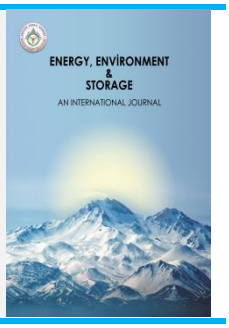
Research Article *Energy, Environment and Storage (2025) 05-01:1-9*

Energy, Environment and Storage

Journal Homepage: www.enenstrg.com



The Potential of Teacher Involvement in Improving the City's Environment

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ABSTRACT. This study aims to determine the role of teachers in environmental education and disaster mitigation in Mataram City, West Nusa Tenggara. Conducted in August 2023, the study involved 422 primary school teacher respondents through the distribution of questionnaires covering four aspects: teachers' perception of students' interest in the environment, teachers' attention to rivers, teachers' role in disaster mitigation, and teachers' contribution to environmental education. Results showed the majority of teachers play an active role in environmental education and disaster mitigation, with 65% of students interested in learning about the environment and 60% of teachers teaching environmental education. Mataram City, as a tourism-based city, faces environmental challenges such as river pollution, suboptimal waste management, limited infrastructure, and drainage problems. This research explores the strategic role of teachers as agents of change in shaping the mindset and behavior of the younger generation towards environmental issues. Through the integration of environmental education in the curriculum and daily practices, teachers can be effective catalysts in instilling environmental awareness and encouraging action among students. This study aims to assess teachers' perceptions of students' interest in the environment, teachers' attention to rivers, teachers' role in disaster mitigation, and teachers' contribution to environmental education. This research is expected to shed light on the relationship between education and environmental action, and advocate for a proactive role of educators in urban sustainability efforts.

Keywords: Teacher, Environmental Education, Disaster Mitigation, Mataram City

Article History: Received: 07.10.2024; Accepted: 18.12.2024 ; Available Online: 31.01.2025
Doi: https://doi.org/10.52924/RAEU6157

1. INTRODUCTION

In the face of increasing environmental challenges, urban areas need innovative solutions to promote sustainability and improve the quality of life of their residents. This covers a wide range of aspects, from efficient waste management, green infrastructure development, to the utilization of smart technologies to optimize resource use [1]. Cities need to adopt a holistic approach that combines smart urban planning, the use of renewable energy, eco-friendly transportation systems, and public education programs on sustainable lifestyles. By implementing these strategies, urban areas can not only reduce negative environmental impacts, but also create a healthier, more comfortable and resilient environment for current and future generations [2]. Collaborative efforts between the government, private sector and communities are key in realizing the vision of sustainable and livable cities amidst the challenges of climate change and rapid urbanization [3]..

One resource that is often overlooked in these efforts is the potential involvement of teachers as primary agents of change, especially in the environmental field [4]. One resource that is often overlooked in these efforts is the potential involvement of teachers as primary agents of change. Teachers have a strategic role in shaping the mindset and behavior of the younger generation towards environmental issues. With their knowledge, skills and influence, these educators can be effective catalysts in instilling environmental awareness and encouraging action among students [5]. Through the integration of

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environmental education in the curriculum, school-based projects, and exemplary daily green practices, teachers can play a key role in shaping a generation that cares and is responsible for the preservation of nature [6]. Therefore, empowering and actively involving teachers in environmental initiatives is not only important, but also a strategic step in creating sustainable positive change for our planet.

Educators have unique insights and skills that can significantly influence students and the wider community regarding environmental management. This article explores the diverse roles of teachers in urban environmental initiatives, examining how their involvement can foster a culture of sustainability, inspire young people, and encourage collective action. By integrating environmental education into their curriculum and participating in local projects, teachers can not only increase their students' environmental awareness and responsibility but also mobilize community efforts to create greener and more resilient cities.

This research was conducted in the city of Mataram, a tourism-based city that has a lot of sea, land and mountain beauty But behind it all, it has a lot of environmental waste problems. Mataram City faces some serious environmental problems. Severe river pollution. The Jangkok River in Mataram City has been categorized as heavily polluted since 2015. Waste management is not optimal. Waste disposal is still not well managed, causing environmental problems. Infrastructure limitations. Mataram City faces resource and infrastructure issues that need to be addressed to build a resilient city environment. Drainage problems. Poorly absorbed rainwater around housing estates causes puddles on the road surface. To address these issues, efforts are needed to improve infrastructure, better waste management, and improvement of the city's drainage system, and issues related to the presence of waste in the river.

This research has several objectives (1) Assessing teachers' perceptions of students' interest in the environment (2) Assessing teachers' attention to rivers (3) Assessing teachers' role in disaster mitigation (4) Assessing teachers' contribution to environmental education. Finally, this paper expects to explain the intersection between education and environmental action, ultimately advocating a more proactive role for educators in urban sustainability efforts.

2. MATERIALS AND METHODS

2.1 Location of Study

The research location is Mataram City. Mataram City is a city and the capital of the Indonesian province of West Nusa Tenggara, in Fig.1 Location of Study. The city is surrounded on all the landward sides by (but is not administratively part of) West Lombok Regency and lies on the western side of the island of Lombok, Indonesia. It is also the largest city of the province, and had a population of 441,147 at the 2024 Census [6] (comprising 219.625 males and 221.522 females).

The city is an economic, cultural, and education center of the province. Administratively, Mataram City has a land area of 61.30 km² and 56.80 km² of sea water, divided into 6 districts, namely Ampenan, Cakranegara, Mataram, Sandubaya, Selaparang and Sekarbela sub-districts with 50 ward and 297 neighborhoods.

2.2 Method

The questionnaire survey comes from two parts. The role and characteristics of teachers in the world of education section was obtained from TALIS - the Teaching and Learning International Survey - is the world's largest international survey about teachers and school leaders [7]. The other part is a direct questionnaire survey in Mataram City regarding (1) Teachers' perceptions of students' interest in the environment (2) The Teacher's Attention to the River (3) Teachers and disaster mitigation and (4) Teachers and Contributions to Environmental Education.

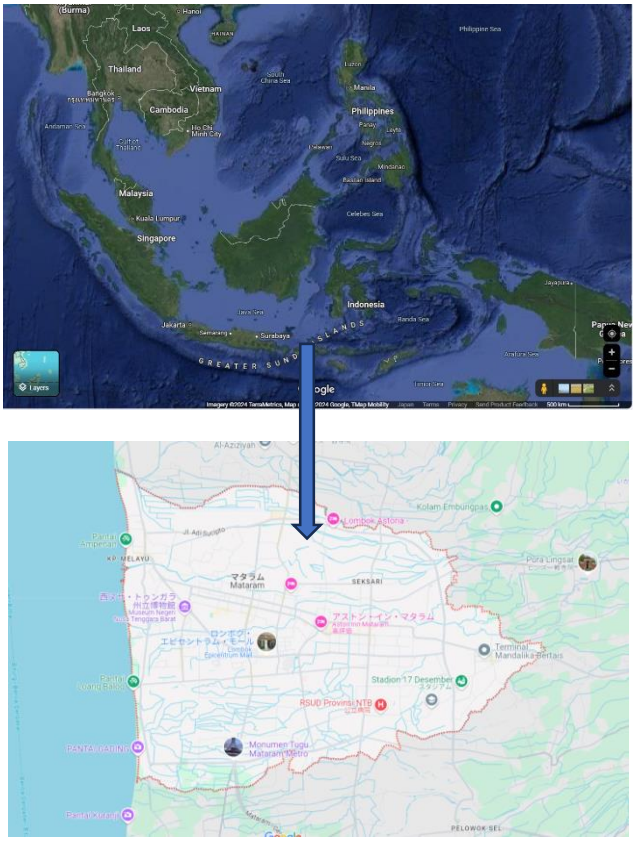

Fig. 1. Location of Study

The survey was conducted by distributing questionnaires through Google Form to 500 primary school teachers located near the river in Mataram city. The target schools were selected based on recommendations from the Mataram City Education Department. of the 500 teachers invited to participate, 422 teachers responded, indicating a high participation rate of 86.4%. This research was conducted using a questionnaire survey by giving 15 close questions to elementary school teachers. The questionnaire results were then processed quantitatively and described to obtain an interpretation of the questionnaire data.

3. RESULT AND DISCUSSION

Teachers should think about their potential involvement in improving the urban environment for several important reasons. Teachers have a key role in shaping future generations. Through teaching and example, teachers can instill environmental awareness in students at an early age [8]. Teacher involvement in urban environmental issues can enrich students' learning experiences. Teachers can integrate environmental topics into the curriculum and learning activities, making education more relevant and contextualized [9].

Teachers involved in urban environmental improvement efforts can be an inspiration and motivator for students and communities. The role of teachers as role models and inspirers can encourage active participation in protecting the environment. Teachers' knowledge and research skills can be utilized to identify urban environmental problems and propose evidence-based solutions. Collaboration between teachers, schools and communities on environmental projects can strengthen school-community relationships and create broader positive impacts [10].

By thinking about their potential involvement, teachers can optimize their role as change agents in improving the urban environment and forming environmentally responsible citizens [11].

Designing Lessons

The Role and Characteristics of Teachers in the World of Education

In managing the classroom, the teacher's role is very important in the development of students' education [12]. Various questionnaire survey questions regarding the role of teachers provide an overview of how classroom management is carried out by elementary school teachers. Survey data in this segment comes from TALIS - the Teaching and Learning International Survey - is the world's largest international survey about teachers and school leaders [13] .

Teachers say they spend a lot of time preparing teaching materials. A total of 61% respondents were of the opinion that the internet was used to prepare learning materials in class. In addition, 59% stated that they often consult with colleagues at other schools. This illustrates that teachers in are not fixated on limited sources of information but open opportunities for them to expand sources of information in compiling learning materials for teaching. Another source used as a reference material for learning in class is books, 58% consider books as the main reference source.

From the aspect of learning media, Powerpoint and other learning media have been implemented, where 62% of respondents think they have used learning media so that learning does not take place conventionally. The dominant number of respondents, namely 63%, thought that they had collected various information to create teaching materials every day.

In preparing classes, respondents generally agreed that they took into account the characteristics of the school and region as well as taking into account the students' actual situation, this provides an understanding that learning develops dynamically and is not static. Classes are prepared by teachers with awareness of their relationship to everyday life, the majority of respondents agreed to this.

At the beginning of the lesson, the teacher used the lesson clearly until students (51%) agreed. The majority (65%) of teachers instruct students to prepare for learning. Most teachers prepare classes to make students interested in learning (52% agree). As many as 65% of teachers agreed to provide guidance according to each person's abilities.

As many as 65% of teachers agree that they are designing ways to encourage students to learn independently, where most of them have used teaching materials and teaching tools that are considered effective for encouraging student learning.

The main obstacle that is usually faced in the teaching and learning process is that teachers cannot understand explanations to students [13], but most respondents answered that they agreed that they had provided explanations that were easy to understand in class. The average teacher elementary schools have taken advantage of student reactions and transformations and used them in the classroom.

Furthermore, as many as 58% of respondents agreed that they should motivate students to learn and 68% of respondents also agreed that they knew each student's learning abilities.

The results of the questionnaire survey further showed that 67% of teachers tried to understand each student's changes in receiving lessons. Furthermore, most respondents agreed that they accurately understand the developmental stage, friendships, family situation, of each student.

In the teaching and learning process, 66% agree that they pay attention to each student when speaking, most teachers agree that they empathize with students' words and actions. When students are asked to express various opinions in class, the teacher gives appreciation to the students even though their answers are not quite correct.

As much as 39% teacher agree that students will not try to learn unless Stimulated from Outside. As many as 55% agreed and 42% strongly agreed that it is important to engage with different ways of thinking for effective learning, free discussion between students should be allowed.

In the process of independent learning, most teachers do not agree that students do nothing when left alone. As much as 47% teacher agree that if students are free, they will do something original.

3.1 Profile of Respondents from Mataram City Teacher

Respondents consisted of state school teachers from grades one to six, totaling 422 people. Most respondents were aged 31- 40 years, as much as 38% and aged 20-30 years as much as 24%. As many as 73% of respondents were female teachers and the remaining 27% were male. The level of

teacher education is 97% with a bachelor's degree while the rest have a master's degree and diploma, and have teaching experience, for an average of about 14.09 years.

In elementary schools in Indonesia, Mataram City there are various subjects, among all respondents the subjects most interested in by teachers are mathematics subjects, second place are Indonesian language subjects, then science subjects and other subjects.

3.2 Teachers' perceptions of students' interest in the environment

Environmental education has been widely discussed by experts who aim to develop environmentally responsible citizens. This concept is known as environmental citizenship, which is considered an important factor in addressing environmental challenges such as climate change [14].

Environmental citizenship involves the active participation of citizens in protecting the environment through various means, including community training, environmental education, and involvement in voluntary organizations5. Environmental citizenship activities include an understanding of environmental issues, citizens' rights and responsibilities related to the environment, and proactive actions to reduce environmental problems [15].

Regarding environmental issues in Mataram City, teachers assessed that students have an interest in improving the school and home environment into a friendly environment. Students are also considered to have the habit of keeping the environment clean. This indicates a positive potential among students to develop environmental citizenship.

To further develop environmental citizenship among students, several strategies can be implemented: Integration of environmental education into the comprehensive school curriculum. Involvement of students in community service projects that focus on environmental issues. Organization of simulations and debates on environmental issues to enhance critical thinking. Encouraging students to start and lead their own environmental initiatives. Developing special programs in green technology in accordance with regional potential [16]. By implementing these strategies, it is expected that the interest and positive habits of students in Mataram City can be further developed into active and responsible environmental citizenship.

Environmental education has been widely discussed by experts who aim to develop citizens who are responsible for the environment [17]. Regarding environmental issues in Mataram City, teachers consider that students have an interest in improving the school and home environment into a friendly environment. Students are also considered to have the habit of keeping the environment clean.

Almost all respondents were aware of the causes of flooding, mainly caused by overflowing rivers and garbage. The results of the questions distributed, found that, Students are Interested in Garbage Problems in Lombok 43% of teachers agreed, 60% of students are Interested in Improving the School Environment, and 83% said yes, to the question Flooding is taught at school. While 10% answered maybe and 7% answered never. This is written in figure 2 to figure 4. .

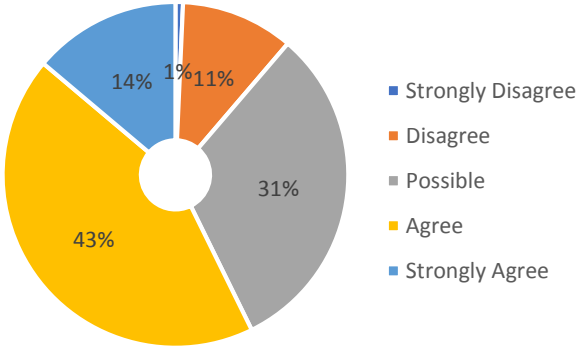

Fig. 2 Students are Interested in Lombok's Waste Problem

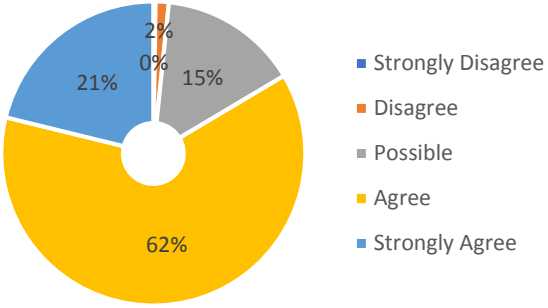

Fig. 3 Students are Interested in Improving the School Environment

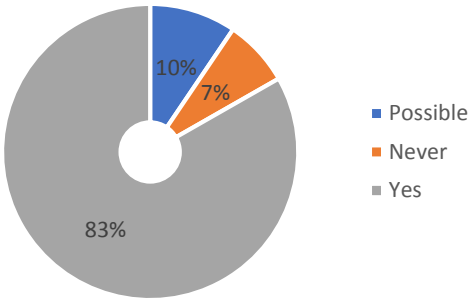

Fig. 4 Flooding is taught in schools

3.3 The Teacher's Attention to the River

Rivers are one of the natural resources that are very important to support the life of human civilization [18]. Since ancient times, rivers have been a source of life, where people have used rivers for drinking water, agriculture, transportation and fishing [19]. Protecting rivers means preserving nature [20]. Most students know the distance from school to the nearest river which shows that they are very concerned about the surrounding natural environment. On average, the river is considered close and accessible on foot, apart from that, some respondents access the river by motor vehicle. Most of teachers and students think they have visited the river closest to school. Most respondents answered that they went to the river to enjoy the view, so for them the river was considered a recreational function to enjoy nature. Rivers are considered to have various kinds of animals that live in river ecosystems. The respondents also agreed that this river is rich in various plants.

As many as 52% of respondents said they knew about stories or legends about rivers in Lombok, while 26% said they didn't know. Furthermore, many teachers want to

Quesioner	Strongly Disagree	Disagree	Possible	Agree	Strongly Agree
School students are aware of natural threats.	0%	8%	11%	59%	22%
Students are interested in learning about the environment	0%	0%	12%	65%	23%
Students are interested in learning about natural disasters.	0%	0%	11%	64%	25%
Introduction to earthquakes comes from school.	3%	21%	76%	0%	0%

Fig. 7 Questionnaire Results Teachers and Disaster Mitigation

Quesioner	Strongly Disagree	Disagree	Possible	Agree	Strongly Agree
The school environment is quite clean and there is no rubbish scattered around.	0%	3%	0%	64%	33%
Teacher teaches environmental education to students.	0%	2%	2%	60%	36%
Students who maintain the school environment from rubbish.	0%	0%	0%	64%	30%
Guidance is needed for students to want to maintain the school environment.	0%	1%	0%	51%	48%
Teachers and students must work together to maintain the school environment.	0%	0%	0%	38%	62%
Environmental education is needed, both for students and teachers.	0%	1%	0%	44%	55%

Fig. 8 Teachers and Contributions to Environmental Education

introduce educational programs, about the river environment, waste problems, biodiversity, etc. in the future. In figure 5 and 6.

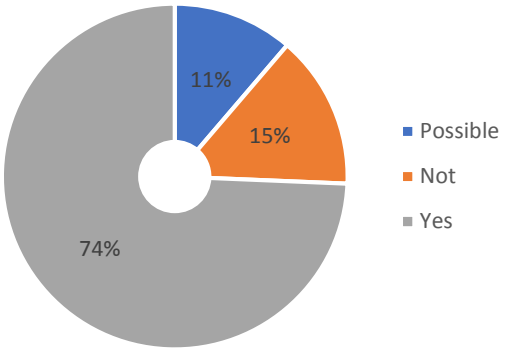

Fig. 5 Possibility Teacher Teaches the River Theme in Class

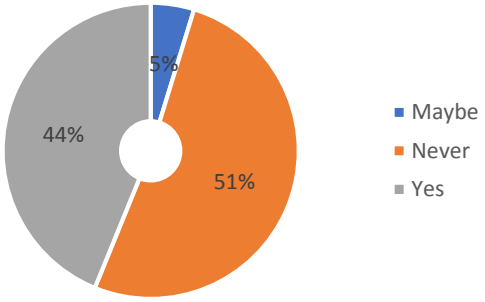

Fig. 6 Teachers and Students have been to The River Together

3.4 Teachers and disaster mitigation

This section will discuss students' knowledge of disaster mitigation and the role of teachers in the field of disaster mitigation in elementary school education. As many as 96% of respondents stated that they had experienced an earthquake. The actions they took when an earthquake occurred were to save themselves, run and avoid buildings. Most respondents learned about the earthquake from their parents, 78%, as well as from school. Most elementary school teachers know about the causes of earthquakes, namely plate friction and volcanic activity. Questionnaire results of Teachers and disaster mitigation. In figure 7. the results of the questionnaire distribution found below, School Students are Aware of Natural Threats, respondents answered Agree: 59% and Strongly Agree: 22%. This means that the majority of respondents (81%) agreed or strongly agreed that school students are aware of natural threats. Only a small percentage (8%) disagreed, while 11% chose the "maybe" option. This indicates a fairly high level of awareness among students about natural threats. As for the question Students are interested in learning about the environment. Respondents responded Agree: 65% and Strongly Agree: 23%. These results are very positive, with 88% of respondents agreeing or strongly agreeing that students are interested in learning about the environment. No respondents disagreed, and only 12% chose "maybe". This shows a high interest among students in environmental issues.

On the question Students are Interested in Learning about Natural Disasters, Respondents answered Agree: 64% and Strongly Agree: 25%, showing these results were also very positive, with 89% of respondents agreeing or strongly agreeing that students are interested in learning about natural disasters. No respondents disagreed, and only 11% chose "maybe". This indicates a high interest among students in the topic of natural disasters. As for the question regarding Introduction to earthquakes comes from school, answers ranged from Disagree: 21% and Possible: 76%. These results show significant uncertainty. The majority of respondents (76%) chose "possible", while 24% disagreed or strongly disagreed. No respondents agreed or strongly agreed. This suggests that schools may not be the main source of information about earthquakes for students, or that there is uncertainty about the role of schools in providing an introduction to earthquakes.

Overall, the results of this questionnaire show that students have a high awareness and interest in natural threats, the environment and natural disasters. However, there is uncertainty about the role of schools in providing an introduction to earthquakes.

3.5 Teachers and Contributions to Environmental Education

Teachers are at the forefront in contributing to environmental education [21]. This section explains the role of teachers in environmental education. Fig. 8 is result of questioner about Teachers and Contributions to Environmental Education

Based on the results of the questionnaire given, the following is a detailed narrative along with the information. The school environment is quite clean and free of litter. The majority of respondents agreed that the school environment is quite clean and free from litter. 64% of respondents agreed, and 33% strongly agreed with this statement. Only 3% expressed possibility, while no one strongly disagreed. This shows that in general, the cleanliness of the school environment is perceived positively by most respondents.

On the question regarding teachers teaching environmental education to students, the majority of respondents acknowledged that teachers teach environmental education to students. 60% of respondents agreed and 36% strongly agreed with this statement. Only 2% stated that it is possible and another 2% stated that it is not possible. No respondents strongly disagreed. This shows that environmental education is already part of the learning process at school.

As for the question about students protecting the school environment from litter, most respondents agreed that students protect the school environment from litter. 64% agreed and 30% strongly agreed. However, there were 6% of respondents who strongly disagreed with this statement. This shows that although the majority of students are considered to play a role in maintaining cleanliness, there is still room for improvement in student participation in this regard.

On the question of whether guidance is needed for students to take care of the school environment, almost all respondents agreed that guidance is needed to encourage students to take care of the school environment. 51% agreed and 48% strongly agreed with this statement. Only 1% stated that it was a possibility. This shows a high awareness of the importance of guidance in shaping students' positive behavior towards the environment.

The next question was about teachers and students having to work together to protect the school environment. This statement received full support from respondents. 62% strongly agreed and 38% agreed that teachers and students should work together to protect the school environment. There were no respondents who disagreed or were undecided. This shows a strong awareness of the importance of collaboration between teachers and students in maintaining the school environment.

Environmental education is necessary for both students and teachers, a large majority of respondents recognized the importance of environmental education for both students and teachers. 55% strongly agreed and 44% agreed with this statement. Only 1% expressed possibility. This shows a high awareness of the importance of environmental education as an integral part of the education system, not only for students but also for educators.

Overall, the results of this questionnaire indicate a high awareness and positive attitude towards the importance of protecting the school environment and environmental education among respondents. However, there is still room for improvement, especially in terms of students' active participation in keeping the school environment clean.

From the questionnaire distributed to respondents in the form of elementary school teachers in Mataram City, on average they gave positive answers which illustrate the positive contribution of teachers in environmental education.

Based on the survey results presented, the following is a narrative discussion on the role of teachers in environmental education and urban environmental improvement:

Teachers have an important role in shaping future generations who are environmentally conscious. Through teaching and example, teachers can instill environmental awareness in students at an early age. Teachers' involvement in urban environmental issues can enrich students' learning experiences by integrating environmental topics into the curriculum and learning activities. The survey results show that the majority of teachers in Mataram City have made efforts to integrate environmental education in the learning process: 96% of teachers agreed that they teach environmental education to students, 97% of teachers agreed that guidance is needed to encourage students to protect the school environment.

100% of teachers agreed that teachers and students should work together to protect the school environment and 99% of teachers recognized the importance of environmental education for both students and teachers. Teachers also assessed that students have positive interests and habits related to the environment, 60% of teachers agreed students are interested in improving the school and home environment to be environmentally friendly, while 83% of teachers said students have a habit of keeping the environment clean. 88% of teachers agreed that students are interested in learning about the environment and 89% of teachers agreed that students are interested in learning about natural disasters.

However, there is still room for improvement in students' active participation, 6% of teachers strongly disagree that students protect the school environment from litter. To optimize the role of teachers as agents of change, several strategies can be implemented. Integrate environmental education comprehensively in the school curriculum. Involving students in community service projects that focus on environmental issues. Organizing simulations and debates on environmental issues to enhance critical thinking. Encouraging students to start and lead their own environmental initiatives. Developing special green technology programs according to regional potential. By implementing these strategies, it is hoped that the positive interests and habits of students in Mataram City can be further developed into active and responsible environmental citizenship.

4. CONCLUSION

As educators, teachers are considered to have a big role in environmental education. Research in Mataram City, West Nusa Tenggara Province, proves that students' interest in environmental sustainability is driven by teachers' efforts in the teaching process regarding environmental materials. This research proves teachers' attention to rivers where 75% agree to teach river themes in class. Apart from that, the role of teachers in disaster mitigation is very large where 64% of students are interested in learning about natural disasters. Finally, 55% strongly agree that environmental education is needed, both for students and teachers. The role of teachers in environmental education and disaster mitigation is very significant, especially in shaping students' awareness and interest in environmental and disaster issues. Based on research in Mataram City, West Nusa Tenggara, several important points were found:

Students' interest in environmental sustainability is influenced by teachers' efforts in the process of teaching environmental materials. Almost 75% of teachers agreed to teach the river theme in class, showing their attention to specific environmental issues and 55% of respondents strongly agreed that environmental education is needed, both for students and teachers.

As for the Disaster Mitigation theme, the role of teachers in disaster mitigation proved to be huge, with 64% of students showing interest in learning about natural disasters. Teachers act as planners, implementers, and evaluators in the learning process of disaster mitigation in basic education. Geography teachers can take a direct role in filling the limited professional human resources in the field of disaster mitigation, equipped with appropriate training. For implication, teachers have a big responsibility in shaping environmental awareness and disaster

preparedness in students. Environmental education and disaster mitigation need to be integrated into the school curriculum. Increasing teacher competence in the field of environment and disaster mitigation is very important to improve the quality of teaching. Thus, the role of teachers as educators is not only limited to transferring knowledge, but also shaping students' awareness and preparedness for critical environmental and disaster issues.

ACKNOWLEDGMENT

We thank the Matsumoto Laboratory, Graduate Programs in Environmental Systems, Graduate School of Environmental Engineering, and The University of Kitakyushu, Japan, for support so that this research can be carried out. We also thank the Kodama Laboratory, Social Studies Program and Murae Laboratory, Disaster and Mitigation department, The University of Kitakyushu, Japan, for support. We also remember to thank all those who have supported the implementation of this research.

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