



Evaluation of the implementation of the Adiwiyata program at State Senior High School 4 Bogor

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ABSTRACT

The Adiwiyata program, as part of environmental education in schools, plays an important role in shaping students' ecological awareness. This study aims to evaluate the implementation of the Adiwiyata Program at SMA Negeri 4 Bogor, which has been designated as a National Adiwiyata School since 2022. The evaluation was conducted to monitor the sustainability of environmentally based programs that strengthen students' environmental awareness and character. The research employed the CSE-UCLA evaluation model, covering five key areas: system assessment, program planning, program implementation, program improvement, and program certification. A qualitative research approach was used, involving interviews, focus group discussions, observations, and document analysis to obtain a comprehensive understanding of the program implementation. The findings indicate that SMA Negeri 4 Bogor has successfully implemented the Adiwiyata Program through well-integrated policies within the curriculum, structured planning, and environmental activities involving school members and external partners. Program improvement is demonstrated through the use of environmentally friendly products, capacity-building initiatives, and collaboration with local government programs. The program has also contributed to enhancing students' environmental awareness and character development. However, further efforts are needed to expand students' environmental awareness and character development, strengthen partnerships, and optimize the use of environmentally friendly technology to ensure long-term program sustainability.

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ABSTRAK

Program Adiwiyata sebagai bagian dari pendidikan lingkungan hidup di sekolah memiliki peran penting dalam membentuk kesadaran ekologis murid. Penelitian ini dilakukan untuk mengevaluasi implementasi Program Adiwiyata di SMA Negeri 4 Bogor sebagai Sekolah Adiwiyata Nasional sejak tahun 2022. Evaluasi ini dilatarbelakangi oleh pentingnya pemantauan keberlanjutan program berbasis lingkungan demi penguatan karakter peduli lingkungan pada warga sekolah. Penelitian menggunakan model evaluasi CSE-UCLA yang mengkaji lima area utama, yaitu asesmen sistem, perencanaan program, pelaksanaan program, pengembangan program, dan sertifikasi program. Pendekatan penelitian kualitatif diterapkan melalui wawancara, diskusi terarah, observasi, dan studi dokumentasi untuk memperoleh gambaran pelaksanaan program secara komprehensif. Hasil penelitian menunjukkan bahwa SMA Negeri 4 Bogor telah menerapkan Program Adiwiyata dengan baik melalui kebijakan yang terintegrasi dengan kurikulum, perencanaan terstruktur, serta pelaksanaan berbagai kegiatan berbasis lingkungan yang melibatkan warga sekolah dan mitra eksternal. Inovasi pengembangan program terlihat pada pemanfaatan produk ramah lingkungan, penguatan kompetensi, serta sinergi dengan program pemerintah daerah. Program ini juga berkontribusi pada peningkatan kesadaran lingkungan dan karakter murid. Namun demikian, diperlukan upaya lebih lanjut dalam memperluas nilai keberlanjutan dalam pembelajaran, memperkuat kemitraan, dan optimalisasi teknologi ramah lingkungan agar program dapat terus berkelanjutan.

Kata Kunci: Adiwiyata; CSE-UCLA; evaluasi program; keberlanjutan; sekolah berwawasan lingkungan

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INTRODUCTION

Climate change is a global environmental issue of major concern in the 21st century. Various credible studies show that climate change occurs as a result of human activities that trigger global warming and increase greenhouse gas emissions. (Ainurrohmah & Sudarti, 2022; Irma & Gusmira, 2023; Irma & Gusmira, 2024). The research confirms that global warming is caused by the use of fossil fuels, deforestation, and unsustainable consumption and production patterns, which cumulatively exacerbate environmental degradation. This environmental damage has a direct impact on the sustainability of human life and ecosystems, including declining air quality, reduced biodiversity, and increased risk of ecological disasters. Strategic action is needed to preserve the environment. (Husni & Remiswal, 2024). The international community has mainstreamed environmental issues through commitments to sustainable development in the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), including the goal of addressing climate change by reducing emissions, enhancing environmental resilience, and integrating climate change considerations into national policies. (Rahman *et al.*, 2023). These various global policies show that environmental education at the local level, including in schools, has an important role in shaping the ecological awareness and behavior of the younger generation as part of the strategy to achieve sustainable development goals.

Indonesia, as a country affected by climate change, has a development policy direction that emphasizes environmental resilience, as stated in the National Medium-Term Development Plan (RPJMN). (Purify *et al.*, 2024). This policy demonstrates the government's commitment to strengthening environmental governance through community-based adaptation and mitigation strategies, including increasing educational capacity to build national ecological awareness. In the educational context, schools play a strategic role in instilling environmental awareness in students through learning and school culture. (Anwar *et al.*, 2025; Johannes *et al.*, 2020; Silvia & Tirtoni, 2023). Active school involvement in environmentally friendly activities, such as waste management, reforestation, and energy conservation, contributes significantly to the development of students' ecological character. Curriculum diversification within the National Education System allows for the integration of environmental education to strengthen character and foster sustainable behavior. (Adelia, 2025; Wulandari, 2024). Thus, environmental education is not only cognitive but also affective and psychomotor, thereby encouraging the creation of a school culture oriented towards sustainability.

One of the national policies in environmental education is the Adiwiyata Program, which was launched by the Ministry of Environment and Forestry (KLHK) in 2006 as an effort to build schools with an environmental culture and support sustainable development. (May & Mamluah, 2024). The policy is designed to integrate environmental conservation values into all aspects of school management and activities, from curriculum planning and infrastructure management to active participation by the school community in environmental preservation. Several previous studies have shown that implementing the Adiwiyata Program can improve the environmental knowledge and behavior of school residents. (Iswari & Utomo, 2017; Nuzulia *et al.*, 2019; Putri, 2019). The participation of teachers and students in environment-based activities, such as waste banks, school gardens, and energy conservation, contributes to the formation of a green culture in the educational environment and increases awareness of environmental issues. (Hadiapurwa *et al.*, 2024). However, some studies only capture the achievement and implementation of programs without comprehensively reviewing the evaluative components, starting from assessment, planning, implementation, development, and the impact of the program. (Bahrudin, 2017; Rokhmah, 2019; Tompodung *et al.*, 2018). These limitations indicate the need for more in-depth evaluative research to comprehensively assess the effectiveness and sustainability of the Adiwiyata Program in educational institutions.

Based on this review, this study offers scientific innovation by evaluating the implementation of the Adiwiyata Program using the CSE-UCLA evaluation model, which includes five main components: 1) System assessment; 2) Program planning; 3) Program implementation; 4) Program development; and 5) Program certification. This approach allows for a comprehensive analysis and contributes ideas for strengthening the program in the context of nationally recognized high schools striving for independence. (Malana *et al.*, 2024; Putri, 2024; Sidik *et al.*, 2023).

The main problem in this study is how the implementation of the Adiwiyata Program at SMA Negeri 4 Bogor is reviewed from the five components of the CSE-UCLA evaluation. Specifically, this study seeks to answer questions related to the assessment of the Adiwiyata Program system at the school, how the program planning is carried out to achieve the objectives of the Adiwiyata Program, how the program implementation takes place in the field, how the program development is carried out through innovation, partnerships, and strengthening of facilities and infrastructure and how the program certification is carried out as an effort to ensure the sustainability of implementation. Therefore, the purpose of this article is to evaluate the implementation of the Adiwiyata Program at SMA Negeri 4 Bogor based on these five components, to obtain a comprehensive picture of the program's effectiveness and the direction of its future development.

LITERATURE REVIEW

Program Evaluation

In his book "Metodologi Penelitian Evaluasi Program," Muharika explains that program evaluation is essentially a planned and systematic scientific process for assessing the quality, success, and value of a program in relation to achieving predetermined goals. In its implementation, program evaluation not only measures the success of implementation but also identifies gaps between plans and actual achievements as a basis for decision-making. Evaluation principles must reflect objectivity, continuity, and totality in their implementation so that the results can be accounted for. (Maksad *et al.*, 2024; Marzuki, 2024). Furthermore, evaluation has a primary function as a means of quality assurance and quality improvement in the management of educational programs and public policies. (Adzhar & Yasin, 2025; Janna *et al.*, 2024). Therefore, program evaluation provides strategic benefits not only to assess the extent to which program objectives are achieved, but also to detect weaknesses in implementation so that improvements and development can be made continuously. Taali, in the book "Teori dan Model Evaluasi Kebijakan: Kajian kebijakan kurikulum pendidikan," argues that evaluation results are an important basis for implementing organizations to strengthen supporting factors and minimize inhibiting factors of the program, while also serving as a logical reference in the preparation of subsequent policies based on accurate and comprehensive evidence.

CSE-UCLA Evaluation Model

The CSE-UCLA Evaluation Model was first developed by Marvin C. Alkin in 1969 as an evaluation framework that emphasizes the function of evaluation to support the decision-making process systematically. (Jusniati *et al.*, 2025). This model consists of five evaluation components, namely 1) System assessment; 2) Program planning; 3) Program implementation; 4) Program improvement; and 5) Program certification, which are interrelated in assessing the needs, planning, implementation, improvement, and feasibility of a program's sustainability. (Priyanto *et al.*, 2024; Suyasa & Divayana, 2021). One advantage of this model is its comprehensive scope of study, as it accommodates both formative and summative evaluation dimensions, thereby providing evidence-based recommendations for continuous program improvement. (Iryani *et al.*, 2024; Sastria *et al.*, 2018). Furthermore, this model is

suitable for evaluating dynamic educational programs that involve multiple stakeholders and require sustainability and quality certification, such as the Adiwiyata Program. Evaluation of the assessment and planning components supports mapping school needs within an environmental context, implementation and improvement strengthen the process of implementing a sustainable culture, while certification is relevant to assessing a school's suitability for Adiwiyata status. (Alfiyah & Rahardjanto, 2020; Somachandra *et al.*, 2024; Suprpto, 2023). Thus, the implementation of the CSE-UCLA Model is expected to provide a comprehensive picture of the effectiveness, consistency of implementation, and direction of development of the Adiwiyata Program, thereby making it more adaptive to changes in the policy context and current educational needs.

Adiwiyata Program in Schools

The Adiwiyata Program is an environmental education initiative designed to create clean, healthy, and environmentally conscious schools through the active participation of all school members. The national policy underlying this program includes the Regulation of the Minister of Environment and Forestry, P.53/MENLHK/SETJEN/KUM.1/9/2019 regarding the Adiwiyata Award, and the memorandum of understanding between the Ministry of Environment and Forestry of the Republic of Indonesia (KLHK), the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia (Kemendikbudristek), the Ministry of Religious Affairs of the Republic of Indonesia (Kemenag), and the Ministry of Home Affairs of the Republic of Indonesia (Kemendagri) regarding the development of environmental education (PKS 5/MENHK/SETJEN/SET.1/5/2022). (Nurdin *et al.*, 2023; Sumarni *et al.*, 2023). According to the PGLHK Center Performance Report Compilation Team, data shows that in 2022, 38,205 schools participated in the Adiwiyata Program, with a success rate of 84.5%. Schools that received the Adiwiyata designation had better environmentally friendly policies, integrated environmental learning, community involvement, and environmentally friendly facilities and infrastructure than schools that did not participate in the program. (Ashar *et al.*, 2024; Kartini, 2024; Nada *et al.*, 2021)

Indicators of success of the Adiwiyata Program include the integration of environmental education into the curriculum, the implementation of environmental activities based on student, teacher, and community participation, the existence of supporting environmental infrastructure, and the school's commitment and governance towards the environment. (Gunawan, 2025; Parasih *et al.*, 2024). Character education through the Adiwiyata Program supports national agendas such as those in the 2020 National Medium-Term Development Plan (RPJMN) regarding the environment and disaster resilience. Furthermore, the active participation of all school elements is a key factor in the successful implementation of the Adiwiyata Program. (Dewi *et al.*, 2025). Thus, these indicators can be used to evaluate the Adiwiyata Program through the five components of the CSE-UCLA evaluation model, namely system assessment, program planning, program implementation, program development, and program certification, to obtain a comprehensive picture of the effectiveness and continued development of the program.

METHODS

This research uses a qualitative approach with an evaluative study method based on the constructivism paradigm. This approach was chosen because it enables researchers to gain a deeper understanding of the meanings, perceptions, and experiences of program actors in a naturalistic context. Alkin and Woolley in the book "A Model for Educational Evaluation" explain that the evaluation is conducted using the CSE-UCLA model which includes five main areas, namely: 1) System assessment; 2) Program planning; 3) Program implementation; 4) Program improvement, and 5) Program certification to assess the suitability between the actual conditions of the Adiwiyata Program implementation at SMAN 4 Bogor with the established success standards.

Data were collected through participant observation, in-depth interviews, focus group discussions (FGDs), and documentation studies. The research subjects consisted of the principal, vice principal, teachers, the Adiwiyata team, education staff, committee members, and students selected using purposive sampling. Data validity was tested through triangulation of techniques and sources, member checks, and a research process audit to ensure the credibility and objectivity of the findings. Triangulation was carried out by comparing the results of various data collection techniques (interviews, observations, and documentation) and checking the consistency of information between sources, to ensure the accuracy and credibility of the data. Member checks were carried out by confirming the preliminary results and the researcher's interpretations with key informants to verify the correspondence between the research findings and the reality on the ground. A research process audit was conducted by systematically retracing all stages of data collection and analysis through field notes and supporting documentation to ensure the traceability (auditability) and reliability (dependability) of the research results. Data analysis used an interactive model that included data reduction, data presentation, and continuous conclusion drawing/verification until valid and comprehensive results were obtained regarding the implementation of the Adiwiyata program at SMAN 4 Bogor.

RESULTS AND DISCUSSION

Results

System Assessment

The evaluation results show that the implementation of the Adiwiyata Program at SMAN 4 Bogor has a strong legal basis, referring to the Regulation of the Minister of Environment and Forestry Number P.53 of 2019 concerning the Adiwiyata Award, as well as guidelines from the Ministry of Education, Culture, Research, and Technology and the West Java Environmental Agency. These regulations serve as a reference in policy formulation, activity planning, and program implementation at the school level. Based on the results of interviews and document analysis, the school has complete documents in the form of an Adiwiyata Team Decree, an environmentally based curriculum, and an annual activity plan that demonstrates the integration of environmental care values in teaching and learning activities.

In general, the implementation of the Adiwiyata Program at SMAN 4 Bogor is considered good, indicated by adequate infrastructure support, such as school gardens, green areas, waste management facilities, and composters. The program's objectives, which are directed at developing an environmentally conscious character, have been reflected in the policies and behavior of the school community. Positive cultures, such as disposing of waste properly, conserving energy, and maintaining cleanliness, have become part of the daily lives of the school community. These findings indicate that SMAN 4 Bogor not only fulfills administrative and regulatory aspects but has also internalized Adiwiyata values in educational practices and school life in a sustainable manner.

Program Planning

The evaluation results show that the Adiwiyata Program planning at SMAN 4 Bogor has been designed systematically and integratively, encompassing aspects of school policy, budget planning, provision of infrastructure, and implementation strategies oriented towards sustainability. Policy documents such as the Adiwiyata Team Decree, school regulations, and the integration of environmental care values into the curriculum (KTSP Books 1 and 2) serve as an important foundation in realizing the vision of a school with an environmental culture. This policy is strengthened by the active role of teachers and education staff in integrating environmental issues into various subjects, creating a learning ecosystem that supports the achievement of the Adiwiyata Program goals.

In terms of resources, budget, and infrastructure management is carried out collaboratively and transparently, with support from BOS funds, parental contributions, assistance from the Education Office, and partnerships with IPB and the Bogor City Environmental Agency. Facilities such as greenhouses, vertical gardens, ecobricks, composters, and hydroponic gardens are used as environmentally based learning media. The program implementation strategy is aimed at maintaining the National Adiwiyata predicate and moving toward Independent Adiwiyata through innovation, coaching other schools, and ensuring consistent implementation of environmentally friendly practices by all school members. This reflects SMAN 4 Bogor's strong commitment to making Adiwiyata not just a program, but part of a sustainable school culture.

Program Implementation

The evaluation results show that the implementation of the Adiwiyata Program at SMAN 4 Bogor has been effective and comprehensive, encompassing environmental care activities, integration of environmental values into the curriculum, cross-institutional partnerships, and the active involvement of all school residents. Various environmental activities, such as the National Clean Action Movement, the P5 project with the theme of climate change, tree planting, making *Komosoap soap from ecoenzymes*, *greenhouse management*, *vertical gardens*, and *ecobricks*, are concrete evidence of the school's consistency in developing a culture of environmental care. Student participation through the selection of Adiwiyata Ambassadors, the implementation of routine cleaning schedules, and waste management activities shows that this program has succeeded in building a sense of responsibility and environmental leadership among students. Figures 1, 2, and 3 are documentation of the implementation of the Adiwiyata Program in various subjects and other activities at school.



Figure 1. Implementation of Adiwiyata in Arts and Culture: Students Create Three-Dimensional Nirmana Works from Used Materials.

Source: Author's Documentation 2024



Figure 2. Implementation of Adiwiyata in Biology: Hydroponic Plantation Practice
Source: Author's Documentation 2024



Figure 3. Tree and Plant Maintenance Efforts through the Creation of Living Fences
Source: Author's Documentation 2024



Figure 4. Adiwiyata Implementation through Partnerships: Biofloc Production in Collaboration with IPB.
Source: Author's Documentation 2024

Curricularly, Adiwiyata values have been integrated into all subjects, intracurricular, cocurricular, and extracurricular activities. All lesson plans (RPP) and KTSP documents contain environmental elements with a project-based learning approach and direct practice, such as biofloc fish cultivation in the PKWU subject in Figure 4. On the other hand, the success of this program is also supported by strategic partnerships with the West Java Environmental Agency (DLH), IPB, PT Mountrash, and Biotrop in terms of providing facilities, planting seeds, and waste management. Regular socialization, the formation of environmental cadres, and a persuasive approach to students strengthen the green culture in the school. Overall, the implementation of the Adiwiyata Program at SMAN 4 Bogor has reflected an effective collaboration between policy, learning, and the participation of school residents in realizing a sustainable educational environment.

Program Development

Evaluation results indicate that the development of the Adiwiyata Program at SMAN 4 Bogor focuses on improving implementer competency, innovative activities, and synergy with government programs toward achieving the Adiwiyata Mandiri award. The school consistently sends teachers to environmental training and disseminates the results to colleagues, while students participate in outreach, competitions, and training organized by the West Java Environmental Agency. These efforts strengthen the capacity of all school members in managing environmentally-based activities and foster a sense of concern for ecosystem sustainability.

In developing the program, SMAN 4 Bogor implemented a collaborative and innovative strategy. The school not only mentored two other schools toward National Adiwiyata status but also established partnerships with the surrounding community of RW 7, which is actively engaged in greening. Various innovations, such as making Komosoap from pineapple waste, GERMATI (Energy Saving Movement), 3R waste processing, and recycled art projects in P5 activities, strengthen student creativity while preserving the environment. In addition, the program is integrated with government policies related to climate change and the Healthy School program, expanding the impact of Adiwiyata at the local and national levels. Overall, the program development at SMAN 4 Bogor demonstrates a strong commitment to the formation of an innovative, collaborative, and sustainable green culture.

Program Certification

Evaluation results show that the Adiwiyata Program at SMAN 4 Bogor provides tangible benefits and impacts for the entire school community, both in increasing environmental awareness and developing a caring character for sustainability. This program has succeeded in creating a clean, green, and conducive learning environment, as well as fostering ecological responsibility in students. Through various activities such as reforestation, waste management, and energy-saving campaigns, students not only play an active role in maintaining environmental cleanliness but also develop critical, creative, and collaborative thinking skills. Teachers also integrate Adiwiyata values into learning, so that a culture of environmental care becomes part of the daily educational process.

Furthermore, the support of the school committee and parents plays a crucial role in maintaining the program's sustainability. Their participation in activities such as tree planting and seedling provision reflects the close collaboration between the school, families, and the community. Student satisfaction with the Adiwiyata Program is also very high, reflected in their sense of pride in being environmental cadres and their enthusiasm for participating in various environmental-based activities. Students experience tangible changes, with the school environment becoming cooler, cleaner, and more enjoyable, while reinforcing the values of social and ecological responsibility. Overall, the Adiwiyata Program at SMAN 4 Bogor has established a sustainable school ecosystem and has become a model for environmentally-based character learning.

Discussion

The evaluation results show that SMAN 4 Bogor has successfully combined a strong legal framework with daily school practices, making Adiwiyata not merely an ad-hoc program but an integral part of the school's governance and curriculum. The adoption of the Ministry of Environment and Forestry Regulation and the Ministry of Education, Culture, Research, and Technology guidelines, as well as internal policy documentation (Adiwiyata Team Decree, RPJM, KTSP, RPP), creates a clear administrative foundation, a crucial condition that enhances the program's legitimacy and facilitates access to external support. (Dewi *et al.*, 2025; Kartini, 2024). These findings confirm that the success of environment-based programs is strongly influenced by the alignment between formal policies and operational practices at the school level. (Adelia, 2025; May & Mamluah, 2024).

The most interesting aspect is the integration of environmental values into the pedagogical realm and student-driven innovation. SMAN 4 Bogor not only incorporates environmental materials into the lesson plans and curriculum (KTSP), but also translates them into project-based learning (*e.g.*, *biofloc*, *greenhouse*, *vertical garden*, *ecobrick*) and P5 projects. This approach transforms students from educational objects into productive agents of change, creating products (eco-enzyme soap, chips, hydroponics) and practices that are both educational and economically valuable. This learning model provides empirical evidence that applied environmental learning can improve life skills while strengthening the internalization of environmentally friendly attitudes. (Alfiyah & Rahardjanto, 2020; Ashar *et al.*, 2024; Silvia & Tirtoni, 2023).

The role of external partnerships is also prominent: collaborations with the Environment Agency (DLH), IPB, PT Mountrash, and other partners accelerated technology transfer, access to resources (seedlings, processing machinery), and capacity building. These relationships demonstrate that schools with ambitious environmental programs need multi-stakeholder networks, not just symbolic support but practical access that overcomes budget and technical capacity limitations. (Gunawan, 2025; Nurdin *et al.*, 2023). However, dependence on partners also demands a sustainability strategy so that commitment and support remain consistent over the long term. (Adzhar & Yasin, 2025; Nada *et al.*, 2021).

Despite numerous successes, the evaluation revealed significant operational constraints and sustainability challenges: limited clean water, post-pandemic facility maintenance, the need for ongoing innovation, and the issue of value regeneration as student and personnel turnover increases. These findings underscore that administrative and facility achievements alone are insufficient; maintenance mechanisms, regular monitoring, and regenerative programs (ongoing training, documentation of standard operating procedures, integration into the school's work structure) are needed to ensure the continued benefits. (Jusniati *et al.*, 2025; Sumarni *et al.*, 2023). The delay in achieving the Adiwiyata Mandiri predicate, which the school chose as a cautious strategy, demonstrates an awareness of the importance of infrastructure readiness and the quality of evidence before certification. (Iswari & Utomo, 2017; Putri, 2019).

In terms of culture formation, active support from the school committee and parents, as well as the role of student cadres, are key drivers of environmentally friendly behavior adoption. Family involvement (e.g., bringing seeds from home) and the formation of cadres create a sense of collective ownership that enhances the transfer of values across generations. (Anwar *et al.*, 2025; Johannes *et al.*, 2020). This shows that effective school interventions are not only curricular interventions but also social interventions that bind local stakeholders in the rhythm of school activities. (Parasih *et al.*, 2024; Rokhmah, 2019).

Based on the above findings, several practical implications can be recommended: 1) strengthening technical maintenance and monitoring mechanisms (facility maintenance SOPs, structured maintenance schedules); 2) formalizing capacity regeneration processes (regular training and mentoring for new teachers and students); 3) developing a water resources and conservation plan so that water limitations do not disrupt environmental activities; and 4) documenting good practices as advocacy material to strengthen SMAN 4 Bogor's position as a center for fostering fostered schools. (Nuzulia *et al.*, 2019; Suprpto, 2023; Wulandari, 2024). Further research is recommended to include longitudinal studies that assess the medium-long-term impact (e.g., 2-5 years) on changes in students' environmental attitudes and practices and the effectiveness of coaching in the target schools.

CONCLUSION

Based on the evaluation results, it can be concluded that the implementation of the Adiwiyata Program at SMAN 4 Bogor has demonstrated good and sustainable performance. This program is supported by a strong legal and policy basis, and has successfully integrated environmental values into the School Level Curriculum (KTSP) and Lesson Plans (RPP). The implementation of a project-based learning approach, such as greenhouse activities, biofloc, and ecobrick making, provides contextual experiences for students in understanding and applying sustainability principles. In addition, the active involvement of students as agents of change, as well as strategic partnerships with various external parties such as the Environmental Agency (DLH), the Bogor Agricultural University (IPB), and industry partners, have strengthened the school's technical capacity and resources. The positive impact of this program's implementation is seen through increased ecological awareness among school residents, the formation of environmentally friendly behaviors, and the creation of a green, clean, and conducive learning environment for meaningful learning.

Nevertheless, several aspects still require attention and improvement to ensure optimal sustainability of the Adiwiyata Program at SMAN 4 Bogor. Challenges include limited clean water supply, post-pandemic infrastructure maintenance, and the need to strengthen innovation and capacity regeneration with each student and teaching staff change. Based on these findings, it can be concluded that SMAN 4 Bogor has become a successful model for the Adiwiyata Program implementation, both institutionally and

pedagogically. However, the sustainability and expansion of the program's impact will depend heavily on strengthening maintenance mechanisms, a consistent monitoring system, and a planned capacity regeneration strategy to ensure that environmental values are evenly internalized throughout the school community.

As a follow-up, further research is recommended to examine the effectiveness of the Adiwiyata Program from a longitudinal perspective to assess the sustainability of its impact on students' environmental behavior after graduation. Furthermore, comparative studies across schools at different levels and contexts could provide a broader understanding of the factors contributing to the program's successful implementation. Research using a quantitative evaluative approach or mixed-methods design could also be developed to more objectively measure the influence of policies, school culture, and community participation on improving ecological literacy in educational settings.

AUTHOR'S NOTE

The author declares that there is no conflict of interest regarding the publication of this article. The author confirms that the article's data and content are free of plagiarism.

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