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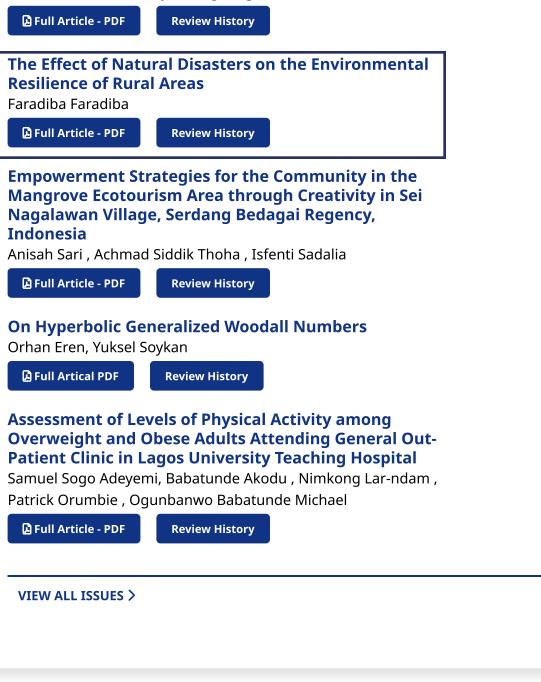
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Asian Journal of Advanced Research and Reports

English title:	*n/d*
ISSN:	2582-3248 (online)
DOI:	10.9734/AJARR
Website:	http://www.journalajarr.com/index.php/AJARR
Publisher:	SCIENCEDOMAIN INTERNATIONAL
Country:	IN
Language of publication:	*n/d*

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The Effect of Natural Disasters on the Environmental Resilience of Rural Areas

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

Original Research Article

ABSTRACT

Disasters have detrimental effects on environmental aspects. This research aims to investigate the negative impacts of earthquakes, volcanic eruptions and land drought on the environment. This research aims to determine the impact of natural disasters on environmental factors. The data used in this research was obtained from Podes 2021 and the Environmental Resilience Index (IKL) 2022 and 2023. The method applied in this research is multiple linear regression. The results of this research show that natural disasters have a negative impact on environmental conditions. Of the three independent variables for natural disasters in this study, it is known that volcanic eruptions have the most significant negative effects, both one year and two years after the event occurs. The negative impacts of natural disasters are still felt by the community at least 2 years after the disaster occurs. Therefore, an extra role is needed from the government to carry out evacuations when a disaster occurs, as well as implementing mitigation measures early on to reduce negative impacts.

Keywords: Natural disaster; environmental resilience; rural.

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1. INTRODUCTION

Natural disasters are natural events that cannot be avoided and often have a destructive environmental impact [1-3]. All natural disasters, from earthquakes, floods, landslides, and forest fires to tropical storms, cause extensive and varied damage. Its negative impact on the environment is evident in various aspects. One of the most visible impacts is ecosystem damage. Natural disasters often destroy the natural habitats of different plant and animal species [4-6]. For example, overflowing floods can destroy riparian forests and disrupt river ecosystems, while forest fires can destroy various types of flora and fauna that live in them. Natural disasters can also pollute the environment with hazardous waste and materials, such as oil spills or industrial waste, which can poison the land, water, and air.

Natural disasters also impact the social and economic sectors [7,8]. Many people have lost their homes, sources of livelihood, and even families due to natural disasters. Natural disasters often result in significant economic losses due to destroyed infrastructure, damaged crops, and loss of human resources. Recovery after a disaster usually takes a long time and costs a lot of money, putting additional pressure on a region's economy [9-11].

Natural disasters often leave traces of waste, which can be a source of ecosystem problems and impact the health of living creatures [12-14]. When a disaster occurs, many materials, such as building debris, household waste, or even hazardous materials, are scattered in the surrounding environment. This rubbish can come from collapsed buildings, used materials, or chemical waste from affected industrial facilities. The impact of waste after natural disasters is enormous. Building debris and used materials can obstruct the flow of rivers or water channels, cause flooding, and damage water ecosystems. Waste originating from industry or leaking chemicals can pollute soil, groundwater, or rivers, negatively impacting plants, animals, and humans who depend on these environments.

It threatens the ecosystem, and post-disaster waste also has serious potential for human health [15-17]. This rubbish can become a nest for disease because it invites the spread of bacteria, viruses, or sharp objects, which can cause wounds and infections in those exposed to it. In addition, the dangerous chemicals that are distributed can cause poisoning or other health problems in humans exposed directly or indirectly. With its abundant natural wealth, Indonesia also has a high risk of natural disasters. Apart from earthquakes, volcanic eruptions, and land drought, this country is also vulnerable to flood disasters. Increased rainfall, the confluence of large rivers in inland areas, and changes in water management patterns often trigger destructive floods.

Floods are natural disasters that occur periodically in various regions of Indonesia [18,19]. Every rainy season, especially between October and March, many areas are vulnerable to flooding due to overflowing rivers, excessive waterlogging, and poor drainage. Floods can cause significant losses, including damage to houses, infrastructure transportation disruption, and health impacts from contaminated water.

Efforts to handle and mitigate flood disasters in Indonesia involve various parties, including the government, community, and aid organizations. Building flood control systems, maintaining water channels, and river rehabilitation are the main focuses for reducing flood risk. Apart from that, awareness campaigns on the importance of protecting the environment, greening, and proper waste management are also preventive steps that minimize the impact of flooding.

Awareness of the risk of natural disasters and joint efforts to deal with them is essential for Indonesian society. Disaster preparedness, emergency response plans, and the availability of tools and safe evacuation routes are crucial in minimizing the losses incurred. Through collaborative efforts and a planned approach, the hope is to reduce the negative impacts of flood disasters and maintain the security and welfare of the Indonesian people.

Environmental conservation is a crucial principle in maintaining the sustainability of ecosystems on Earth [20,21]. This refers to actions to protect, preserve, and maintain the balance of nature and existing natural resources. A healthy and balanced environment is the foundation for the survival of humans and all life forms on this planet. Environmental conservation covers various aspects, from conserving natural resources such as water, air, land, and biodiversity. These conservation efforts also include reducing waste, using renewable energy, protecting natural habitats, and controlling

pollution to minimize adverse environmental impacts.

The importance of environmental preservation is also reflected in climate change mitigation efforts. By maintaining the sustainability of ecosystems, we can reduce greenhouse gas emissions and slow the rate of climate change, which can seriously impact life on this planet [22-24]. Through sustainable environmental conservation, we can realize harmony between humans and nature and improve the quality of life now and for future generations. This long-term investment is vital for the survival of humans and all living things on Earth. Based on the background above, it is therefore necessary to study the impact of disasters on environmental factors. This research aims to determine the effect of natural disasters on the environment in rural areas.

2. METHODOLOGY

This research uses natural disaster data from Village Potential (Podes 2021) sourced from the Central Statistics Agency and Environmental Resilience Index (IKL) from the Ministry of Villages, Development of Disadvantaged Regions and Transmigration. The data used in this research is at the village level. The Environmental Resilience Index (IKL) used in this research includes IKL for 2022 and 2023. The indicators used in calculating IKL are as follows:

List 1. Environmental resilience indicators

1. Environmental Quality
2. Disaster-prone
3. Disaster Response

This research uses multiple regression analysis to see the influence of disaster events in 2020 and 2021 on IKL in 2022 and 2023. Through this method, it is hoped that it can show past natural disasters' impact on current environmental conditions. The natural disasters discussed in this research include earthquakes, volcanic eruptions, and droughts (Land). The dependent variable in this research is the Environmental Resilience Index (IKL), while the independent variable is the number of earthquakes, volcanic eruptions, and droughts (land).

This research is an in-depth exploration using multiple linear regression methods as the main approach. This method was chosen with the aim of understanding more comprehensively the

influence of the independent variable on the dependent variable in the context of this research. Multiple linear regression is known as an effective statistical analysis tool in identifying and evaluating relationships between variables. By using this approach, researchers hope to uncover complex patterns that may be hidden behind the collected data.

The choice of the multiple linear regression method also provides the opportunity to analyze the simultaneous impact of several independent variables on the dependent variable. In other words, this research not only aims to determine the extent to which each independent variable influences the dependent variable individually, but also how the combination of these variables can interact and have a joint impact. This provides a richer and deeper dimension of analysis, allowing researchers to explore nuances of relationships between variables that may not be apparent at simpler levels of analysis.

3. RESULTS AND DISCUSSION

The regression analysis results show that earthquakes, volcanic eruptions, and land drought negatively and significantly impact environmental resilience (IKL), illustrating the ecological vulnerability to natural disasters in various regions. These findings demonstrate that natural disasters, such as destructive earthquakes, threatening volcanic eruptions, and productivity-reducing land droughts, significantly affect the environment's ability to maintain natural balance.

The existence of a significant relationship between natural disasters and environmental resilience provides a deeper understanding of the link between natural events and ecological sustainability. Earthquakes, as one of the often unpredictable natural disasters, can affect the ecological structure of the affected areas. Likewise, volcanic eruptions can cause extensive environmental damage and land drought, threatening the productivity and sustainability of natural resources.

Natural disasters can cause severe environmental damage that is difficult to repair quickly. When disasters such as earthquakes, volcanic eruptions, floods, or forest fires occur, the environmental impact can be extensive and severe. For example, earthquakes can change the topography of an area by collapsing soil

structures and creating cracks that affect drainage and water flow patterns. Volcanic eruptions produce lava, volcanic ash, and pyroclastic material, which can bury and damage natural habitats and surrounding agricultural land.

Environmental damage due to natural disasters also affects biodiversity. Natural disasters such as forest fires or major floods often destroy the natural habitats of animals and plants. Loss of this habitat can cause species extinction and disrupt the food chain in the ecosystem. Complete environmental recovery can take years, even decades, even after a disaster.

The difficulty of repairing environmental conditions damaged by natural disasters highlights the importance of prevention and mitigation. Preventive efforts such as wise spatial planning, effective early warning systems, and investment in disaster-resistant infrastructure are significant. In addition, mitigation strategies involving post-disaster environmental restoration, sustainable management of natural resources, and public education about the importance of environmental sustainability can help minimize the negative impact of natural disasters on the environment. With awareness of the environment's vulnerability to natural disasters, efforts to protect and preserve ecosystems become increasingly crucial in maintaining environmental sustainability for future generations.

The natural sustainability we enjoy today results from the accumulation of ecosystems that have developed over many years. Nature carries within itself a long history of complex interactions between elements, ranging from various species to physical environments formed from natural processes that last thousands or even millions of years.

Each ecosystem has a unique pattern of balance, where every organism, from microorganisms to large animals, has an essential role in maintaining the continuity of the ecosystem itself. Natural processes such as water circulation, nutrient cycles, and interconnected food chains have formed and adapted over the years, creating a fragile but essential balance.

However, natural sustainability accumulated over the years cannot be considered permanent and eternal. Current environmental changes, such as

deforestation, pollution, climate change, and other human activities, have disrupted this natural balance. This disturbance has threatened the survival and balance of ecosystems, affecting the biodiversity and ecological functions of various habitats.

Based on Table 1, it is informed that earthquakes, volcanic eruptions, and land drought in 2020 have a negative and significant effect on the environmental resilience index in 2022. Volcanic eruptions have the most resounding negative impact compared to other research variables.

Table 2 shows that volcanic eruptions and drought (land) in 2020 negatively and significantly affect the environmental resilience index in 2022. Volcanic eruptions have the most resounding negative impact compared to other research variables.

Based on Table 3, it is informed that the majority of research observations were in developing villages. This result follows the distribution of village conditions currently in Indonesia. There are 6.40 percent who have an independent status, 21.89 percent who have an advanced level, 50.62 percent who have a developing situation, 15.35 percent who have an underdeveloped status, and 5.74 percent who have a very underdeveloped group.

Table 4 shows that the earthquake in 2020 had a negative and significant effect on the Environmental Resilience Index in 2022. Earthquakes and volcanic eruptions were not substantial in this study.

Table 5 shows that the 2020 earthquake had a negative and significant effect on the Environmental Resilience Index in 2022. Earthquakes and volcanic eruptions were not substantial in this study.

Based on Table 6, it is informed that the majority of research observations were in developing villages. This result follows the distribution of village conditions currently in Indonesia. 13.05 percent have an independent status, 25.92 percent have an advanced level, 45.28 percent have a developing situation, 10.53 percent have an underdeveloped status, and 5.21 percent have a very underdeveloped status.

Based on regression analysis, almost all variables show a significant negative influence

on the Environmental Resilience Index. Of the three independent variables in this study, volcanic eruptions were proven to have the most decisive negative impact within one year and two years after the event. This finding is in line with previous research, which confirms that natural disasters have a detrimental effect on the state of the environment [25-27]. Therefore, an extra role is needed for the government to evacuate when a disaster occurs and implement mitigation measures to minimize the negative impacts that may arise.

Table 1. The impact of natural disasters in 2020 on the environmental resilience index in 2022

Natural Disasters (2020)	Coefficient	Significance
Earthquake	-0.0028233	0.070
Erupting volcano	-0.2644590	0.000
Drought (Land)	-0.0175872	0.022
Constant	0.6823114	0.000

Note: Dependent Variable: Environmental Resilience Index
Independent Variable: Earthquake, Volcano Eruption, and Drought (Land)

Table 2. The Impact of natural disasters in 2021 on the environmental resilience index in 2022

Natural Disasters (2021)	Coefficient	Significance
Earthquake	-0.0028642	0.106
Erupting volcano	-0.0443517	0.002
Drought (Land)	-0.0066247	0.574
Constant	0.6812539	0.000

Note: Dependent Variable: Environmental Resilience Index
Independent Variable: Earthquake, Volcano Eruption, and Drought (Land)

Table 3. Number of observation villages according to development classification in 2022

Development Village Index Status (2022)	Frequency	Percent
Independent	185	6.40
Proceed	633	21.89
Develop	1,464	50.62
Left behind	444	15.35
Very Left behind	166	5.74
Total	2.892	100.00

Table 4. The impact of natural disasters in 2020 on the environmental resilience index in 2023

Natural Disasters (2020)	Coefficient	Significance
Earthquake	-0.0070937	0.000
Erupting volcano	0.0058219	0.650
Drought (Land)	-0.0071925	0.426
Constant	0.7156952	0.000

Note: Dependent Variable: Environmental Resilience Index
Independent Variable: Earthquake, Volcano Eruption, and Drought (Land)

Table 5. The impact of natural disasters in 2021 on the environmental resilience index in 2023

Natural Disasters (2021)	Coefficient	Significance
Earthquake	-0.0061510	0.001
Erupting volcano	0.0365999	0.218
Drought (Land)	-0.0045005	0.716
Constant	0.7146002	0.000

Note: Dependent Variable: Environmental Resilience Index
Independent Variable: Earthquake, Volcano Eruption, and Drought (Land)

Table 6. Number of Observation Villages According to Development Classification in 2023

Development Village Index Status (2023)	Frequency	Percent
Independent	368	13.05
Proceed	731	25.92
Develop	1,277	45.28
Left behind	297	10.53
Very Left behind	147	5.21
Total	2,820	100.00

4. CONCLUSION

Natural disasters harm various aspects of life, including the environment. The impact of natural disasters can cause damage to environmental elements that have already been formed, requiring the affected areas to be rebuilt so that they can be used again by the community. Reorganizing aspects affected by natural disasters takes quite a long time. This research shows that the adverse effects of natural disasters are still felt two years after the disaster. Therefore, an active role from the government is necessary to accelerate the recovery process from the impacts of natural disasters. Apart from that, disaster mitigation efforts also need to be carried out to reduce the adverse effects that may arise from natural disasters.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Caraka RE, Lee Y, Chen RC, Toharudin T, Gio PU, Kurniawan R, Pardamean B. Cluster around latent variable for vulnerability towards natural hazards, non-natural hazards, social hazards in West Papua. Ieee Access. 2020;9:1972-1986.
2. Kelman I. Disaster by choice: How our actions turn natural hazards into catastrophes. Oxford University Press; 2020.
3. Panwar V, Sen S. Economic impact of natural disasters: An empirical re-examination. Margin: The Journal of Applied Economic Research. 2019;13(1): 109-139.
4. Gunderson L. Ecological and human community resilience in response to natural disasters. Ecology and Society. 2010;15(2).
5. Kiss T. Biosphere-related natural hazards. In natural hazards and the mitigation of their impact. Springer. 2022;213–227.
6. Kumari S, Sharma A, Swarup S. Mitigation of immediate damages from tropical cyclones on the coastal forest ecosystem: A Case of Wildlife Sanctuaries. Journal of Wildlife and Biodiversity. 2023;7(1):1–12.
7. Jovel JR. Natural disasters and their economic and social impact. CEPAL Review; 1989.
8. Salvato C, Sargiacomo M, Amore MD, Minichilli A. Natural disasters as a source of entrepreneurial opportunity: Family business resilience after an earthquake. Strategic Entrepreneurship Journal. 2020; 14(4):594-615.
9. Finucane ML, Acosta J, Wicker A, Whipkey K. Short-term solutions to a long-term challenge: rethinking disaster recovery planning to reduce vulnerabilities and inequities. International Journal of Environmental Research and Public Health. 2020;17(2):482.
10. Gatti R, Lederman D, Islam AM, Bennett FR, Andree BPJ, Assem H, Lotfi R, Mousa ME. Altered destinies: The long-term effects of rising prices and food insecurity in the Middle East and North Africa; 2023.
11. Quartieri J, Mastorakis NE, Guarnaccia C, Troisi A, D'Ambrosio S, Iannone G. Traffic noise impact in road intersections. International Journal of Energy and Environment. 2010;1:1–8.
12. Akhtar N, Syakir Ishak MI, Bhawani SA, Umar K. Various natural and anthropogenic factors responsible for water quality degradation: A review. Water. 2021;13(19):2660.
13. Dehghani MH, Omrani GA, Karri RR. Solid waste-sources, toxicity, and their consequences to human health. In Soft computing techniques in solid waste and wastewater management. Elsevier. 2021; 205–213.
14. Uralovich KS, Toshmamatovich TU, Kubayevich KF, Sapaev IB, Saylaubaevna

SS, Beknazarova ZF, Khurramov A. A primary factor in sustainable development and environmental sustainability is environmental education. Caspian Journal of Environmental Sciences. 2023;21(4): 965-975.

15. Habib MS, Maqsood MH, Ahmed N, Tayyab M, Omair M. A multi-objective robust possibilistic programming approach for sustainable disaster waste management under disruptions and uncertainties. International Journal of Disaster Risk Reduction. 2022;75:102967.

16. Kasabdji GS, Pradhananga P, Elzomor M. Health and safety issues in post-disaster waste management: A case study in Nepal. Construction Research Congress. 2020;520-528.

17. Pradhananga P, ElZomor M, Kasabdji GS. Disaster waste management challenges in Nepal: Health impacts and the need for safe practices. Natural Hazards Review. 2021;22(2):5021001.

18. Hakim WL, Lee CW. A review on remote sensing and GIS applications to monitor natural disasters in Indonesia. Korean Journal of Remote Sensing. 2020;36(6_1): 1303-1322.

19. Kusumasari B. Natural hazards governance in Indonesia. In Oxford Research Encyclopedia of Natural Hazard Science; 2019.

20. Chen T, Feng Z, Zhao H, Wu K. Identification of ecosystem service bundles and driving factors in Beijing and its surrounding areas. Science of The Total Environment. 2020;711:134687.

21. Hosen N, Nakamura H, Hamzah A. Adaptation to climate change: Does traditional ecological knowledge hold the key? Sustainability. 2020;12(2):676.

22. Mikhaylov A, Moiseev N, Aleshin K, Burkhardt T. Global climate change and greenhouse effect. Entrepreneurship and Sustainability Issues. 2020;7(4):2897.

23. Prakash S. Impact of Climate change on Aquatic Ecosystem and its Biodiversity: An overview. International Journal of Biological Innovations. 2021;3(2).

24. Shen M, Huang W, Chen M, Song B, Zeng G, Zhang Y. (Micro) plastic crisis: un-ignorable contribution to global greenhouse gas emissions and climate change. Journal of Cleaner Production. 2020;254:120138.

25. Benevolenza MA, DeRigne L. The impact of climate change and natural disasters on vulnerable populations: A systematic review of literature. Journal of Human Behavior in the Social Environment. 2019; 29(2):266-281.

26. Botzen WJW, Deschenes O, Sanders M. The economic impacts of natural disasters: A review of models and empirical studies. Review of Environmental Economics and Policy; 2019.

27. Hussain M, Butt AR, Uzma F, Ahmed R, Irshad S, Rehman A, Yousaf B. A comprehensive review of climate change impacts, adaptation, and mitigation on environmental and natural calamities in Pakistan. Environmental Monitoring and Assessment. 2020;192:1-20.

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