Al-Bidayah : jurnal pendidikan dasar Islam
Volume 14, Number 2, December 2022
ISSN: 2549-3388 (online)
Available online at https://jurnal.albidayah.id
Submitted: August 25, 2022, Accepted: December 31, 2022

ANALYSIS OF FOLKLORE ON ELEMENTARY SCHOOL STUDENTS IN ENVIRONMENTALLY-BASED DISASTER MITIGATION EFFORTS IN THE SOUTHERN COASTAL AREAS OF JAVA ISLAND

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DOI: 10.14421/al-bidayah.v14i2.810

ABSTRACT

Folklore as an oral heritage that is entrenched in the community has values that can increase understanding of legends and culture and move people's awareness of the importance of life values. One of themis folklore related to the natural environment. In Indonesia, folklore is not only an oral tradition that is told but also formalized in the education curriculum, especially at the elementary education unit or elementary school level. Folklore that developed in disaster-affected communities was built to provide disaster mitigation education. The purpose of this study was to analyze folklore in elementary school students in an environmentally friendly- based disaster mitigation effort in the Pelabuhanratu Sukabumi area, West Java and Parangtristis Jogjakarta. Usingdescriptive qualitative methods, this folklore research in elementary schools is discussed using an analysis of disaster mitigation and an environmentally friendly lifestyle. The results showed that folklore contributed to disaster mitigation for elementary school students in Pelabuhanratu Sukabumi and Parangtritis Jogjakarta utilizing several folk stories whose purpose was to build children's understanding and awareness, then for the practical stage it was done through simulation, and for the habituation stage it was done through routines. Values, the values taught are more about protecting the environment to prevent disasters, providing an understanding of the dangers of disasters, and explaining what to do in the event of a disaster.

Keywords: disaster mitigation; elementary school students; folklore

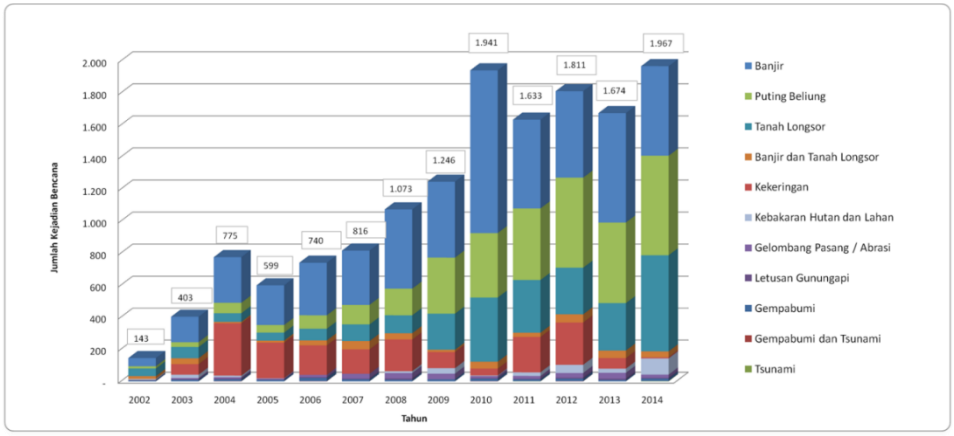
INTRODUCTION

Indonesia is one of many equatorial countries which have both beautiful natural potential and natural disasters. The disasters have been long becoming the greatest challenges for the Indonesian government and people in general. Disaster is a serious disturbance that triggers physical, material, and natural losses, where the impacts often exceed human ability to overcome it with existing resources.

A disaster is an unusual event caused by nature or human being itself like technological errors that push responses from communities, individuals, and the environment to provide strong enthusiasm[1]. Disaster-prone areas with a large population must be protected with adequate disaster resilience to minimize the impacts of the occurring disasters. The disaster effects commonly afflict the communities having low

[1] Elizabeth Altmaier, *Promoting Positive Processes after Trauma - 1st Edition* (Acadmic Press, 2019), https://www.elsevier.com/books/promoting-positive-processes-after-trauma/altmaier/978-0-12-811975-4.

resilience so they must have good reparations in dealing with the disasters thatmay befall at any time.



Graph 1.1 Disaster Trends in Indonesia from 2011-2021 Source: National Disaster Relief Agency of the Republic of Indonesia

In general, there have been increasing trends of disaster occurrence in Indonesia from 2011-2021. Approximately 90% of the total disaster events per year are hydrometeorological (floods, landslides, droughts, forest and land fires, and tidal waves). The trends may continue to grow higher because it is anthropogenic.

Humans cannot be independent of their surrounding environment in every life aspect. Daily work activities that are routinely carried out must have impacts on the environment. The impacts may spread to the air, water, and on the earth's surface entirely. More active areas will surely raise greater possibilities for the unfavorable environmental effects if there is no specific action to protect them properly. Many of the disasters experienced by urban communities come from the people themselves that are less aware ofthe natural environment.

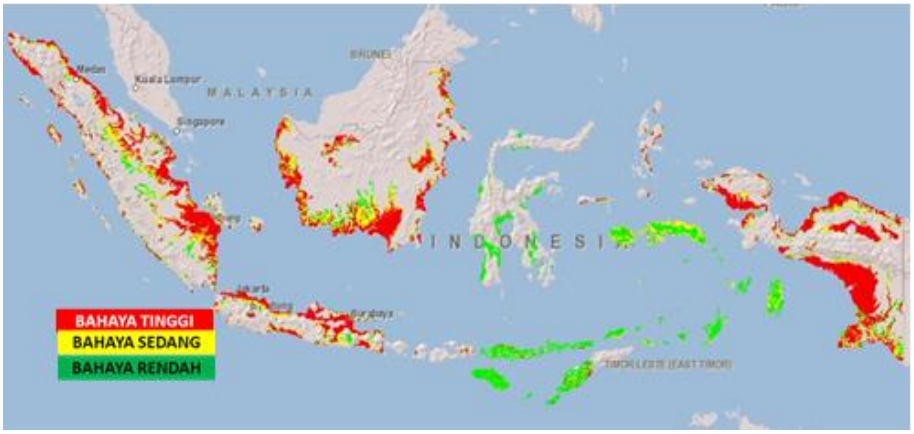


Figure 1.2 Flood-Prone Areas

Source; Ministry of General Works and Public Housing Republic of Indonesia

The figure above informs that there are 315 regencies/cities in Indonesia which are located in moderate to high-intensity flood-prone areas. There are 63.7 million people exposed to moderate to high flood rates (Ministry of Housing and General Works in the presentation of the Head of BNPB 2021 at the Defense University).

As time goes by, people have changed their lifestyles a lot. Some have realized that they as individuals have a big role in changing their surrounding environment. For many people, environmental responsibility does not provide enough motivation to choose more eco-friendly lifestyles. Therefore, they argue that both government policies and business strategies should be adjusted in their life so that they can change their consumptive behavior. Moisander argued that environmental policies that focus on motivating individual consumers have a weak and less significant influence on people's lifestyles.[2]

The environmentally friendly lifestyle should focus more on our care for our earth. It is a lifestyle that truly makes this earth a "partner" in our daily activities, not just as an "object" of exploitation to meet life's needs. To start living with, we don't have to make drastic changes to our lifestyles, but we can just begin with the simplest things that we routinely do every day.

The negative impacts of the disasters also apply to communities in general. A community is an entity that has geographic boundaries and a common destiny. Communities consist of built, natural, social, and economic environments that influence each other in a complex manner. A community is also vulnerable to exposure to disasters. If they have been exposed to a disaster, of course, they will be in a slumped condition. To maintain their existence, a community must struggle a lot and be strong in facing challenges natural disasters. Efforts made by the community to rise from adversity after a disaster has befallen them are also known as resilience.

In terms of environmental concern, all community members must always be warned and educated to implement a Zero-waste lifestyle. It means a lifestyle to minimize the production of waste generated from each daily activity which will end up in a final disposal site (TPA) that aims to preserve the environment. The zero-waste program can also play arole as a gathering place for individuals, activists, communities, and other parties who highly care about environmental sustainability.

[2] Johanna Moisander, "Motivational Complexity of Green Consumerism," *International Journal of Consumer Studies* 31, no. 4 (2007): 404–9, https://doi.org/10.1111/j.1470-6431.2007.00586.x.

As a country that has a high level of natural disasters risk, media coverage can also be useful as a reference for other regions that have the same vulnerability level. People who care much about their natural environment and master adequate disaster knowledge can establish and form strong resilience to reduce the risks and cope with natural disasters thatmay come anytime and anywhere.

Natural disasters that often occur in recent times are caused by many factors. The millennial industrial era has greatly influenced many people in their household behavior and social life. Human interaction has now been dominated by social media activities and the use of audio-visual communication that is freely available, effective, and affordable. This includes information regarding the condition of natural disasters.

Some researches have been conducted to study the implementation of disaster mitigation education at schools. Most of them aim to examine the application of some specific approaches. Art et al. studied an environmental-based earthquake and tsunami natural disaster mitigation education in elementary schools[3]. There is also a study that tried to explore disaster mitigation education based on local wisdom which is also carried out in elementary schools[4]. Next, related to the implementation of mitigation education in elementary schools, Proulx and Aboud found that mitigation education which has been started from the elementary education levelcould successfully prepare the children to face disasters and reduce the risks of life[5]. Their findings are also supported by Hayudityas and Palet al who stated that disaster mitigation education has a crucial role and is vital to be implemented at schools.[6]

Talking about learning strategies, several previous studies have also found that earthquake disaster mitigation education through simulations in social science learning can improve students' understanding and readiness[7]. The disaster mitigation education

[3] Antonio D'Uffizi et al., "A Simulation Study of Logistics for Disaster Relief Operations," *Procedia CIRP* 33 (2015): 157–62, https://doi.org/10.1016/j.procir.2015.06.029.

[4] Putu Eka Suarmika and Erdi Guna Utama, "Pendidikan Mitigasi Bencana Di Sekolah Dasar (Sebuah Kajian Analisis Etnopedagogi)," *JPDI (Jurnal Pendidikan Dasar Indonesia)* 2, no. 2 (December 29, 2017): 18, https://doi.org/10.26737/jpdi.v2i2.327.

[5] Kerrie Proulx and Frances Aboud, "Disaster Risk Reduction in Early Childhood Education: Effects on Preschool Quality and Child Outcomes," *International Journal of Educational Development* 66 (April 2019): 1–7, https://doi.org/10.1016/j.ijedudev.2019.01.007.

[6] Beatrix Hayudityas, "Pentingnya Penerapan Pendidikan Mitigasi Bencana Di Sekolah Untuk Mengetahui Kesiapsiagaan Peserta Didik," *Jurnal Edukasi Nonformal* 1, no. 1 (April 20, 2020): 94–102; Indrajit Pal et al., "Disaster Risk Reduction Education (DRRE) and Resilience in Asia-Pacific," in *Disaster Resilience and Sustainability* (Elsevier, 2021), 667–83, https://doi.org/10.1016/B978-0-323-85195-4.00004-4.

[7] Muhammad Eko Atmojo, "PENDIDIKAN DINI MITIGASI BENCANA," *Jurnal Abdimas BSI:*

conducted through routine simulations is also shown to improve students' understanding and reduce the risk of danger caused by naturaldisasters[8]. Besides, other studies have also been conducted to set the importance of involving interdisciplinary knowledge in disaster mitigation education and found that to obtain optimal results in reducing the risk of losses, interdisciplinary knowledge is important to be implemented at the right moments[9].

Other research was also conducted to identify approaches taken by schools in implementing disaster mitigation education, such as (1) active instructor/passive learner approach; (2) knowledge transmission approach, and; (3) short-term knowledge evaluationapproach[10]. A study on disaster mitigation education was also carried out to identify some factors that made the education successful, and it was found that school commitment was the strongest factor[11]. There was a studythat aimed to identify learning media to deliver earthquake disaster mitigation education, and the results stated that the learning aids were important in the educational process[12]. Apart from tools, the role of mitigation education in the family is also crucial[13]. Parental involvement is vital for the success of disastermitigation education[14].

Based on some previous studies, it can be concluded that many researchers studied

Jurnal Pengabdian Kepada Masyarakat 3, no. 2 (July 20, 2020): 118–26, https://doi.org/10.31294/jabdimas.v3i2.6475; Lativa Qurrotaini and Novita Nuryanto, "Implementasi Pendidikan Mitigasi Bencana Alam Gempa Bumi Dalam Pembelajaran IPS SD," *Trapsila: Jurnal Pendidikan Dasar* 2, no. 01 (August 6, 2020): 37, https://doi.org/10.30742/tpd.v2i01.885.

[8] Kambod Amini Hosseini and Yasamin O. Izadkhah, "From 'Earthquake and Safety' School Drills to 'Safe School-Resilient Communities': A Continuous Attempt for Promoting Community-Based Disaster Risk Management in Iran," *International Journal of Disaster Risk Reduction* 45 (May 2020): 101512, https://doi.org/10.1016/j.ijdrr.2020.101512.

[9] Elena Righi et al., "Disaster Risk Reduction and Interdisciplinary Education and Training," *Progress in Disaster Science* 10 (April 2021): 100165, https://doi.org/10.1016/j.pdisas.2021.100165.

[10] Genta Nakano and Katsuya Yamori, "Disaster Risk Reduction Education That Enhances the Proactive Attitudes of Learners: A Bridge between Knowledge and Behavior," *International Journal of Disaster Risk Reduction* 66 (December 2021): 102620, https://doi.org/10.1016/j.ijdrr.2021.102620.

[11] Evi Widowati, Wahyudi Istiono, and Adi Heru Husodo, "The Development of Disaster Preparedness and Safety School Model: A Confirmatory Factor Analysis," *International Journal of Disaster Risk Reduction* 53 (February 2021): 102004, https://doi.org/10.1016/j.ijdrr.2020.102004.

[12] Yusuke Toyoda et al., "Framework for Utilizing Disaster Learning Tools Classified by Real and Virtual Aspects of Community Space and Social Networks: Application to Community-Based Disaster Risk Reduction and School Disaster Education on Earthquakes in Japan for during- and Post-COVID-19 Periods," *Progress in Disaster Science* 12 (December 2021): 100210, https://doi.org/10.1016/j.pdisas.2021.100210.

[13] Sakinah Anggun Estikawati, Nur Hidayah, and Aris Martiana, "Pendidikan Mitigasi Bencana Pada Keluarga Di Desa Kepuharjo Kecamatan Cangkringan," *Dimensia: Jurnal Kajian Sosiologi* 9, no. 2 (2020): 133–46, https://doi.org/10.21831/dimensia.v9i2.38995.

[14] Hiromi Kawasaki et al., "Teachers-Parents Cooperation in Disaster Preparation When Schools Become as Evacuation Centers," *International Journal of Disaster Risk Reduction* 44 (April 2020): 101445, https://doi.org/10.1016/j.ijdrr.2019.101445.

how disaster mitigation education was implemented properly and what aspects were important to pay attention to in the implementation. However, from previous findings, no one has ever studied the use of folklore as one of the mitigation education materials. For this reason, this research is conducted to analyze the use of folklore in implementing disaster mitigation education for elementary school children in the disaster-prone south coastal areas. The novelty of this research is that it observes, views, and identifies the use of mitigation education materials in the form of folklores.

Folklore may be applied for delivering the mitigation education which aims to maintain the surrounding natural environment from the threat of natural disasters. Folklore becomes the local wisdom in disaster mitigation, both during the disaster and recovery stages to things that can be prevented for future disasters. Also, the children are surely enthusiastic about the stories[15]. Therefore, the disaster mitigation education process becomes more attractive to them if thematerials are delivered in attractive ways and media. This research is conducted in elementary schools in the Pelabuhanratu area, Sukabumi regency of West Java province, and Parangtritis coastal area of Jogjakarta province. The researchers have decided to hold a study on the two sites because they are included as disaster-prone areas, especially earthquakes and tsunamis[16]. Besides, based on a preliminary study from several elementary schools in the areas, it is found that the students still often experience problems in understanding and implementing mitigation when a disaster occurs. This research is based on elementary schools because in dealing with disasters it is necessary to educate all communities, especially those in disaster-prone areas, disaster mitigation education should be given as early as possible starting with elementary school children, because this is very important, at the elementary school level if If disaster mitigation education has been given, a habit of living will arise, and if a

[15] Lisa M. Henderson et al., "Timing Storytime to Maximize Children's Ability to Retain New Vocabulary," *Journal of Experimental Child Psychology* 210 (October 2021): 105207, https://doi.org/10.1016/j.jecp.2021.105207; Ioana Panc, Adriana Georgescu, and Mădălina Zaharia, "Why Children Should Learn to Tell Stories in Primary School?," *Procedia - Social and Behavioral Sciences* 187 (May 2015): 591–95, https://doi.org/10.1016/j.sbspro.2015.03.110; Najeemah Mohd Yusof, "CHAPTER 1 Influence of Family Factors on Reading Habits and Interest among Level 2 Pupils in National Primary Schools in Malaysia," *Procedia - Social and Behavioral Sciences* 5 (2010): 1160–65, https://doi.org/10.1016/j.sbspro.2010.07.253.

[16] Danis Arbabun Naja and Djati Mardiatno, "Analisis Kerentanan Fisik Permukiman di Kawasan Rawan Bencana Tsunami Wilayah Parangtritis, Yogyakarta," *Jurnal Bumi Indonesia* 7, no. 1 (2018): 228864; Ichwan Dwi Saputra, Petrus Subardjo, and Gentur Handoyo, "Peta Kerawanan Tsunami Serta Rancangan Jalur Evakuasi Di Pantai Desa Parangtritis Kecamatan Kretek Kabupaten Bantul Daerah Istimewa Yogyakarta," *Journal of Oceanography* 3, no. 4 (October 31, 2014): 722–31.

disaster occurs early on, they will be able to deal with it.

RESEARCH METHODS

General Background

This study uses a descriptive qualitative method to find a comprehensive folklore analysis model as a media for disaster mitigation education in West Java and Yogyakarta. According to Bogdan and Taylor in Moleong the qualitative methodology provides written and verbal descriptive data taken from local communities and their behavior. those that can be observed[17].

Furthermore, the researcher seeks to uncover the real problems and provide an overview of a comprehensive analysis of folklore in supporting the creation of disaster awareness and response in the coastal areas of West Java and Jogjakarta. This study describes how the development of awareness and response to disasters through disaster mitigation programs through folklore leads to a detailed description of the efforts of elementary school teachers in the area. The locations of elementary schools in Pelabuhan Ratu and Parangtritis were chosen because they are disaster-prone areas, so there is a need to educate local residents through Disaster Mitigation Education for elementary school children to instill a caring attitude and be responsive to disasters that may suddenly come to their area.

Participant

The sources for this research included: Sukabumi and Bantul Government Officials (Regional Assistant 3, Head of Culture, Youth and Sports Services, Regional Disaster Management Agency (BPBD) of Sukabumi and Bantul Regencies, 216 teachers at Pelabuhanratu and Parangtritis Elementary Schools.

Instruments and Procedures

The research team is a vital instrument in research by carrying out several data collection techniques, such as observation, interviews, and documentation. Observation techniques are carried out to obtain an accurate description of phenomena in the field and understand the habits of informants by using field notes. Interview techniques were carried out to gain informants' experience in carrying out learning with folklore in disaster

[17] Lexy J. Moleong, *Metodologi Penelitian Kualitatif*, 38th ed. (Bandung: PT Remaja Rosdakarya, 2018).

mitigation efforts. In addition, the researchers also gave questionnaires to respondents to find out the responses of the respondents to as many as 216 elementary school teachers at Pelabuhan Ratu Elementary School and Parangtritis Elementary School in providing disaster mitigation learning.

Data analysis

Data were analyzed using interactive models and collected, processed, and analyzed using qualitative techniques, namely reduction, presentation, and verification. Reduction includes selection, focusing, simplification, abstraction, and transformation of raw data in interview notes and observations obtained at Pelabuhan Ratu and Parangtristis Elementary Schools. While the presentation of data includes a collection of information that has been compiled and provides meaning that can be drawn as a conclusion. Verification is carried out after the data is presented, described, and given meaning with a logical interpretation. Information is validated by careful observation, while triangulation of sources and techniques is carried out.

RESULTS AND DISCUSSIONS

` From the data analysis, it is found that elementary schools teachers in the Pelabuhanratuarea of West Java province and Parangtritis beach of Jogjakarta province already use folklore to support the disaster mitigation learning to their students. Folklore is used to improve students' understanding and awareness of the importance of preserving the environment. Then,for practice, simulations are carried out so that they understand what to do when a disaster occurs. To get used to it, simulation activities are carried out regularly.

Next, to identify what the teachers think about learning natural disaster mitigation through folklore and simulations, the researchers distribute questionnaires to the teachers of elementary schools in Parangtritis and Pelabuhanratu. The questionnaires are distributed to fourelementary schools in the Parangtritis, and 32 public elementary schools in the Pelabuhanratu sub-district. Therefore, there are 216 classroom teachers involved in the survey. From the data,it is found that most of the teachers say that folklore can effectively explain the dangers of a disaster and what to do if a disaster occurs. The students feel excited in the learning process, and the teachers state that through folklore, the students can understand and explain what theymust do when there is a disaster coming to them.

Meanwhile, through simulations, they can practice some steps that must be taken when there is a disaster. The teachers think that the simulations can make the students implement and practice appropriate mitigation steps. Likewise, through routines, the teachers believe that the students have built sufficient understanding and experiences. In detail, the research findings can be seen in Table 1.

Table 1.
Percentage level of the students' understanding, implementation, and acculturation towards disaster mitigation

Nu.	Aspect	Teacher's statement				
		SS	S	CS	TS	STS
1.	**Understanding**					
	The students identify the types of natural disasters	100.00 %	0.00 %			
	The students identify the causes of each type of natural disaster	97.22 %	2.31 %			
	The students understand the effects of natural disasters	100.00 %	0.00 %			
	The students know what to doto prevent natural disasters	98.15 %	1.85 %			
	The students know what to do to save themselves in the event of a disaster	99.07 %	0.93 %			
	The students know the emergency numbers that canbe contacted when a disaster occurs	91.67 %	8.33 %			
2.	**Implementation**					
	All students follow each stageof the disaster simulation regularly	100.00 %	0.00 %			
	The students follow each stage properly and correctly	100.00 %	0.00 %			
	Students practice their knowledge of what to doduring the disaster	98.15 %	1.85 %			
	The students show a cooperative attitude and help each other during simulations	97.22 %	2.78 %			
3.	**Habituation**					
	The students maintain the cleanliness of the school environment and around their houses	91.67 %	8.33 %			
	The students maintain the sustainability of the school andhome environment	91.67 %	8.33 %			
	The students do not do anything that could cause a disaster (such as playing withfire or flammable objects)	99.07 %	0.93 %			
	The students have implemented the steps that must be taken when a disaster occurs both at school andhome	99.07 %	0.93 %			

Note: SS: *Sangat Setuju* (Strongly Agree); S: *Setuju* (Agree); CS: *Cukup Setuju* (Fairly Agree); TS: *Tidak Setuju* (Disagree); STS:

Sangat Tidak Setuju (Srongly disagree)

From the table above it can be concluded that at the student's understanding stage, which includes: students can identify the types of natural disasters by 100%, and students understand the impact of natural disasters by 100%, the others are close to 100% results. As for the application which includes: All students take part in each stage of the disaster simulation on a regular basis and students follow each stage properly and correctly the result is 100%, while the other factors are close to 100%. For habituation Students do not do things that can cause disaster (such as playing with fire or objects flammable materials, and the students implemented the steps that must be taken when a disaster occurs both at school and at home by 99% more, so that it can be concluded that almost all the teachers in this study have done these three things with very good results for their students.

Analysis of Folklore and Environmentally Friendly Lifestyles for Elementary School Students

Elementary school students are vulnerable and they must be protected during a disaster to reduce the number of disaster victims, especially in Pelabuhanratu and Parangtritis. In this research, the data are closely connected to (1) what types of folklore taught by the elementaryschool teachers in Pelabuhanratu, Sukabumi, and Parangtritis, Jogjakarta; (2) what values are contained in the folklore; (3) when the teachers deliver and explain the folklore; and (4) how the students respond to the implementation of folklore for learning an environmentally friendlylifestyle.

Based on the interviews conducted with the teachers at SD (elementary schools) in Pelabuhanratu Sukabumi and Parangtritis Jogjakarta, it can be concluded that there are some kinds of folklores that are usually told to the children to teach them the importance of protectingthe environment. They include the legend of Nyi Roro Kidul (teaching the students to preservethe sea), the legend of Batu Bagaung (preserving rivers), the legend of Gunung Lokon in Minahasa located in North Sulawesi (teaching and preventing the impacts of earthquakes) thelegend of Lake Toba (describing the dangers of flash floods), and the legend of Sawerigading (explaining the dangers of earthquake and tsunami disaster) (see Table 2).

Theoretically, improving the students' understanding of local culture that pays attentionmore to environmental protection will help and support them in protecting the

environment andpreparing them for disasters[18]. Besides, the delivery of traditionalstories in the learning process has also been proven by several studies to make the children more motivated in learning[19]. Traditionalstories told by the teachers make the students more excited in participating in the learning process[20].

However, when being confirmed to the teachers, the curriculum on folklore in elementary schools had changed since the implementation of the 2013 Curriculum. For this reason, the materials on preserving the natural environment are frequently inserted in some relevant subjects such as the Indonesian language. Although not specifically scheduled in certain lessons, learning through stories has been shown to have a positive impact on children's character establishment[21]. Meanwhile, based on the students' responses, they love to learn through stories. They always carefully pay attention to the delivery of the materials enthusiastically when the teachers tell them a story. Infact, according to the teachers, the students frequently ask the teachers to tell stories. This is in line with the children's characteristics who love to listen to the stories. That is why the stories are very effective teaching methods to be applied to elementary school students[22].

Environmentally friendly lifestyles must be implemented in all life aspects of the community to preserve natural beauty and mitigate disasters. As two disaster-prone areas, the people of Pelabuhanratu and Parangtritis must perform an environmentally friendly

[18] Sandra Appleby-Arnold et al., "Applying Cultural Values to Encourage Disaster Preparedness: Lessons from a Low-Hazard Country," *International Journal of Disaster Risk Reduction* 31 (October 2018): 37–44, https://doi.org/10.1016/j.ijdrr.2018.04.015.

[19] Kerim Karabacak and Serdar Erdem, "The Effect of Using English Story Books in English Courses by Adapting Them to Different Activities on the Foreign Language Success of the Students," *Procedia - Social and Behavioral Sciences* 176 (February 2015): 1028–33, https://doi.org/10.1016/j.sbspro.2015.01.574; J. Richard Eiser et al., "Risk Interpretation and Action: A Conceptual Framework for Responses to Natural Hazards," *International Journal of Disaster Risk Reduction* 1 (October 2012): 5–16, https://doi.org/10.1016/j.ijdrr.2012.05.002.

[20] Nasser Saleh Al-Mansour and Ra'ed Abdulgader Al-Shorman, "The Effect of Teacher's Storytelling Aloud on the Reading Comprehension of Saudi Elementary Stage Students," *Journal of King Saud University - Languages and Translation* 23, no. 2 (July 2011): 69–76, https://doi.org/10.1016/j.jksult.2011.04.001; Adriana G. Bus, Zsofia K. Takacs, and Cornelia A.T. Kegel, "Affordances and Limitations of Electronic Storybooks for Young Children's Emergent Literacy," *Developmental Review* 35 (March 2015): 79–97, https://doi.org/10.1016/j.dr.2014.12.004.

[21] Isabella Aura, Lobna Hassan, and Juho Hamari, "Teaching within a Story: Understanding Storification of Pedagogy," *International Journal of Educational Research* 106 (2021): 101728, https://doi.org/10.1016/j.ijer.2020.101728; Wohabie Birhan et al., "Exploring the Context of Teaching Character Education to Children in Preprimary and Primary Schools," *Social Sciences & Humanities Open* 4, no. 1 (2021): 100171, https://doi.org/10.1016/j.ssaho.2021.100171.

[22] Henderson et al., "Timing Storytime to Maximize Children's Ability to Retain New Vocabulary"; Panc, Georgescu, and Zaharia, "Why Children Should Learn to Tell Stories in Primary School?"; Yusof, "CHAPTER 1 Influence of Family Factors on Reading Habits and Interest among Level 2 Pupils in National Primary Schools in Malaysia."

lifestyle toreduce the impacts or the risks of natural disasters. Therefore, if materials used by the people in the disaster-affected areas are not environmentally friendly for their daily activities, it will make the situation even getting worse when a disaster occurs.

One of the environmentally friendly lifestyles that must be preserved by the people of Pelabuhanratu and Parangtritis is reducing the use of plastics. Everything made of plastics is very difficult to decompose. They will accumulate and end up in the sea. Imagine if a tsunamioccurs the plastic mountains in the ocean will be carried by the waves and hit the land. This will exacerbate the risk of natural disasters. The school teachers, especially at the elementary level, are expected to be able to contribute as early as possible in educating the students to getused to the use of environmentally friendly materials and instill an environmentally friendly lifestyle.

Practicing environmentally friendly lifestyles from an early age requires appropriate strategies. One of them is through folklore or fairy tales which tell stories regarding environmentally friendly behaviors. The folklore of Ratu Laut Selatan provides education to the community to maintain the balance of nature, especially the sea as the main livelihood for the people of Pelabuhanratu and Parangtritis. Cultural practices carried out by the communityshould also reflect an environmentally friendly lifestyle.

According to the UN Environment Program, currently, humans produce around 300 million tons of plastic waste every year (which is almost equivalent to the weight of the entirehuman population). Plastic takes a very long time to decompose, approximately between 20 to500 years. Most of the plastic waste ends up in the oceans, causing collateral damages to the living things in it. Thus, what we must do now is reducing plastics by avoiding the use of plasticbags, always carrying shopping bags, using reusable cutlery, and recycling plastic waste.

Based on The World Counts, every year we throw 2.12 billion tons of waste into the natural environment. The accumulated waste triggers diseases, damages, and natural disasters.To reduce waste, we can apply the 3R principle (reduce, reuse, and recycle). We can also stop purchasing unnecessary things, particularly those made up of plastics because research showsthat 99 percent of the stuff we buy will end up in the garbages in just six months.

Adapted from the Food and Agriculture Organization of the United Nations, the deforestation rate (forest clearance) is 10 million hectares per year. A third of the world's

forests have been removed since the last ice age. It may cause the ecosystem to become unbalanced, the water cycle is disrupted, the extinction of animals and plants, landslides, and global warming which later cause more natural disasters to occur. Therefore, we must carry out a reforestation program as soon as possible. Reforestation can be supported by implementing a selective logging system (only cutting trees according to requirements), avoiding illegal logging, building terraces to prevent landslides, and planting trees in the houseyards and roadsides.

The students at SDN Sriwijaya Pelabuhanratu have already been taught about environmentally-friendly lifestyles. Together with the teachers' council, they are also provided with knowledge from NGOs and the local government who provide socialization related to disaster mitigation at schools.

The following is a list of folklore and character values that can be instilled in elementary school students:

Table 2.
Folklore and Values

Nu.	Folklore	Myth/warning	Value
1.	The Legend of Nyi Roro Kidul	Nyi Roro Kidul will be angry if the sea is polluted	Preserving the sea
2.	The Legend of Batu Bagaung	The ruler of the river willbe angry if the river is polluted	Preserving the river
3.	Mount Lokon	The danger of volcanic eruptions and earthquakes	Mitigation during the arthquake and volcanic eruption
4.	The Legend of Toba Lake	The danger of flash floodhazard	Mitigationduring the flash flood
5.	The Legend of Sawerigading	The danger of earthquakeand tsunami	Mitigationduring earthquake and tsunami

From the table above it can be concluded that: Folklore Legend of Nyi Roro Kidul, Legend of Batu Bagaung, Mount Lokon, Legend of Lake Toba, and Legend of Sawerigading can instill values in elementary school students, for example: preserving the sea, preserving rivers, mitigating during earthquakes and volcanic eruptions, mitigation during flash floods, mitigation during earthquakes and tsunamis.

Simulation of the Early Warning System in the Pelabuhan Ratu of Sukabumi Regency

An interesting research finding is that the Regional Disaster Relief Agency/BPBD of Sukabumi regency conducts a simulation of an early warning system regularly (every 26th of each month). BPBD turns on a siren to alert and prepare for evacuation for the people living around the Pelabuhanratu beach within a radius of 500 meters. The simulation aims to preparefor earthquake and tsunami disasters.

"We hold a simulation by turning on the siren to signal an earthquake and tsunami once a month in every 26th. When the sound (the siren) is sounded, all people immediately take over the simulation with evacuation steps including running to a higher place and the gathering point that we have instructed before. ." (Head of BPBDSukabumi Regency).

The simulation of the early warning system from the BPBD is also confirmed by the teachers of SDN Sriwijaya Pelabuhanratu. The school invites all students and residents to have a simulation when the siren sounds. The elementary school students as a vulnerable group areordered to run to the evacuation route.They (the students) already understand that if there is a sound signal from the BPBD,they must immediately run to a higher place according to the instructions given previously by the officers. We (school officials) are regularly guided and educated byBPBD about the preparations for tsunami and earthquake warning simulations. The local people have also fully understood and wanted to join the simulation with us. Wehope this program will be sustainable to educate people and our children especially"(Teachers of SDN Sriwijaya Pelabuhanratu).

The fishermen living around the pier also already understand such signal. They have been notified that every 26th there will be an early warning system simulation by activating the earthquake and tsunami sensors.

They have been given socialization that every 26th, there is an earthquake and tsunamisimulation. So far, everything runs well, but sometimes they are still busy with their work on the boat. The point is that the fishermen are ready to help people around therethrough this simulation process so that everyone can be safe and secured. (Chairman of the Pelabuhanratu).

From the findings regarding the earthquake simulation carried out in the Pelabuhanratuarea, it can be concluded that the local government and local schools have collaborated well toperform the simulation as best as they can. Based on the results of previous studies, the most effective natural disaster mitigation education is through

simulation[23], because the simulation can identify the effectiveness and flexibility of the techniques applied in the mitigation process[24]. By conducting regular simulations, it will be possible to find the most appropriate methods and tools to be used in the mitigation process when a disaster occurs so that the number of casualties can be minimized[25]. The simulation can compare and observe the most appropriate techniques and tools to be applied to certain places and situations[26]. By conducting a simulation, all components involved can be trained so that if a real disaster occurs they already know what to do exactly[27]. Good understanding and readiness will also be better if the simulation is conducted regularly[28].

Government Early Response System to Disaster

The Sukabumi Regency Government has made efforts to build adequate infrastructure to respond early to potential disasters around Pelabuhanratu, especially the prediction of a megathrust that will engulf the southern sea on the island of Java with an average tsunami wave height of up to 20 meters.They have built evacuation routes by widening road markings and building special two-way evacuation routes. We will also carry out evacuations and security during and after the disaster to ensure that our residents are safe and that the property left behindis also safely controlled and guarded by the apparatus specifically tasked with guardingthe residence when the occupants are evacuated.

The local government makes the prediction from BMKG related to megathrust as a benchmark for responding to early disaster mitigation to prepare and minimize potential casualties. The government and the community must cooperate well in disaster mitigation, especially the preparations or socialization and simulations that have been provided and facilitated by the government. So far, the local people have clearly

[23] Takashi Yamada and Noriko Yamasaki, "Simulation of Tsunami Evacuation Behavior Considering Inland Direction," *International Journal of Disaster Risk Reduction* 65 (November 2021): 102566, https://doi.org/10.1016/j.ijdrr.2021.102566.

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understood what steps should be taken when a disaster occurs in their area.

The government's task is to protect and support the residents immediately especially those living in a disaster-prone area. They will directly record and trace people who are categorized as vulnerable, so when a disaster occurs, we will prioritize them for evacuation. Vulnerable groups include pregnant women, toddlers and elderly.

The implementation of an early warning system has been proven to successfully reducecasualties and material losses[29].Therefore, the early warning system is considered one of the best systems in dealing with natural disasters[30]. Considering its importance in reducing the number of victims and material losses, it is mandatory to ensure that the early warning systemis always in an active state[31]. Also, another thing that must be considered carefully is that the entire community must know how the early warning system works and what to do after receiving a warning from the system[32]. The early warning system will be less effective if the people do not understand when the system provides warnings[33]. Therefore, any implementation of an early warning system must be followed by regular training to ensure the system is functioning and the community understandsthe signals related to natural disasters[34].

Disaster Mitigation Analysis in Yogyakarta Region

Based on destructive seismic data, Java Island has experienced 48 major earthquakes from 1612 to 2014[35]. Several earthquakes with a magnitude of more than7

[29] Lorenzo Alfieri et al., "Operational Early Warning Systems for Water-Related Hazards in Europe," *Environmental Science & Policy* 21 (August 2012): 35–49, https://doi.org/10.1016/j.envsci.2012.01.008; Katsushige Kitazawa and Scott A. Hale, "Social Media and Early Warning Systems for Natural Disasters: A Case Study of Typhoon Etau in Japan," *International Journal of Disaster Risk Reduction* 52 (January 2021): 101926, https://doi.org/10.1016/j.ijdrr.2020.101926; Martina Sättele, Michael Bründl, and Daniel Straub, "Reliability and Effectiveness of Early Warning Systems for Natural Hazards: Concept and Application to Debris Flow Warning," *Reliability Engineering & System Safety* 142 (October 2015): 192–202, https://doi.org/10.1016/j.ress.2015.05.003.

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[31] Duminda Perera et al., "Identifying Societal Challenges in Flood Early Warning Systems," *International Journal of Disaster Risk Reduction* 51 (December 2020): 101794, https://doi.org/10.1016/j.ijdrr.2020.101794.

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[35] Supartoyo et al., "Studi Paleoseismologi Sesar Cimandiri Bagian Barat, Daerah Sukabumi, Jawa

are associated with a subduction zone located in the southern part of Java[36]. This is an active plate boundary that accommodates the collision of the Indo-Australian Plate and the Eurasian plate with a normal convergence rate of 58.3 ± 0.5 to 61.8 ± 0.4 mm/year in the south of West Java[37]. Java Island has a high seismic hazard risk because it is located in a subduction zone and is densely populated. Therefore, a better understanding of the potential and degree of coupling in the interplate plane in the Java subduction zone is very important. Another disaster risk in Java comes from active faults on the mainland such as the Lembang Fault[38].

GPS observation points in the south of Central Java and Yogyakarta are moving towardsthe southeast and east and experiencing an increase in vertical position. In the Bantul region, the movement is pushed by the Opak Fault which is suspected to have reactivated during the 2006 Yogya earthquake in the form of an escarpment extending in a southwest-northeast direction, turning east to the inactive Batur Agung rising fault. This fault also experiences a sinistral shift with a fault plane that is not perpendicular[39]. Movements with varying magnitude and direction indicate that the southern part of Java Island has active tectonic activities.

To deeply understand the potential for earthquakes in the subduction zone, an inversionis carried out using two earthquake sources. The first plane is measured from the southern partof the eastern tip of Java Island to the southern part of Garut, West Java, and the second planestretches from the southern part of Garut to the southern part of the western tip of Java Island.The two planes are divided into sub-planes measuring 20 x 20 km (adjusted for data sensitivity)where each sub-plane has a depth value and slope angle

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obtained from the Slab 1.0 model[40]. The value of the convergence rate of the Indo-Australian plate and the Eurasian plate is 64 mm/year[41].

By comparing these values, the results of the inversion of the Java subduction zone showthat there is a lack of slip or coupling occurs in the eastern and western Java subduction zones,while there is an excess of slip in the middle which is a postseismic effect of the 2006 Pangandaran earthquake. In western Java, where the shift vector shows northeast, it can be seenthat the slip in the earthquake plane is positive, which means that there is a coupling. Then, thevector changes tend to be horizontal to the east, and it can be seen that the slip value in the earthquake plane is close to zero. In central Java, the vector is towards the southeast, and the slip in the earthquake plane is negative, which means that the slip exceeds the value of the convergence rate. Then, the vector again flattens out, and the slip value returns close to zero. Furthermore, in the eastern part of Java where the vector size is relatively large towards the northeast, there is coupling with a value higher than that in the western part of Java.

The subduction zone in the south of Java Island has greater earthquake potential as indicated by the seismic gap. This research supports the existence of aseismic gap in the future, especially in the southern part of western and eastern Java.[42]

Parangtritis is the southernmost region of Java that is at high risk of being affected by the tsunami. Therefore, the local government is assisted by the Central BNPB to collaborate inthe socialization of disaster mitigation. This synergy is carried out to increase public awareness and understanding of disaster mitigation. The government also focuses on the preparation of infrastructure that will provide access for human mobilization in the event of a disaster. By identifying specific sites that have a high level of vulnerability, efforts to minimize the impactof natural disasters can be carried out through appropriate prevention and mitigation measures[43]. With the proper mapping of disaster-proneareas, prevention and better spatial planning can be carried out to avoid disasters that cause high

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levels of losses[44].

CONCLUSION

Based on the results described previously, it can be concluded that folklore is used by the teachers at SD in Pelabuhanratu Sukabumi and Parangtritis Jogjakarta to provide understanding and awareness of their students. For the practical stage, the process is done through simulation, and for the habituation stage, it is done through routines. In other words, the teachers use folklore to create a comprehensive learning process starting from building understanding and awareness to building culture through habituation.

Given that this research was only conducted qualitatively, the findings cannot provide data on how effective the implementation of folklore is to build the students' knowledge about disaster mitigation. Thus, to determine the extent to which the effectiveness of the implementation of folklore in building the students' understanding of the natural disaster mitigation process, further research needs to be carried out using a quantitative approach that focuses on measuring effectiveness. Besides, further research can also be conducted to identifythe students' responses and motivation in learning disaster mitigation through folklore. Therefore, the results can complement these research findings.

RECOMMENDATION

Folklore can be reconstructed by humanists so that they have positive value for disaster mitigation efforts in the community around the southern coastal areas of Java Island to preventit to be a misleading myth. Folklore about disaster mitigation education can be included in thecurriculum at the elementary school level as local content or a shadow curriculum. The historyor events of natural disasters in the past can be used as folk tales that are valuable in educatingthe children for disaster mitigation efforts.

ACKNOWLEDGMENTS

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The author would like to thank the Center for Research and Publishing, State Islamic UniversityJakarta, which has provided funding for this research, in a competitive grant program in 2021,and also to the Faculty of Educational Sciences and various parties who provide support for this research process.

DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest concerning the research, authorship, and publication.

FUNDING

Sources of funding in conducting research are from Center for Research and Publishing, State Islamic University Jakarta.

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