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One Class, One Pot, One Tree as a Sustainability Design Strategy in Environmental Management at SMP Negeri 1 Warureja

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ABSTRACT

Environmental issues have become a global concern that requires serious attention, including in the education sector. This study aims to evaluate the "One Class, One Pot, One Tree" program as a sustainability design strategy for environmental management at SMP Negeri 1 Warureja. The research employed a descriptive qualitative approach with participants including students, teachers, and the principal. Data were collected through observation, interviews, and documentation, and analysed thematically. The findings revealed that student participation reached 85%, reflecting the success of the experiential learning approach. The program also positively impacted the school environment, with an increase in green spaces by 35% (52.5 m²) and a reduction in the average environmental temperature by 1.5°C. However, challenges such as limited water resources and busy schedules were identified. Local community involvement and integration with the curriculum present opportunities to enhance program sustainability. In conclusion, the program not only improves students' environmental awareness but also establishes a sustainability education model that can be adopted by other schools in Indonesia.

Keywords: *Sustainability; Environmental Education; Green Spaces; Experiential Learning; Student Participation*

INTRODUCTION

Environmental problems are a global issue that requires serious attention from all parties, including educational institutions (Calculli et al., 2021). Climate change, environmental degradation, and biodiversity loss are consequences of unsustainable human activities (Khoiri et al., 2021). In this context, the world of education has a strategic role to instill sustainability values from an early age in students. In Indonesia, the implementation of environmental education-based programs such as Adiwiyata aims to increase students' environmental awareness (Nur'Afifah, 2022). However, the implementation of this program still faces many challenges, especially in terms of sustainability and active participation of students (Wibowo et al., 2023)

SMP Negeri 1 Warureja, as one of the educational institutions at the junior high school level, has great potential in integrating environmental education into daily learning programs. One of the proposed strategies is through the "One Class, One Pot, One Tree" program. The program aims to provide students with hands-on experience in managing sustainable plants and green spaces in the school environment. This strategy adopts experiential learning principles that have proven to be effective in increasing students' awareness and involvement in environmental issues (Celadyn, 2020). By involving each class in plant care, students not only learn about the importance of sustainability, but are also invited to take collective responsibility for the environment (Brahma, 2025).

Practice-based environmental education is a relevant approach to answer the challenges of the 21st century (Meneses et al., 2023). Research shows that students who are involved in environment-based activities show an increase in the aspects of awareness, responsibility, and sensitivity to environmental issues (Rahmawati et al., 2022). The "One Class, One Pot, One Tree" program creates a direct connection between students and the environment, allowing them to understand the impact of their actions on the sustainability of the ecosystem. This approach also supports the achievement of the Sustainable Development Goals (SDGs), especially in the aspects of life on land (life on land, SDG 15) and action against climate change (SDG 13) (Octavia et al., 2022).

In Indonesia, the need for an innovative approach to environmental education is increasingly urgent (Darmawan & Dagamac, 2021). Based on data from the Ministry of Education and Culture (Kemendikbud), only about 35% of schools have a structured environmental program. Furthermore, research by Budihardjo et al., (2021) shows that environmental awareness among students is still relatively low, with only 45% of students able to identify local environmental problems. This shows the need for more targeted and strategic interventions to increase environmental awareness among the younger generation.

In the Warureja area, Tegal Regency, environmental challenges such as air pollution, lack of green space, and domestic waste are significant issues. SMP Negeri 1 Warureja has 18 classes with a total of 540 students. The potential of these students can be harnessed to create positive change through environmentally based sustainable programs. Research shows that collective green space management can improve air quality, aesthetics, and the mental well-being of school communities (Fatriansyah et al., 2021). The program offers a simple but far-reaching approach. Each class is responsible for planting and caring for one potted tree placed in the school area. This approach is in line with the concept of sustainability design that emphasizes resource efficiency, waste reduction, and overall environmental quality improvement (Celadyn, 2020). Through this program, students are also invited to understand the importance of preserving local biodiversity and their role in creating a healthier environment.

This study aims to evaluate the effectiveness of the "One Class, One Pot, One Tree" program as a sustainability design strategy in environmental management at SMP Negeri 1 Warureja. This study also aims to measure the level of student participation in environmentally based sustainable programs, analyze the impact of programs on the quality of the school environment, and identify challenges and opportunities in the implementation of this program. By integrating this program into the school's daily activities, it is hoped that a culture of sustainability can be created that not only benefits the school environment, but also has a long-term positive impact on students and the school community. A practice-based approach like this program is the answer to the need for relevant and applicable environmental education (Curtis et al., 2021). The program not only builds environmental awareness, but also instills sustainability values that can be applied in daily life (Hidayat et al., 2020). This research is expected to contribute to the development of a sustainable environmental education model in Indonesia, especially at the junior high school level.

Several previous studies have discussed the importance of environmental education and student involvement in realizing sustainability in the school environment. Research by Rahmawati et al., (2022) highlights student engagement in continuing education through an ethical dilemma-based STEAM approach in chemistry learning. Although this study shows an increase in students' awareness of environmental issues, the approach is still limited to integrating sustainability concepts in subjects, rather than hands-on practice.

Furthermore, in the study, Budihardjo et al., (2021) discussed sustainable waste management strategies in universities, especially at Diponegoro University. The focus of this research is more on the managerial and environmental infrastructure aspects at the higher education level, without highlighting the direct participation of students in daily environmental activities.

Meanwhile, research by Wibowo et al., (2023) examined the attitude of environmental concern of students at Adiwiyata schools based on the New Ecological Paradigm. The research was quantitative and placed more emphasis on students' attitudes than their active involvement in real action.

Based on the study, it can be seen that there is a research gap that has not been touched much, namely the direct involvement of students in environmental activities based on real experiences (experiential learning), especially at the junior high school level. This research fills this gap by evaluating this program as a sustainability design strategy that actively engages students in caring for plants, creating green spaces, and building a culture of collective responsibility for the school environment. In addition to measuring student participation rates, this study also presents concrete data on the impact of the program, such as an increase in the area of green space by 35% and a decrease in environmental temperature by 1.5°C. Thus, this research not only strengthens the concept of applicable environmental education, but also offers a strategic model that can be adopted by other schools to create a more sustainable learning environment.

MATERI DAN METODE

This study uses a qualitative descriptive approach to analyze the implementation of the program at SMP Negeri 1 Warureja. This approach was chosen to dig deep into data on the implementation process, student participation, and the impact of the program on the school environment (**Figure 1**). Qualitative descriptive research is considered appropriate because it provides a detailed and comprehensive picture of the phenomena that occur in the field, especially in the context of environmental education that requires the direct involvement of students and teachers (Rahmawati et al., 2022). The main focus of this research is to understand the extent to which this program has succeeded in increasing students' awareness and responsibility towards the environment.

This research was carried out at SMP Negeri 1 Warureja located in Tegal Regency, Central Java. This location was chosen because the school shows great potential in integrating sustainability values into its environment-based education programs. The research subjects consisted of students, teachers, and principals. Students are the main implementers of the program, teachers act as facilitators, while school principals act as policy makers and program monitors. The selection of subjects is carried out purposively to ensure the direct involvement of parties who have a strategic role in this program (Budihardjo et al., 2021).

Data was collected through two main methods, namely observation and interviews. Observations are carried out to directly monitor program activities carried out by students. In-depth interviews were conducted with students, teachers, and principals to gain insights into the benefits, constraints, and responses to the program. The validity of the data is guaranteed by triangulating the sources, so that the information presented is more accurate and reliable (Celadyn, 2020).

The collected data was analyzed descriptively with a thematic approach. The analysis was carried out by grouping data into themes such as student participation rates, impact on the school environment, and challenges and opportunities in program implementation. This process aims to provide a structured picture of the implementation of the "One Class, One Pot, One Tree" program. Furthermore, the results of the analysis are interpreted to answer the research questions and formulate recommendations for future program development. The results of this analysis are expected to be a reference for other schools that want to adopt a similar strategy in school environment management (Wibowo et al., 2023).

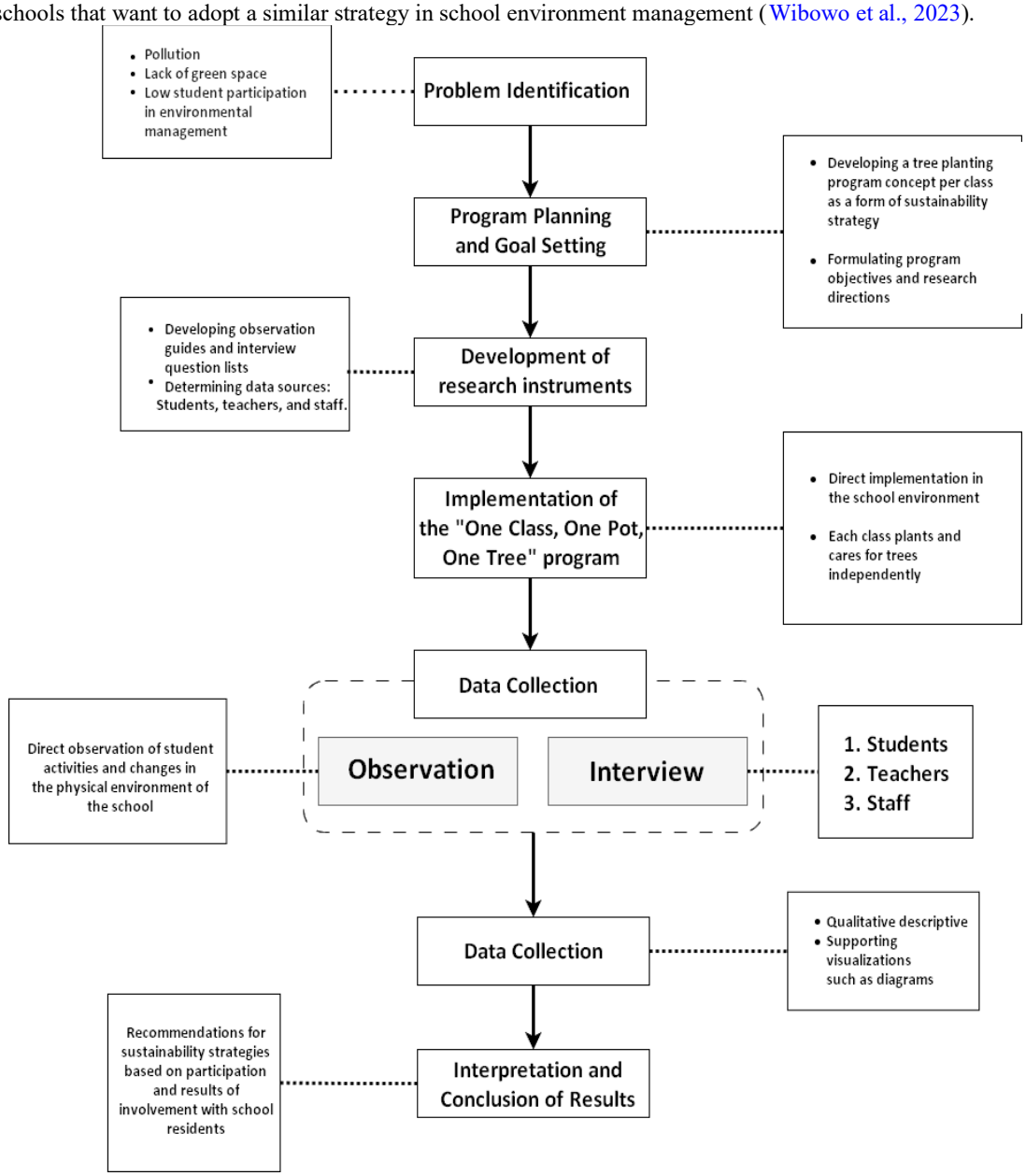

Figure 1. Research Scheme

The research is carried out through several stages that start with planning, including the preparation of goals, the development of instruments, and the identification of school needs related to environmental programs. The next stage is implementation, where researchers conduct direct observations, interviews, and documentation collection. The last stage is the analysis and reporting of research results. Through this procedure, this study aims to evaluate the effectiveness of the program and provide applicable guidance for other schools that want to implement sustainability-based education. Thus, this research is expected to make a real contribution in efforts to increase environmental awareness among students.

RESULTS AND DISCUSSION

This study aims to evaluate the effectiveness of the "One Class, One Pot, One Tree" program as a sustainability design strategy in environmental management at SMP Negeri 1 Warureja. The results of the research are presented in a thematic form that includes three main focuses according to the problem formulation, namely the level of student participation, the impact of the program on the quality of the school environment, and the challenges and opportunities in the implementation of this program. The analysis was carried out based on data obtained through observations, interviews, and supported by relevant literature.

Student Participation Rate in the "One Class, One Pot, One Tree" Program

The results showed that the level of student participation in this program was relatively high, with 85% of the total students actively involved in tree care being the responsibility of their respective classes. This data was obtained through direct observation and interviews with supervisors. Student participation includes various activities such as watering plants, applying organic fertilizers, to regular observation of plant conditions. Teachers and principals also report that students collectively form a rotating schedule to take care of the plants, with each student getting a clear assignment each week.

Students' active participation is not only limited to maintenance activities, but also includes discussions in the classroom about the importance of environmental sustainability. For example, 75% of students reported that they discussed with classmates about how to keep plants healthy and how to optimize plant growth in pots. In addition, 68% of students stated that they began to implement eco-friendly habits at home, such as utilizing used washing water to water plants. This result is in line with the research of Rahmawati et al., (2022), who found that an experiential learning approach is able to increase students' awareness of environmental issues.

Program Impact on School Environment Quality

This program has a significant impact on improving the quality of the environment at SMP Negeri 1 Warureja. Physically, the amount of green space in the school environment has increased by 35% since this program began to be implemented, based on the results of the measurement of the area of the school green area carried out before and after the implementation of the program. Before the program was implemented, the school only had 150 m^2 of green space spread across several points. However, after the program ran for six months, the green space increased to 202.5 m^2 with an additional 52.5 m^2 filled by plant pots from the program.

In addition to increasing green spaces, the results also show that the air temperature in the school environment has decreased by an average of 1.5°C, from 30°C to 28.5°C during the day. This temperature drop was measured using digital thermometers placed in several strategic locations in the school environment. The study of Budihardjo et al., (2021) stated that the addition of green space can help lower local temperatures and increase thermal comfort, which ultimately supports teaching and learning activities.

Aesthetically, the school environment becomes more attractive with the existence of various plant pots, both in terms of plant types and pot designs made by students. The principal reported that this change also attracted the attention of parents of students who came to the school, thus increasing their appreciation of the environmental efforts made by the school. In addition, research shows that microbiodiversity, such as the presence of butterflies and small birds, increases in the school area, which suggests that the program contributes to the preservation of local ecosystems (Celadyn, 2020).

Challenges in Program Implementation

While the program has been successful in improving student participation and the quality of the school environment, the study also found some challenges. One of the main challenges is the limited resources, especially water and organic fertilizers, needed to care for the crops (Gamage et al., 2023). As many as 40% of students reported that they often face difficulties in providing water during the dry season, resulting in some crops experiencing drought. In addition, teachers report that there are still 15% of students who lack active participation due to lack of awareness or motivation.

Time constraints are also an obstacle, especially because students have a busy study schedule (Rahiem, 2021). Some teachers state that it is difficult to integrate the program into an existing learning schedule without reducing the duration of core subjects. This shows the need for a better integration strategy between environmental programs and school curricula. Research by Wibowo et al., (2023) highlights the importance of school management support in overcoming time constraints so that sustainability programs can run optimally.

Opportunities for Program Development

Despite facing some challenges, the results of this study also show great opportunities for future program development. One opportunity is the involvement of local communities, such as students' parents and community leaders, in supporting the sustainability of the program. The principal reported that some parents had offered to help in the form of donations of organic fertilizers and garden tools to support the care of the plants (**Figure 2)**.

In addition, this program can also be developed by adding an educational component about local biodiversity. For example, students can be invited to learn about local plant types that have high ecological value and how to manage them.

Previous research by Rahmawati et al., (2022) showed that the introduction of local biodiversity can improve students' understanding of the importance of environmental conservation holistically.

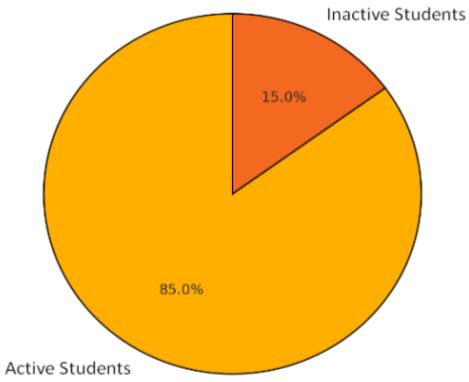

Figure 2. Student Participation Rate

The results of the data visualization presented through graphs support the research findings related to the effectiveness of this research program at SMP Negeri 1 Warureja. The first graph, in the form of a pie chart, shows that the student participation rate in the program reaches 85%, with only 15% of students inactive (**Figure 3)**. This indicates that most students are actively involved in plant care activities, either through watering, fertilizing, and observation of plant conditions. This high level of participation reflects the success of the program in engaging students and instilling a sense of responsibility for the environment, as also revealed by Rahmawati et al., (2022) that an experiential approach is able to increase student active participation.

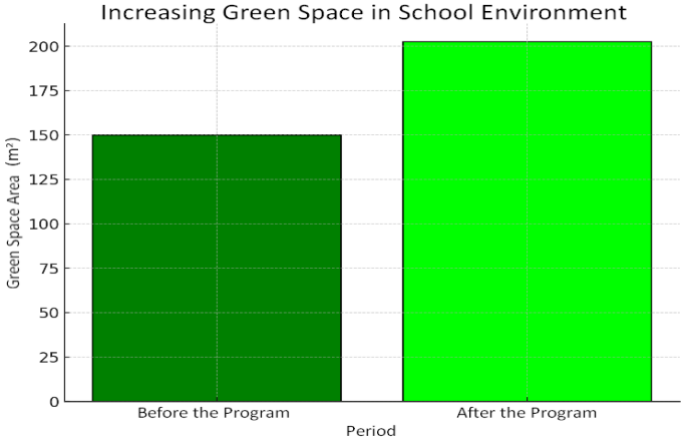

Figure 3. Increased Green Space

The second graph, in the form of a bar chart, shows a significant increase in the area of green space in the school environment. Before the program was implemented, the area of green space at SMP Negeri 1 Warureja was only 150 m². After the program ran for six months, the area of green space increased by 52.5 m² to 202.5 m² (**Figure 4)**. This increase shows the program's direct contribution to the sustainability of the school environment, in line with the findings of Budihardjo et al., (2021) who stated that green spaces have a great impact on aesthetics and environmental quality.

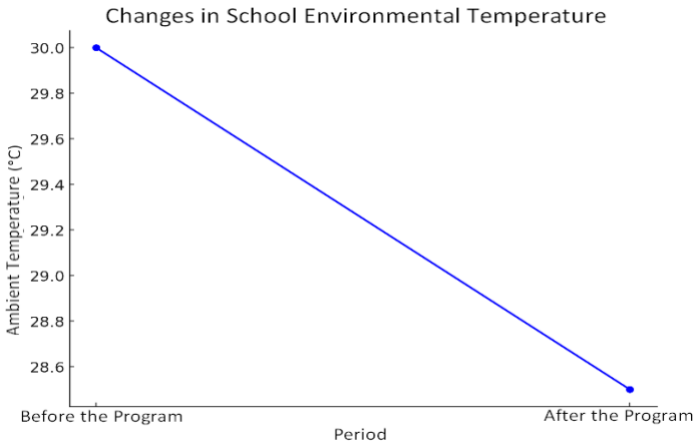

Figure 4. Changes in School Environment Temperature

The third graph, a line graph, shows the average temperature drop in the school environment from 30°C to 28.5°C after the program runs. This drop in temperature, although seemingly small, has a significant impact on the thermal comfort of students and teachers in schools. This is in accordance with a study by Celadyn (2020) who explains that increasing green space can help reduce environmental temperature through the natural cooling effect of plants.

These three graphs as a whole show that the program in this study has succeeded in achieving its main goals of increasing student participation, improving the quality of the school environment, and providing real benefits to the school community. However, to ensure the sustainability of the program, additional efforts are needed such as addressing resource challenges and involving more parties, including local communities, as proposed by Wibowo et al., (2023). With the right support, this program has the potential to become a model of environmental education that can be applied in other schools.

The results of the study show that the "One Class, One Pot, One Tree" program has succeeded in increasing student participation, improving the quality of the school environment, and creating awareness of the importance of environmental sustainability. The high student participation rate, which is 85%, shows that the experiential learning approach applied in this program is effective in actively engaging students. These findings are in line with the research of Rahmawati et al., (2022) who stated that students' involvement in practice-based activities not only enhances their knowledge, but also instills deep sustainability values. In addition, activities such as plant care and group discussions create an action-oriented learning experience, which is indispensable in building a young generation that cares about the environment (Kalla et al., 2022).

The increase in the area of green space from 150 m² to 202.5 m² shows the direct impact of the program on the physical environment of the school. The study of Budihardjo et al., (2021) revealed that green spaces have an important role in creating a healthy environment, both in terms of aesthetics and ecological functions, such as reducing temperature and improving air quality. In this context, the results reinforce previous findings that green spaces are able to provide significant ecological benefits, including an average temperature reduction of 1.5°C in the school environment. This temperature drop, although seemingly small, has a positive impact on the thermal comfort of students and teachers, which supports the effectiveness of teaching and learning activities. This is in line with Celadyn (2020) research which shows that increasing green space through sustainable interior and exterior design can support resource efficiency while improving environmental quality.

However, although this program has succeeded in improving the quality of the environment, some challenges are still faced, such as limited water resources and organic fertilizers, especially during the dry season. This challenge is in accordance with the findings of Wibowo et al., (2023), which show that the success of environmental programs in schools is often constrained by the lack of supporting facilities. In addition, lack of time due to the busy learning schedule is also an obstacle, as reported by the teacher. This condition emphasizes the importance of integration between environmental programs and school curricula to ensure program sustainability. For example, research by Hasani et al., (2020) suggests that the development of sustainability-based programs needs to involve a cross-disciplinary curriculum so that the program can be naturally integrated into learning activities.

Great opportunities are also seen in the involvement of local communities. Several parents of students have shown interest in supporting the program, either through donations of gardening tools or direct involvement in plant care. This support underscores the importance of synergy between schools and communities in creating sustainable change (Altassan, 2023). This is in line with the research of Marlina and Astina (2020), which shows that the sustainability of environmental programs is highly dependent on the support of local communities, including in overcoming resource constraints.

The results of this study also indicate that this program has the potential to be further developed through the introduction of local biodiversity. For example, students can be invited to study local plants that have high ecological and cultural value. This approach, as proposed by Octavia et al., (2022), not only enhances students' understanding of the importance of ecosystem sustainability, but also strengthens local identity through the preservation of the region's distinctive

flora. Thus, the program not only impacts the physical environment of the school, but also contributes to the preservation of local and ecological values.

Overall, the results of this study reinforce the previous literature that an experience-based, collaboration, and sustainability approach is key to creating effective environmental education programs. Although challenges remain, the success of the program provides hope that schools can be significant agents of change in building environmental awareness among younger generations. Going forward, school management support, curriculum integration, and community involvement will be key factors in ensuring the sustainability of the program. With further development, the program carried out in this research can become an inspiring environmental education model for other schools in Indonesia.

CONCLUSION

The results of the study show that the "One Class, One Pot, One Tree" program at SMP Negeri 1 Warureja has succeeded in having a positive impact on students' environmental awareness, the quality of the school environment, and sustainability-based learning experiences. The 85% student participation rate reflects the effectiveness of the experiential learning approach in increasing student engagement. Through activities such as watering, fertilizing, and plant observation, students not only learn in theory, but also understand the importance of concrete actions in maintaining environmental sustainability. In addition, discussions between students regarding plant care further strengthen their understanding of collaboration and collective responsibility, which is relevant in building a culture of sustainability in schools.

The impact of the program on the physical environment of the school is also significant. An increase in the area of green space by 52.5 m² and a decrease in average temperature by 1.5°C indicate that the presence of potted plants makes a real contribution to thermal comfort and environmental aesthetics. These changes not only support more conducive teaching and learning activities, but also increase microbiodiversity in the school environment, such as the emergence of pollinating insects and small birds. This is in line with studies that show that green spaces function as an important element in creating healthy ecosystems. However, obstacles such as limited water resources and tight time are challenges that need to be overcome to ensure the sustainability of the program.

The success of this program shows that schools can be agents of environmental change through the integration of sustainability-based programs. For further development, the involvement of local communities, such as parents of students and the surrounding community, is a great opportunity that needs to be taken advantage of. Support from external parties can also strengthen the program, both through the provision of resources and collaboration in environmental education. By strengthening the synergy between programs, curriculum, and communities, the "One Class, One Pot, One Tree" Program has the potential to become a model of environmental education that can be adopted by other schools in Indonesia, thereby contributing to the development of a young generation that cares about environmental sustainability.

REFERENCES

Altassan, A. 2023. Sustainable integration of solar energy, behavior change, and recycling practices in educational institutions: a holistic framework for environmental conservation and quality education. *Sustainability*, 15(20), 15157.

Brahma, R. (2025). Innovations in teaching and learning for environmental education. *Journal of the American Institute*, 2(2), 210–224.

Budihardjo, M. A., Humaira, N. G., Putri, S. A., Ramadan, B. S., Syafrudin, S., & Yohana, E. 2021. Sustainable solid waste management strategies for higher education institutions: Diponegoro university, Indonesia case study. *Sustainability*, 13(23), 13242. https://doi.org/10.3390/su132313242

Calculli, C., D'Uggento, A. M., Labarile, A., & Ribecco, N. 2021. Evaluating people's awareness about climate changes and environmental issues: A case study. *Journal of Cleaner Production*, 324, 129244.

Celadyn, M. (2020). Integrative design classes for environmental sustainability of interior architectural design. *Sustainability*, 12(18), 7383. https://doi.org/10.3390/su12187383

Curtis, H. L., Gabriel, L. C., Sahakian, M., & Cattacin, S. 2021. Practice-based program evaluation in higher education for sustainability: A student participatory approach. *Sustainability*, 13(19), 10816.

Darmawan, M. D., & Dagamac, N. H. (2021). Situation of environmental education in senior high school programs in Indonesia: Perspectives from the teachers of Palembang. *Interdisciplinary Journal of Environmental and Science Education*, 17(3), e2241.

Fatriansyah, J. F., Abdillah, F. A., & Alfarizi, F. R. 2021. Green campus design for national institute of science and technology: Implementing UI GreenMetric criteria to create environmentally friendly and sustainable campus. *International Journal of Technology*, 12(5), 956. https://doi.org/10.14716/ijtech.v12i5.5283

Gamage, A., Gangahagedara, R., Gamage, J., Jayasinghe, N., Kodikara, N., Suraweera, P., & Merah, O. 2023. Role of organic farming for achieving sustainability in agriculture. *Farming System*, 1(1), 100005.

Hasani, A., Juansah, D. E., Sari, I. J., & El Islami, R. A. Z. (2020). Conceptual frameworks on how to teach STEM concepts in Bahasa Indonesia subject as integrated learning in grades 1–3 at elementary school in the curriculum 2013 to contribute to sustainability education. *Sustainability*, 13(1), 173. https://doi.org/10.3390/su13010173

Hidayat, W., Susatya, A., & Apriyanto, E. 2020. Pertumbuhan Tanaman Nyamplung (Callophyllum innophylum L.) dalam Blok Organik dari Limbah Serat Buah Sawit dengan Pemupukan di Lahan Pantai. *Naturalis: Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan*, 9(2).

Kalla, M., Jerowsky, M., Howes, B., & Borda, A. 2022. Expanding formal school curricula to foster action competence in sustainable development: A proposed free-choice project-based learning curriculum. *Sustainability*, 14(23), 16315.

Khoiri, A., Sunarno, W., Sajidan, S., & Sukarmin, S. (2021). Analysing students' environmental awareness profile using strategic environmental assessment. *F1000Research*, 10, 305. https://doi.org/10.12688/f1000research.51523.1

Marlina, S., & Astina, I. K. 2020. Sustainable marine ecotourism management: A case of marine resource conservation based on local wisdom of Bajo Mola community in Wakatobi national park. *GeoJournal of Tourism and Geosites*, 32(4), 1317–1323. https://doi.org/10.30892/gtg.32419-575

Meneses, A., Nussbaum, M., Veas, M. G., & Arriagada, S. 2023. Practice-based 21st-century teacher education: Design principles for adaptive expertise. *Teaching and Teacher Education*, 128, 104118.

Nur'Afifah, U. U. 2022. Integrasi Pendidikan Lingkungan Hidup Pada Pengembangan Karakter Peduli Lingkungan di Sekolah Dasar. *Jurnal Pendidikan Modern*, 7(3), 135–140.

Octavia, D., Suharti, S., Murniati, Dharmawan, I. W. S., Nugroho, H. Y. S. H., Supriyanto, B., Rohadi, D., Njurumana, G. N., Yeny, I., Hani, A., Mindawati, N., Suratman, Adalina, Y., Prameswari, D., Hadi, E. E. W., & Ekawati, S. 2022. Mainstreaming smart agroforestry for social forestry implementation to support sustainable development goals in Indonesia: A review. *Sustainability*, 14(15), 9313. https://doi.org/10.3390/su14159313

Rahiem, M. D. H. 2021. Remaining motivated despite the limitations: University students' learning propensity during the COVID-19 pandemic. *Children and Youth Services Review*, 120, 105802.

Rahmawati, Y., Taylor, E., Taylor, P. C., Ridwan, A., & Mardiah, A. 2022. Students' engagement in education as sustainability: Implementing an ethical dilemma-STEAM teaching model in chemistry learning. *Sustainability*, 14(6), 3554. https://doi.org/10.3390/su14063554

Wibowo, N. A., Sumarmi, S., Utaya, S., Bachri, S., & Kodama, Y. 2023. Students' environmental care attitude: A study at Adiwiyata public high school based on the New Ecological Paradigm (NEP). *Sustainability*, 15(11), 8651. https://doi.org/10.3390/su1511865