

## Disaster Risk Reduction Based on Indigenous Knowledge in Fostering Environmental Care and Student Responsibility

Ilfi Intansari<sup>1</sup>, Bambang Saptono<sup>2</sup>, Ujang Sugara<sup>3</sup>, Sisca Wulandari<sup>4</sup>

<sup>1</sup>Universitas Muhammadiyah A.R Fachruddin, Indonesia

<sup>2</sup>Universitan Negeri Yogyakarta, Indonesia

<sup>3</sup>Universitan Negeri Yogyakarta, Indonesia

<sup>4</sup>Universitas Muhammadiyah A.R Fachruddin, Indonesia

[ilfiintansari@unimar.ac.id](mailto:ilfiintansari@unimar.ac.id), [b.saptono@uny.ac.id](mailto:b.saptono@uny.ac.id), [ujangsugara.2021@student.uny.ac.id](mailto:ujangsugara.2021@student.uny.ac.id),  
[siscawulandari@unimar.ac.id](mailto:siscawulandari@unimar.ac.id)

### Abstract

The purpose of this study is 1) the application of indigenous Knowledge-based Disaster Risk Reduction education in fostering the character of environmental care and responsibility. 2) supporting and inhibiting factors in the implementation of indigenous Knowledge-based Disaster Risk Reduction education in fostering the character of environmental care and responsibility. This study is a qualitative research with a case study approach. This research data obtained from observation, documentation, and in-depth interviews. Data analysis used in this study is qualitative data analysis. The results of this study indicate: 1) the application of Disaster Risk Reduction education based on indigenous knowledge is very important in shaping the character of environmental care and responsibility of Elementary School students 1 Waymuli. 2) several supporting factors have an important role in supporting the successful formation of the character of environmental care and responsibility. Routine evaluation, especially in overcoming obstacles to the implementation of indigenous knowledge-based Disaster Risk Reduction education in fostering the character of environmental care and responsibility of Elementary School students 1 Waymuli Lampung

**Keywords:** Disaster Risk Reduction, Indigenous Knowledge, Environmental Care, Responsibility

### INTRODUCTION

Indonesia's position at the confluence of three mega plates, namely the Pacific, Eurasian, and Indo-Australian plates, makes this country very vulnerable to the effects of natural disasters, especially earthquakes, volcanic eruptions, and tsunamis (Kurnio et al., 2021). In 2019, the Meteorology, Climatology and Geophysics Agency in Indonesia recorded 11,573 earthquakes (Bali, 2020). The frequent dangers continue to take their toll, and thus the well-being and safety of people, communities and countries have been affected as a whole (Wang et al., 2019).

Disaster-prone areas are areas or regions that have a high potential for natural disasters. An area can be called a disaster-prone area if within a certain period of time it has geological, biological, hydrological, climatological, geographical, and technological conditions and

characters. And lack of ability to prevent, reduce, and achieve readiness in response to the adverse effects of natural disasters that occur (Almukarramah et al., 2019).

Lampung is one of the disaster-prone areas, especially tsunamis and earthquakes. The tsunami disaster occurred in Lampung in 2018. As many as 2,500 residents fled the Lampung Governor's office for fear of an aftershock tsunami. In the event of a tsunami, usually, Lampung residents will evacuate to the Highlands. In line with the regional regulation of South Lampung Regency number 11 of 2014 on regional mitigation of geological disasters in South Lampung regency, it states that the threat of geological disasters such as volcanoes, soil movement, earthquakes, and tsunamis in South Lampung Regency has the potential to cause disasters in the form of fatalities, environmental damage, property losses, and psychological impacts. The government seeks to reduce the risk of geological disasters through mitigation in a planned, integrated, and comprehensive regional scope by optimizing all existing potential and commodifying indigenous knowledge values.

Understanding and resilience to disasters must be instilled in the community, especially children, most of whom do not yet understand what to do when a disaster unexpectedly occurs (Desfandi, 2014). Because children are one of the groups that are vulnerable to natural disasters and affect its life including well-being, mental, physical and social. To reduce these risks, it takes disaster education (Amri et al., 2018; Seddighi et al., 2021).

Disaster education is a solution to improve children's knowledge of disaster (Qurrotaini et al., 2022). The existence of disaster education is also able to help children build their skills to contribute to disaster risk management and develop attitudes and characters to work together collectively when their families or groups are threatened or affected by disasters (Seddighi et al., 2022).

Disaster Risk Reduction implemented in schools is considered more profitable than other ways because it has a continuous follow-up, in addition to disaster risk reduction in schools is also considered one of the best ways to ensure Disaster Risk Reduction reaches every family and community (Thi & Shaw, 2016).

The Disaster Risk Reduction adopted at the third UN World Conference on Disaster Risk Reduction in March 2015, clearly supports a comprehensive school safety framework consisting of three pillars: i) safe school facilities; ii) effective School Disaster Management; and iii) Disaster Risk Reduction and resilience education. The educational component can be achieved through changes in educational policies and practices that are aligned with disaster management at the national, regional, district and local school levels (Sakurai et al., 2018) . In

addition, the development of natural potential in every region in Indonesia requires school readiness to accommodate local wisdom (Pratiwi & Hafida, 2021). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), indigenous knowledge refers to the understanding, abilities, and philosophies developed by local communities with a long history and understanding of interactions with the nature around them (Hiwasaki et al., 2014). Local wisdom was chosen because it is likely to be the most effective model for disaster management when local communities have a say in their own development and are involved in participatory processes (Wang et al., 2019).

Indigenous knowledge-based disaster education is important because it instills traditional cultural values over natural phenomena that occur. Therefore, Indigenous Knowledge is obtained from long observations and interactions with disasters. The results of these observations and interactions are applied to Daily culture, especially in the face of natural disasters (Zulfadrim et al., 2019). For example, local wisdom highlights that buildings must be flexible and made of bamboo, coconut roots, and coconut leaves to Be Earthquake Resistant (Kurnio et al., 2021). In addition, if destroyed, the impact of the loss is not too large like a concrete building.

The implementation of Indigenous Knowledge-based disaster education has proven effective in improving the character of environmental care and responsibility. This is because these students have a better understanding of disaster (Maknun, 2015). The 2013 curriculum has integrated indigenous knowledge-based disaster mitigation (Suarmika & Utama, 2017) .

The results of a preliminary study conducted by researchers on May 13 to June 2022 showed that Sekolah Dasar Negeri I Waymuli is one of the schools that has a high risk of earthquakes, tsunamis and volcanic eruptions because the location of this school is adjacent to the coastline. Thus, in the event of an earthquake, tsunami and volcano eruption will take many victims, especially school residents who have not responded to the disaster. Sekolah Dasar Negeri 1 Waymuli besides being prone to volcanic eruptions (Mount Krakatau) is also prone to tsunamis because this school is located in Kecamatan Rajabasa directly adjacent to the beach and Lampung Bay. The high risk of natural disasters in state elementary school I Waymuli, then in 2019 the government appointed this school as a disaster preparedness pilot school. In this case, Sekolah Dasar Negeri 1 Waymuli is obliged to produce a generation that is ready for disaster through indigenous knowledge-based disaster mitigation education. It is hoped that through the implementation of disaster education such implementation can reduce disaster risk in Lampung.

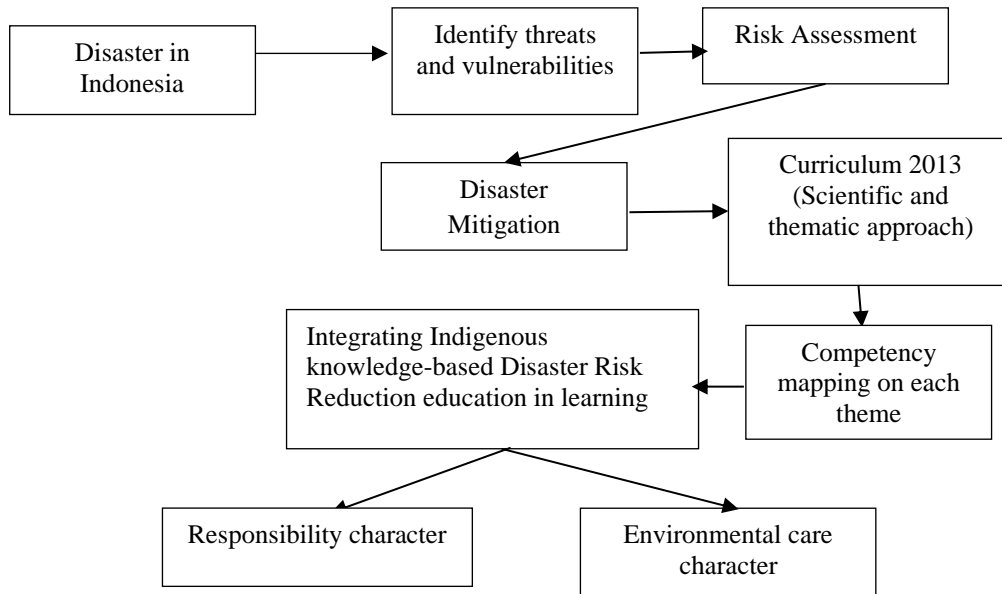
The implementation of indigenous knowledge-based disaster reduction education is certainly a medium in improving the character of environmental care and responsibility for the environment. The form of students' concern and seriousness towards the environment can be realized in the form of students' habits in caring for environmental sustainability, but indigenous knowledge in Lampung has not been able to reduce the impact of disasters to the maximum and has never been evaluated on the implementation of indigenous knowledge-based disaster mitigation education implemented by SDN 1 Waymuli 1 Lampung.

The purpose of this study was to understand the application of Disaster Risk Management Education based on Indigenous knowledge in fostering the character of environmental care and responsibility of students in Sekolah dasar negeri 1 waymuli lampung so that it is known whether the application of Disaster Risk Management Education based on Indigenous people can foster the character of environmental care and local.

## **METHOD**

This study uses a descriptive qualitative research design with a case study approach that aims to describe in depth the application of Indigenous Knowledge-based Disaster Risk Reduction education can foster environmental care and responsibility characters and note the various obstacles faced in growing environmental care characters and responsibilities in the implementation of Indigenous knowledge-based Disaster Risk Reduction education for SDN 1 Waymuli students for the period May 2022 to February 2023. One of the elementary schools in the are as chosen by the researchers because of its location on the coast so that the school is very vulnerable to disasters.

In simple terms, the plot and framework of the study can be understood in the figure below.



**Figure 1.** Research Flow

In obtaining the data, the researchers used observation techniques, documentation, and interviews with indicators of attitude and character of environmental care and responsibility. The observations made by the researchers were related to the application of Disaster Risk Education based on Indigenous Knowledge, observation of environmental care characters and responsibilities of SDN 1 Waymuli Lampung students. The documentation is done by analyzing documents in the form of archives, brochures, social media accounts, photos, videos, and news on the internet related to natural disasters in SDN 1 Waymuli as well as media and equipment used for disaster mitigation in SDN 1 Waymuli. Then the interviews conducted by researchers to informants, namely kepala sekolah SDN 1 Waymuli and 2 teachers who understand the geographical and cultural conditions of the Lampung region and know about the application of indigenous Knowledge-based disaster risk. Here are the indicators.

**Table 1.** Environmental care character indicators according to the curriculum Center Research and Development Agency

Indicators	Sub-Indicator
Schools	Habituation to maintain the sustainability and cleanliness of the school Provide trash and hand washing The presence of a bathroom and clean water Energy saving Making biopores in the school environment Construction of sewerage well Carry out the habit of separating types of organic waste with non-organic

---

	Composting assignment
	Waste management practices
	Preparation of sanitary equipment
	Making water storage reservoir
	Programming Love Clean Environment
Classroom	Classroom maintenance
	Garbage disposal available in the classroom
	Accustomed to carry out energy-saving
	Installation of energy-saving appeal stickers

---

**Table 2.** Responsibility Indicators (Syafitri, 2017)

Indicators	Sub-Indicator
Responsibility	Using time effectively
	Prepare before learning
	Performing individual tasks
	Conduct discussion process
	Working on the matter carefully

The technique of checking the validity of the data used in this study is through triangulation of sources and techniques. Data analysis techniques used in this study are qualitative data analysis using Miles & Huberman model, namely data reduction, data display, and conclusion/verification (Sugiyono, 2019). In reducing, the researcher uses seven stages of Collazi's data analysis, namely: a) The researcher listens to the recordings repeatedly and composes a transcript in the form of a narrative; b) researchers codify meaningful words; c) The researcher formulates the meaning or interpretation of the meaning of each significant statement based on the group of words that have been codified; e) Researchers determine the theme based on the data obtained; f) Researchers compose narratives that are easy to understand; g) Researchers ensure that the transcripts compiled are valid by ensuring narration to research informants (K.R. & S., 2021). In presenting this research data, the researchers describe the data on the application of Disaster Risk Reduction Education based on indigenous knowledge in fostering the character of environmental care and responsibility of students in elementary school 1 Waymuli Lampung accompanied by tables, pictures, and graphs so that the data presented is easier to understand for readers. And ended by summing up the data on the application of Disaster Risk Reduction Education based on indigenous knowledge in

fostering the character of environmental care and responsibility of students in Sekolah Dasar Negeri 1 Waymuli Lampung.

The relationship studied is the application of Disaster Risk Reduction education based on local wisdom in fostering the character of environmental care and responsibility of students in Sekolah Dasar Negeri 1 Waymuli.

## RESULTS

SDN I Waymuli is located in South Lampung Regency, which is one of the districts of Lampung Province. South Lampung Regency has several mountains, the highest is Mount Rajabasa in Rajabasa district, with an altitude of 1,280 m, and also several rivers that cross South Lampung Regency such as way Sekampung, way Jelai, way Katibung, way Pisang and way itching. The location of SDN I Waymuli is shown in the following picture.



**Figure 2.** Location Of SDN 1 Waymuli

South Lampung is an area prone to natural disasters (occupying the 16th position out of 33 provinces in Indonesia), including natural disasters such as volcanic eruptions and earthquakes along with tsunamis. This is because the condition of the landscape of South Lampung Regency which has coastal areas on the West Coast and east coast stretches with the existence of villages along the coast plus in the middle of the Sea Mount Krakatau and Mount Rajabasa. Potential to erupt at any time and cause natural disasters, both volcanic eruptions and earthquakes accompanied by tsunamis.

In terms of geology, South Lampung Regency consists of the following parts:

- a. Mostly rocky endesite, covered with turfazam. Sedimentary rocks extend to the East until around the railway direction towards Kotabumi, the state of undulating to hilly soil.
- b. Peguyoung volcanic nungan.

- c. The eastern part of the land which includes the South Lampung Regency is not so wide, the endesite rocks are covered with turfazam.
- d. Betawi alluvial plain-swamp with mangrove trees

In the area of South Lampung Regency there are several important rivers, among others, way Sekampung, way Barley, way Ketibung, way bananas and way itching. In general, these rivers are used to irrigate (irrigation) rice fields with the manufacture of dams

SDN 1 Waymuli South Lampung which is a disaster preparedness pilot school. Frequent disasters in Lampung make SDN I Waymuli must be alert in the face of disasters. This is in line with the government program in the 2013 curriculum which emphasizes Disaster Mitigation education to provide awareness to students about the importance of Disaster Risk Reduction. As a disaster preparedness pilot school, Sekolah Dasar I Waymuli is expected to provide knowledge and insight to students about disaster mitigation, increase students ' skills about disaster mitigation and change the attitude of teachers and students to be responsive to disasters with the knowledge they have.

SDN 1 Waymuli is one of the schools that have a high risk of earthquakes, tsunamis and volcanic eruptions because the location of this school is close to the coastline. So that in the event of an earthquake, tsunami and volcanic eruption will take many victims, especially school residents who are not responsive to the disaster. SDN 1 Waymuli besides prone to volcanic eruptions (Mount Krakatoa) is also prone to tsunamis because the school is located in Rajabasa Regency directly adjacent to the beach and the Gulf of Lampung. Assessment of the probability of threat / danger of natural disasters in SDN 1 Waymuli shown Table 1.

**Table 3.** Probability of Threat/Danger of Natural Disasters at SD Negeri 1 Waymuli

No.	Threat/Hazard Rating	Probability (P)	Impact (D)
1	Earthquake	3	3
2	Flood	2	3
3	Fires	2	5
4	Tsunami	4	5

Based on the probability of disaster in Waymuli 1 Lampung Elementary School is a tsunami hazard with very severe impacts. This is because Elementary School 1 Waymuli Lampung is located on the beach. The following is a description of the results of research Elementary School 1 Waymuli Lampung



## **1. Implementation of Disaster Risk Education based on Indigenous Knowledge in fostering environmental care character**

The results of research findings in the application of Indigenous Knowledge-based Disaster Risk Education in fostering the character of environmental care can be seen from fostering the habit of maintaining cleanliness and environmental sustainability of schools, providing garbage disposal and hand washing, providing bathrooms and clean water, energy-saving habits, building wastewater disposal wells, doing the task of making compost from organic waste, providing cleaning tools, making water reservoirs and creating a love clean environment program. This can be seen from SD Negeri 1 Waymuli has a wide environment and is filled with shady trees from various types of plants. The environment is one of the things that support the implementation of Disaster Risk Reduction education based on local wisdom supported by supporting facilities and infrastructure owned by the school.

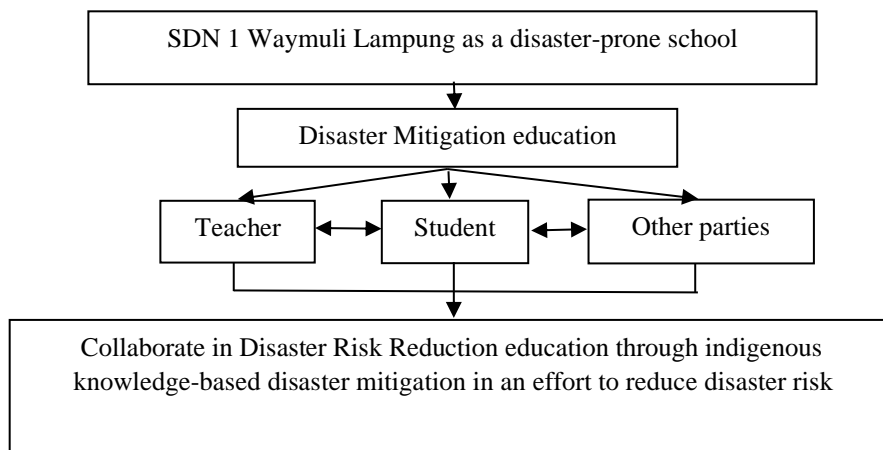
Considering that students are included in vulnerable groups with high Disaster Risk, It is necessary to understand Disaster Risk Education based on Indigenous Knowledge in fostering the character of environmental care to foster the habit of maintaining cleanliness and preservation of the school environment in order to realize the character of students and alert alert (disaster response). The character of siaga siaga students can be formed if disaster mitigation educational materials are taught in schools in learning and extracurricular activities so that students have the skills and knowledge related to disaster mitigation.

Local values implemented in building a clean and healthy environment are the *Sakai-Sambaiyan* and *Titie Gamattei* values. Which is included in *Piil Senggiri* which is the value of local wisdom that guides the life of Lampung tribal communities. *Piil Senggiri* for the people of Lampung has a meaning as a way of life that is based on the cleanliness of the soul (Pranoto & Wibowo, 2018). *Sakai-Sambaiyan* means mutual assistance, solidarity, and sewers that must be done by every Lampung community. The *Titie Gamattei* is a good habit inherited by ancestors in the form of budayam adatm and wisdom, including maintaining cleanliness is also a good habit. Indigenous knowledge in the form of local values *Sakai-Sambaiyan* and *Titie Gamattei* can form the character of students.

Character is something that exists in every individual that is formed in the family environment since childhood. However, character is also present in every individual from birth. One of the characters that must be formed early on is the character of caring for the environment. The formation of this character can be done through environmentally sound learning. With the attitude of learning to care for the environment is expected to awaken

students to have concern for nature and the surrounding environment. Instilling an attitude of environmental care to students can be started from keeping the classroom and school clean by throwing garbage in its place, conducting class pickets, caring for plants, and so on. In addition, one way to foster the character of caring for the environment in elementary school students is to implement clean and healthy living behavior. These behaviors play a very important role in instilling the value of environmental care character (Ismail, 2021) .

SDN 1 Waymuli Lampung as one of the disaster pilot schools seeks to reduce disaster risk through disaster mitigation education based on local wisdom through cooperation between teachers, students and several parties, both government and private parties as seen in the following picture:



**Figure 3.** Disaster Risk Reduction based on Indigenous Knowledge

The implementation of Disaster Risk Reduction education based on local wisdom in fostering the character of caring for the environment carried out by SDN 1 Waymuli students mentioned above is the empowerment of students to empower students to become additional resources or at least be able to protect themselves. The existence of these resources can affect the preparedness of a person or group in the face of disaster in addition to risk perception and self-efficacy.

Implementation of Disaster Risk Education based on local wisdom is one form of human efforts in implementing and maintaining the environment that starts early. One of the efforts to instill Disaster Risk Education based on local wisdom in students is to foster the character of caring for the environment. Students who care about their environment will make

every effort to maintain the environment around them as implemented by students at Sekolah Dasar 1 Waymuli Lampung. Extracting local wisdom is very necessary because it provides understanding and guidance within the scope of local traditions on how to live everyday life, including knowledge of the characteristics of disasters and prohibitions on activities that damage the environment or ecosystem balance.. In character education involves all the interests that exist in education, both Family, School, school environment, and also the wider community. Will not succeed in the formation and education of character if there is no continuity and harmony with the educational environment.

## **2. Implementation of Disaster Risk Education based on Indigenous Knowledge in fostering the character of responsibility**

The application of Disaster Risk Reduction education based on local wisdom in fostering the character of responsibility of SDN 1 Waymuli students is carried out through several habituation to students. Research findings the application of Disaster Risk Reduction education based on local wisdom in fostering the character of responsibility is done through several habituation.

The first habit is the habit of using time effectively. SDN 1 Waymuli Lampung in utilizing time in school effectively and efficiently is by getting used to order and discipline. For example, when the school bell rings, students are required to close the line to wash their hands then students enter the classroom and pray led by the class leader. The implementation of prayer does not need to wait for the teacher to come first so it is the responsibility of the class leader and all class members to position themselves to be orderly and regular. The application of student habits to use time effectively certainly has many obstacles such as the difficulty of starting to start these habits so teachers must pay more attention to students to get used to applying these habits.

The second habit is to get used to doing preparation before learning, in which case the teacher is a role model. Through the preparation carried out, teachers can deliver material in an interesting, creative, innovative, fun and accompanied by a varied learning methodology. This is expected to be exemplified by students so that students are accustomed to preparing everything before carrying out an activity.

The third habit is to conduct a discussion process that is usually done during the teaching and learning process. SDN 1 Waymuli 1 teachers usually give students the opportunity to have discussions 1-3 times each month. The fourth habit is to learn to work on problems

carefully. Students of SDN 1 Waymuli are mostly able to work on the problems given by the teacher. It can be seen from the response of children when discussing very excited. Students usually choose their own discussion group leader. Students are also full of enthusiasm, enthusiasm in learning, this is because the teaching methods used by teachers are considered fun by their students. Teachers also try to foster a sense of responsibility of students by getting used to being responsible for time, doing various preparations, discussions and training the accuracy of the goal so that the character of Student Responsibility. The character of environmental responsibility is related to the responsibility of students to the environment when natural disasters occur so that they will try to save themselves and even want to save others when natural disasters occur.

In addition, students can take responsibility for themselves in the event of an earthquake by hiding under a desk as is done during disaster simulations at school. Students are also expected to take responsibility for the safety of others, which can be done by inviting other students to gather at a gathering point provided by the school. As for dealing with a tsunami disaster, students can be responsible for themselves by finding a safe place when a tsunami occurs and are responsible for others/the community by providing information about the importance of saving themselves when a tsunami disaster occurs. This is in line with the statement Sumantri & Ahmad (2019) that attitude and knowledge is a requirement to achieve the goal of self-actualization in a supportive environment.

The application of disaster education based on local wisdom has proven effective in improving the character of environmental responsibility. In line with the statement Chairiyah (2014) which states that the formation of character requires patience, habituation, and repetition so that the process of character education is the entire educational process experienced by students as an experience of personality formation through understanding and appreciation of the values that are owned by themselves, moral virtues, religious ideals, moral values.

### **3. Disaster Risk Education based on Indigenous Knowledge in fostering the character of environmental care and responsibility**

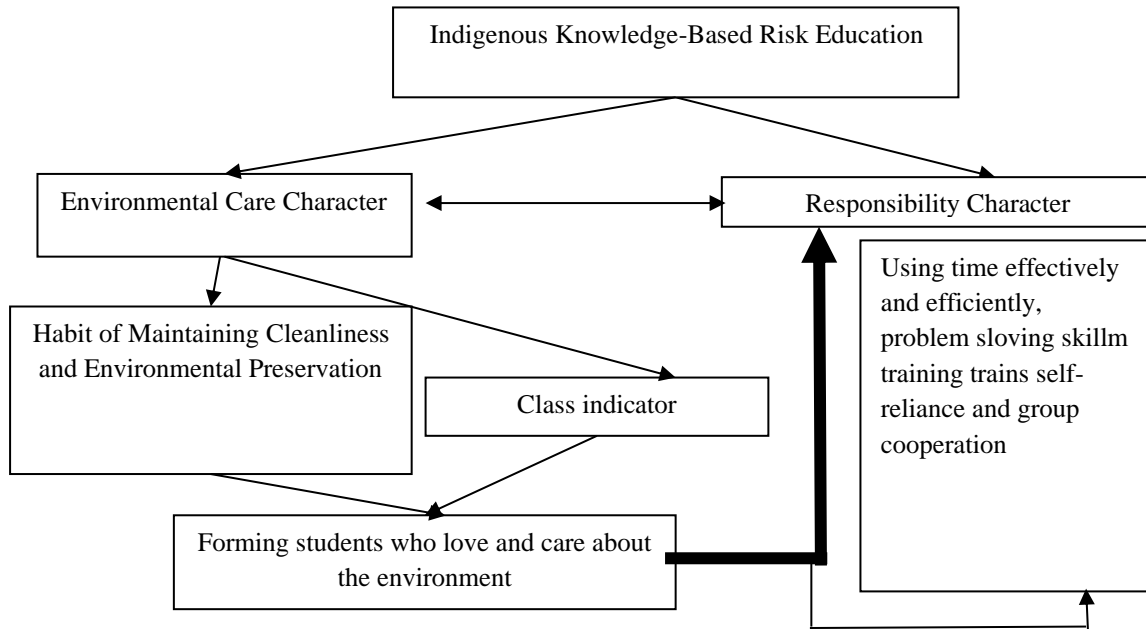
Based on the findings of this study, it shows that the implementation of Disaster Risk Reduction education based on local wisdom is very important in fostering the character of environmental care and the character of responsibility of SDN 1 Waymuli students, which is carried out through habits in schools that are accustomed to maintaining cleanliness and environmental sustainability. Maintaining cleanliness and sustainability is applied every day

by starting from the smallest habit, namely by throwing garbage in its place. The character of responsibility SDN 1 Waymuli students have practiced learning to be responsible from the smallest thing, namely protecting themselves when a disaster occurs and then followed by responsibility to others and the environment. Disaster Mitigation education is carried out at SDN 1 Waymuli Lampung because it is located on the coast so that the biggest potential disaster is a tsunami. In disaster-prone areas the need for a sense of security is very important to be met because the tsunami disaster can certainly occur at any time both when learning takes place and when learning does not take place.

Schools play an important role in disaster management efforts. Disaster education based on local wisdom is important because it instills traditional cultural values over natural phenomena that occur. In this case, not only Disaster Mitigation simulation is favored in preventing many disaster victims. SDN 1 Waymuli Lampung also fosters character education about the environment and the responsibilities that students do and get used to in their daily lives. This can be seen from the role of teachers who are very instrumental in transferring knowledge to students, by fostering the character of environmental care and responsibility that students do and get used to in everyday life. Disaster Risk Education based on local wisdom plays an important role in shaping the character of environmental care and responsibility. The character of environmental care is pursued by SDN 1 Waymuli Lampung through the habit of maintaining environmental cleanliness and environmental sustainability as well as efforts that can be made through class indicators/habitation to cleanliness and environmental sustainability through habituation in the classroom.

The character of environmental responsibility is related to the responsibility of students to the environment when natural disasters occur so that they will try to save themselves and even want to save others when natural disasters occur. Caring character and Environmental Responsibility play an important role in helping reduce disaster risk because the basic attitude of responsibility is the fulfillment of good work, full of commitment and strive to provide the best results. Environmental care character education fosters habits and behavior of students who are commendable and in line with great environmental management, improve the ability to avoid properties that damage the environment, foster students' sensitivity to environmental conditions so as to avoid properties that can damage the environment and instill a caring attitude and a responsible soul towards environmental sustainability. The character of environmental care emphasizes attitudes and actions that always try to prevent damage to the

surrounding natural environment and develop efforts to repair natural damage that occurs, as seen in the following picture:



**Figure 4.** Indigenous Knowledge-based Disaster Mitigation education in improving the character of environmental care and responsibility in SDN 1 Waymuli students

**4. Factors supporting and inhibiting the implementation of Indigenous Knowledge-based Disaster Risk Reduction education in fostering the character of environmental care**

Some of the supporting factors for the implementation of Disaster Risk Reduction education based on local wisdom in fostering the character of caring for the environment of students include the location of SDN 1 Waymuli which is prone to disasters, the existence of Local Government policies that accommodate local wisdom values , there are still some residents who have nuwou houses for a while, the class.

These supporting factors greatly assist the implementation of Disaster Management Education at SDN 1 Waymuli Lampung which was implemented after the South Lampung Regency regional Regulation Number 11 of 2014 on Geological Disaster Management Areas of South Lampung Regency. To reduce disaster risk, mitigation within the area is needed in a planned, integrated, and comprehensive manner by optimizing all existing potential and commodifying local wisdom values. One manifestation of Disaster Management at SDN 1 Waymuli is the evacuation procedure as shown in the following picture.

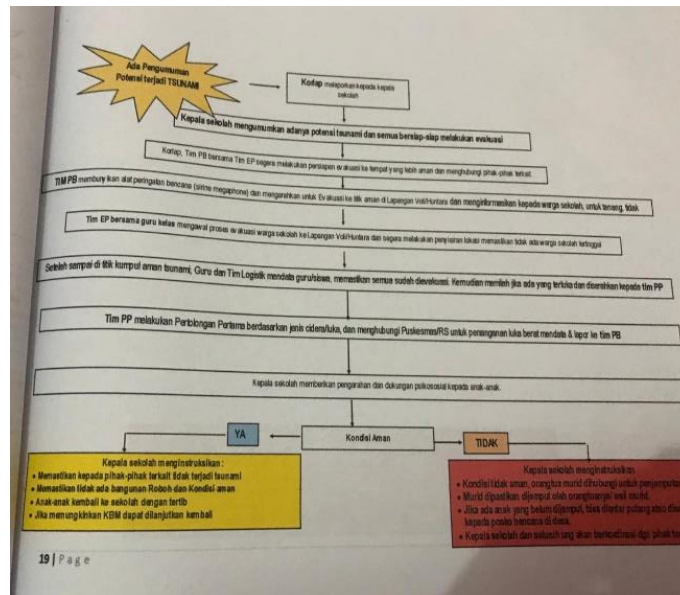


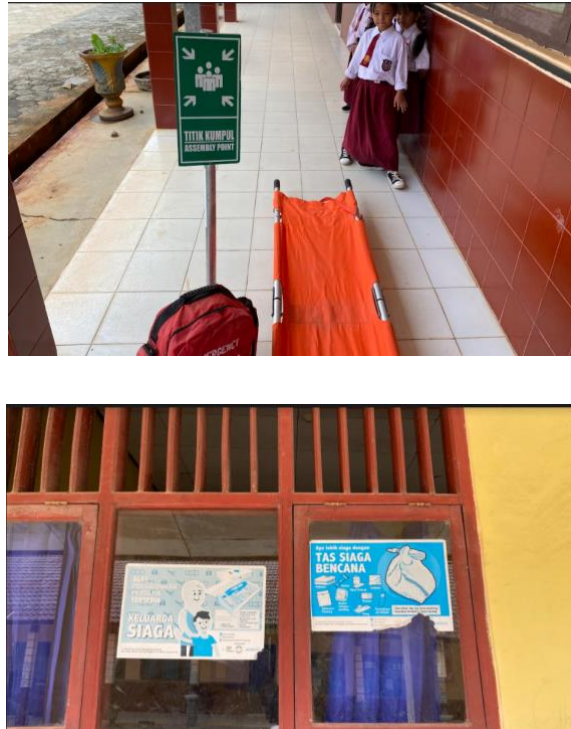
Figure 5. Tsunami Evacuation Procedures Remain

The practice of local wisdom is proven to help in fostering the character of caring for the environment in elementary school students. Excavation of local wisdom is very necessary because it provides understanding and guidance within the scope of local traditions how to live everyday life, including knowledge of the characteristics of disasters and the Prohibition of activities that damage the environment or ecological balance. Indigenous knowledge is effective in forming awareness of the disaster compared with the appeal apparatus (Desfandi, 2014) . Local wisdom can be implemented through the development of materials, learning resources, teaching materials, learning models, Learning media, and education and learning management (Mustofa, 2020).

### 5. Factors supporting and inhibiting the implementation of Indigenous Knowledge-based Disaster Risk Reduction education in fostering the character of responsibility

Based on the findings, there are several supporting factors for the implementation of Disaster Risk Reduction education based on local wisdom in fostering the character of student responsibility including Sekolah Dasar 1 Waymuli is a disaster safe pilot school, local wisdom that is starting to be abandoned, the existence of a disaster preparedness team, the availability of facilities and infrastructure, students are familiarized from, recommendations to integrate local wisdom based on Disaster Mitigation lessons in the 2013 curriculum, Disaster Risk Reduction practices in Scout activities, deployment of resources, willingness of Grade 6

students to help provide an understanding of natural disasters and the importance of Disaster Reduction to the community below, the availability of supporting facilities and infrastructure and students who are serious in studying Disaster Mitigation.



**Figure 6.** Supporting Facilities For Disaster Risk Reduction Education Implementation

It can be seen that the practice of local wisdom is proven to help in fostering the character of student responsibility for the environment of SD Negeri 1 Waymuli. Excavation of local wisdom is very necessary because it provides understanding and guidance within the scope of local traditions how to live everyday life, including knowledge of the characteristics of disasters and the Prohibition of activities that damage the environment or ecological balance. Indigenous knowledge is effective in forming awareness of the disaster compared with the appeal apparatus (Desfandi, 2014). Local wisdom can be implemented through the development of materials, learning resources, teaching materials, learning models, Learning media, and education and learning management (Mustofa, 2020) .

Supporting factors are also very instrumental in supporting the successful formation of the character of student responsibility due to the contribution of various parties as well as the formation of character that is done by doing the practice or simulation of disaster. Character development one of which is the character of responsibility is better if applied in the form of



exercises so that students know how they should be responsible for themselves, their communities and the environment to avoid and deal with disasters that are prone to occur in their environment.

As for some of the factors that can hinder also found in this study on the implementation of Disaster Risk Reduction education based on local wisdom in fostering the character of the responsibility of students SDN 1 Waymuli, among others, disaster simulation has not been done intensively, lack of time to deliver disaster materials when learning, inadequate disaster warning equipment, heavy curriculum load, limited, Lampung residents tend to like the style of today's houses and tend to like the style of modern houses made of concrete making lampung traditional houses increasingly rare. This certainly makes it difficult for the school to explain for a moment about the privileges of the Nuwou traditional house.

The importance of fostering awareness and culture of Disaster Risk Reduction (DRR), given the dangers posed by natural disasters, disaster mitigation measures need to be taken, especially for areas that are in areas prone to natural disasters. In this case, education is one of the spaces that the government considers capable of reducing disaster risk by providing disaster education from an early age in schools, where disaster education can equip students with knowledge about disasters. Disaster Risk Reduction Education based on Indigenous Knowledge has an important role in fostering the character of environmental responsibility so that when natural disasters occur, students will try to save themselves and even want to save others when natural disasters occur.

## **DISCUSSION**

The implementation of Disaster Risk Reduction education based on local wisdom in fostering the character of caring for the environment carried out by SDN 1 Waymuli students mentioned above is the empowerment of students to empower students to become additional resources or at least be able to protect themselves. The existence of these resources can affect the preparedness of a person or group in the face of disaster in addition to risk perception and self-efficacy (Fajrin & Wulandari, 2021).

Implementation of Disaster Risk Education based on local wisdom is one form of human efforts in implementing and maintaining the environment that starts early. One of the efforts to instill Disaster Risk Education based on local wisdom in students is to foster the character of caring for the environment. Students who care about their environment will make every effort to maintain the environment around them as implemented by students at SDN 1

Waymuli Lampung. Extracting local wisdom is very necessary because it provides understanding and guidance within the scope of local traditions on how to live everyday life, including knowledge of the characteristics of disasters and prohibitions on activities that damage the environment or ecosystem balance (Amri et al., 2018). In character education involves all the interests that exist in education, both Family, School, school environment, and also the wider community. Will not succeed in the formation and education of character if there is no continuity and harmony with the educational environment.

In addition, students can take responsibility for themselves in the event of an earthquake by hiding under a desk as is done during disaster simulations at school. Students are also expected to take responsibility for the safety of others, which can be done by inviting other students to gather at a gathering point provided by the school. As for dealing with a tsunami disaster, students can be responsible for themselves by finding a safe place when a tsunami occurs and are responsible for others/the community by providing information about the importance of saving themselves when a tsunami disaster occurs. This is in line with the statement Sumantri & Ahmad (2019) that attitude and knowledge is a requirement to achieve the goal of self-actualization in a supportive environment.

The application of disaster education based on local wisdom has proven effective in improving the character of environmental responsibility. In line with the statement Chairiyah (2014) which states that the formation of character requires patience, habituation, and repetition so that the process of character education is the entire educational process experienced by students as an experience of personality formation through understanding and appreciation of the values that are owned by themselves, moral virtues, religious ideals, moral values.

The character of environmental responsibility is related to the responsibility of students to the environment when natural disasters occur so that they will try to save themselves and even want to save others when natural disasters occur. Caring character and Environmental Responsibility play an important role in helping reduce disaster risk because the basic attitude of responsibility is the fulfillment of good work, full of commitment and strive to provide the best results (Sumirah et al., 2023). Environmental care character education fosters habits and behavior of students who are commendable and in line with great environmental management, improve the ability to avoid properties that damage the environment, foster students' sensitivity to environmental conditions so as to avoid properties that can damage the environment and instill a caring attitude and a responsible soul towards environmental sustainability (Wulandari et al., 2022).

The character of environmental responsibility is related to the responsibility of students to the environment when natural disasters occur so that they will try to save themselves and even want to save others when natural disasters occur. Caring character and Environmental Responsibility play an important role in helping reduce disaster risk because the basic attitude of responsibility is the fulfillment of good work, full of commitment and strive to provide the best results (Safitri & Wulandari, 2023). Environmental care character education fosters habits and behavior of students who are commendable and in line with great environmental management, improve the ability to avoid properties that damage the environment, foster students' sensitivity to environmental conditions so as to avoid properties that can damage the environment and instill a caring attitude and a responsible soul towards environmental sustainability (Wulandari, 2018).

It can be seen that the practice of local wisdom is proven to help in fostering the character of student responsibility for the environment of SDN 1 Waymuli. Excavation of local wisdom is very necessary because it provides understanding and guidance within the scope of local traditions how to live everyday life, including knowledge of the characteristics of disasters and the Prohibition of activities that damage the environment or ecological balance. Indigenous knowledge is effective in forming awareness of the disaster compared with the appeal apparatus (Desfandi, 2014). Local wisdom can be implemented through the development of materials, learning resources, teaching materials, learning models, Learning media, and education and learning management (Mustofa, 2020).

## **CONCLUSION**

The implementation of Disaster Risk Reduction education based on local wisdom carried out by SDN 1 Waymuli Lampung successfully fosters (1) the character of caring for the environment by maintaining the cleanliness of the classroom and school environment, which is done by providing school hygiene facilities and infrastructure such as trash cans, sinks, bathrooms with clean water, water reservoirs, energy-saving stickers, making class picket groups and school environment pickets (clean Friday pickets), preserving the school environment, which is done through, familiarize energy saving, making biopores in schools, managing waste channels, disposing of waste according to its type, namely organic and non-organic waste and familiarize students to maintain school gardens; (2) the character of responsibility, namely fostering a sense of responsibility by accustoming students to be responsible for time, conducting various preparations, discussions and precision training; and

(3) the character of environmental care and responsibility both to oneself, others and the environment. Making a miniature lampung traditional house, the nuwou traditional house for a moment trains students to care about the environment in the form of not cutting trees carelessly (implementing a selective cutting system) and can improve the character of student responsibility, of course students try to keep their environment from being flooded by forests, while Forest Products Wood can be used as raw material; (4) prone to disasters, the existence of Local Government policies that accommodate local wisdom values; (5) students from an early age are accustomed to maintaining cleanliness and the- based on Disaster Mitigation lessons in the 2013 curriculum, Disaster Risk Reduction practices in Scout activities, deployment of resources , willingness of Grade 6 students to help provide an understanding of natural disasters and the importance of Disaster Reduction to the lower classes

Based on the results and discussion of this study, the suggestion of this study is that schools should apply Indigenous Knowledge-based disaster mitigation education in fostering environmental character and responsibility through habituation in order to more quickly achieve the development of environmental character and responsibility.

## REFERENCES

- Almukarramah, Fadhillah, & Sudrajat, A. (2019). Integrasi Konsep Kebencanaan dalam Implementasi Kurikulum 2013 di Sekolah Dasar. *Jurnal Pendidikan Dasar*, 10(2), 118–130.
- Amri, A., Haynes, K., Bird, D. K., & Ronan, K. (2018). Bridging the divide between studies on disaster risk reduction education and child-centred disaster risk reduction: a critical review. *Children's Geographies*, 16(3), 239–251.  
<https://doi.org/10.1080/14733285.2017.1358448>
- Bali, I. (2020). The on-site earthquake early warning system application as a manifestation of concern for community. *Alumni Meeting "HUNGER for JUSTICE" 7-10th February 2020 Yogyakarta-Indonesia*, 1–23.
- Chairiyah. (2014). Pendidikan Karakter dalam Dunia Pendidikan The Education Character in Education World. *Pendidikan Karakter Dalam Dunia Pendidikan*, 4(1), 42–51.
- Desfandi, M. (2014). Urgensi Kurikulum Pendidikan Kebencanaan Berbasis Kearifan Lokal Di Indonesia. *SOSIO DIDAKTIKA: Social Science Education Journal*, 1(2).  
<https://doi.org/10.15408/sd.v1i2.1261>
- Fajrin, N. D., & Wulandari, S. (2021). Kendala dan solusi pembelajaran daring selama masa pandemi COVID-19 di sekolah dasar se-pulau madura. *Briliant: Jurnal Riset Dan Konseptual*, 6(November), 874–889.  
<http://www.jurnal.unublitar.ac.id/index.php/briliant/article/view/776>
- Hiwasaki, L., Luna, E., Syamsidik, & Shaw, R. (2014). Process for integrating local and

- indigenous knowledge with science for hydro-meteorological disaster risk reduction and climate change adaptation in coastal and small island communities. *International Journal of Disaster Risk Reduction*, 10, 15–27.  
<https://doi.org/10.1016/j.ijdr.2014.07.007>
- Ismail, M. J. (2021). Pendidikan Karakter Peduli Lingkungan Dan Menjaga Kebersihan Di Sekolah. *Guru Tua : Jurnal Pendidikan Dan Pembelajaran*, 4(1), 59–68.  
<https://doi.org/10.31970/gurutua.v4i1.67>
- K.R., P., & S., S. (2021). Application of Colaizzi's Method of Data Analysis in Phenomenological Research. *Medico Legal Update*, 21(2).  
<https://doi.org/10.37506/mlu.v21i2.2800>
- Kurnio, H., Fekete, A., Naz, F., Norf, C., & Jüpner, R. (2021). Resilience learning and indigenous knowledge of earthquake risk in Indonesia. *International Journal of Disaster Risk Reduction*, 62, 102423. <https://doi.org/10.1016/j.ijdr.2021.102423>
- Maknun, J. (2015). Pembelajaran Mitigasi Bencana Berorientasi Kearifan Lokal Pada Pembelajaran IPA Di Sekolah Menengah Kejuruan. *Jurnal Kajian Pendidikan*, 5(1), 143–156.
- Mustofa, M. (2020). Pendidikan Kebencanaan Berbasis Kearifan Lokal Dalam Penguatan Karakter Siapsiaga Bencana. *Geodika: Jurnal Kajian Ilmu Dan Pendidikan Geografi*, 4(2), 200–209. <https://doi.org/10.29408/geodika.v4i2.2776>
- Pranoto, H., & Wibowo, A. (2018). Identifikasi Nilai Kearifan Lokal (Local Wisdom) Piiil Pesengiri Dan Perannya Dalam Dalam Pelayanan Konseling Lintas Budaya. *JBKI (Jurnal Bimbingan Konseling Indonesia)*, 3(2), 36.  
<https://doi.org/10.26737/jbki.v3i2.714>
- Pratiwi, D. W., & Hafida, S. H. N. (2021). *Pengaruh Implementasi Pendidikan Mitigasi Bencana Gempabumi di SMA Negeri 1 Karanganyar Terhadap Pembentukan Karakter Siswa Siap Siaga*. Universitas Muhammadiyah Surakarta.
- Qurrotaini, L., Amanda Putri, A., Susanto, A., & Sholehuddin, S. (2022). Edukasi Tanggap Bencana Melalui Sosialisasi Kebencanaan Sebagai Pengetahuan Anak Terhadap Mitigasi Bencana Banjir. *AN-NAS: Jurnal Pengabdian Masyarakat*, 2(1), 35.  
<https://doi.org/10.24853/an-nas.2.1.35-42>
- Safitri, E., & Wulandari, S. (2023). *Case study at sd muhammadiyah 33 tangerang : lack of manners , impoliteness , and selfishness problem of class 6 student*. 1(2), 55–62.
- Sakurai, A., Bisri, M. B. F., Oda, T., Oktari, R. S., Murayama, Y., Nizammudin, & Affan, M. (2018). Exploring minimum essentials for sustainable school disaster preparedness: A case of elementary schools in Banda Aceh City, Indonesia. *International Journal of Disaster Risk Reduction*, 29, 73–83. <https://doi.org/10.1016/j.ijdr.2017.08.005>
- Seddighi, H., Sajjadi, H., Yousefzadeh, S., López López, M., Vameghi, M., Rafiey, H., & Khankeh, H. (2022). School-Based Education Programs for Preparing Children for Natural Hazards: A Systematic Review. *Disaster Medicine and Public Health Preparedness*, 16(3), 1229–1241. <https://doi.org/10.1017/dmp.2020.479>
- Seddighi, H., Yousefzadeh, S., López López, M., Sajjadi, H., Vameghi, M., Rafiey, H., & Khankeh, H. (2021). Disaster Risk Reduction in Iranian Primary and Secondary School Textbooks: A Content Analysis. *Disaster Medicine and Public Health Preparedness*.  
<https://doi.org/10.1017/dmp.2021.161>

- Suarmika, P. E., & Utama, E. G. (2017). Pendidikan Mitigasi Bencana Di Sekolah Dasar (Sebuah Kajian Analisis Etnopedagogi). *JPDI (Jurnal Pendidikan Dasar Indonesia)*, 2(2), 18. <https://doi.org/10.26737/jpdi.v2i2.327>
- Sugiyono. (2019). *Metode Penelitian Kualitatif, Kuantitatif dan R & D*. Alfabeta.
- Sumantri, B. A., & Ahmad, N. (2019). Teori Belajar Humanistik dan Implikasinya terhadap Pembelajaran Pendidikan Agama Islam. *Fondatia: Jurnal Pendidikan Dasar*, 3, 1–18.
- Sumirah, S., Anggraeni, D. N., & Wulandari, S. (2023). *Case study at nature school mekar bakti tangerang : low grade , hard to understand , and lack of responsibility problem of class 1. 1(2)*, 81–89.
- Syafitri, R. (2017). Meningkatkan Tanggung Jawab Belajar Melalui Strategi Giving Questions and Getting Answers Pada Siswa. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 1(2), 57–63. <https://doi.org/10.23887/jppp.v1i2.12623>
- Thi, T., & Shaw, R. (2016). School-based disaster risk reduction education in primary schools in Da Nang City, Central Vietnam. *Environmental Hazards*, 15(4), 356–373. <https://doi.org/10.1080/17477891.2016.1213492>
- Wang, Z., Liu, J., Xu, N., Fan, C., Fan, Y., He, S., Jiao, L., & Ma, N. (2019). The role of indigenous knowledge in integrating scientific and indigenous knowledge for community-based disaster risk reduction: A case of Haikou Village in Ningxia, China. *International Journal of Disaster Risk Reduction*, 41. <https://doi.org/10.1016/j.ijdr.2019.101309>
- Wulandari, S. (2018). Web-Based Learning for Elementary School Student to Keep Indonesian Culture: Bridge among Z Generation Kid's Character and Local Culture Existence. In Y. Kawasaki & Chien-Kuo Lie (Eds.), *Proceedings of The International Conference on Education and Global Studies, Japan*. Hyogo University of Teacher Education, Hyogo, Japan. [https://scholar.google.co.id/citations?view\\_op=view\\_citation&hl=en&user=sG2ZPVEAAA&citation\\_for\\_view=sG2ZPVEAAA&2osOgNQ5qMEC](https://scholar.google.co.id/citations?view_op=view_citation&hl=en&user=sG2ZPVEAAA&citation_for_view=sG2ZPVEAAA&2osOgNQ5qMEC)
- Wulandari, S., Sumatirta, E., & Zuhro, S. F. (2022). The Role of Muslim Parents in Familiarizing Halal Snacks in Indonesia After the Covid-19 Pandemic. *Proceedings of The International Halal Science and Technology Conference*, 15(1), 32–38. <https://doi.org/10.31098/ihsatec.v15i1.592>
- Zulfadrim, Z., Toyoda, Y., & Kanegae, H. (2019). The Integration of Indigenous Knowledge for Disaster Risk Reduction Practices through Scientific Knowledge: Cases from Mentawai Islands, Indonesia. *International Journal of Disaster Management*, 2(1), 1–12. <https://doi.org/10.24815/ijdm.v2i1.13503>