



ZERO WASTE REVOLUTION: TRANSFORMING SCHOOLS TOWARDS SUSTAINABLE ENVIRONMENTAL LITERACY

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ABSTRACT

This research aims to evaluate the implementation of the Zero Waste program and environmental literacy among secondary school students in West Lampung. The research method used is a mixed method with data collection techniques through observation, interviews, multiple choice test questions, questionnaire tests, and documentation. The research results show that the Zero Waste program in schools applies the 5R principle (Refuse, Reduce, Reuse, Recycle and Rot). The implementation of this zero waste program has a positive impact on environmental literacy and on students' lives. Students' environmental knowledge and cognitive skills are in the medium category, while students' attitudes and behavior towards the environment are in the high category. The average student environmental literacy in the medium category. Thus, this research shows that the Zero Waste program has a positive impact on students' environmental literacy.

Keywords: Environmental Literacy, implementation, zero waste, 5R.

1. INTRODUCTION

Environmental education has urgency in awareness and sustainable behavior in the younger generation. Schools are an ideal place to introduce and implement environmentally friendly practices and skills in learning, including the Zero Waste concept (Gutberlet & Baeder, 2008; Pratama & Natalia, 2023; Rahmawati et al., 2024; Zaman, 2022). Zero Waste is a holistic approach that aims to reduce, recycle and minimize the waste produced, thereby reducing negative impacts on the environment (Islam et al., 2023; Zaman, 2022). Introducing the Zero Waste concept in schools not only helps reduce the amount of waste that ends up in landfills, but also increases students' awareness and understanding of the importance of resource conservation and environmental protection. Thus, implementing the Zero Waste program in schools has the potential to form a generation that is more concerned and responsible for the environment (Gutberlet & Baeder, 2008; Kowasch, 2022; Zaman, 2022). This is one of the programs at the Adiwiyata school.

The Adiwiyata School Program is a means of promoting sustainable practices and environmental awareness among students and the entire school community (Afrianda et al., 2019; Desfandi et al., 2017). Adiwiyata School is a national program that aims to encourage schools in Indonesia to care more about the environment. Activities carried out include managing the school environment, efficient use of energy and water, as well as reducing, sorting and managing waste better (Zero Waste) (Afrianda et al., 2019; Choi et al., 2022). The zero waste concept is a real sustainable concept that can be applied in schools. Zero waste programs in schools teach students to develop and practice knowledge about the concept of sustainable systems by reducing waste production (Choi et al., 2022; Nekouei, 2020; Uska et al., 2021).

Although the Zero Waste concept has received increasing attention in Indonesia, there is a lack of empirical data covering the implementation of Zero Waste programs at various levels, including in schools. Previous research tends to focus on policy analysis or literature observations, while empirical research proving the effectiveness of implementing the Zero Waste program at the school level is still limited. In addition, little research has looked at the impact of Zero Waste programs on students' environmental literacy, including their knowledge, skills, attitudes and behavior towards the environment. Therefore, further research is needed that comprehensively explores the implementation of the Zero Waste program in schools and its impact on students' environmental literacy in Indonesia. This kind of research will provide valuable insights for stakeholders in developing more effective strategies in supporting the Zero Waste movement in the educational environment. Based on the introduction of the problems that have been discussed, it is clear how important it is to implement the Zero Waste concept in maintaining the ecosystem and the welfare of society in Indonesia. Concrete steps in



reducing, recycling and minimizing waste are a must to withstand today's environmental challenges. With joint efforts from the government, civil society and the private sector, as well as increased awareness and active participation from all elements of society, we can move towards creating a cleaner, healthier and more sustainable environment for future generations. Therefore, Zero Waste is not just a concept, but also a vision that can be realized through the cooperation and commitment of all parties.

2. METHODS

This research uses mixed methods, where this research uses a research approach that combines qualitative and quantitative elements. In this strategy, researchers collect data from both approaches simultaneously, then integrate the data to provide a more comprehensive understanding. In this research, a qualitative approach was used to understand the implementation of the Zero Waste program in schools, while a quantitative approach was used to collect data on students' environmental literacy levels. The population in this study was the academic community of MTsN 1 Lampung Barat, with a sample consisting of two classes to collect data on students' environmental literacy levels. Apart from that, data regarding the implementation of the Zero Waste program was obtained through interviews with the Adiwiyata coordinator, the coordinator of one of the Zero Waste program working groups, canteen traders, and school security guards. By combining these two types of data, researchers can provide a more complete picture of the implementation of the Zero Waste program and its impact on students' environmental literacy.

3. RESULTS & DISCUSSION

The results of this research review the implementation of Zero Waste and the application of zero waste to students' environmental literacy abilities.

3.1 *Implementation of the Zero Waste Program*

The Adiwiyata Program, which has been implemented since MTsN 1 Lampung Barat, received status as an Adiwiyata school in 2021 and has continued to be developed since then. Active participation of all school members, especially students, is very important in carrying out this program to create a school environment that is conducive and comfortable for learning activities. To ensure the smooth running of the program, a working group (pokja) was formed consisting of teachers and administration staff, involving members from various grade levels, starting from grade 7 to grade 9. Each working group has a coordinator whose job is to coordinate program activities. This step aims to ensure that all school members understand and comply with the policies that have been set, so that the program can run as expected. As a first step, minimum participants It is hoped that they will be aware of the policies issued by the school principal, as well as comply with and not violate policies related to the implementation of environmental activities at school.

To support the implementation of the Zero Waste program, providing environmentally friendly facilities and infrastructure is very important. At MTsN 1 Lampung Barat, the school land has been utilized optimally by providing various facilities that support learning and handling environmental problems. Based on observations, several facilities are available to support the implementation of the Zero Waste program, including healthy canteens, separate organic and non-organic waste bins, waste banks, composters, and liquid waste disposal channels such as septic tanks. With adequate facilities and infrastructure, it is hoped that it can provide optimal support in efforts to create a clean, healthy and sustainable school environment through the implementation of the Zero Waste program (Chu et al., 2023). This is also in line with research conducted by (Afrianda et al., 2019) in his research on the Adiwiyata program on environmental literacy.

The activities carried out at MTsN 1 Lampung Barat in support of the Zero Waste program include the Adiwiyata picket which is carried out every day, where students scheduled for the Adiwiyata picket are on duty. Apart from that, there are also Healthy and Clean Friday activities, which are held once a week on Fridays involving residents from all schools. Waste recycling activities are also part of this effort, which are coordinated by the waste recycling creation working group. One of the results of this activity is the creation of ecobricks, where non-organic waste such as plastic is recycled into ecological bricks. Apart from that, activities for making



liquid fertilizer and compost (eco-enzyme) are also carried out, usually carried out at the end of every semester. These activities are also in line with previous research to reduce waste and zero emissions (Rustam et al., 2023; Nasir et al., 2023; Yadav et al., 2023).

Apart from that, the school community is also trying to utilize the school canteen by not selling food wrapped in plastic, and replacing it with packaging that is easily decomposed such as banana leaves. However, it is realized that reducing activities that can generate waste is not easy, considering that humans are basically consumer creatures who will always produce waste in the surrounding environment. Based on observations, activities are still found in the school environment that produce waste. Therefore, the school continues to socialize and educate all school members to care more about the surrounding environment, especially regarding the problem of plastic waste.

Table 1. List of Zero Waste Activities at MTs N 1 Lampung Barat

No.	Activity	Schedule	Implementation
1.	Adiwiyata Picket	Everyday	Students who are scheduled to attend the Adiwiyata picket
2.	Healthy and Clean in Friday	Friday	The entire MTs N 1 Lampung Barat
3.	Innovation and Creation/ Recycling Rubbish	Tentative	Waste Recycling Creation Working Group
4.	POC (liquid organic fertilizer) and Compost		Compost Working Group and Waste Bank
	Eco enzyme		

The school community, especially the teachers and the entire Adiwiyata team, always strives to reduce the waste produced in the school environment. However, there is still organic and non-organic waste in the school environment. Therefore, the school is trying to manage this waste in order to reduce the amount of waste that goes to final disposal. Through the results of research in the form of interviews and observations, it is known that the waste disposal or processing system at MTsN 1 Lampung Barat is the same as in general, namely by providing organic and non-organic waste bins. Non-organic waste, especially plastic, is sorted before ending up in final disposal, then recycled into products that have useful value, such as ecobricks, stationery storage, and so on. Meanwhile, organic waste is used as fertilizer and liquid compost (eco-enzyme).

However, the results of interviews and observations show that the waste bank at MTs N 1 West Lampung is not optimal in separating organic and non-organic waste. One of the contributing factors is the location of the waste bank which is close to residential areas, making it possible for people to throw household waste into the waste bank. However, the school always tries and sensitizes the school community to reduce waste production as much as possible in the school environment. This is in line with research conducted (Ap. Moreira & Wanda Rutkoski, 2021; Chu et al., 2023; Federico, 2021; Yüzüak & Erten, 2022) which explains zero waste in education.

3.2 Implementation of the Zero Waste Program on Students' Environmental Literacy

In conveying the impact of implementing the Zero Waste program on students' environmental literacy at MTsN 1 Lampung Barat, a comprehensive analysis of various aspects of environmental literacy is needed. This analysis includes an assessment of environmental knowledge, cognitive skills, attitudes towards the environment, and behavior towards the environment. By paying attention to these aspects as a whole, we can gain a deeper understanding of the impact of the Zero Waste program on students' environmental understanding and awareness, as well as their ability to take sustainable action in protecting the environment. The results of implementing



environmental literacy can be seen in Figure 1.

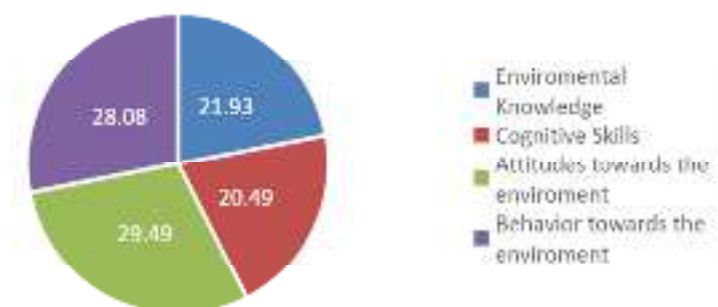


Figure 1. Results of Environmental Literacy Percentage

Based on the results of the presentation above, it can be seen that there are four domains of environmental literacy, namely; Environmental Knowledge: Students' knowledge of environmental issues, including their understanding of Zero Waste principles, waste management processes, and the importance of sustainable practices in everyday life. Cognitive Skills: Evaluation of students' cognitive skills in applying Zero Waste concepts and principles in daily activities, such as sorting waste, using environmentally friendly goods, and participating in waste management activities at school. This skill gets the lowest results, this is because students have not really implemented the zero waste concept in life. Attitudes towards the Environment: It is necessary to assess students' attitudes towards the environment, including whether they have a positive attitude towards Zero Waste practices, awareness of the importance of protecting the environment, and a desire to contribute to environmental conservation efforts. In terms of environmental literacy results, the highest results were obtained, this is because students have given a positive response to the zero waste program implemented. Behavior towards the environment: Analysis of student behavior towards the environment, including practices carried out in daily life that reflect the application of the Zero Waste concept, such as reducing the use of plastic, sorting waste, and participating in environmental activities.

Environmental literacy is important because it helps individuals understand the importance of maintaining environmental sustainability for the well-being of humans and the planet. By increasing environmental literacy, individuals can become agents of change who contribute to global efforts to protect the environment and create a sustainable future (Afrianda et al., 2019; Pratama et al., 2018; Safrizal et al., 2020; Septiani et al., 2019). By analyzing these four aspects before and after implementing the Zero Waste program, we can identify the real impact of the program on students' environmental literacy at MTsN 1.

Students' environmental literacy can be obtained because schools implement Adiwiyata components, one of which is implementing a zero waste program in schools. Therefore, implementing environmentally based programs such as the zero waste program which is part of the Adiwiyata program can shape students' environmental literacy, especially in attitudes and behavior towards the environment. This was also researched by (Hendinata et al., 2022) who stated that literacy is an important part of the environment, especially in Indonesia. Apart from that, the implementation of the Zero Waste program also has a positive impact on students' attitudes and behavior towards the environment. They become more aware of the importance of protecting the environment, develop a caring attitude towards sustainability, and actively engage in practices that support the environment, such as reducing waste, recycling, and using environmentally friendly products.

4. CONCLUSION

In conclusion, implementing the Zero Waste program can make a significant contribution to increasing environmental literacy in students. By adopting a Zero Waste approach, the Zero Waste program in schools applies the 5R principle (Refuse, Reduce, Reuse, Recycle and Rot). The implementation of this zero waste



program has a positive impact on environmental literacy and students' lives. Students' environmental knowledge and cognitive skills are in the medium category, while students' attitudes and behavior towards the environment are in the high category. Through this program, they not only gain practical knowledge about how to manage waste, but also develop the cognitive skills to analyze and assess the environmental impact of their daily actions. Thus, through the Zero Waste program, students not only gain knowledge about environmental issues, but also internalize the pro-environmental values and attitudes needed to become responsible citizens who care about the future of the earth. By continuing to encourage the implementation of the Zero Waste program and increasing environmental literacy among students, we can create a society that is more environmentally aware and committed to preserving the environmental ecosystem for future generations.

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