Change," and Goal 4 is "Quality Education," both of which can be integrated through environmentally sound education practices in schools to instill an attitude of environmental stewardship in students. In the school environment, both goals can be implemented through the Adiwiyata School program, which is a program developed by the Ministry of Environment and Forestry (KLHK) to encourage the creation of environmentally friendly schools. The Adiwiyata program aims to create good conditions for schools as an environmentally friendly learning place. Adiwiyata has two principles, namely participatory and sustainable. The participatory principle emphasizes the involvement of all school components, starting from planning, implementation, and evaluation. Meanwhile, the sustainable principle emphasizes that all activities must be carried out in a planned and continuous comprehensive manner ([Retnasari, 2021](#))

One of the elementary schools in Palembang City that is an Adiwiyata school is SD Plus IGM, which is located on Jl. Kol. H. Burlian KM 10, Palembang City. SD Plus IGM Palembang City has a vision of "Becoming a Center of Science for the development of students with character and environmental insights." As one of the schools that has run the Adiwiyata program in Palembang City, SD Plus IGM Palembang City is a real example in the implementation of a culture of environmental care at the elementary education level. This school has excellent facilities in the form of a "Botanical Garden," which is used as a learning medium for ecology and farming practices, as well as freshwater fish cultivation. The Botanical Garden has a very big influence on the school in running Adiwiyata. Character cultivation from an early age can be a strong basis for cultivating character that cares for the environment. Students' character can develop if supported by learning experiences from the surrounding environment, one of which is through the Adiwiyata program ([Riyanti & Maryani, 2019](#)). Adiwiyata is a school program that aims to create an ideal learning environment for all school residents while fostering awareness of the importance of caring for the environment. This program encourages school residents to be responsible in environmental conservation through good school management as part of efforts to support sustainable development ([Permata & Nurizka, 2021](#)).

Data from Dapodik states that this school has a total of 483 students with experienced educators. Even though SD Plus IGM Palembang City is an environment-based school, based on the results of interviews with the school, there are still students who do not have an attitude of caring for the environment, and even still tend to be low. Another problem encountered at SD Plus Palembang City is the problem of waste in schools, especially in terms of waste management. Waste management that is not done correctly will cause serious problems if not handled properly ([Pahru et al., 2021](#); [Utami & Saputra, 2023](#)).

Currently, waste management is limited to being thrown into landfills, without a waste sorting or recycling process, or the use of organic waste for compost. This is certainly not in accordance with the waste management process, namely the 3Rs, namely Reduce, Reuse, and Recycle ([Hidayat & Wijaya, 2023](#); [Purnami, 2021](#)). Waste management based on the 3R concept (Reduce, Reuse, and Recycle) aims to minimize waste disposal through three main practices: reusing items that are still functional (reuse), reducing waste generation by limiting the use of disposable products and choosing reusable alternatives (reduce), and recycling waste into new or useful materials (recycle). In daily life, these practices can be implemented through simple actions such as reusing plastic bottles as plant pots, bringing

reusable shopping bags, and processing organic waste into compost. The application of the 3R concept also plays an important role in improving environmental awareness and encouraging sustainable behavior among students ([Estrada-Araoz et al., 2023](#); [Kamil et al., 2020](#); [Trisnawati & Khasanah, 2020](#)).

As a non-productive school partner in the field of primary education, SD Plus IGM Palembang possesses considerable strategic potential to develop as an environmentally oriented school. Adequate physical facilities provide opportunities for implementing school-based environmental management practices, while human resources are relatively sufficient, supported by teachers with relevant educational backgrounds and competencies. However, despite these strengths, the implementation of environmental programs has not yet been optimized as a sustainable school culture.

From an academic perspective, environmental education at the primary school level is often limited to conceptual understanding and incidental activities, without being systematically integrated into daily learning practices, curriculum content, and character education. Previous studies emphasize the importance of early environmental literacy and habituation to foster long-term pro-environmental behavior; however, practical models that integrate environmental care, waste management skills, and school culture strengthening in real school contexts remain limited. This condition creates a gap between theoretical frameworks of environmental education and their practical application in elementary schools, particularly in supporting the Adiwiyata program as a holistic and sustainable initiative.

From a community development perspective, the main challenge faced by SD Plus IGM Palembang is the low active involvement of all school residents in consistently building an environmental care culture. Existing environmental programs tend to be sporadic and activity-based rather than embedded in everyday school life. Access to information, training, and mentoring related to waste management and environmentally friendly practices is still limited. Waste sorting facilities are inadequate, organic waste management, such as composting, has not been implemented, and school-generated organic waste from food leftovers and fallen leaves remains underutilized. These conditions indicate the need for a structured assistance program that not only transfers knowledge but also builds skills, habits, and collective responsibility among school stakeholders.

Considering both the academic gap and the real conditions within the school community, the implementation of the Eco-Green program becomes a relevant and urgent approach. The Eco-Green concept emphasizes environmentally friendly lifestyles, responsible resource management, and increased ecological awareness through sustainable design and efficient use of energy and materials ([Syantayanta, 2017](#)). In the educational context, Eco-Green aims to shape students' environmental character and promote the application of sustainable practices in daily life through experiential learning and habituation.

Therefore, this community service activity aims to develop and strengthen a culture of environmental care at SD Plus IGM Palembang through structured habituation of environmental awareness and organic and inorganic waste management, in support of the Adiwiyata program for realizing a sustainable green school. This program aligns with the Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education) through strengthening environmental literacy and character education, and Goal 13 (Climate Action) through waste reduction and sustainable waste management practices.

In addition, this service activity supports Higher Education Key Performance Indicators (KPIs), including KPI 2 (student learning experiences outside campus) and KPI 5 (lecturers' scientific publications). It also contributes to the implementation of Asta Cita, particularly the fourth ideal of improving quality of life through environmental education

and healthy, sustainable living, and the fifth ideal of increasing productivity through waste management and farming skills. Furthermore, this activity aligns with the National Research Master Plan (RIRN) focus on the environmental sector, aiming to foster an environmentally conscious, independent, and empowered society. Through a collaborative approach involving lecturers, students, teachers, and pupils, this service is expected to serve as a replicable model for other elementary schools and generate sustainable behavioral change extending beyond the school environment to families and surrounding communities.

METHODS

This community service implementation follows the Participatory Action Research (PAR) model. The PAR approach was selected because it emphasizes active collaboration between the service team and school stakeholders (teachers and students) to solve environmental problems through practical innovation and behavioral change. This service implementation method focuses on assisting the Eco-Green program as a systematic solution to overcome the low awareness of environmental care of students and the lack of innovation in waste management in partner schools (SD Plus IGM Palembang). The implementation of this service program is arranged in an integrated manner through five main stages:

1. Socialization

This stage aims to get full support and a comprehensive understanding from all school residents regarding the Eco-Green program. The activity began with an analysis of initial needs through surveys and interviews to ensure that the solutions offered were relevant to the school's problems. Furthermore, the team discussed with the school to agree on the implementation of the solution. This stage was closed with counseling to all school residents about the Eco-Green concept, followed by a discussion session. The core material presented was the socialization of the Digital Waste Bank Application for inorganic waste management, materials related to biopores, and materials related to horticultural plants.

2. Training

This stage focuses on improving students' practical skills and mentoring teachers as the main agents of change in schools. The training is carried out by the demonstration method or hands-on practice. The first training is related to the creation of biopore holes, which are carried out directly by students. The training continued with the planting of horticultural plants in the school's green open space.

3. Application of Technology

This core implementation stage involves students and teachers' assistance in practicing the Eco-Green program. Two main technologies are applied: Biopores, used to manage organic waste into fertilizer for horticultural plants in schools; and the Digital Waste Bank Application (simple web-based), used to record and track the "Star of Kindness" points obtained by students from inorganic waste collection activities. The school is in charge of providing supporting devices such as internet access so that the Digital Waste Bank can function optimally.

4. Mentoring and Evaluation

This stage runs simultaneously with the implementation to ensure the effectiveness of the program. Assistance is carried out through regular visits (monitoring) by the service team to provide input and ensure that activities run according to schedule. The evaluation was carried out to measure the impact of the program on behavior change, using environmental care questionnaires as a pre-test and post-test for students. The results of this questionnaire were complemented by direct observation to measure the

improvement of students' environmental care attitudes and the overall success of the program.

5. Program Sustainability

This final stage aims to make *the Eco-Green* program an inherent and sustainable culture in schools, supporting Sustainable Green Schools. The team encourages schools to continue this program as a routine activity. As post-program support, the Digital Waste Bank application (in the process of IPR) and digital scales have been submitted to the school, and then an official handover will also be carried out related to the pocketbook for the use of biopores, which is currently still being registered for an ISBN.

The flowchart illustrating the community service process within this service method is presented in Figure 1.

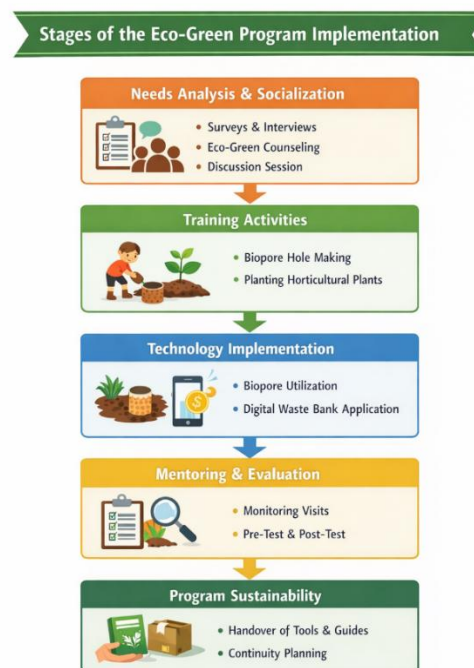


Figure 1 Flowchart of the community service process

RESULTS AND DISCUSSION

This community service activity was carried out at SD Plus IGM Palembang City as a form of support for the achievement of the SDGs, especially Goal 4 (Quality Education) and Goal 13 (Handling Climate Change). This activity aims to foster an attitude of caring for the environment, improve waste management skills, and strengthen the culture of green schools through environmentally friendly practices involving teachers and students.

1. Program Implementation

Eco-Green mentoring activities are designed through five main stages, namely, socialization, training, technology application, mentoring and evaluation, and program sustainability. The results obtained from this Eco-Green activity are described in the order of the implementation stages as follows:

a. Preparation

The initial activity carried out by the service team was to carry out preparations for service activities. At this stage, the team designed the Digital Waste Bank application. This

application is in the form of a web application that can be accessed through laptops and smartphones. After finishing making a prototype of the Digital Waste Bank application, the team discussed again with Mrs. Mefi Laranti, S.Pd., as the principal of SD Plus IGM, for the finishing of the application and manual book. The creation of the prototype of the Digital Waste Bank application will be carried out from September 30 to October 15, 2025.

The discussion between the service team and the principal of SD Plus IGM Palembang resulted in several strategic agreements that served as the foundation for implementing the Eco-Green community service program. The discussion focused on aligning the school's needs with the objectives of the service program in supporting the strengthening of environmental care culture and the implementation of the Adiwiyata program.

First, the school conveyed its initial conditions related to environmental management, particularly issues concerning organic and inorganic waste that had not been optimally managed and were not yet integrated into daily learning activities. Based on these conditions, it was agreed that the community service activities would focus on fostering environmentally responsible behavior through educational, practical, and sustainable waste management practices.

Second, the discussion resulted in an agreement on the main forms of activities to be implemented, including the socialization of the Eco-Green concept, training on the construction and maintenance of biopore holes, and the implementation of a Digital Waste Bank application as a technology-based medium for managing inorganic waste. The school principal expressed full support for the use of simple and accessible technology to enhance student participation and motivation in environmental activities.

Third, the discussion clarified the division of roles and responsibilities. The service team would act as facilitators, material providers, trainers, and mentors, while the school would be responsible for providing supporting facilities, organizing participants, and ensuring the sustainability of the program after the completion of the service activities.

Fourth, the discussion also resulted in an agreement on the evaluation instruments to measure the success of the program, namely, environmental care attitude questionnaires administered to students before and after the activities, as well as direct observations to assess behavioral changes and the overall implementation of the program. This evaluation aimed to examine the relationship between the Eco-Green activities and improvements in students' environmental awareness and behavior.

Overall, the results of this discussion served as the basis for systematic and contextual planning of the community service activities and ensured that all stages of the program were aligned with the theme of service, namely, strengthening environmental care culture and sustainable waste management to support the realization of sustainable green schools.

Other preparations made are compiling a questionnaire on environmental care attitudes and a pocketbook on biopore utilization to manage organic waste. This pocketbook was developed by the service team so that it can be used by schools for the manufacture and maintenance of biopore holes. The questionnaire and pocket book on biopore utilization are shown in Figure 2.

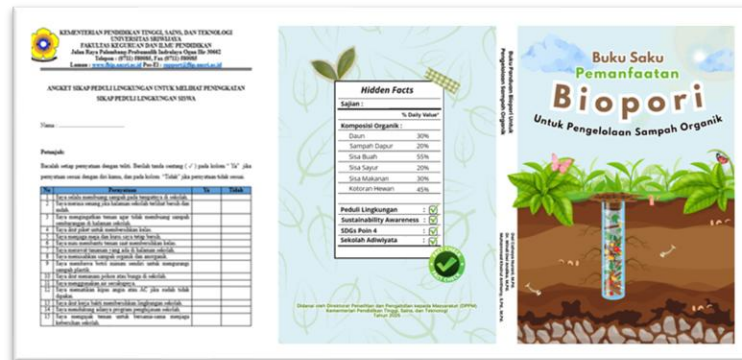


Figure 2 Questionnaire and pocket book of biopore utilization

b. Socialization

The socialization stage was carried out as the first step in introducing the Eco-Green program to all school residents. This activity was carried out on October 16, 2025, in the form of counseling packaged through the delivery of materials, discussions, and question-and-answer sessions with the aim that all parties could have the same perception and actively participate in supporting the achievement of the activity. School education that utilizes the environment as a source of facilities and infrastructure is known as *Green School*, which emphasizes harmony between buildings and the environment, so that students learn directly from nature (Pinassang et al., 2024). Before the activity started, the service team conducted a pretest to measure students' attitudes and concerns for the environment. Based on the results of data processing, an average score of 74.68 was obtained, which shows that the level of students' concern for the environment is in the good category, but it still needs to be improved through habituation and real practice activities.

The main material presented covered three important topics, namely the introduction of digital waste bank applications, the use of biopores, and the planting of horticultural plants. After the socialization activity, the practice of biopore drilling was carried out in the school area as a follow-up and a form of direct application of the material that had been delivered. Biopore socialization and training are shown in Figure 3.



Figure 3 Biopore socialization and training

In this activity, students were accompanied by teachers and the service team to make several biopore hole points around the school park. This activity aims to make students understand the function of biopores directly, as well as foster a sense of responsibility in maintaining the cleanliness and sustainability of the school environment.

c. Training

The training activity was held on October 24, 2025, at SD Plus IGM Palembang City by involving students and accompanying teachers as participants. This training uses

demonstration methods and hands-on practice that focus on finishing biopore making and planting school horticultural plants in the form of kale plants. The purpose of this training is to enable participants to apply the material that has been provided in the school environment. The service team ensures that all participants not only understand the concept but are also ready to become facilitators in implementing the Eco-Green program in a sustainable manner in the school environment. Horticulture and biopore training are shown in Figure 4.



Figure 4 Horticulture and biopore training

The training stage provided a direct impact on improving students' practical skills and strengthening teachers' roles as agents of change in environmental education. Through hands-on demonstrations and active participation in biopore hole construction and horticultural planting, students gained concrete experience in managing organic waste and understanding its environmental benefits. This experiential learning approach helped transform abstract environmental concepts into real-life practices, thereby enhancing students' environmental awareness and responsibility.

For teachers, the training functioned as a capacity-building process that enriched their knowledge and pedagogical skills in implementing environment-based learning activities. Teachers were equipped with practical methods to integrate eco-green activities into daily learning, extracurricular programs, and school routines, supporting the sustainability of the program beyond the service period.

In addition, the training activities fostered collaboration and collective responsibility among students, teachers, and the service team, creating a supportive learning environment for pro-environmental behavior change. Overall, this training stage not only improved technical skills related to waste management and urban farming but also contributed to the development of positive environmental attitudes and sustainable habits, in line with the objectives of the Eco-Green program and the Adiwiyata framework.

d. Application of Technology

The technology application stage is a core activity in the implementation of the Eco-Green program. At this stage, students and accompanying teachers begin to directly practice the entire series of activities that have been socialized and trained before, especially in organic and inorganic waste management. The applied technology is shown in Figure 5.

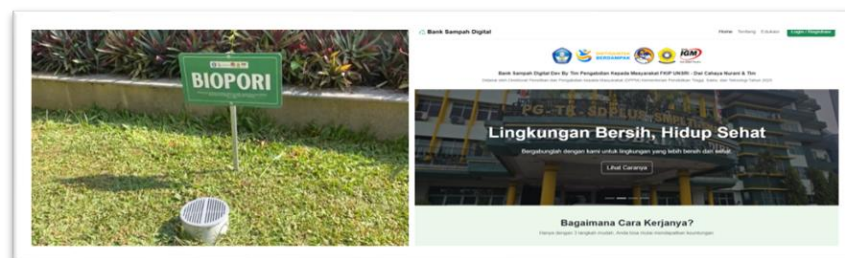


Figure 5 Applied technology

The technology applied in this stage includes biopores as a simple and environmentally friendly technology, or what is often called appropriate technology, as well as the application of digital waste banks as an innovation in waste management based on information technology. Appropriate technology is a simple innovation that helps the community in managing waste efficiently and improving environmental empowerment (Pradani et al., 2025). In its implementation, tools in the form of laptops or smartphones connected to the internet network are used to record and monitor waste transactions digitally, as well as checking the "Star of Kindness" points.

In horticultural activities, students and accompanying teachers transfer kale seeds into the planting medium in the form of hydroponic net pots, which are then arranged on hydroponic horticulture pipes. After transplanting, the plant is given additional vitamins and nutrients to support growth. Furthermore, students are guided to take turns to schedule checking and caring for plants as a form of responsibility for the environment.

e. Mentoring and Evaluation

The mentoring and evaluation stage was carried out directly by the service team, consisting of lecturers and students, on November 3, 2025, to ensure that the partner schools have carried out all Eco-Green programs in accordance with the established procedures. In this activity, the team conducted field visits to provide technical guidance, assist teachers and students in maintaining the sustainability of activities, and ensure that all program components, such as biopores, digital waste bank applications, and horticultural plant care, run well. Monitoring is shown in Figure 6.



Figure 6 Monitoring

In addition to mentoring, the service team with partners also conducted an evaluation by conducting interviews with accompanying teachers related to the implementation and inhibiting factors of eco-green activities, as well as conducting post-tests on students. Monitoring is focused on the sustainability of the habituation of environmental care attitudes in schools, while evaluation is used to assess changes in attitudes and knowledge of school residents after the program is implemented.

Based on the post-test results, an average score of 96.68 was obtained, which shows a significant increase compared to the pretest results. This result is proof that the Eco-Green program has succeeded in increasing environmental care and waste management awareness in schools.

f. Program Sustainability

As a follow-up to the implemented community service activities, the Eco-Green program is planned to be further developed through continued mentoring to ensure the sustainability and strengthening of an environmental care culture in partner schools. These follow-up activities include periodic monitoring of biopore utilization and the implementation of the Digital Waste Bank, as well as mentoring teachers in integrating Eco-Green activities into

classroom learning and routine school programs. The transfer of assets is shown in Figure 7.



Figure 7 Asset surrender

In addition, further service activities are directed toward strengthening the school's capacity to manage waste independently and sustainably, including optimizing the use of compost produced from biopores for school horticultural plants. The service team will also provide technical consultation if the school encounters challenges in using the Digital Waste Bank or maintaining biopore facilities.

As part of sustainability support, the outputs of the activity in the form of a biopore utilization guidebook and guidelines for using the Digital Waste Bank were handed over to the school so that they can be continuously applied. Through these further service activities, it is expected that the Eco-Green program will not merely function as a community service initiative but will develop into a routine school program and culture that supports the realization of a sustainable green environment and the implementation of the Adiwiyata program.

2. Results and Outputs of Activities

Qualitatively, students showed high enthusiasm in the practice of making biopores and horticulture, and began to apply the habit of sorting waste in school. This high level of engagement in hands-on environmental activities aligns with research showing that direct participation in eco-projects significantly fosters students' emotional connection and practical skills in environmental stewardship ([Ardoin et al., 2020](#); [Estrada-Araoz et al., 2023](#)). Teachers also stated that this activity helped them integrate the value of caring for the environment into learning. This is corroborated by the pre-test and post-test results showing a significant increase in the attitude of caring for the environment of students. Such improvements demonstrate that structured environmental education programs and experiential learning activities are effective in bridging the gap between environmental knowledge and students' pro-environmental behavior ([Ardoin et al., 2020](#); [Estrada-Araoz et al., 2023](#)). An attitude of caring for the environment is a behavior that appears in a person's daily life as an effort to preserve, repair, and prevent damage to the environment ([Warni et al., 2022](#)). Based on the results of the pre-test and post-test (see Table 1), there was an increase in the average score from 74.68 to 96.68 which showed an increase in understanding of 29.35% with an average N-Gain value of 0.90 which was included in the high category.

The pre-test results indicate that prior to the implementation of the community service activities, students possessed basic knowledge of environmental care; however, this knowledge had not yet been fully reflected in sustainable waste management attitudes and behaviors. The pre-test scores, which fell into the moderate category—particularly on indicators of waste sorting and organic waste utilization—suggest that an environmental care culture had not been optimally internalized within the school environment.

These findings highlight the urgency of implementing the Eco-Green program as a community service intervention focused on behavior habituation through practical activities and mentoring. Within the service process, the pre-test results served as the basis for designing socialization, training, and technology implementation activities, ensuring that all stages of the program were aligned with the service theme of strengthening environmental care culture and sustainable waste management.

Table 1 N-gain test results pre-test and post-test

No	Name	Pre-test	Post Test	N Gain
1	BQAP	80	100	1.00
2	AAP	67	100	1.00
3	RRM	67	93	0.79
4	MDA	73	93	0.74
5	AAHG	73	93	0.74
6	KZA	80	100	1.00
7	AHAZ	80	100	1.00
8	MSA	60	93	0.82
9	KKL	53	93	0.85
10	MAD	80	100	1.00
11	AFN	60	100	0.50
12	MSTMA	73	93	0.74
13	NS	87	100	1.00
14	GGH	80	100	1.00
15	TQN	80	100	1.00
16	AN	73	100	1.00
17	AFM	87	100	1.00
18	SGA	87	100	1.00
19	AFPH	73	93	0.74
20	TASTE	67	93	0.79
21	MRA	67	93	0.79
22	DPP	87	100	1.00
23	DNS	73	100	1.00
24	MDAA	73	100	1.00
25	RPH	87	100	1.00
Average		74.68	96.68	
			N Gain Score	0.90

In terms of concrete output, the activities produce:

- Biopore holes are active in the school environment.
- The Digital Waste Bank application has begun to be used to record waste collection results.

In line with the results of [Rajasa et al., \(2024\)](#) research study, the development of a waste bank application system has been proven to be able to simplify the transaction process and manage customer data and waste automatically and accurately. This digital system also improves the efficiency and transparency of waste management while encouraging community participation in waste bank activities. With the application of a similar concept in schools, the Digital Waste Bank application plays an important role in accustoming students to managing waste in a structured and responsible manner, while strengthening the culture of green schools.

- Report on the results of community service activities.

These results show that the service program not only succeeds in improving student understanding but also produces sustainable products that support a green school culture.

3. Driving and Inhibiting Factors

Factors driving the success of this activity include

- a. Active support from the school, including principals, teachers, and education staff.
- b. The high enthusiasm of students for hands-on practice is enjoyable.
- c. Effective collaboration between lecturers and students in the implementation of activities and technical assistance.

Meanwhile, the inhibiting factors found include

- a. There are many school agendas, so that some progress is hampered.
- b. The process of sorting and collecting waste is still an obstacle in the implementation of activities.
- c. The garbage storage area is no longer available because the garbage bank area has been used for the construction of elevators.

Nonetheless, other aspects of the program have been going well. Plant care activities have started with the creation of a picket schedule for students so that every day they can monitor the growth of kale plants. The implementation of structured schedules like this is essential in transforming environmental knowledge into long-term habits, ensuring that green school initiatives become a lived culture rather than a one-time event ([Hidayat & Wijaya, 2023](#)). In addition, biopore management has also gone well and has been used for the composting process. The results of this activity show that Eco-Green has a positive impact on students' caring attitudes in protecting the environment. Based on the results of the pre-test and post-test, there was an increase in the average understanding of 29.35% with an N-Gain value of 0.90. These results are the main indicators of the program's success in improving students' environmental literacy. In terms of practice, the activity of making biopores and planting horticultural plants with a simple hydroponic method is the second indicator of success, because it shows the ability of students to apply the concept of organic waste management and school greening in a sustainable manner. Meanwhile, the implementation of the Digital Waste Bank application is the third success indicator that strengthens the aspect of technological innovation in the school waste management system. Digital-based waste management not only increases administrative efficiency but also provides a modern, gamified experience that encourages students to be more proactive in waste segregation ([Setiawan et al., 2024](#)). Through this application, the data collection process of waste collection becomes more structured, transparent, and easy to monitor by school residents. In addition, changes in students' behavior can also be seen from their habits in sorting waste and caring for plants in the school area. Although the process of sorting and collecting waste still requires further assistance to be more consistent, this shows the achievement of the fourth success indicator, namely the formation of an attitude of caring for the environment in students. This program is in line with the goals of SDGs number 4 (Quality Education) and SDGs number 13 (Climate Change Handling) and supports the Adiwiyata School principle, which emphasizes the active participation of all school residents in preserving the environment. The monitoring and evaluation stage proves that activities do not stop at the training stage but continue to become real practices in schools. Teachers and students continue to carry out biopore, horticulture, and digital waste bank applications independently. Thus, the output of the program develops into a sustainability impact that fosters a green school culture.

CONCLUSION

The community service activity that has been carried out at SD Plus Indo Global Mandiri Palembang City focuses on improving the attitude of environmental care of students and has gone well in accordance with the method of implementing the activity, namely preparation, pretest, socialization, training, application of technology, mentoring and evaluation, program sustainability, and ending with a post-test. The results of the activity showed a significant increase related to the attitude of caring for the environment by students, namely with an average pretest score of 74.68 and post-test of 96.68. So that it gets an N-gain of 0.90, which is included in the category of high improvement. Overall, this Eco-Green activity is effective in increasing environmental care attitudes and awareness of sustainable waste management in the school environment. This program is in line with Adiwiyata's main goal, which is to create a school that cares about and has an environmental culture as part of character education. Through the implementation of environment-based activities such as biopores, digital waste banks, and horticultural planting in the school environment, students not only gain knowledge but also develop skills and values of caring for nature as a form of quality education (SDG 4). In addition, the simple steps taken in this program contribute to climate change mitigation (SDG 13) through organic waste management. Thus, Eco-Green activities are not just environmental projects but are an important part of continuous education efforts to form a generation that is aware, resilient, and responsible for the future of the earth.

Further community service activities are recommended to expand the involvement of the entire school community, including educational staff and students' parents, and to integrate the Eco-Green program into the curriculum and extracurricular activities to ensure sustainable impact. In addition, the development of advanced features in the Digital Waste Bank application is suggested to enhance the effectiveness and sustainability of waste management. The limitations of this activity include the relatively short mentoring period, limited supporting facilities and school technological readiness, and variations in students' levels of participation. Therefore, further community service with a longer mentoring duration and improved facility support is needed to strengthen program sustainability and impact.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

AUTHOR CONTRIBUTIONS STATEMENT

DCN: as the lead author, conceived the original framework of the community service program, coordinated the team's task distribution, drafted the grant proposal and final reports, designed the digital waste bank system, and managed intensive coordination throughout the program implementation. MKA, FSA, and ES contributed to developing the Eco-Green educational materials, leading the practical training for biopore construction, and coordinating the implementation of the horticultural planting program. WDA, RTA, and NM contributed to developing educational materials on horticultural plants and facilitated hands-on training for the horticultural planting program. CPU: Assisted the lead author in developing the environmental care attitude questionnaire and managed the distribution of the instruments to the participants. IPH: Performed the data analysis for the environmental care questionnaires, designed the draft of the program's pocketbook, and managed the production of activity certificates. MHF: Responsible for the comprehensive documentation of all activities, designing visual media including posters, and producing audio-visual content for the program's activity videos.

AI DISCLOSURE STATEMENT

The authors declare that this research was prepared, researched, written, and edited without the aid of artificial intelligence (AI) techniques.

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