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MORALITY BEFORE KNOWLEDGE

Rehabilitation and reconstruction emergency response management

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ABSTRACT

Background: Disasters have long-term impacts on sustainable development, disrupting socio-economic systems, governance, infrastructure, and the psychological well-being of affected communities. As a disaster-prone country, Indonesia has developed an integrated disaster management system that emphasizes rehabilitation and reconstruction as critical phases in the recovery process. **Methods**: This study adopts a qualitative descriptive approach by reviewing regulatory documents—particularly PerKa BNPB No. 11/2008—and various institutional frameworks, including the disaster management cycle and the Post-Disaster Needs Assessment (PDNA) system known. **Findings:** The analysis reveals that rehabilitation focuses on temporary repairs and restoring basic public services, while reconstruction targets permanent rebuilding efforts that emphasize sustainability, community empowerment, and institutional resilience. Implementation strategies for both phases differ in focus and timeline but are complementary. **Conclusion**: The findings also highlight the importance of standardized tools such as Post-Disaster Needs Assessment (PDNA), which combines the World Bank's DALA and UNDP's HRNA, to assess physical damages and human recovery needs across five sectors. The study concludes that sustainable rehabilitation and reconstruction must be positioned as long-term strategic priorities in Indonesia's disaster management framework. Successful implementation demands multisectoral collaboration through a pentahelix model involving government, civil society, academia, media, and the private sector. **Novelty/Originality of this article:** The novelty of this study lies in its comprehensive integration of sustainability principles and human-centered recovery into the post-disaster planning framework, offering a replicable model for holistic disaster resilience.

KEYWORDS: disasters; human recovery needs; post-disaster needs assessment.

1. Introduction

Disaster rehabilitation is an integrated part of disaster management. Disasters are events that can seriously reduce a country's potential for sustainable development in the long term. They can also cause a country's government to significantly alter socio-economic priorities and programs. Disasters can also cause psychological distress that leads to many further consequences. In the process, high disaster risk areas/countries will receive more attention where necessary actions must be taken before another disaster occurs. Disasters result in loss of human lives and resources. Disaster rehabilitation requires a long period of time, and large resources (Pinkowski, 2008).

Figure 1 illustrates the disaster management cycle, which consists of a series of continuous phases. The cycle includes four main stages: preparedness, response, recovery

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and prevention, which are interconnected in an effort to manage disaster risk holistically. The preparedness phase involves mitigation and warning efforts to reduce threats, followed by the emergency response phase which includes handling the impacts of disasters in the emergency phase. Next, the recovery phase consists of restoration and reconstruction aimed at restoring post-disaster conditions and supporting national development.

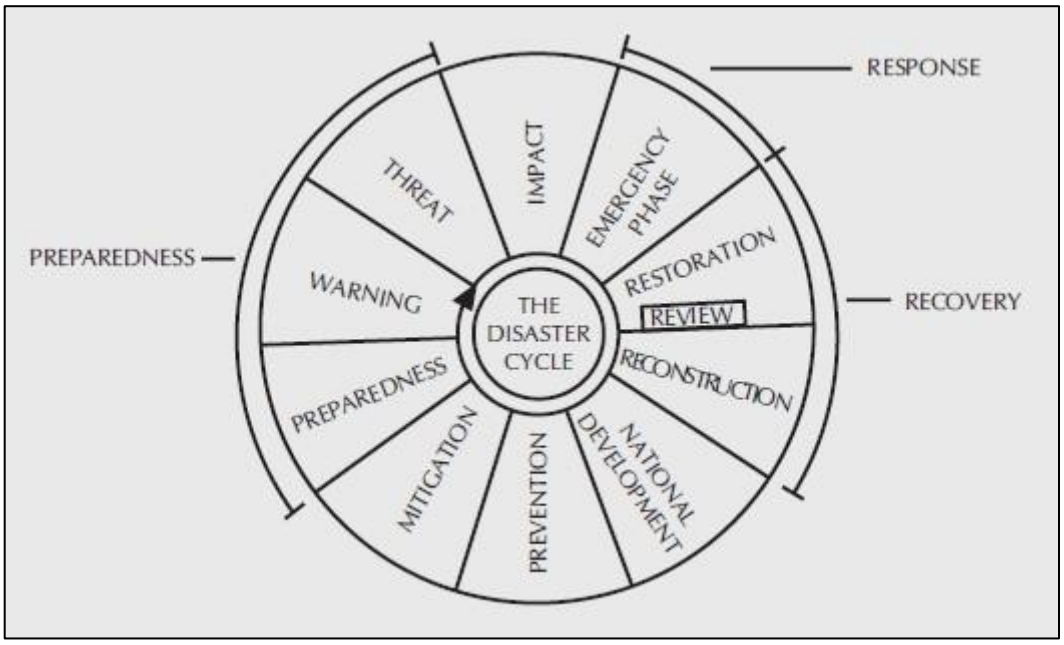

Fig. 1. Disaster management cycle
(Carter, 2008)

The next phase in the disaster management cycle is prevention, which includes mitigation efforts and the development of strategies to reduce the risk of future disasters. The cycle also involves a process of evaluation (review) to ensure continuous improvement in each phase (Carter, 2008). Furthermore, Pinkowski (2008) defines recovery as a process in which communities and countries are assisted to return to normal functioning after a disaster. This process can be lengthy, perhaps taking 5- 10 years or more, and usually includes aspects such as restoration and reconstruction.

The Government of Indonesia defines rehabilitation as the repair and restoration of all aspects of public or community services to an adequate level in the post-disaster area with the main objective of normalizing or running reasonably all aspects of government and community life in the post-disaster area. Meanwhile, reconstruction is defined as the formulation of policies and efforts as well as well- planned, consistent and sustainable concrete steps to permanently rebuild all infrastructure, facilities and institutional systems, both at the government and community levels, with the main target of the growth of economic, socio-cultural activities, the establishment of law and order, and the rise of the role and participation of civil society in all aspects of community life in the post-disaster area (PerKa BNPB no 11 of 2008 concerning Guidelines for Post-Disaster Rehabilitation and Reconstruction, 2008). In short, rehabilitation is a temporary repair, while reconstruction is a permanent development. The implementation of rehabilitation includes physical repair activities and the restoration of non-physical functions. Rehabilitation activities are carried out in disaster-affected areas and other areas that may be used as target areas for rehabilitation activities. Rehabilitation activities are carried out by BNPB if the disaster status is at the national level or on its own initiative BNPB and or ast Java Provincial Disaster Management Agency/*Badan Penanggulangan Bencana Daerah Provinsi Jawa Timur* (BPBD) for regional disaster status. It is also possible for rehabilitation activities to involve many stakeholders and communities.

Based on BNPB Head Regulation No 11/2008 on Guidelines for Post-Disaster Rehabilitation and Reconstruction, the implementation of rehabilitation and reconstruction

covers 10 components, including: (i) environmental restoration in disaster areas, (ii) restoration of public infrastructure and facilities, (iii) provision of assistance for the repair of community homes, (iv) social and psychological recovery, (v) health services, (vi) reconciliation and conflict resolution, (vii) social recovery, (viii) restoration of security and order, (ix) restoration of government functions, (x) restoration of public service functions. Rehabilitation and reconstruction have different characters and objectives, therefore the strategies at the implementation stage also have different characters. The following table summarizes the rehabilitation and reconstruction implementation strategy based on PERKA BNPB No 11/2008.

Table 1. Focus of emergency response program

No	Rehabilitation	Reconstruction
1	Involve and empower community in the implementation of rehabilitation.	Involve community participation,
2	Take into account the characteristics of the disaster, the region, and the culture of the local community. characteristics of the disaster, the region, and the culture of the local community.	Respect local wisdom by considering local social and cultural conditions and government policies. local culture and government policies.
3	Based on actual conditions on the ground, including the level of damage and obstacles.	Encourage capacity building at various levels to produce reconstruction that is more resilient to disasters. disaster.
4	Promote rehabilitation as a community movement by organizing victims and active actors in self-help groups. in self-help groups.	Prioritizing long-term solutions over temporary solutions.
5	Distribute assistance in a timely, appropriate form and amount to encourage comprehensive rehabilitation. Comprehensive	Focus on local sustainable enterprises.
6		Use integrated planning with short-, medium- and long-term priorities.
7		Prioritize local economic recovery by involving many local economic actors.
8		Combine advanced technology with appropriate local appropriate local resources.
9		Using a simple implementation plan imple implementation plan.
10		Provide open access to information on all reconstruction activities for the sake of accountability and transparency.

Table 1 explains the main differences in the implementation strategies for rehabilitation and reconstruction in the post-disaster recovery process, in accordance with the Head of BNPB Regulation No. 11/2008. The rehabilitation phase emphasizes community empowerment, strengthening local characteristics, and addressing actual conditions on the ground by ensuring that assistance is provided in a timely, appropriate and targeted manner. Rehabilitation aims to restore the basic functions of life for affected communities. Meanwhile, the reconstruction phase includes broader community participation, preservation of local wisdom, capacity building, and a focus on long-term sustainable efforts, including strengthening the local economy. Appropriate technology and access to information are also emphasized in this stage to ensure simple and effective implementation in rebuilding. These two phases complement each other as part of a comprehensive post-disaster recovery strategy.

There are 5 main phases in the implementation of Rehabilitation and Reconstruction which include; (i) post-disaster needs assessment; (ii) preparation of rehabilitation and

reconstruction plan; (iii) allocation of resources and funds; (iv) implementation of rehabilitation and reconstruction; and (v) monitoring and evaluation and reporting. Some of these phases have been regulated in several regulations such as BNPB Regulation No. 6/2017 on the Implementation of Rehabilitation and Reconstruction, BNPB Regulation No. 5/2017 on Rehabilitation and Reconstruction Plans and BNPB Head Regulation No. 15/2011 on Post-Disaster Needs Assessment followed by BNPB Head Regulation No. 5/2012. BNPB currently has a standardized disaster damage assessment framework called Post-Disaster Needs Assessment (PDNA), or Post Disaster Need Assessment (PDNA), which has been conducted on all major disasters in Indonesia. This activity is managed by the Deputy 3 for Rehabilitation and Reconstruction at BNPB. Post-Disaster Needs Assessment (PDNA) has a long history, starting in 2005 when the World Bank introduced DALA (Damage & Loss Assessment) to the Aceh Tsunami (December 2004) and Yogyakarta Earthquake (May 2006) through BAPPENAS. Since 2009, after the West Sumatra (Padang) Earthquake, BNPB combined DALA with HRNA (Human Recovery Needs Assessment) introduced by UNDP, to form the current Post-Disaster Needs Assessment (PDNA). While DALA focuses more on asset losses (value/how much), HRNA focuses more on the human needs for recovery (results for policy making & prioritization). Post-Disaster Needs Assessment (PDNA) itself is regulated in the Head of BNPB Regulation No. 15/2011 on Guidelines for Post-Disaster Needs Assessment. In Post-Disaster Needs Assessment (PDNA), DALA is conducted by assessing 5 (five) sectors, namely: 1) Housing, 2) Infrastructure, 3) Economy, 4) Social and 5) Cross Sector. For Damage, all asset losses across the five (5) sectors are estimated and calculated. Losses mostly calculate the cost for cleanup, additional cost for gasoline, loss of income, decrease in production/harvest, etc. For HRNA, the assessment covers 3 (three) aspects, namely: 1) Access disruption, 2) Impaired function, and 3) Increased risk (Japan International Cooperation Agency (JICA) et al., 2019).

2. Methods

This study uses a qualitative descriptive approach that aims to analyze post-disaster rehabilitation and reconstruction strategies in Indonesia based on the national regulatory and policy framework. The main data was obtained through a document study of a number of official regulations, including BNPB Regulation No. 11 of 2008 on Guidelines for Post-Disaster Rehabilitation and Reconstruction, BNPB Regulation No. 6 of 2017, No. 5 of 2017, and No. 15 of 2011, as well as international reports and guidelines such as Post-Disaster Needs Assessment (PDNA).

In addition, a literature analysis of academic publications and technical documents such as Carter's (2008) disaster management framework and Pinkowski's (2008) definition of recovery was used to provide a theoretical perspective to support the study. The data were analyzed using content analysis techniques, namely identifying the main themes related to the role, strategies, and principles of sustainability in the rehabilitation and reconstruction phase. This approach enables researchers to understand how regulations and field practices in Indonesia are systematically integrated into long-term disaster risk management.

3. Results and Discussion

3.1 Sustainable concept in rehabilitation & reconstruction

Sustainable development is defined as a development activity to meet current needs without compromising the ability to meet future needs. Sustainable development has 3 pillars, namely: social, environmental and economic, which must be considered to harmonize the interaction between these pillars (UNISDR, 2009). The idea of sustainability is a form of long-term development that departs from the realization that planet earth has

limited resources. In its development, sustainable development is defined as an effort to fulfill the needs of human life but still within the carrying capacity of the ecosystem.

The 2019 Global Assessment Report (GAR) on Disaster Risk Reduction emphasizes sustainable development based on the principle of disaster risk reduction. The approach to managing risk (current and future), requires an understanding of the systemic and complex nature of risk. Due to its complex nature, risk management cannot be done in isolation. It requires a fundamental redesign of both financing and international development cooperation (UNDP) financing and international development cooperation (UNDRR, 2019). The document lists seven global targets with guidance to reduce the impact of disasters, while addressing the underlying causes of disaster risk, and protecting development gains for current and future generations.

In rehabilitation management, there are three types of disaster rehabilitation, namely: physical, social, and psychological (Pinkowski, 2008). Physical rehabilitation is a very important aspect o f rehabilitation. It includes the reconstruction of physical infrastructure, such as housing, buildings, railways, roads, communication networks, water supply, electricity, and others. Social rehabilitation is also an important part of disaster rehabilitation where vulnerable groups, such as the elderly, orphans, widows, and children, require specialized social support to survive the impact of the disaster. Rehabilitation plans should have a component that takes into account the fact that victims have to undergo a process of readjustment to a new social environment. Another important dimension of disaster rehabilitation is psychological rehabilitation (Pinkowski, 2008).

3.2 Challenges and opportunities

Community Challenges in the post-disaster rehabilitation and reconstruction phase are complex issues that require careful planning and collaboration among stakeholders. One of the main challenges is the uncertain nature of reconstruction. Disaster damage often involves multiple sectors such as housing, infrastructure, economy and social, requiring an integrated approach. In addition, the time needed to start long-term recovery often takes years. When the emergency response period is over, support from government and non-government agencies tends to decline, leaving many affected communities to fend for themselves to recover, both physically and psychosocially (Leitmann, 2007).

Land availability is one of the most significant challenges in the rehabilitation and reconstruction phase, as seen in the post-disaster case in Palu. More than a year after the earthquake and tsunami, the issue of relocating permanent housing remains a major obstacle. Difficulties in finding safe and suitable land are often caused by a lack of coordination between agencies, regulatory barriers and land ownership conflicts. This situation shows the importance of early planning that incorporates risk-based spatial aspects, so that affected areas can quickly find solutions for redevelopment (Prawenti et al., 2023). In addition, research by Prawenti et al. (2023) identified that suboptimal planning and management are often the cause of the slow reconstruction process. Unclear roles and responsibilities between institutions, as well as inflexible regulations, often exacerbate the situation. Regulations that are designed too strictly or are not in accordance with local conditions hinder the implementation of reconstruction programs, making it difficult to achieve recovery goals. This calls for adaptive regulations and stronger cross-sector collaboration to ensure the success of reconstruction programs.

On the other hand, health and safety in reconstruction sites is often an overlooked challenge. Reconstruction processes carried out in environments that are not yet fully stabilized, such as landslide- prone areas or close to danger zones, pose risks to workers and surrounding communities. The mental health of survivors also often receives insufficient attention, even though they face severe stress due to the loss of assets and life-sustaining environments. The provision of health services covering both physical and psychosocial aspects in reconstruction sites should be an integral part of planning.

Funding issues are also a significant challenge in the rehabilitation and reconstruction phase. Often, government funding allocations are insufficient to cover all recovery needs, while assistance from donors or international agencies tends to be short-term. This budget uncertainty can affect the quality and sustainability of rebuilding. Therefore, a more inclusive and sustainable funding strategy is needed, including encouraging private sector involvement in supporting the recovery process. By addressing these challenges in an integrated manner, the rehabilitation and reconstruction phases can be more effective in restoring people's lives after a disaster (Prawenti et al., 2023).

As a country with diverse potential disaster risks and unique geographic and demographic contexts, the Indonesian government receives various supports for capacity building in disaster management. Some of them are USAID-HFI STEADY (Strengthening Disaster Management Capacity and Accompaniment of CSOs in Emergency Response, Coordination, and Advocacy) run by USAID and Humanitarian Forum Indonesia (HFI), which aims to increase the capacity of Civil Society Organizations (CSOs) in disaster response (U.S. Embassy Jakarta, 2023). In addition, the program strengthens collaboration for the construction of disaster-resistant houses of worship. Meanwhile, the Indonesia Disaster Resilience Initiatives Project (IDRIP) funded by the World Bank with a loan of US$160 million helps Indonesia improve disaster resilience through a comprehensive approach (World Bank Indonesia, 2019). The Japan International Cooperation Agency (JICA) also frequently provides technical and financial assistance for training and development of disaster-resistant infrastructure. The Australian Department of Foreign Affairs and Trade (DFAT) supports preparedness training and local capacity building, while the European Union (EU) is involved in technology development and disaster management training. The United Nations Office for Project Services (UNOPS) is also supporting disaster-resistant infrastructure projects to strengthen national capacity. This support reflects global collaboration in helping Indonesia become more resilient to disaster threats.

Indonesia has a great opportunity to improve disaster coordination through leveraging the presence of civil society organizations (CSOs) that are active and established in discussions and advocacy related to disaster issues. CSOs in Indonesia, such as the Indonesian Red Cross (PMI), Humanitarian Forum Indonesia (HFI), and various other local organizations, have extensive networks at the community, national, and international levels. Their existence provides a strong basis to support the government in harmonizing policies, improving communication across sectors, and ensuring inclusiveness in decision-making. The active role of CSOs in policy advocacy and disaster response programs allows for more effective synergy between the government, communities and the private sector. By empowering CSOs as strategic partners, Indonesia can accelerate local capacity building, improve the dissemination of disaster risk-related information, and facilitate the development of more sustainable community-based solutions. In addition, CSOs' expertise in managing resources and building community trust can be key in creating a disaster coordination system that is more adaptive and responsive to the needs on the ground.

The presence of civil society organizations (CSOs) can also be strengthened through the government's regulatory framework related to disaster coordination, including (Decree No. 308 of 2024 on Disaster Management Cluster, 2024). This cluster system divides responsibilities in various sectors such as logistics, health, evacuation and child protection, involving the government, international organizations and CSOs. The clusters are designed to facilitate more organized cross-sector coordination during the emergency response, ensuring that the needs of affected communities are met quickly and effectively. CSOs have a strategic role in supporting these clusters through resource mobilization and direct access to communities.

With this regulatory support, CSOs are not only complementary, but also strategic partners that contribute to the effectiveness of disaster response. This role allows CSOs to collaborate closely with the National Disaster Management Agency (BNPB) and local governments in supporting disaster policy implementation. This cluster-based collaboration clarifies the roles and responsibilities of each party, reduces overlapping efforts, and improves the overall efficiency of the disaster management system. The

integration of CSOs into this regulatory framework creates stronger synergies, ensuring a more inclusive, coordinated and adaptive disaster response to needs on the ground.

3.3 Case study

On July 29, 2018 at 05:47:39 am and August 5, 2018 at 18:46:35 pm there were earthquakes with considerable shaking with magnitudes of 6.4 and 7.0 respectively. In the series of earthquakes that occurred with the epicenter located on Lombok Island, as many as 564 people died, 1,584 people were injured, 445,343 people were displaced. Based on BNPB data, the majority of the death and injury victims were in North Lombok and West Lombok regencies. The number of deaths in North Lombok reached 467 people and 829 people were injured, while in West Lombok Regency the number of deaths was 44 people and 399 people were injured (PUPR, 2019).

Rehabilitation and reconstruction in Lombok after the disaster was carried out by applying sustainability principles that integrate environmental, social and economic aspects. In this context, several sustainable practices have been implemented to ensure that this process not only improves physical conditions, but also supports ecological sustainability and improved community welfare.

From the environmental aspect, the use of eco-friendly materials such as bamboo and local timber is one of the sustainable practices implemented in Lombok. In addition, renewable energy such as solar power is also used to support environmental restoration. These initiatives aim to reduce the carbon footprint and ensure that natural resources are preserved (North Lombok District Government, North Lombok District Government, 2018) are maintained (Pemerintah Kabupaten Lombok Utara, 2021). From a social aspect, various activities initiated by BNPB act as a catalyst in accelerating the recovery of the social situation in the community. The program is designed to encourage the activation of social capital in community groups, creating solidarity that supports long-term recovery. A significant role was also played by Tuan Guru, a religious leader with great influence in Lombok. Through various religious activities, Tuan Guru contributes to spreading disaster mitigation knowledge, raising public awareness of the dangers of earthquakes, and providing basic information on steps to take when a disaster occurs. Moreover, with their influence, guru masters are able to calm the community and strengthen the community's psychosocial resilience during and after disasters (Mardialina & Munir, 2021). On the economic side, sustainable tourism and local business development are an important part of the rehabilitation strategy in Lombok. Tourism destinations such as the Rinjani Geopark not only attract tourists, but also provide employment for local communities. In addition, eco-friendly accommodations that apply energy-saving technologies help reduce operational costs and promote sustainability.

The strategies used in rehabilitation and reconstruction in Lombok have shown quite positive results. The use of green technology, community empowerment and local economic development have improved the quality of life and reduced environmental impacts. However, there are still challenges such as limited resources and coordination between related parties that require further attention. A sustainable approach brings many benefits, including increased disaster resilience, reduced carbon emissions, and improved local economic welfare. This initiative will help Lombok Island to increase the use of clean energy while reducing the impact of carbon emissions. With proper integration of environmental, social and economic aspects, the rehabilitation and reconstruction process in Lombok can be effective and sustainable. Collaboration between the government, community, and private sector is essential to ensure the success of this program and achieve better long-term goals.

3.4 Strategies and recommendations

The integration of sustainability principles in disaster rehabilitation and reconstruction programs needs to be continuously improved to ensure the long-term

impact of the program. Some strategies that can be done include: (i) Implementation of risk-based and environmental approaches. To ensure sustainability, rehabilitation and reconstruction programs must use a risk-based approach by considering environmental aspects. This strategy includes disaster risk-based spatial planning, the use of environmentally friendly building materials, and the adoption of energy-efficient technologies. The program also needs to incorporate climate change mitigation into every stage of planning so that the infrastructure built is able to deal with potential risks in the future (Badan Penanggulangan Bencana Daerah Provinsi Jawa Timur, 2021). (ii) Strengthen collaboration among stakeholders. The success of sustainable rehabilitation and reconstruction programs requires synergy between the government, communities and the private sector. The government should be the main facilitator in creating regulations that support sustainability, such as incentives for the use of environmentally friendly materials and resilient infrastructure development. Communities need to be actively involved through local empowerment and education on the importance of sustainability in reconstruction. Meanwhile, the private sector can play a role in providing innovative technologies, alternative funding and skills training for affected communities. (iii) Enhancing local capacity and education. Empowering local communities is key to ensuring sustainability in the recovery phase. The government and relevant agencies should provide training and education for affected communities to improve their skills, both in sustainable construction work and environmental management (B Badan Penanggulangan Bencana Daerah Provinsi Jawa Timur, 2021). (iv) Promote inclusive and sustainable funding. Sustainable financing requires cross-sector collaboration. The government can adopt blended funding schemes, such as public-private partnerships (PPPs), and encourage long-term investment from the private sector. In addition, the use of innovative financing mechanisms, such as green bonds, can ensure that available funds are used for projects that support sustainability. International donors should also be directed to support initiatives that directly contribute to sustainable development (Jibiki et al., 2020). (v) Establish a transparent monitoring and evaluation system To ensure sustainability, a transparent and accountable monitoring and evaluation system is needed. The government and relevant agencies should set clear sustainability indicators to measure the effectiveness of rehabilitation and reconstruction programs. This system should also involve the community as an independent watchdog to ensure that the principles of sustainability are actually applied in the field. With this mechanism, all stakeholders can work together to achieve long-term sustainable goals (BPBD Prov East Java, 2021).

4. Conclusions

Sustainable Rehabilitation and Reconstruction programs need to be a priority in the development of disaster management strategies in Indonesia. To achieve this goal, collaboration between various parties is essential, including: government, community, private sector, academia and media through a pentahelix approach. By working together, we can strengthen community and national resilience to increasing disaster risks. This approach also integrates sustainability principles in every stage of emergency response, from mitigation to rehabilitation, focusing on sustainable practices that balance social, economic and environmental factors.

This process will not happen in a short time because it requires systematic interventions and involves various sectors. It requires long-term commitment and strong support from all parties to ensure that sustainability principles are applied thoroughly in rehabilitation and reconstruction programs. Only in this way, we can build better capacity and create a more resilient system to face future disaster challenges.

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