

Commentary



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Disaster preparedness culture in Japan and Indonesia: cultural perspectives and practical implementation (a commentary)

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Abstract

This article discusses the comparison of disaster preparedness culture between Japan and Indonesia, focusing on cultural perspective and practical implementation. Japan is known to have a highly structured disaster preparedness system, supported by advanced technology, systematic disaster education, and a strong culture of discipline. Regular simulation exercises, disaster-resistant infrastructure, and effective coordination between various parties make Japan a model in disaster mitigation. In contrast, Indonesia faces more complex challenges, such as cultural and geographical diversity, which affect the consistency in disaster preparedness implementation. Nevertheless, Indonesia has strengths in local community involvement and the use of traditional wisdom in disaster management. This article also emphasizes the importance of integrating local wisdom and traditional practices with modern technology to improve the effectiveness of disaster preparedness in Indonesia. Through this comparison, valuable lessons are obtained that can be applied to strengthen disaster preparedness capacity in both countries. Collaboration between Japan and Indonesia in terms of knowledge and experience exchange is also proposed as a strategic step to create a more resilient society. This article argues that leveraging local culture is key to enhancing relevant and effective disaster preparedness, and to building community resilience in the face of future disasters.

Commentary

Disaster preparedness is very important because it can reduce the risk and impact of disasters, save lives, and minimize material losses [1]. Culture plays a key role in this preparedness, as local values, traditions, and practices influence how individuals and communities respond to disaster threats [2]. For example, in some communities, traditional rituals and beliefs can increase awareness and preparedness for disasters [1]. In

addition, local culture can encourage community solidarity and collaboration in dealing with emergencies [1,2]. Therefore, understanding and integrating local culture into disaster preparedness strategies is an important step to increase the effectiveness of disaster response [2].

Japan and Indonesia are both vulnerable to natural disasters, but their contexts differ significantly. Japan, located on the Pacific Ring of Fire, frequently experiences earthquakes and tsunamis, thus developing disaster-resilient early warning systems and infrastructure [3]. On the other hand, Indonesia, also on the Ring of Fire, frequently experiences volcanic eruptions, earthquakes, and floods, with the additional challenge of a population spread across thousands of islands [4]. Preparedness in Japan is heavily supported by advanced technology and well-established disaster education, whereas in Indonesia, geographic and socio-cultural challenges often influence disaster response and mitigation [3,4]. Both countries have long experience with disasters, but their approaches and capabilities in managing disaster risk vary according to their respective local contexts [1,2]. Disaster preparedness culture is a crucial aspect in reducing the impact of disasters, with culture playing a significant role in shaping community responses [3]. Japan and Indonesia face unique challenges in disaster management, influenced by differences in education, infrastructure, local beliefs, community participation, and geographic conditions. Japan excels in technology and community discipline, while Indonesia must deal with complex cultural and geographic diversity. To improve preparedness, Indonesia can learn from Japan's experience while respecting and integrating local culture [3]. Adapting strategies based on local contexts will strengthen the effectiveness of disaster management efforts in both countries. The purpose of writing this commentary article is to compare the disaster preparedness culture between Japan and Indonesia and its implications for practical implementation.

Disaster preparedness culture in Japan: Japan has a long history of natural disasters, especially earthquakes and tsunamis, due to its location on the Pacific Ring of Fire. One of the deadliest earthquakes occurred in 1923, known as the Great Kanto Earthquake, which devastated Tokyo and Yokohama and killed an estimated 140,000 people. In 1995, the Hanshin-Awaji Earthquake in Kobe caused more than 6,000 deaths and extensive damage, prompting improvements in Japan's disaster preparedness system. The 2011 tsunami, triggered by the Tohoku Earthquake, caused catastrophic damage and a nuclear meltdown in Fukushima, reinforcing Japan's focus on early warning technology and disaster mitigation [5]. This history of disasters has shaped Japan's policies, culture, and infrastructure in dealing with the threat of natural disasters [6].

Japan's long history of frequent earthquakes and tsunamis has created a strong culture of disaster preparedness in the country [3]. A sophisticated early warning system was developed in response to the urgent need to provide the public with rapid and accurate information when disasters strike [7]. In addition, community training is routine, with citizens actively participating in disaster simulations, thereby strengthening collective preparedness and response. Disaster education is also integrated into the school curriculum, ensuring that from an early age, children understand the risks of disasters and how to deal with them [4,5]. This combination creates a culture of discipline and high preparedness, where Japanese society is prepared to face disasters with the right knowledge and actions.

Japan implements various effective and innovative practices in disaster preparedness, one of which is the disaster simulation exercises that are routinely conducted throughout the country. These simulations involve all levels of society, including schools, offices, and communities, which serve to improve preparedness and rapid response to emergencies [3]. In addition, Japan utilizes advanced technologies such as satellite-based early warning systems and seismic sensor

networks to detect earthquakes and tsunamis in real-time. This technology allows for early warnings that are only seconds away, giving residents time to evacuate. Japan also develops earthquake-resistant buildings that are designed to withstand strong shaking, thereby reducing the risk of damage and loss of life [5,6]. Collaboration between the government, private sector, and communities ensures that these practices are continuously updated and adapted to technological developments and community needs [5].

One prominent case study is the "Tōhoku Earthquake and Tsunami" of March 11, 2011. This disaster was one of the largest in Japanese history, with a magnitude 9.0 earthquake followed by a massive tsunami. However, Japan's strong culture of disaster preparedness was evident in the public response. Before the tsunami struck, an early warning system immediately alerted residents, who then evacuated in an orderly and disciplined manner following the training they had undergone in disaster simulations [7]. Furthermore, earthquake-resistant buildings saved many lives, although material damage remained extensive. After the disaster, the Japanese people demonstrated solidarity and resilience by quickly beginning recovery efforts, supported by disaster awareness and training that was deeply ingrained in their culture.

Disaster preparedness culture in Indonesia: Indonesia's disaster history reflects its position on the Pacific Ring of Fire, making it vulnerable to earthquakes, volcanic eruptions, and tsunamis. One of the most devastating disasters in modern history was the 2004 Aceh tsunami, caused by a 9.1 magnitude undersea earthquake, resulting in widespread damage and a huge loss of life. The eruption of Mount Merapi in 2010 also had significant impacts, with the eruption killing hundreds and forcing the evacuation of thousands of residents [8]. These disasters have prompted efforts to improve preparedness and mitigation, as well as strengthen response and community support systems across Indonesia [1,2]. Learning

from Indonesia's disaster history has shaped patterns of response that are influenced by diverse socio-cultural conditions. Indonesia's ethnic and cultural diversity has resulted in varied approaches to disaster preparedness, with local communities often relying on local wisdom and traditions to deal with disasters. For example, in disaster-prone areas, such as around Mount Merapi, communities have developed traditional warning and evacuation systems based on natural signs they observe [9]. In addition, community organizations such as traditional villages and non-governmental organizations (NGOs) play an important role in mobilizing and educating communities about disaster management [8]. However, geographical challenges and limited infrastructure in many areas hinder the distribution of information and preparedness training evenly [10]. Therefore, increasing local community involvement and strengthening coordination between the government and community organizations is very important to strengthen disaster preparedness in Indonesia [1].

Key challenges to implementing a culture of disaster preparedness in Indonesia include cultural and ethnic diversity resulting in different local approaches, often hindering the dissemination of consistent information and practices [1]. Complex geographic conditions, with thousands of islands and remote areas, also make it difficult to distribute resources and training equitably. Inadequate infrastructure in some areas makes disaster response less effective, and community engagement is often suboptimal [2]. However, opportunities for improvement lie in the development and implementation of more inclusive, community-based training programs, and the use of information technology to improve warning and coordination systems. Integrating local wisdom with modern approaches to preparedness can strengthen disaster response capacity in various regions [7,8]. In addition, increasing collaboration between government, NGOs, and the private sector can expand the reach

and effectiveness of disaster mitigation efforts across Indonesia [8].

The case study of the 2018 Palu Earthquake and Tsunami reveals challenges and successes in disaster preparedness in Indonesia [8]. Key challenges included the lack of effective infrastructure and early warning systems, as well as difficulties in coordination between agencies and access to remote areas. Despite these challenges, local communities and civil society organizations demonstrated strength and solidarity in responding quickly to the disaster. The mobilization of volunteers and international assistance helped accelerate the recovery process, demonstrating the ability to adapt and collectively support [9,10]. The experience of the Palu disaster also provides important lessons for future preparedness system improvements, including improvements in early warning technology and disaster coordination. Reforms undertaken after the disaster demonstrated a commitment to strengthening disaster infrastructure and response. By building on these lessons, Indonesia can improve and strengthen its disaster preparedness capacity. In conclusion, despite the challenges, the Palu disaster provides an opportunity for significant improvement in disaster mitigation and preparedness strategies.

Comparison and analysis: differences and similarities in disaster preparedness culture between Japan and Indonesia, highlighting each country's strengths as well as areas for improvement, are presented in Table 1. The illustration in Table 1 is an explanation of the similarities between Japan and Indonesia in terms of disaster preparedness culture including the importance of the role of local communities in disaster mitigation and response. Both countries rely on shared values of cooperation and solidarity to deal with disasters and involve communities in training and simulations [4-6]. However, the differences lie in the implementation of existing practices and systems. Japan has advanced infrastructure and technology, such as satellite-based early warning systems and earthquake-

resistant buildings, as well as systematic disaster education in schools. In contrast, Indonesia faces challenges in equalizing technology and training due to its cultural and geographical diversity [1,8]. Local values and traditional beliefs in Indonesia often influence the approach to disaster preparedness, while Japan tends to integrate modern approaches more broadly [9]. Both must continue to adapt and strengthen strategies based on the local context and needs of their respective communities.

The influence of culture on implementation: cultural differences significantly affect the effectiveness of disaster preparedness implementation in Japan and Indonesia. In Japan, a strong culture of discipline and adherence to government guidelines and disaster training ensures that preparedness procedures are strictly followed. Disaster education integrated into the school curriculum and regular drills involving the entire community strengthen disaster preparedness and response [1,4,5]. In contrast, in Indonesia, cultural and customary diversity influences varying approaches to preparedness, often leading to irregularities in the consistent implementation of practices. Local wisdom and traditional beliefs can strengthen, but also sometimes hinder, the acceptance of modern methods and warning systems. In addition, Indonesia's complex geographic challenges affect the effective distribution of technology and training [10]. Diverse local cultures demand a more adaptive and inclusive approach to ensure equitable preparedness across the region [1,7,8]. Therefore, cultural differences require tailored strategies to enhance the effectiveness of disaster preparedness in each country.

Practical implications and recommendations: lessons from Japan that can be applied in Indonesia include the integration of disaster education into the school curriculum to raise awareness from an early age. The development of disaster-resistant infrastructure, as implemented in Japan, can strengthen the resilience of buildings in Indonesia [6,7]. Advanced early warning

systems can be adapted to provide faster warnings in disaster-prone areas. Regular disaster simulation exercises should involve all levels of society to improve preparedness [4,5]. Effective coordination between government, the private sector, and communities needs to be improved for a more coordinated response. Local community involvement in disaster preparedness and recovery should be strengthened to improve the effectiveness of disaster management [2,5].

Recommendations for Indonesia: to improve disaster preparedness in Indonesia, it is necessary to integrate disaster education that is adapted to local culture into the school curriculum [1,4,5]. The government must strengthen the development of disaster-resistant infrastructure by involving local wisdom in design and construction. Early warning systems must be expanded and adapted to local needs, including community training for the use of technology [7,9,10]. Disaster simulation exercises should be held regularly and involve local communities and organizations, utilizing traditional practices to increase effectiveness. In addition, strengthening coordination between the government, NGOs, and local communities will improve post-disaster response and recovery [10].

International collaboration: collaboration between Japan and Indonesia in disaster preparedness can be done through a mutually beneficial exchange of knowledge and experience. Japan can share expertise in early warning technology and disaster-resistant infrastructure development, while Indonesia can provide insights into relevant local wisdom and traditional practices [2-7]. Joint training programs and seminars can facilitate the transfer of technology and best practices. Staff exchanges and study visits can also strengthen the understanding and adaptation of preparedness strategies [3,4]. This collaboration will strengthen disaster preparedness in both countries and enhance community resilience to disasters.

Competing interests

The authors declare no competing interests.

Authors' contributions

Suparji Suparji conceptualized and wrote the original draft; Heru Santoso Wahito Nugroho, Sunarto Sunarto, and Agus Sarwo Prayogi revised and edited the paper. All the authors have read and approved the manuscript.

Table

Table 1: comparison of disaster preparedness culture in Japan and Indonesia

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Table 1: comparison of disaster preparedness culture in Japan and Indonesia

Aspect	Japan	Indonesia
Cultural values	Discipline, high compliance, and collectivity in following procedures	Mutual cooperation, local wisdom, and community solidarity
Disaster education	Integrated into the school curriculum systematically	Beginning to be implemented, but not yet evenly distributed and structured
Technology and infrastructure	Advanced early warning systems, earthquake-resistant buildings	Limited early warning, infrastructure still needs to be strengthened
Disaster drills and simulations	Carried out routinely and involving all levels of society	Implemented, but not evenly distributed and not yet well integrated
Community roles	Active participation in disaster training and simulations	High involvement in local actions, but fragmented
Disaster management coordination	Effective coordination between government, society, and the private sector	Coordination is still often hampered by bureaucracy and geographical challenges