

School-Based Climate Change Education for Fostering Ecological Awareness: A Qualitative Case Study in an Indonesian Islamic Elementary School

Halimatust Sya'diah¹, Gista Naruliyah Siswanti², Laily Faridah³, Alfa Rohmatin⁴

¹, Universitas Uluwiyah (UNU) Mojokerto, Indonesia

², Universitas Uluwiyah (UNU) Mojokerto, Indonesia

³, Roudlotul Ulum Elementary School, Mojokerto, Indonesia

⁴, Roudlotul Ulum Elementary School, Mojokerto, Indonesia

ARTICLE INFO

Keywords:

Climate Change Education;
Elementary School; Waste
Management; Tree Planting;
School Environment

Article history:

Received 2026-06-13

Revised 2026-07-29

Accepted 2026-07-31

ABSTRACT

This study discusses the implementation of the climate change education program at MI Roudlotul Ulum Mojokerto as an effort to instill ecological awareness from an early age. Climate change education is a part of environmental education that aims to build environmentally friendly behavior through practical school-based activities. This research aims to describe the planning, implementation, and evaluation of the climate change education program, as well as to identify its supporting and inhibiting factors. The research used a descriptive qualitative method with data collected through observation, interviews, and documentation. The findings show that the program has been implemented through tree planting (pine and longan), biopore making, waste management, and creative recycling activities. However, several challenges were found, such as limited facilities and reliance on voluntary donations. This study contributes to enriching the literature on environmental education at the elementary level and provides an example of good practices that can be applied in other madrasas. The results highlight that simple school-based routines can be an effective strategy in shaping students' environmental awareness and responsibility.

This is an open-access article under the [CC BY SA](#) license.



Corresponding Author:

Halimatust Sya'diah

Universitas Uluwiyah (UNU) Mojokerto, Indonesia: 20222001260254@student.uluwiyah.ac.id

INTRODUCTION

Climate change education is a form of environmental education that aims to foster students' awareness, knowledge, and skills in addressing the real-world impacts of climate change. Through this education, students are not only encouraged to understand the causes and effects of climate change but are also guided to take concrete action to protect and preserve the environment. Climate change

education encourages students to engage in environmentally friendly behaviors, such as conserving energy, reducing plastic waste, planting trees, and reusing used goods (Kemendikbudristek, 2023). Thus, climate change education is a crucial part of efforts to shape a generation that is ecologically aware and responsible for the sustainability of the earth.

Education on environmental issues, particularly climate change, has become a major focus in the elementary school curriculum. At MI Roudlotul Ulum Mojosari, Mojokerto, climate change education has begun to be integrated into various thematic subjects, habituation activities, and extracurricular activities, with the aim of building ecological awareness from an early age. This is done because madrasah students are at a golden age in character formation, so values of environmental concern can be more easily instilled through real-life activities at school. This effort also aligns with the global need to involve the younger generation in climate change mitigation, while simultaneously making schools centers of learning that are environmentally friendly and responsive to the challenges of the times.

The impacts of climate change are not limited to the global environment but also impact aspects of daily life such as seasonal changes, food security, and public health (Komalasari & Yakubu, 2023). As a primary educational institution, Islamic elementary schools (MI) play a crucial role in instilling a sense of environmental responsibility from a young age. It is hoped that implementing climate change education programs in elementary schools will improve students' understanding, knowledge, and behavior, encouraging them to actively participate in environmental conservation (Anwar, 2021).

A preliminary assessment conducted at MI Roudlotul Ulum Mojosari Mojokerto revealed that educational initiatives on climate change had been initiated through thematic lessons in the classrooms in addition to some extracurricular activities, although the implementation was less than uniform. According to interviews with teachers, a number of them mentioned that students still found it difficult to understand abstract concepts related to climate change, which indicates the need for refinement in the approach used. Simultaneously, the results of the initial questionnaire from students showed that only about 40% of students understood the core drivers behind climate change, although more than 70% had adopted environmentally conscious habits such as proper waste disposal. This information indicates a gap between theoretical understanding and daily practice in the school environment.

Several studies demonstrate the importance of early environmental education. Prasetyo (2015) emphasized that integrating environmental education into science increases student awareness, while Rahmawati and Santoso (2018) demonstrated the effectiveness of project-based methods, and Lestari (2021) highlighted the role of a thematic environment-based curriculum in understanding climate change. However, studies on the implementation of climate change education at the elementary school level, particularly in Mojokerto, are still limited. Therefore, this study aims to describe the planning, implementation, and evaluation of the climate change education program at MI Roudlotul Ulum Mojosari Mojokerto, while also identifying supporting and inhibiting factors. The results are expected to contribute to the development of thematic environment-based learning in MI and add to the literature on climate change education in elementary schools.

METHODS

This study uses a qualitative descriptive approach with a focus on the implementation of climate change education programs. The variables observed include: (1) planning of climate change education programs, (2) implementation of climate change education programs, and (3) evaluation of the implementation of climate change education programs at MI Roudlotul Ulum Mojosari Mojokerto. The research subjects consisted of the madrasah principal, class teachers, and students at MI Roudlotul Ulum Mojosari Mojokerto. The madrasah principal was chosen because of her role in program planning and policy, teachers were chosen as the primary implementers of learning and habituation activities,

and students were the direct recipients of the climate change education program. The instruments used included interview guides for madrasah principals and teachers, observation sheets to observe learning activities and student activities, and a simple questionnaire to measure students' understanding and attitudes toward climate change issues. Additionally, documentation in the form of activity photos, schedules, and school program documents was used to supplement the observation and interview data.

This research was conducted through three main stages, namely: (1) data collection through observation, in-depth interviews, student questionnaires, and documentation; (2) data reduction by selecting relevant information according to the research focus; (3) data presentation in narrative and tabular form to make it easier to analyze; and (4) drawing conclusions to answer the research problem formulation. The data analysis technique used the interactive model of Miles and Huberman which includes data reduction, data presentation, and drawing and verifying conclusions. Data validity was obtained through source triangulation (madrasah principal, teachers, students) and technical triangulation (interviews, observation, documentation, and questionnaires).

FINDINGS AND DISCUSSION

Implementation of Climate Change Education Program

The research results show that MI Roudlotul Ulum Mojosari Mojokerto has implemented a number of activities aligned with climate change education goals. Students are introduced to the habit of separating organic and inorganic waste as part of the school routine.



Figure 1.[student activity sorting organic and inorganic waste]

Source: Researcher Documentation (2025)

This habit is the first step in instilling ecological awareness from an early age, recognizing that waste is not simply waste but can be separated according to type for easier subsequent management. Furthermore, within the school grounds, pine trees have been planted collaboratively by students and teachers since childhood. These trees have now grown large and become a tangible symbol of the sustainable reforestation program. Not only do they provide shade, but they also provide students with firsthand experience of the importance of protecting and caring for the environment. Researchers also planted longan trees as part of the sustainable reforestation program.



Figure 2. Tree planting activity around the area

Source: Researcher Documentation (2025)

In practical learning, teachers also encourage students to participate in biopore activities. One such activity, led directly by Mrs. Erni, a teacher at MI Roudlotul Ulum, involved students digging biopore holes to manage organic waste. This activity demonstrated a concrete effort to integrate environmental management theory with practical field practice. Thus, students not only understood the abstract concept of climate change but also experienced real-life experiences through simple practices relevant to everyday life.

Creativity And Innovation In Waste Management

The school also encourages students' creativity in waste management through a recycling approach. Some of the students' creations include handicrafts made from bottle caps, simple fences made from small Aqua bottles filled with used fabric, decorative flowers made from plastic bags, and book covers made from scrap fabric. These activities not only aim to reduce inorganic waste but also foster motor skills, creativity, and teamwork among students.

Parents' participation was also evident in this program. One way they contributed was by creating decorations from used plastic cups to beautify the classroom. The collaboration between the school, students, and parents demonstrates that climate change education at MI Roudlotul Ulum is not solely the responsibility of teachers but also involves the entire school community. With the involvement of various parties, this program becomes more effective and instills the values of mutual cooperation and shared concern for the environment.

Table 1: Climate change education activities at MI Roudlotul Ulum

No.	Type of activity	Executor	Frequency	Objective
1.	Sorting organic and inorganic waste	Students and teachers	Every day	Instilling ecological awareness
2.	Planting pine and longan trees	Teachers & students	Every semester	Greening the school environment
3.	Making biopores	Science teachers & students	Once a year	Managing organic waste and protecting the soil
4.	Recycled crafts (plastic flowers, bottle fences, patchwork)	Students in grades 4–6	Every semester	Train creativity and responsibility

5.	Class decorations from used materials (student guardians)	Parents & students	Incidental	Supporting school aesthetics and collaboration
----	---	--------------------	------------	--

Source: Results of interviews with class 5A teachers at MI Roudlotul Ulum Mojosari and researcher observations 2025

Problems Faced

Although the implementation of the climate change education program has been quite successful, research has found several obstacles. First, waste management is not yet fully optimized. The practice of burning trash in the area behind the school after students have gone home is still found. This has the potential to cause air pollution and contradicts the goals of environmental education. Second, available infrastructure is still limited. Schools do not have dedicated bathrooms for teachers, and handwashing facilities are still very limited. Handwashing practices, which were initially encouraged during the COVID-19 pandemic, now rely more on simple water gallons and hand sanitizer. Third, funding for activities still relies on volunteer donations. This reliance on donations often hinders program sustainability if there is insufficient funding.

Efforts to Support the Program

Despite these limitations, schools continue to strive to instill clean and healthy living habits. Following the 2019 COVID-19 pandemic, students and teachers have become accustomed to using hand sanitizer, disinfectant fluid, and gallon jugs of water to maintain cleanliness. Although simple, these practices help reinforce students' hygienic behavior, which is also relevant to the goals of climate change education, namely fostering healthy and environmentally conscious lifestyles. This demonstrates that limited facilities do not prevent schools from continuing to innovate.



Overall, the implementation of the climate change education program at MI Roudlotul Ulum Mojosari Mojokerto has been successful, with activities such as reforestation, waste management, biopore practices, and creative projects based on recycling. However, several challenges remain, such as less-than-environmentally friendly waste management, limited infrastructure, and reliance on donations. Nevertheless, the spirit of collaboration between students, teachers, and parents is a strength that can be further developed for the program's sustainability in the future.

Discussion

Environmental care activities at MI Roudlotul Ulum, such as planting longan trees, show that education about climate change can be carried out in a way that is close to children's lives.. Planting trees not only makes the school environment cooler, but also teaches students about the importance of preserving nature for the future. In line with Palmer's (1998) opinion, hands-on experiences like tree planting can foster a love and responsibility for the environment. Aini's (2022) research also demonstrated that students involved in reforestation activities better understood the benefits of trees in absorbing pollution and reducing global warming. This is similar to what happened at MI Roudlotul Ulum, where students actively participated in caring for longan trees alongside teachers. Learning through real-world experiences supports the theory. Kolb (1984) said that children will understand more easily if they learn through direct practice, not just theory.

Apart from planting trees, students are also invited to manage waste in creative ways, for example making decorations from used bottles, flowers from plastic. plastic bags, or bookcases made from scrap fabric. This activity aligns with Tilbury's (2011) opinion, which states that environmental education should train students to think creatively in finding solutions to problems around them. However, challenges remain in the field. For example, trash is often burned behind schools, despite this practice being detrimental to health and the environment. This aligns with research by Syafruddin (2020), which states that the success of environmental education depends heavily on the alignment between learning, school facilities, and daily habits. Overall, activities at MI Roudlotul Ulum have shown a positive direction in environmental education. However, better facilities and practices are still needed to ensure the program's effectiveness and long-term impact on both students and the school.

Planting of longan trees carried out in the yard of MI Roudlotul Ulum Mojosari is a concrete example of environmental education for students. Through this activity, students are not only taught about climate change theory in class but also directly involved in environmental preservation efforts. Longan trees were chosen because they not only provide greenery but also produce fruit in the future, allowing the children to see the tangible benefits of the trees they plant and care for. This tree planting activity is in line with the opinion Palmer (1998) stated that hands-on experiences such as farming can foster a love and responsibility for nature. Furthermore, research by Aini (2022) also showed that students involved in reforestation programs better understood the role of trees in absorbing pollution and reducing the impact of global warming. Therefore, the implementation at MI Roudlotul Ulum aligns with these research findings.

Apart from planting longan trees, students are also invited to manage waste through various creative activities, for example making flowers from plastic. plastic bags, bookcases made from scrap fabric, and mini fences made from used bottles. These activities not only reduce waste but also foster children's creativity. This aligns with Tilbury's (2011) opinion that environmental education should train children to think creatively in finding solutions to everyday problems. Despite the many positive initiatives, challenges remain. One example is the practice of burning trash behind schools after school hours. This practice is undesirable because it can cause air pollution. Research by Syafruddin (2020) confirms that the success of environmental education is greatly influenced by the alignment between learning, school facilities, and daily habits. Therefore, the practice of burning trash needs to be replaced with more environmentally friendly waste management practices. Overall, planting longan trees in the yard of MI Roudlotul Ulum Mojosari, along with its creative waste management activities, has been a significant step in climate change education. However, more consistent support and familiarization are still needed for this program to truly have a long-term impact on students and the school environment.

CONCLUSION

This study found that the implementation of the climate change education program at MI Roudlotul Ulum Mojokari provided meaningful, hands-on experiences for students. A surprising aspect was the students' enthusiasm in processing waste into various creative products, such as flowers made from plastic bags, fences from used bottles, and bookcases made from scrap fabric. Furthermore, planting longan trees in the schoolyard served as a tangible symbol of collective environmental awareness. Fieldwork demonstrates that despite limited facilities, student and teacher awareness and initiative can foster consistent, environmentally friendly activities.

In terms of scientific contribution, this study confirms previous findings regarding the importance of experiential environmental education in increasing student awareness (Prasetyo, 2015; Rahmawati & Santoso, 2018; Lestari, 2021). However, this study also contributes a new perspective, namely that simple habituation in Islamic elementary schools can be an effective model for climate change education. The novelty lies in the integrative approach between environmental practices (tree planting, biopores, recycling) and character education, so that climate change education is not only understood cognitively but also realized in concrete daily actions.

The limitations of this study lie in its relatively narrow scope, conducted in only one madrasah with a limited number of cases. It also did not compare the results of program implementation at other levels or locations, so the generalizability of the findings is still limited. Furthermore, the methods used emphasized qualitative observations and interviews, so they were unable to quantitatively describe the program's impact on student attitudes or behavior. Therefore, further research is needed involving more schools, different levels of education, and a variety of methods to obtain a more comprehensive understanding. With broader and more in-depth results, more appropriate environmental education policies can be formulated.

REFERENCES

- Amma, T., & Rifa'i, M.A. (2022). Knowledge as A Factor That Affects The Validity and Interest in Carrying out Islamic Law. *Nazhruna: Journal of Islamic Education*, 5(2), 843–851. <https://doi.org/10.31538/nzh.v5i2.2337>
- Anwar, K. (2021). Pancasila Village, Multicultural Education, and Moderation of Diversity in Indonesia. *Nazhruna: Journal of Islamic Education*, 4(2), 221–234. <https://doi.org/10.31538/nzh.v4i2.1238>
- Astuti, S., & Prasetyo, M. (2020). Implementation of Environmental Education in Elementary Schools to Increase Student Awareness of Climate Change. *Indonesian Journal of Elementary Education*, 6(1), 45–56. <https://doi.org/10.31004/jpdn.v6i1.789>
- Badri, KN bin Z. (2022). Balanced Education According to Imam Al-Zarnuji. *Tafkir: Interdisciplinary Journal of Islamic Education*, 3(2), 135–147. <https://doi.org/10.31538/tijie.v3i2.177>
- Ministry of Education, Culture, Research, and Technology. (2023). *Guidelines for Implementing Climate Change Education in Elementary Schools*. Jakarta: Directorate of Elementary Schools, Ministry of Education, Culture, Research, and Technology.
- Komalasari, M., & Yakubu, AB (2023). Implementation of Student Character Formation Through Islamic Religious Education. *At-Tadzkir: Islamic Education Journal*, 2(1), 52–64.
- Lestari, D. (2021). Integrating Climate Change Education into the Thematic Curriculum in Elementary Schools. *Journal of Elementary Education and Learning*, 8(2), 101–110. <https://doi.org/10.17509/jppd.v8i2.27654>

- Prasetyo, H. (2015). Integration of Environmental Education in Science Learning in Elementary Schools. *Indonesian Journal of Science Education*, 3(2), 77–85.
- Rahmawati, N., & Santoso, D. (2018). The Effectiveness of Project-Based Learning in Increasing Environmental Awareness of Elementary School Students. *Indonesian Journal of Elementary Education*, 4(3), 198–207.
- Qomar, M. (2013). *Dimensions of Islamic Education Management*. Emir.
- Tafsir, A. (1992). *Educational Science in an Islamic Perspective*. Rosdakarya Youth.
- Terry, G. R. (1977). *Principles of Management*. R.D. Irwin