

Evaluation of Conservation Education Implementation in Elementary Schools Located Near Conservation Areas in Wirajaya Bogor

Selanova Nurdina ¹, Endang Koestati Sriharini Muntasib ¹, Resti Meilani ², Burhanuddin Masyud ¹

¹ Tropical Biodiversity Conservation Study Program, Faculty of Forestry and Environment, IPB University, Bogor, Indonesia

² Department of Forest Resources Conservation and Ecotourism, Faculty of Forestry and Environment, IPB University, Bogor, Indonesia

selanova252@gmail.com, harinimuntasib1@gmail.com, restimeilani@apps.ipb.ac.id,

burhanuddin_m@apps.ipb.ac.id

corresponding author: selanova252@gmail.com

ABSTRACT

Conservation education is essential for communities living near conservation areas to support environmental sustainability and ecosystem preservation. Wirajaya, Jasinga, Bogor, is located near Gunung Halimun Salak National Park and Dungus Iwul Nature Reserve. However, this geographical proximity has not been accompanied by adequate conservation understanding, particularly in elementary school settings. This study aims to evaluate the implementation of conservation education in elementary schools in Wirajaya by analyzing the curriculum and students' and teachers' conservation-related knowledge, attitudes, and behaviors. The study was conducted in three elementary schools, namely SDN Curug 03, SDN Curug 05, and SDN Cigelung, involving 86 fifth-grade students and 9 teachers as research participants. Data were collected through curriculum document analysis, interviews, and field observations. The results reveal that conservation content has not been systematically integrated into the school curriculum. The topics taught were still limited to environmental cleanliness, greening activities, waste management, and an introduction to biodiversity. Students' knowledge and teachers' understanding of conservation remained limited. This study provides an initial overview of conservation education implementation in elementary schools near conservation areas, highlighting curriculum, teacher and student understanding, and local conservation areas as learning resources.

Keywords: *conservation areas, conservation education, environmental awareness*

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INTRODUCTION

Conservation areas are designated areas intended to protect and preserve biodiversity, including flora, fauna, and their ecosystems. Conservation areas not only serve as sites for biodiversity protection but also have educational value, helping communities understand the importance of the natural environment, protected areas, and the sustainable use of biological resources (Booth et al., 2009). Conservation areas are not frequently located far from human settlements. Numerous conservation areas are situated adjacent to villages, thereby creating opportunities for interaction between local communities and these areas. Communities living within or around forest areas often use forest ecosystem services to meet their daily needs and livelihoods, such as food, water, medicine, and sources of income (Abdullah et al., 2023). A similar pattern can also be found in Wirajaya Village, where parts of two conservation areas lie within the village's territory.

Wirajaya, Jasinga, Bogor, contains 182 hectares within the Halimun Salak National Park (TNGHS) Mountain and 9 hectares within the Dungus Iwul Nature Reserve. The presence of these two conservation areas provides opportunities for local communities, including schools, to directly understand their ecological functions. However, geographical proximity to conservation areas is not always accompanied by adequate understanding of conservation. If community interactions with conservation areas lack sufficient knowledge and environmental awareness, these conditions may affect the sustainability of the areas. Human resources

with strong concern and understanding of conservation's importance are among the key factors in maintaining the sustainability of conservation areas (Muntasib et al., 2009).

Conservation education is crucial because it aims to develop knowledge, attitudes, skills, motivation, and community participation in conserving natural resources (Muntasib et al., 2015). Internationally, environmental and conservation education has been widely studied as an approach to improve students' knowledge, attitudes, behaviors, and involvement in environmental action (Ardoin et al., 2020). Franquesa-Soler et al. (2019) emphasized that the development of conservation education programs should consider how children learn, students' learning preferences, and the social context in which learning occurs to make conservation education more effective. Kamaludin et al. (2022) also state that experience-based conservation education programs can improve students' understanding of the importance of ecosystems. In addition, Valenzuela-Morales et al. (2022) demonstrate that water conservation education in elementary schools can build students' awareness of natural resource management. These studies indicate that conservation education in elementary schools should be implemented contextually, not only through the delivery of learning materials but also through learning experiences that are closely connected to students' surroundings.

In Indonesia, the urgency of conservation education is aligned with the national education policy. Law Number 20 of 2003 concerning the National Education System states that curriculum development should take into account the diversity of regional potential and environmental conditions. Furthermore, the Minister of Education, Culture, Research, and Technology Regulation Number 12 of 2024 concerning the Curriculum for Early Childhood Education, Basic Education, and Secondary Education provides space for educational units to develop learning that is relevant to students' contexts and surrounding environments. The school environment can serve as a primary learning resource, making scientific concepts more concrete (Kholidiyah & Balqis, 2026). Therefore, elementary schools located near conservation areas have both the opportunity and responsibility to connect learning with local environmental potential, including conservation areas as learning resources. However, the 2024 Capacity Building Program Report of the Forest Resource Conservation and Ecotourism Student Association (Himakova) reports that the understanding of the Wirajaya community, particularly elementary school students and teachers, regarding conservation areas remains limited. Numerous teachers view nature reserves only as "leuweung" or forests in a general sense, without a deeper understanding of their ecological functions, benefits, and management regulations. This condition indicates a gap between Wirajaya's environmental potential, as a village near conservation areas, and the implementation of conservation education in elementary schools.

The research gap addressed in this study concerns the limited number of studies that specifically evaluate the implementation of conservation education in elementary schools near conservation areas, particularly by linking the school curriculum, teachers' understanding, students' knowledge, and the use of conservation areas as local learning resources. Previous studies have mostly discussed environmental education in general, while studies that position elementary schools near conservation areas within a local conservation education system remain limited. Therefore, this study was conducted to evaluate the implementation of conservation education in all public elementary schools in Wirajaya by identifying conservation-related curriculum content, students' and teachers' conservation-related knowledge, attitudes, and behaviors, and the forms of conservation education activities implemented. The research results are expected to provide an initial basis for schools and stakeholders in designing conservation education that is more contextual, focused, and relevant to local environmental characteristics.

METHODS

This study was conducted in three public elementary schools in Wirajaya Village, Jasinga Subdistrict, Bogor, namely SDN Curug 03, SDN Curug 05, and SDN Cigelung, from January to February 2025. This study employs a descriptive qualitative approach supported by descriptive quantitative data. The research participants consisted of 87 fifth-grade students as respondents and 9 teachers as key informants. The student respondents were distributed across the three schools: 24 from SDN Curug 03, 20 from SDN Curug 05, and

43 from SDN Cigelung. Meanwhile, the teacher informants consisted of three teachers from each school: the homeroom teacher, the religious education teacher, and the physical education teacher who taught fifth-grade students. Primary data were collected through structured interviews with students, semi-structured interviews with teachers, and field observations. Secondary data were obtained from curriculum documents, including teaching modules, lesson plans, and learning materials, to identify the integration of conservation-related content in school learning.

Data analysis was conducted in stages. Student interview data were tabulated and analyzed using descriptive statistics, including frequencies and percentages, to describe students' conservation-related knowledge, attitudes, and behaviors. Teacher interview data were analyzed qualitatively through data reduction, data display, and conclusion drawing, while curriculum documents were analyzed by mapping conservation-related competencies, materials, and learning activities. Data validity was strengthened through source triangulation and method triangulation by comparing information from students, teachers, curriculum documents, and field observations. This process was conducted to ensure consistency in findings across interview results, observed practices, and written curriculum documents.

RESULTS AND DISCUSSION

General conditions

Wirajaya Village in Jasinga Subdistrict, Bogor, has three public elementary schools that served as the research sites: SDN Curug 03, SDN Curug 05, and SDN Cigelung. All three schools have adopted the Merdeka Curriculum and have been awarded B accreditation, indicating that they have met the National Education Standards in the “good” category, as determined by the applicable accreditation assessment instrument (Ministry of Education, Culture, Research, and Technology Regulation No. 38 of 2023). In the context of conservation education, the distance between schools and conservation areas is crucial because it shapes access to and opportunities for field-based learning. SDN Curug 05 and SDN Cigelung are relatively close to Dungus Iwul Nature Reserve and Halimun Salak National Park Mountain, while SDN Curug 03 has the least access, being 4.30 km from the nature reserve and 7.50 km from the national park. Proximity to conservation areas provides opportunities for learning to be conducted in and through them, with these areas serving as both learning resources and media (Muntasib et al., 2015).

Table 1. Distance between elementary schools and conservation areas

Conservation Area	Distance (km)		
	SDN Curug 03	SDN Curug 05	SDN Cigelung
Dungus Iwul Nature Reserve	4,30	3,10	0,80
Halimun Salak National Park	7,50	0,65	3,90

School facilities and learning conditions influence the implementation of conservation education. The variation in teacher-student ratios affects the intensity of guidance that can be provided during learning, especially in outdoor conservation activities. SDN Curug 03 has a teacher-student ratio of 1:20, which allows for more optimal guidance compared to SDN Cigelung with a ratio of 1:31. A smaller ratio can support more intensive mentoring in field practice and environmental observation activities, while schools with larger ratios may face challenges in providing personal guidance (Hartman et al., 2021). This is essential because children need guidance in every learning activity, particularly in outdoor activities (Jensen & McConchie, 2020). In addition, SDN Curug 03 lacks a library, which may hinder the development of conservation literacy and access to environmental learning materials. Libraries create literacy-friendly environments by offering free and equitable access to diverse information resources, including materials on environmental issues, community challenges, and sustainability (Ajani et al., 2025).

Furthermore, environmental management conditions in the three schools provide essential context for conservation education. All schools face drought problems that affect water availability. This condition can be used as a relevant learning context to introduce water conservation, sustainable resource management, and

environmentally responsible behavior. Increasing water conservation awareness is crucial, especially among students who are receptive and can be influenced in shaping conservation behavior (Lal et al., 2023). Therefore, integrating water conservation concepts into learning is vital to improve students' understanding and participation in maintaining the sustainability of water resources (Valenzuela-Morales et al., 2022). Waste management, moreover, remains a challenge because cooperation with the local Environmental Agency has not yet been established, and plastic waste is still often burned, which may cause air pollution and health risks. The limited number of trash bins further exacerbates this condition. These findings reveal that conservation education in the three schools is needed not only as classroom material but also as a practical approach to improve students' habits related to environmental care, waste management, water conservation, and the sustainable use of natural resources.

Conservation-related Content in the Curriculum

Conservation and environmental content in the curriculum is delivered through various subjects, with a primary focus on IPAS. IPAS is a subject in the Merdeka Curriculum that integrates Natural and Social Sciences into a unified field, encompassing the study of living and non-living things, the universe, and human life as individuals and social beings interacting holistically with the environment. Learning covers environmental awareness, waste management, biodiversity, and the relationship between humans and nature. Students are introduced to ecosystems, the Wallace Line, and the impact of natural resource exploitation through reading, discussion, and hands-on practice. However, the conservation aspect is limited to a brief introduction to biodiversity, without addressing protection, preservation, or sustainable use.

Table 2. Conservation and environmental content in the curriculum

Subjects	Relevant Topics
Mathematics	Calculations related to the environment, including the number of fruits.
Indonesian Language	Environmental awareness, preservation, waste management, 3R crafts, environmental texts, forests, and pets.
Physical Education, Sports, and Health	Introduction to the surrounding environment; identifying trees, flowers, or other plants; outdoor activities in forest areas as a medium for play; grouping activities based on pets.
Natural and Social Sciences	Natural environment, water cycle, biodiversity, ecosystems, human–nature relationships, environmental issues, forestry, and sustainable natural resource management.
Islamic Religious Education and Character Education	Attitudes toward the environment and natural disasters.
English	Introduction to animals.
Pancasila Education	Introduction to the village environment: mutual cooperation.
Arts	Plants as art objects; recycling household waste.

The curriculum has also not been fully adapted to the surrounding environmental conditions, even though Law Number 20 of 2003 mandates that education be aligned with the school's environmental conditions. Ki Hajar Dewantara, an Indonesian education pioneer, emphasized that education must be based on two main aspects, namely the nature of the environment, which reflects the character and conditions of the surrounding environment, and the nature of the times, which is related to the development and dynamics of life (Saifullah, 2023). This is also supported by Alpusari (2013), who stated that environmental education in elementary schools can be integrated into several subject groups, including religious education, civic education, science and technology, arts, and physical education. In addition, pursuant to West Java Governor Regulation Number 25 of 2007 on Guidelines for the Implementation of Local Content in Environmental Education, every educational unit in West Java is expected to integrate environmental education into its curriculum. Budiono et al. (2024) also emphasized that environmental education can be integrated into the primary school curriculum through interdisciplinary, multidisciplinary, and transdisciplinary approaches. However, such integration requires appropriate teaching modules and learning strategies so that environmental

education is not only delivered as general content, but also becomes part of meaningful learning activities. Learning should therefore be more holistic and contextual, involving direct experiences such as environmental rehabilitation and the conservation of local species. Kholidiyah & Balqis (2026) explained that the school environment can serve as a living laboratory, transforming abstract ecological concepts into concrete environmental experiences. Similarly, Dewi et al. (2024) emphasized that local environmental issues can be integrated into science learning so that students gain direct awareness of environmental protection. Through this approach, students are expected not only to develop environmental awareness but also to take an active role in ecosystem preservation.

Students' Knowledge, Attitudes, and Behavior towards Conservation

1. Knowledge

Students' knowledge of conservation was analyzed through structured interviews with 87 fifth-grade students: 24 from SDN Curug 03, 20 from SDN Curug 05, and 43 from SDN Cigelung. The graph is presented in percentages to facilitate comparison among schools. Students' responses were classified into three categories: "correct," "almost correct," and "do not know." The "correct" category refers to answers that included key elements of conservation, such as protection, preservation, biodiversity, conservation areas, or the sustainable use of natural resources. The "almost correct" category refers to answers related to environmental protection that are still general, incomplete, or not specific to conservation. The "do not know" category refers to students who state that they do not know or are unable to provide an answer (Figure 1).

Students' understanding of conservation at SDN Curug 03, SDN Curug 05, and SDN Cigelung was generally still low. Most students stated that they had never been taught about conservation at school. Only a small number of students, particularly at SDN Cigelung, reported receiving conservation-related information, while students at SDN Curug 03 and SDN Curug 05 were mostly unfamiliar with the concept. The results in Figure 1 reveal that SDN Curug 03 and SDN Curug 05 had the highest proportions of students who did not know the meaning of conservation, whereas SDN Cigelung indicated relatively better responses. In addition, most students were unaware of conservation areas in Wirajaya, although a small number at SDN Cigelung could identify or mention conservation areas in their village.

The differences in students' knowledge across the three schools indicate that geographical proximity to conservation areas does not automatically lead to a better understanding of conservation. SDN Cigelung demonstrated relatively better knowledge than SDN Curug 03 and SDN Curug 05, which might be influenced by students' previous participation in socialization activities conducted by university students during community service activities in Wirajaya, as well as supporting factors such as school facilities, learning methods, and the school environment (Koshmanova & Ravchyna, 2010; Rissanen, 2018). In contrast, although SDN Curug 03 is located near conservation areas, the surrounding environment has not been optimally used by teachers as a learning medium or learning resource. This condition is also influenced by limited access to literacy resources due to the absence of a school library. The availability of local learning resources is essential because contextual learning materials can help students recognize and understand the potential and issues in their surrounding environment (Khotima et al., 2021).

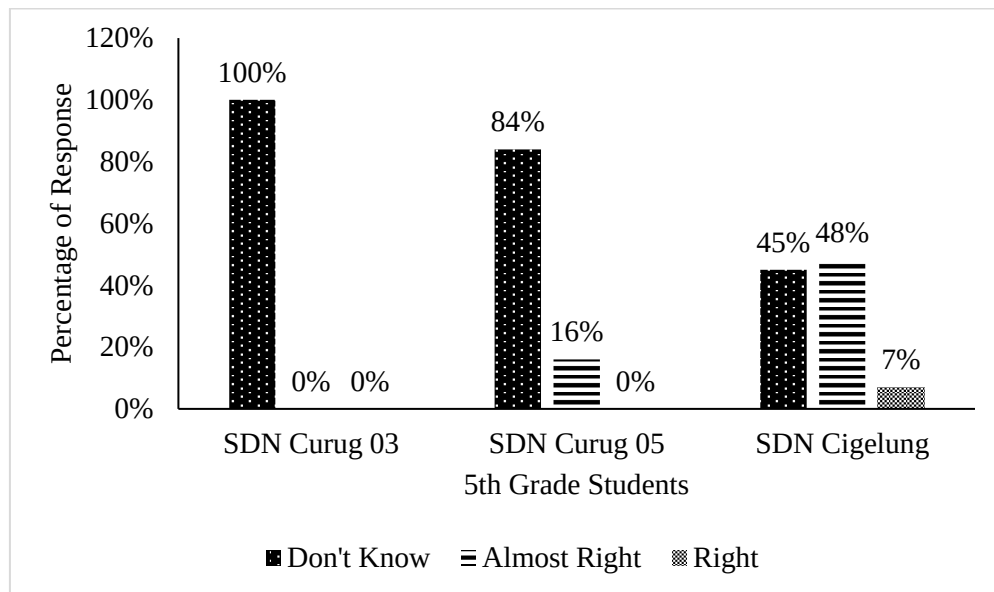


Figure 1. Knowledge about the meaning of conservation

These findings underscore that students' low conservation knowledge is not only due to limited exposure to conservation terms, but also to the weak integration of local conservation issues into school learning. Students' understanding of biodiversity and ecological relationships in their local environment can foster emotional attachment to nature while providing the knowledge needed to support environmental preservation and conservation efforts (Hunn, 2014; Michalik-Śniezek et al., 2025). However, the three schools have not sufficiently adapted the national curriculum to the surrounding environmental conditions, including the presence of Halimun Salak National Park and Dungus Iwul Nature Reserve. As a result, students' understanding remains limited to general environmental issues and has not yet developed into a more specific understanding of conservation, including protection, preservation, biodiversity, and sustainable use. These findings emphasize the need to strengthen conservation education in elementary schools through curriculum integration, contextual learning, and the use of local conservation areas as learning resources. Environmental education has been shown to improve students' understanding of environmental issues, particularly water management and conservation, which are crucial aspects of sustainable environmental management (Balcha et al., 2025; Del Rey et al., 2022). Making the integration of conservation content into school learning an essential step in building environmental awareness from an early age.

2. Attitude

Students' attitudes toward the environment in the three schools were generally positive, though their conservation attitudes remained limited. Most students stated that they felt sad when they saw forests damaged by human activities. However, many of them were unable to explain how to prevent or mitigate environmental damage (Figure 2).

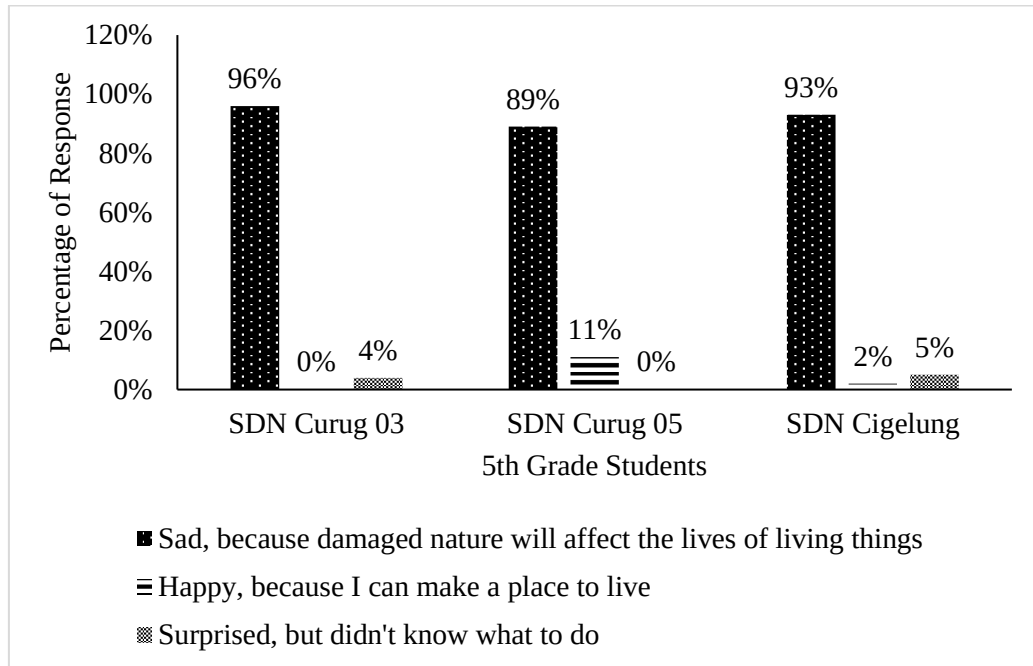


Figure 2. Students' attitudes toward damaged forests

These findings indicate that students' affective awareness of environmental damage has begun to develop, but it has not yet been supported by adequate conservation knowledge and action. This aligns with Wald et al. (2017), who stated that an emotional connection to nature can motivate environmental concern. However, Kholidiyah & Balqis (2026) emphasized that environmental education should encompass cognitive, affective, and conative dimensions, namely understanding environmental issues, developing empathy and responsibility, and showing pro-environmental behavior. Therefore, students' positive attitudes need to be strengthened through conservation knowledge and direct learning experiences.

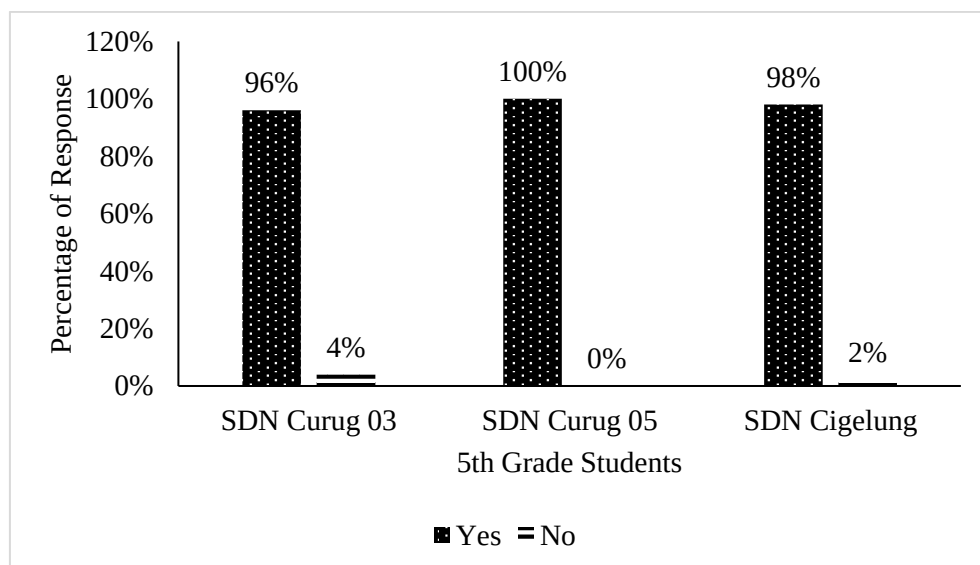


Figure 3. Students' desire to learn about conservation education

A small number of students still hold inaccurate views, including the belief that forest destruction is beneficial. This condition indicates that conservation values have not been fully understood. The limited integration of conservation principles into the curriculum means students learn about biodiversity only as general knowledge, without understanding conservation, ecosystem protection, or the broader impacts of environmental damage. In fact, students need to go through stages of awareness and knowledge before they can be encouraged to take an active role in conservation efforts (Muntasib et al., 2015).

Students' interest in learning about conservation was relatively high. This provides schools with an opportunity to develop more interactive, contextual, and practical learning. Exploration-based learning can deepen students' understanding (Kouicem, 2020). Sugevin & Wibowo (2026) also explained that elementary students need direct and contextual learning experiences, as they construct knowledge more meaningfully through concrete objects and real situations. Therefore, students' concern for the environment should be directed through direct observation, school-based environmental activities, and simple conservation practices. In addition, Amalia et al. (2021) elucidated that environmental care character can be internalized through planned habituation programs supported by the school and home environment.

3. Behavior

During the study, the observed student behavior was mainly environmental rather than conservation-specific. Maintaining school cleanliness remained a challenge in all three schools. Littering was still common among students, even though cleaning duties and community clean-up activities had been scheduled. At SDN Curug 03, students still littered during breaks, even though classroom cleanliness was maintained through a strict cleaning schedule. SDN Curug 05 faced greater challenges due to the limited number of trash bins, despite its greening initiatives. Meanwhile, SDN Cigelung indicated better cleanliness, supported by the availability of more trash bins.

These findings indicate that students' environmental behavior has not yet become a consistent habit. According to the Stages of Change model in Bergman et al. (2026), students' inconsistent cleanliness behavior underscores that they are still in the early stages of behavioral change and require ongoing environmental education to develop sustainable habits. In this context, environmental values need to be strengthened as part of character education, as they can be integrated into science and social studies instruction (Nurikhsani et al., 2026). Learning themes related to caring for animals and plants can also help increase students' motivation to understand and practice environmental care (Junaidi, 2018). Therefore, strengthening waste management habits at school is crucial not only for improving the school environment but also for preparing students to care for the conservation areas around them. Habits can be formed through repetition in a stable context (Carden & Wood, 2018)

Teachers' Knowledge, Attitudes, and Behavior towards Conservation

1. Knowledge

Teachers of the three schools had varying degrees of knowledge about conservation, which tended to be limited. Teachers at SDN Curug 03 lacked knowledge of the concept of conservation, while those at SDN Curug 05 had a more specific understanding of environmental preservation, and teachers at SDN Cigelung placed greater emphasis on changing attitudes towards natural resources. However, most teachers were still limited to knowing the term 'conservation' without a deeper understanding, which could affect the effectiveness of delivering the material to students (Muntasib et al., 2015). Their understanding of conservation areas in Wirajaya was also limited, with several teachers only mentioning the Haurbentes and Salak Mountain protected forests without knowing their specific names, and none mentioning the Dungus Iwul Nature Reserve. The teachers' answers that did not match the questions revealed that they tended to equate conservation with the environment, whereas, according to Law Number 5 of 1990, conservation includes the protection of biodiversity, preservation, and sustainable use of natural resources. Therefore, it was not a surprise to find that conservation education had not been explicitly included in the curriculum. SDN

Curug 03 integrates only a small amount of material into IPAS; SDN Curug 05 teaches conservation in a broader context of protecting the environment, while SDN Cigelung has no conservation topic taught at the school.

2. Attitude

Fifth-grade teachers' attitudes toward conservation generally indicated a positive trend, especially in maintaining the cleanliness and comfort of the school environment. The teachers agreed that understanding the importance of conservation areas needs to be instilled early so that students are aware of the need to protect the environment. Several teachers emphasized the importance of parental involvement to ensure conservation values are applied consistently at home and at school. They also highlighted that natural resources are a basic human need that must be sustained. Religion teachers viewed children as the next generation who need to be equipped with an understanding of their role in protecting the environment, and proposed a special environmental education curriculum to make conservation learning more systematic. Physical education teachers emphasized the role of a sustainable environment in fostering a comfortable, healthy learning atmosphere. The focus of their responses was noticeably related to the subjects they taught at the schools.

However, these positive attitudes were not fully supported by an adequate conceptual understanding of conservation; hence, teachers tend to interpret conservation as merely managing the environment around the school. These findings are in line with previous studies showing that teachers and pre-service teachers may demonstrate positive environmental attitudes and awareness, but limited knowledge, skills, training, and practical experience can restrict their ability to translate these attitudes into concrete environmental actions (Dolenc Orbanic & Kovač, 2021; Handoyo et al., 2025; Khazen et al., 2025). This condition reflects the Dunning–Kruger Effect, which indicates that confidence in a field that is not balanced with sufficient knowledge would potentially lead to misperceptions (Mahmood, 2016). In fact, teachers' understanding and capacity play a vital role in designing learning activities that are appropriate to students' needs and local contexts, including in conservation education (Lukas et al., 2019), and teachers are key actors in instilling conservation values as part of the (Muntasib et al., 2015; Zakiah & Solihah, 2024). Therefore, more structured and applicable education and socialization are needed to improve teachers' capacity to understand and integrate conservation concepts into learning practices.

3. Behavior

Teachers' behavior was more inclined toward environmental issues than substantive conservation. Observations showed that teachers' actions were generally limited to maintaining school cleanliness, encouraging students to dispose of waste properly, and carrying out small-scale greening activities, such as planting plants in the school environment. Although this reflects environmental awareness, it does not yet include conservation practices such as biodiversity protection, preservation, and sustainable use of natural resources. At SDN Curug 03, teachers involved students in recycling and reuse activities but did not demonstrate exemplary conservation practices. At SDN Curug 05, teachers showed a more progressive behavior through joint greening activities and enthusiasm for the free seedling program, but these efforts were still limited to general environmental actions, such as planting and maintaining cleanliness, and did not yet include deeper conservation practices such as biodiversity protection, preservation, or sustainable resource management. While at SDN Cigelung, teachers tended to be more individualistic and revealed little active involvement in conservation. This behavior pattern aligns with the Knowledge–Attitude–Behavior (KAB) model, which emphasizes that limited knowledge impedes changes in attitude and behavior (Marcinkowski & Reid, 2019). Knowledge-based behavior is more sustainable than spontaneous behavior or simply following social norms (Suwanti & Aprilin, 2017). In addition, teachers' behavior has not met the skill level set for conservation education objectives, particularly in the ability to solve conservation problems (Muntasib et al., 2015). Teachers play a central role in conservation education because they help translate conservation concepts into classroom learning, guide students through appropriate learning activities, and support the

internalization of conservation values through both instruction and exemplary practices (Lukas et al., 2019). Therefore, more intensive training and mentoring are needed so that teachers are able to integrate conservation practices more comprehensively into their daily lives and learning.

Current Implementation of Conservation Education

The three elementary schools in Wirajaya have implemented the Merdeka Curriculum, but its implementation has not been fully adapted to local environmental conditions. Although the curriculum includes environmental topics, conservation has not been specifically integrated into learning. As a result, the materials taught are still limited to cleanliness, waste management, greening activities, and biodiversity introduction. SDN Curug 03 focused more on waste recycling projects, SDN Curug 05 was relatively more active through greening and the reuse of used materials, while SDN Cigelung was still limited to habituating students to maintain cleanliness. This condition indicates that conservation education has not yet been systematically integrated into school learning. Teachers' limited understanding of conservation also affects the depth of the material they deliver to students. When teachers have a narrow understanding of conservation and conservation education, students' understanding of conservation tends to be limited as well. Therefore, teachers need a strong conceptual understanding in order to instill conservation awareness effectively in students (Zakiah & Solihah, 2024). This is also supported by Mista (2020), who emphasized that teacher professional competence includes the ability to master learning materials and to develop them creatively in line with students' needs.

In addition, the learning methods used in the three schools were still dominated by lectures with limited media support, such as textbooks and blackboards. Lectures tend to be one-way and less effective when not accompanied by practice, though they remain useful for delivering basic concepts. Contextual learning is needed; hence, students can connect learning materials to real-world conditions in their surroundings. Hutaeruk et al. (2020) added that Contextual Teaching and Learning can significantly improve students' learning outcomes by helping them understand learning materials more clearly through real-life contexts. Similarly, Purwasi et al. (2025) found that Discovery Learning had a positive effect on students' learning outcomes in IPAS, as it encouraged students to be more active in exploring and understanding concepts. However, practical learning activities in the three schools were still limited to tree planting and crafts made from waste. Efforts to introduce conservation through Scouting activities at SDN Curug 05 and SDN Cigelung were also still general and had not yet addressed protection, preservation, and sustainable use. In addition, there was no cooperation with the local Environmental Agency in waste management. As a result, waste was still commonly burned, indicating that school environmental management practices had not yet reflected conservation principles. These findings highlight the need to strengthen conservation education through contextual curriculum adaptation, teacher capacity building, practical learning activities, and collaboration with relevant stakeholders. Thus, conservation education in the three schools needs to be directed not only toward environmental cleanliness but also toward developing students' conservation knowledge, attitudes, skills, participation, and concrete actions related to the protection, preservation, and sustainable use of local natural resources.

Recommendations for the Implementation of Conservation Education

The implementation of conservation education at SDN Curug 03, SDN Curug 05, and SDN Cigelung needs to be strengthened through conservation-area-based education policies. Although the Merdeka Curriculum has been implemented, learning has not been fully adapted to the local environmental context and remains limited to cleanliness, recycling, greening activities, and basic biodiversity introduction. In accordance with Law Number 20 of 2003, schools should adjust their learning to local environmental conditions. Therefore, elementary schools located near Gunung Halimun Salak National Park and Dungus Iwul Nature Reserve should integrate conservation topics more systematically into the curriculum, including protection, preservation, sustainable use, soil and water conservation, and conservation of local species.

Conservation education should not only introduce environmental issues, but also develop students' knowledge, attitudes, skills, problem-solving abilities, and concrete actions for ecosystem preservation (Muntasib et al., 2015), as emphasized in Law Number 32 of 2024. Policy implications include adapting the Merdeka Curriculum to the local conservation context, developing local conservation education modules, providing teacher training, establishing collaboration between schools and conservation area managers, and strengthening local-content learning based on nearby conservation areas.

Teaching methods that are still dominated by lectures and simple practices have not been able to form conservation habits and awareness in students. Conventional methods need to be reinforced with interactive and experience-based approaches, such as Brain-Based Learning, which emphasizes exploration and deep reflection (Jensen & McConchie, 2020), as well as outdoor learning, which has been proven effective in improving conservation understanding (Kamaludin et al., 2022). Project-based learning and direct involvement in conservation areas, including collaboration with the Dungus Iwul Nature Reserve and TNGHS, can turn these areas into natural laboratories that enable students to learn in and for conservation (Muntasib et al., 2015). The success of this approach requires the support of trained teachers who action (Jensen & McConchie, 2020), as well as the involvement of parents through a citizen science approach that encourages family participation in conservation actions (Kobori et al., 2016). The systematic integration of curriculum, learning methods, schools, families, and communities is essential for building long-term ecological awareness and encouraging sustainable conservation behavior (Ardoin et al., 2020).

CONCLUSION AND RECOMMENDATIONS

This study concludes that conservation education in the three elementary schools in Wirajaya has not been systematically integrated into the curriculum and learning process. Although environmental topics were found across several subjects, they remained limited to cleanliness, waste management, greening activities, and biodiversity introduction, without a deeper emphasis on protection, preservation, and sustainable use. Students' conservation knowledge remained low, while their environmental attitudes were generally positive; teachers' understanding of conservation was also limited, affecting the implementation of conservation learning. This study contributes to conservation education by showing that proximity to conservation areas does not automatically build students' conservation understanding. Therefore, schools located near conservation areas need to adapt learning to local environmental conditions, strengthen teacher capacity, develop conservation-based learning materials, and use nearby conservation areas as contextual learning resources.

Credit authorship contribution statement

First Author: Conceptualization, Data Curation, Formal Analysis, Investigation, Writing – Original Draft, Writing – Review, Editing. Second Author: Conceptualization, Formal Analysis, Supervision, Writing – Review, Editing. Third Author: Conceptualization, Formal Analysis, Supervision, Writing – Review, Editing. Last Author: Writing – Review, Editing.

Declaration of competing interest

The author declares that there are no conflicts of interest associated with the publication of this manuscript.

Ethical Declaration

All participants provided informed consent prior to their involvement in the study. They were informed about the study's purpose, procedures, and their right to withdraw at any time without consequence.

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